FINAL CLOSEOUT REPORT
FOR IHSS GROUP 800-4

UBC 886 - Building 886

IHSS 164.2 - Radioactive Site #2, Building 886 Spill

IHSS 000-121 - Building 828 Sump, Tanks, and OPWL

February 2003

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ACRONYMS AND ABBREVIATIONS

AL	action level
Am	americium
AOC	Area of Concern
AR	Administrative Record
CAD/ROD	Corrective Action Decision/Record of Decision
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
cpm	counts per minute
CHWA	Colorado Hazardous Act
D&D	deactivation and decommissioning
DOE	U.S. Department of Energy
dpm	disintegrations per minute
DQA	Data Quality Assessment
DQO	data quality objective
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol
GPS	global positioning system
HAER	Historic American Engineering Record
HEUN	highly enriched uranium
HPGe	high-purity germanium
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
ICP	inductively coupled plasma
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
K-H	Kaiser-Hill Company L.L.C.
LCS	laboratory control sample
LLW	low-level waste
MDA	minimum detectable activity
MDL	method detection limit
mg/kg	milligrams per kilograms
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable

ND	not detected
NLR	No Longer Representative
OPWL	Original Process Waste Lines
OU	Operable Unit
PAC	Potential Area of Concern
pCi/g	picocuries per gram
PCOC	potential contaminant of
Pu	plutonium
QC	quality control
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RISS	Remediation, Industrial D&D, & Site Services
RPD	relative percent difference
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
SOR	sum of ratios
SVOC	semi-volatile organic compound
U	uranium
UBC	Under Building Contamination
UCL	upper confidence limit
ug/kg	micrograms per kilogram
VOC	volatile organic compound
V&V	verification and validation

EXECUTIVE SUMMARY

This Closeout Report summarizes accelerated action activities conducted at Individual Hazardous Substance Site (IHSS) Group 800-4, which consists of UBC 886 - Critical Mass Laboratory, IHSS 164.2 - Radioactive Site #2, 800 Area - Building 886 Spill, and IHSS 000-121 - Building 828 Sump, Tanks (21, 22, and 27) and Original Process Waste Lines (OPWL) (partial IHSS only) that are located at the Rocky Flats Environmental Technology Site (RFETS). Activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan, (SAP) (IASAP), IASAP Addendum #IA-02-03, and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP). Notification of the planned characterization and removal activities was provided in ER RSOP Notification #02-03.

All removal activities were completed by the Remediation, Individual Deactivation & Decommissioning (D&D) Site Services (RISS) organization between April 1st and April 23, 2002. Removal activities included the removal of the Building 866 concrete slab, Building 828 Pit, and associated Original Process Waste Lines (OPWL).

The action also involved soil characterization. Soil sampling activities were conducted between March 14th and June 13, 2002. Characterization analytical results indicate that arsenic, beryllium, 1,2-dichloroethane, and methylene chloride are above RFCA Tier II action levels (ALs) in three locations. Preaccelerated action sample results identified SVOCs and VOCs in subsurface soil above RFCA Tier II ALs. However, all analytical results are below the proposed Wildlife Refuge Worker (WRW) ALs.

Removal activities were consistent with and contributed to the ER RSOP overall long-term remedial action objectives (RAOs) for RFETS soil. Removal of the concrete slabs contributed to the protection of human health and the environment, because potential sources of contamination were removed or isolated. These actions also minimized the need for long-term maintenance and institutional or engineering controls because potential sources of contamination were removed or isolated. In addition, best management practices (BMPs) were used during the accelerated action to prevent the spread of contamination during the accelerated action (for example, erosion and dust controls). Air monitoring data during the accelerated action did not indicate any exceedances.

No ISSS Group-specific, near-term management techniques are required because of environmental conditions. Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process. Fencing and signs restricting access will be posted to minimize disturbance to newly revegetated areas. Site access and security controls and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls.

The presence of radionuclides, metals, volatile organic compounds (VOCs), semivolatile (SVOCs), inorganics, and polychlorinated biphynels (PCBs) in soils will be analyzed in the Site-Wide Comprehensive Risk Assessment, which is part of the Resource Conservation Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility Study (CMS/FS) that will be conducted for the Site. The need for and extent of any, more general, long-term stewardship activities will also be analyzed in the RFI/RI and CMS/FS and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for RFETS will ultimately be contained in the Corrective Action Decision/Record of Decision (CAD/ROD), in

any post-closure Colorado Hazardous Waste Act (CHWA) permit that may be required, and in any post-RFCA agreement.

No specific long-term stewardship activities are recommended for IHSS Group 800-4 beyond the generally applicable Site requirements that may be imposed on this area in the future, which depend on the final remedy selected. Institutional controls that will be used as appropriate for this area include prohibitions on construction of buildings in the IA, restrictions on excavation or other soil disturbance, or prohibitions on groundwater pumping in the area of IHSS Group 800-4.

No specific engineering controls or environmental monitoring are anticipated as a result of the conditions remaining at IHSS Group 800-4.

This Closeout Report and associated documentation will be retained as part of the RFETS Administrative Record (AR). The specific long-term stewardship recommendations will also be summarized in the Rocky Flats Long-Term Stewardship Strategy.

Approval of this Closeout Report constitutes regulatory agency concurrence that this IHSS Group is a No Further Action (NFA). This information and NFA determination will be documented in the FY03 Historical Release Report (HRR).

1.0 INTRODUCTION

This Closeout Report summarizes the characterization and accelerated action activities conducted at Individual Hazardous Substance Site (IHSS) Group 800-4 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden Colorado. IHSS Group 800-4 consists of one Under Building Contamination (UBC) site and two IHSSs:

- UBC 886, Critical Mass Laboratory;
- IHSS 164.2, Radioactive Site #2, 800 Area, Building 886 Spill; and
- IHSS 000-121, Building 828 Sump, Tanks (21, 22, and 27) and Original Process Waste Lines (OPWL) (partial IHSS only).

The location of IHSS Group 800-4 is shown on Figure 1, and the UBC site and IHSSs are shown on Figure 2.

Characterization and accelerated action activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (DOE 2001a), IASAP Addendum #IA-02-03 (DOE 2001b), and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002a). Notification of the planned activities was provided in ER RSOP Notification #02-03 (DOE 2002b), which was approved by the Colorado Department of Public Health and Environment (CDPHE) on March 26, 2002 (CDPHE 2002).

This report contains the information necessary to demonstrate attainment of cleanup objectives and final closure of IHSS Group 800-4, including:

- Site Characterization Information
  - Description of historical information for the UBC and IHSSs, including pre-accelerated action activities
  - Description of site characterization activities
  - Site characterization data, including data tables and maps
- Site Accelerated Action Information
  - Description of the accelerated action, including the rationale for the action and map of the target remediation area (if applicable)
  - Map of the actual remediation area, including bounds of the excavation, and dates and durations of specific remedial activities (if applicable)
  - Photographs documenting site characterization and accelerated action activities
- Confirmation sampling data, including data table and sampling location map, as well as a comparison of the confirmation data and applicable cleanup goals (if applicable)

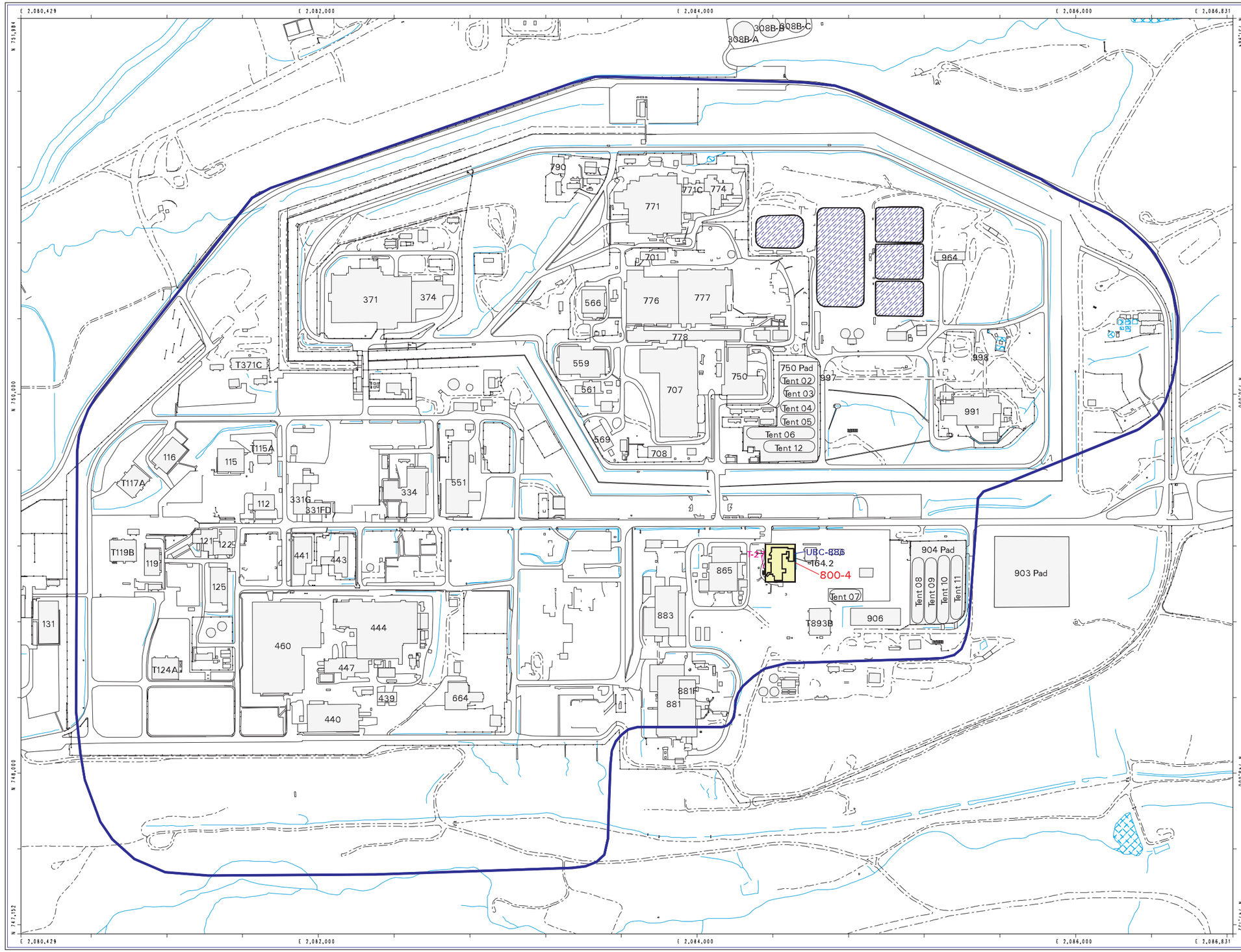

Figure 1

IA Group Location Map

EXPLANATION

IHSS Groupings

800-4

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads
- Industrial Area Operable Unit Boundary

DATA SOURCE BASE FEATURES:
PACs
Historical Release Report (HRR)
2nd Annual Update
Sept. 30, 1997
Individual Hazardous Substance Sites (IHSS)
DOE, 1992, HRR Report and Subsequent Updates.
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1/95

Scale = 1 : 6240
1 inch represents 520 feet

200 0 400 800ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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

GIS Dept. 303-966-7707

Prepared by:
DynCorp
THE ART OF TECHNOLOGY

Prepared for:
KAISER•HILL COMPANY

August 09, 2002

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Figure 2. IHSS Group 800-4(800-164.2 and UBC 886)

- Description of any deviations from the ER RSOP (if applicable)
- Description of near-term stewardship actions and long-term stewardship recommendations
- Description of wastes generated
- Description of site condition upon completion of accelerated action activities, including a map of residual contamination above background mean plus two standard deviations (background), method detection limits (MDLs), and/or Tier II action levels (ALs), if any
- Description of site reclamation activities
- Table of No Longer Representative (NLR) locations that have been remediated (if applicable).
- Data quality assessment (DQA), including comparison of confirmation data with project data quality objectives (DQOs)

2.0 SITE CHARACTERIZATION

Characterization information for IHSS Group 800-4 includes historical knowledge and analytical data. Historical information for the UBC and IHSSs is presented below in Sections 2.1 through 2.3. Analytical data are presented in Section 2.4.

2.1 UBC 886, Critical Mass Laboratory

Information on Building 886, Critical Mass Laboratory, is from the Historic American Engineering Record (HAER) (DOE 1998). Building 886 was commissioned in 1965 to house the Nuclear Safety Group, which performed criticality experiments on a variety of fissile materials to establish criticality limits and ensure safe handling and processing during Site operations.

Approximately 1,700 critical mass experiments were conducted in Building 886 between 1965 and 1987. Highly enriched uranium (HEUN) was introduced into the building in the summer of 1965, and the first experiments were performed in September 1965. Subsequently, the building was used to perform experiments on enriched uranium metal and solutions, plutonium metal, and low-enriched uranium oxide. After 1983, experiments were conducted primarily with uranyl nitrate solutions.

Typical critical mass experiments conducted in Building 886 involved removing the fissile material from storage, placing it in one of the reactivity addition devices, operating the device remotely until criticality was achieved, measuring the slightly supercritical parameters, reversing the operation of the device to slightly subcritical, and returning the fissile material to storage. The experiments were conducted in a controlled manner and generally involved power levels of no more than 10 milliwatts for no more than one hour. Approximately one-half of the experiments conducted in Building 886 actually achieved criticality.

Other experiments were performed to validate safety parameters for the storage of fissionable solutions in raschig ring tanks, resulting in the design of two substitute storage tank configurations: the annular tank and point tube tank. These designs allowed for more economical solution testing with no decrease in safety. Experiments were also conducted to validate the cross-sections and usefulness of materials used at the Site.

The work performed in Building 886 supported the Site's nuclear weapons production activities and assisted the U.S. Nuclear Regulatory Commission in setting industry safety standards. The measurements were essential to validate computer models that were, in turn, used to establish nuclear criticality safety operating limits at U.S. Department of Energy (DOE) facilities.

Building 886 was decommissioned in accordance with the Interim Measure/Interim Remedial Action (IM/IRA) Action Plan for the Building 886 Cluster (RMRS 1998).

2.2 IHSS 164.2, Radioactive Site #2, 800 Area, Building 886 Spill

The area immediately surrounding the building has been a source of concern for possible soil contamination. The summary of events provided in the HAER indicates a contamination release on June 9, 1969; however, no details are given in that report. In addition, on September 26, 1989, a 500-gallon stainless steel portable tank was found leaking a colorless liquid from its drain valve onto the concrete, creating a wet spot approximately five inches in diameter. A radiation monitoring survey of the area resulted in direct counts of 650 counts per minute (cpm), and 12 to 24 disintegrations per minute (dpm) on a smear. This was considered low-level contamination. At that time, the valves were tightened, decontaminated and bagged, and the tank was shipped to the size reduction facility in Building 776. The concrete was decontaminated and sealed with acrylic paint. Soil samples indicated contamination from uranium.

2.3 IHSS 000-121, Building 828 Process Waste Pit - Sump, Tanks (21, 22, 27) and Original Process Waste Lines (OPWL)

Building 886 contains several OPWL components, including Building 828, a below-grade concrete vault containing a sump, process waste tanks, and associated process waste lines. Tank T-21 was a 250-gallon floor sump located in the southeast corner of the vault. Tank T-22 consisted of two, 250-gallon stainless steel tanks located on the floor of the vault. Tank T-27 was a 500-gallon portable tank that was located on a concrete pad north of Building 828. This tank was used to transfer process waste from Tanks T-21 and T-22 to the Site waste treatment facility.

Tanks T-21 and T-22 were installed in 1963 and abandoned in 1978. It is unknown when Tank T-27 was installed. Tank T-22 held waste from the laboratories in Building 886, including radionuclides, laboratory soaps, janitorial cleaning fluids, and possible nitrates. Tank T-21 captured overflow from T-22.

Historical reports indicate Tanks T-21, T-22, and T-27 may have been associated with cesium-137 handling. No known releases at this location were identified in these reports. High purity germanium (HPGe) surveys conducted during the Operable Unit (OU) 9 Phase I Remedial Investigation/Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI/RI) (DOE 1992) indicated radium-226, thorium-232, uranium-235, and uranium-238 were above background. Two sodium iodide surveys indicated radionuclide activity above background

directly west of the tanks on the concrete driveway, and at the northeast corner of Building 828. Activities ranged from 1,000 to 2,200 cpm.

Tank T-27 was decontaminated, removed, and transported to the Building 776 size reduction facility in July 1989 after a state employee noted a wet area, approximately 4 to 5 inches in diameter, under the bottom drain valve of the tank. Tanks T-21 and T-22 were removed with Building 828 and the associated OPWL in accordance with the IM/IRA Action Plan for the Building 886 Cluster (RMRS 1998).

2.4 Analytical Data

As described in IASAP Addendum #IA-02-03 (DOE 2001b) potential contaminants of concern (PCOCs) at IHSS Group 800-4 were determined based on data collected during characterization of UBC 886, as summarized in the Final Data Summary Report for the Characterization of UBCs 123 and 886 (DOE 2001c), and data collected during previous studies (DOE 2000a, DOE 2001c). These pre-accelerated action data, greater than background or the MDLs, are shown on Figures 3 and 4.

Results of previous sampling and analysis of surface soil at IHSS Group 800-4 indicate that radionuclides and metals were detected at concentrations greater than background, and semivolatile organic compounds (SVOCs) were detected in surface soil at concentrations greater than MDLs. SVOCs and volatile organic compounds (VOCs) were detected in subsurface soil at concentrations greater than RFCA Tier II ALs.

The new characterization sampling locations proposed in IASAP Addendum #IA-02-03 (DOE 2001b) are shown on Figure 5. The actual characterization sampling locations are shown on Figure 6. The differences between the planned and actual sampling locations are summarized in Table 1.

Table 2 details the characterization sampling specifications. The characterization data are summarized by location in Table 3, and by analyte in Table 4. As shown on Figures 7a and 7b, background exceedances and/or detections of organics greater than the MDLs occur at several locations within the IHSS Group; however, all are below Tier I ALs. In addition, all analytical results are below the proposed RFCA Wildlife Refuge Worker (WRW) ALs. A comparison of the analytical results to the proposed WRW ALs is shown in Appendix D.

Sum of ratio (SOR) calculations were based on the following contaminants of concern (COCs):

- Radionuclides (americium-241, plutonium-239/240), uranium-235),
- Metals (aluminum, arsenic, barium, beryllium, cadmium, calcium, cobalt, copper, lead, lithium, mercury, strontium, thallium, and zinc),
- Inorganics (nitrate and nitrite), and
- Organics (VOCs and SVOCs).

Characterization sample SORs are listed in Table 5 and depicted in Figures 8a through 8d. The Area of Concern (AOC) is shown in Figure 9. Characterization sampling results indicate that all contaminant concentrations are less than RFCA Tier I ALs. Tier II SORs for nonradionuclides exceed the threshold value of 1 at 10 locations in surface soils and 15 locations in subsurface

soils. The extent and magnitude of Tier II nonradionuclide exceedances are shown in Figures 8b and 8d. The compounds primarily contributing to the Tier II SOR exceedances are arsenic and beryllium. Individual compounds that exceed Tier II ALs include arsenic (at CI38-0022), beryllium (at CI38-0015), 1,2-dichloroethane (at CI38-0022), and methylene chloride (at CI38-0002). These exceedances occur only at three locations rather than the 15 locations based on the more conservative SOR approach. The SOR calculations are conservative considering that arsenic and beryllium values are less than background at the majority of the sampling locations. The complete dataset is provided on a compact disc in Appendix A.

Because there are Tier II SOR exceedances in the characterization samples, these data are further evaluated by calculating the 95% upper confidence limit (UCL) of each COC across the AOC. The SOR approach is then re-applied using the 95% UCL value to determine if remediation is necessary.

SOR values and 95% UCL calculations are provided in Tables 6 and 7 for subsurface and surface soil, respectively. As shown in Table 6, the SOR for subsurface soil across the AOC is greater than 1. However, none of the 95% UCL values exceeds the corresponding Tier II AL. Further, the majority of the metal UCLs are less than background. The SOR values were therefore re-calculated to include only those compounds with 95% UCL values greater than background. The 95% UCL for all detected organic compounds was also retained in the SOR calculations. Based on these parameters, the revised SOR value for subsurface soil is less than the threshold value of 1. Therefore, no further action is warranted for subsurface soil.

Table 7 summarizes the 95% UCL and SOR calculations for surface soil. The uncensored Tier II SOR exceeds 1. However, the primary drivers are arsenic and beryllium. The arsenic and beryllium concentrations are likely contributing to false positives because the 95% UCL for both of these compounds is less than background. Omitting arsenic, beryllium, and other metals with 95% UCL values that are less than background from the SOR calculations results in a recalculated SOR value of zero. Similar to subsurface soil, no further action is required for surface soil.

Figure 3. Existing Sample Results Above Detection Limits or Background Levels at IHSS Group 800-4 (800-164.2)

Figure 4. Existing Sampling Results Above Detection Limits or Background Collected in April 2001 at IHSS Group 800-4

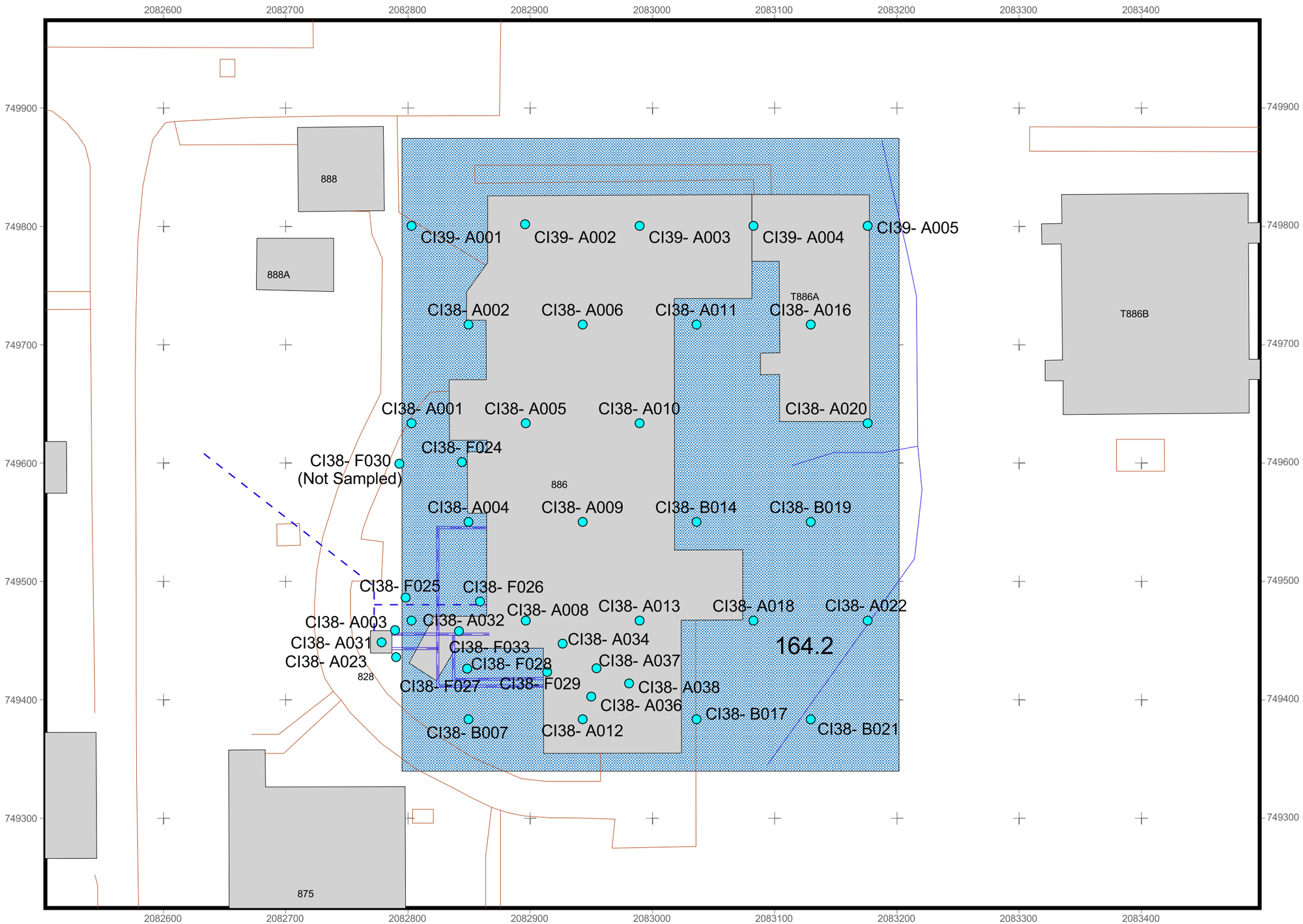

Figure 5

IHSS Group 800-4
Planned Characterization
Sampling Locations

Key

- Planned Sampling Locations
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale 1:500

20 0 20 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared by:

KAISER•HILL COMPANY

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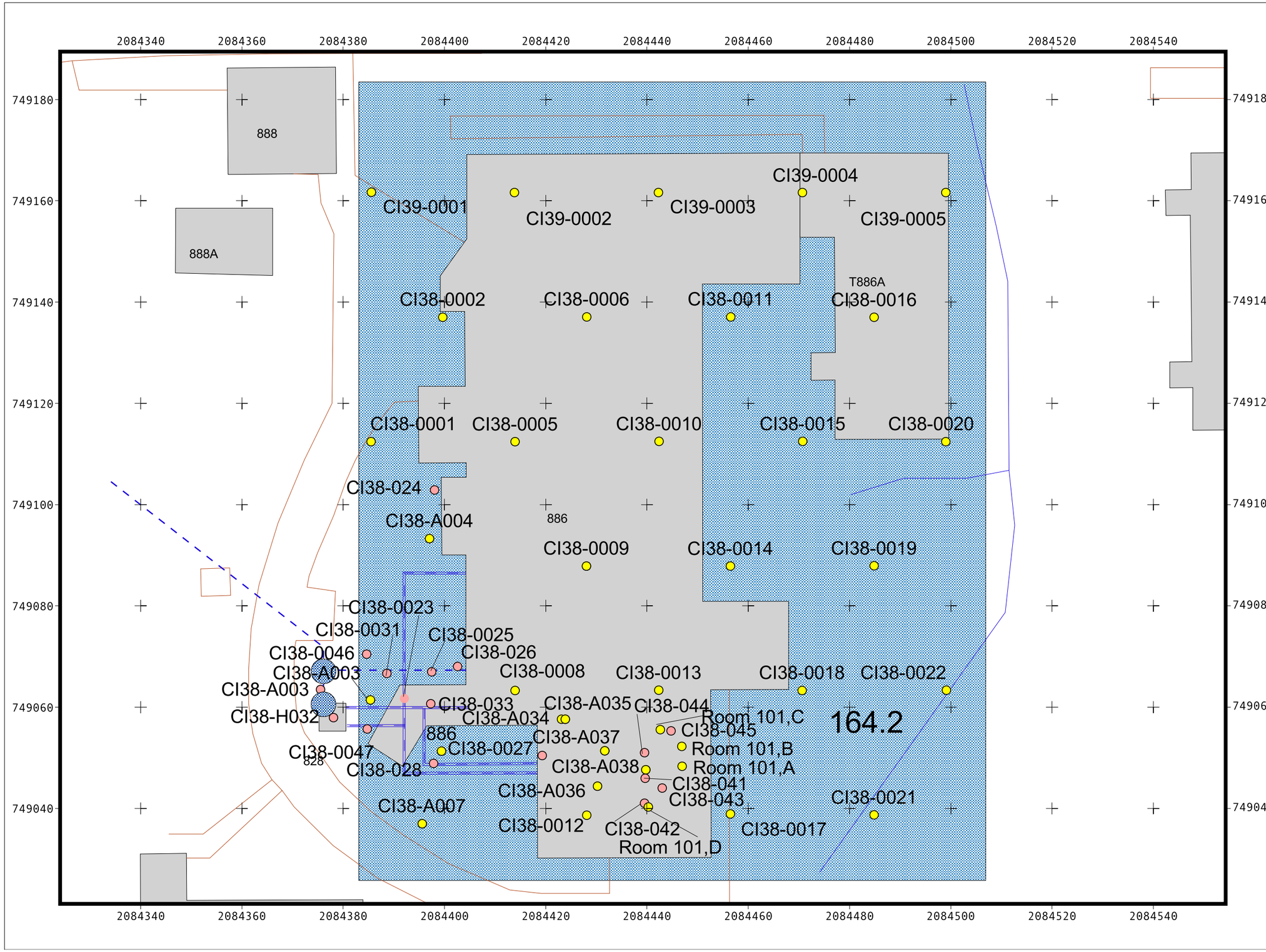

Figure 6

IHSS Group 800-4
Actual Characterization Sampling Locations

Key

- Characterization Sampling Locations
- Characterization Samples Collected Beneath OPWL and Slab
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale 1:500

20 0 20 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

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Table 1. Differences in Planned and Actual Characterization Sampling Locations

IHSS/PAC/ UBC Site	Sampling Location	Medium	Planned Northing	Planned Easting	Actual Northing	Actual Easting	Explanation
UBC 886	Room 101A	Surface Soil	NA	NA	2084442	749037.5	Additional surface soil sample collected from eastern portion of Room 101 (see Figure 10), at a former trench location and at intersections of saw cuts through the concrete floor slab.
UBC 886	Room 101B	Surface Soil	NA	NA	2084442	749042.5	Additional surface soil sample collected from eastern portion of Room 101 (see Figure 10 for location of Room 101), at a former trench location and at intersections of saw cuts through the concrete floor slab.
UBC 886	Room 101C	Surface Soil	NA	NA	2084436	749046.8	Additional surface soil sample collected from eastern portion of Room 101 (see Figure 10 for the location of Room 101), at a former trench location and at intersections of saw cuts through the concrete floor slab.
UBC 886	Room 101D	Surface Soil	NA	NA	2084433	749027.4	Additional surface soil sample collected from eastern portion of Room 101 (see Figure 10 for the location of Room 101), at a former trench location and at intersections of saw cuts through the concrete floor slab.
000-121	CI38-0023	Subsurface Soil	2084359.12	749044.96	2084372	749054.4	Sample relocated to position east of B828 Pit and beneath OPWL, consistent with actual layout of the line.
000-121	CI38-0025	Subsurface Soil	2084362.06	749063.79	2084379	749061.2	Sample relocated too a position east of B828 Pit and beneath OPWL, consistent with actual layout of the line.
000-121	CI38-0026	Subsurface Soil	2084385.57	749062.59	2084386	749062.6	Sample relocated in the field west of planned location due to access limitations; sampled from a re-excavated trench from which OPWL had been removed and backfilled.
000-121	CI38-0028	Subsurface Soil	2084381.50	749041.33	2084380	749038.2	Depth of sample differed from planned interval, consistent with actual depth of OPWL.
000-121	CI38-0029	Subsurface Soil	2084406.83	749040.29	2084407	749040.2	Sample relocated in the field northwest of planned location to obtain a biased sample from OPWL.
000-121	CI38-0030	Subsurface Soil	2084360.16	749106.15	NA	NA	Sample not taken; associated OPWL terminated well before this sample location.
000-121	CI38-0031	Subsurface Soil	2084358.76	749053.52	2084368	749060.8	Sample relocated to position east of B828 Pit and beneath OPWL, consistent with actual layout of the line.

Table 1. Differences in Planned and Actual Characterization Sampling Locations

IHSS/PAC/ UBC Site	Sampling Location	Medium	Planned Northing	Planned Easting	Actual Northing	Actual Easting	Explanation
000-121	CI38-H032	Subsurface Soil	2084354.52	749049.72	2084355	749049.7	One sample collected 2.0 to 2.5 feet beneath top of concrete floor of B828 Pit. The soil samples were saturated with water because the water table was at the base of the Pit at the time of sampling. VOCs were added to the Addendum-specified analytical parameters of radionuclides, nitrates, nitrites, and metals.
000-121	CI38-0033	Subsurface Soil	2084378.90	749053.17	2084379	749053.2	Depth of sample differed from planned interval, consistent with actual depth of OPWL.
000-121	CI38-0046	Subsurface Soil	NA	NA	2084363	749065.7	Additional subsurface soil samples collected following removal of B828 Pit.
000-121	CI38-0047	Subsurface Soil	NA	NA	2084363	749046.9	Additional subsurface soil samples collected following removal of B828 Pit.
000-121	CI38-0048	Subsurface Soil	NA	NA	2084351	749056.8	Additional subsurface soil samples collected following removal of B828 Pit.
Foundation Drain	CI38-0027	Subsurface Soil	2084381.50	749041.35	2084382	749041.3	Depth of sample differed from planned interval, consistent with actual depth of OPWL.
Concrete Spill	CI38-041	Surface Soil	NA	NA	2084433	749034.5	Additional surface soil samples collected from site where contaminated concrete was spilled onto surface soil during slab removal. Contaminated concrete and soil were removed as part of D&D activities.
Concrete Spill	CI38-042	Surface Soil	NA	NA	2084432	749028.3	Additional surface soil samples collected from site where contaminated concrete was spilled onto surface soil during slab removal. Contaminated concrete and soil were removed as part of D&D activities.
Concrete Spill	CI38-043	Surface Soil	NA	NA	2084437	749032.1	Additional surface soil samples collected from site where contaminated concrete was spilled onto surface soil during slab removal. Contaminated concrete and soil were removed as part of D&D activities.
Concrete Spill	CI38-044	Surface Soil	NA	NA	2084432	749041	Additional surface soil samples collected from site where contaminated concrete was spilled onto surface soil during slab removal. Contaminated concrete and soil were removed as part of D&D activities.

Table 1. Differences in Planned and Actual Characterization Sampling Locations

IHSS/PAC/ UBC Site	Sampling Location	Medium	Planned Northing	Planned Easting	Actual Northing	Actual Easting	Explanation
Concrete Spill	CI38-045	Surface Soil	NA	NA	2084439	749046.4	Additional surface soil samples collected from site where contaminated concrete was spilled onto surface soil during slab removal. Contaminated concrete and soil were removed as part of D&D activities.

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
800-164.2	CI38-0001	2084364	749118.9	Subsurface Soil	0.5 - 1	Metals	Total metals by inductively coupled plasma (ICP)
						Radionuclides	Gamma spectroscopy
					1 - 3	Metals	Total metals by ICP 6200
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
						SVOCs	SW-846 8270
UBC 886	CI38-0002	2084382	749150	Surface Soil	0 - 0.5	Metals	Total metals by ICP 6200
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Metals	Total metals by ICP 6200
						Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
800-164.2	CI38-A003	2084364	749054.1	Surface Soil	0 - 0.5	Metals	Total metals by ICP 6200
						Radionuclides	Gamma spectroscopy
800-164.2	CI38-B003	2084364	749054.1	Subsurface Soil	0.5 - 1.2	Metals	Total metals by ICP 6200
						Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
800-164.2	CI38-A004	2084379	749094.6	Surface Soil	0 - 0.5	Metals	Total metals by ICP 6200
						Radionuclides	Gamma spectroscopy
800-164.2	CI38-B004	2084379	749094.6	Subsurface Soil	0.5 - 2.5	VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
UBC 886	CI38-0005	2084400	749118.8	Subsurface Soil	0.5 - 1	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
					1 - 3	VOCs	SW-846 8260

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
UBC 886	CI38-0006	2084418	749150.1	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
				Subsurface Soil	0.5 - 2.5	Radionuclides	Isotopic Am, Pu, U
						Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
						Metals	Total metals by ICP 6200
800-164.2	CI38-A007	2084377	749023.2	Surface Soil	0 - 0.5	Metals	Total metals by ICP 6200
						Radionuclides	Gamma spectroscopy
800-164.2	CI38-B007	2084377	749023.2	Subsurface Soil	0.5 - 0.9	Metals	Total metals by ICP 6200
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
UBC 886	CI38-0008	2084400	749056.5	Subsurface Soil	0.5 - 1	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
					1 - 3	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
						VOCs	SW-846 8260
UBC 886	CI38-0009	2084418	749087.7	Subsurface Soil	1 - 3	Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
						Metals	ICP 6200
UBC 886	CI38-0010	2084436	749118.9	Subsurface Soil	0.5 - 1	Metals	ICP 6200
						Radionuclides	Gamma spectroscopy
					1 - 3	VOCs	SW-846 8260
						Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
800-164.2	CI38-0011	2084454	749150.1	Surface Soil	0 - 0.5	Metals	ICP 6200
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Metals	Total metals by ICP 6200
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
UBC 886	CI38-0012	2084418	749025.3	Subsurface Soil	2 - 2.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
						VOCs	SW-846 8260
						Radionuclides	Isotopic Am, Pu, U
				Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
UBC 886	CI38-0013	2084436	749056.6	Subsurface Soil	2 - 2.5	Metals	Total metals by CP 6200
						Radionuclides	Gamma spectroscopy
					2.5 - 4.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP 6200
						SVOCs	SW-846 8270
						VOCs	SW-846 8260
					6 - 8	VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
						SVOCs	SW-846 8270
						Metals	Total metals by ICP
800-164.2	CI38-0014	2084454	749087.7	Subsurface Soil	0.5 - 1	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
					1-3	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						SVOCs	SW-846 8270
						VOCs	SW-846 8260
800-164.2	CI38-0015	2084472	749118.9		6-8	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						SVOCs	SW-846 8270
						VOCs	SW-846 8260
				Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						VOCs	SW-846 8260

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
				Subsurface Soil	0.5 - 2.5	Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
						Metals	Total metals by ICP
UBC 886	CI38-0016	2084490	749150	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	05. – 2.5	Metals	Total metals by ICP
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
800-164.2	CI38-0017	2084454	749025.6	Subsurface Soil	2 - 2.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
					2.5 - 4.5	VOCs	SW-846 8260
						Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
800-164.2	CI38-0018	2084472	749056.5	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Metals	Total metals by ICP
						VOCs	SW-846 8260
800-164.2	CI38-0019	2084490	749087.7	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Radionuclides	Isotopic Am, Pu, U
						Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						VOCs	SW-846 8260
UBC 886	CI38-0020	2084508	749118.9	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
						Metals	Total metals by ICP

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
800-164.2	CI38-0021	2084490	749025.3	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
				Subsurface Soil	0.5 - 2.5	VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
800-164.2	CI38-0022	2084508	749056.6	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Metals	Total metals by ICP
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
000-121	CI38-0023	2084372	749054.4	Subsurface Soil	4.5 - 4.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
						Radionuclides	Isotopic Am, Pu, U
						VOCs	SW-846 8260
						SVOCs	SW-846 8270
						Inorganics	Nitrite by ion chromatography
000-121	CI38-024	2084380	749106.8	Subsurface Soil	4 - 5	Radionuclides	Isotopic Am, Pu, U
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
						SVOCs	SW-846 8270
000-121	CI38-0025	2084379	749061.2	Subsurface Soil	4.5 - 4.5	Metals	Total metals by ICP
						Radionuclides	Isotopic Am, Pu, U
						VOCs	SW-846 8260
						SVOCs	SW-846 8270
						Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
000-121	CI38-026	2084386	749062.6	Subsurface Soil	4 - 5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
						SVOCs	SW-846 8270
						Radionuclides	Isotopic Am, Pu, U
						VOCs	SW-846 8260
Foundation Drain	CI38-0027	2084382	749041.3	Subsurface Soil	13 - 15	VOCs	SW-846 8260
						SVOCs	SW-846 8270
						Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
000-121	CI38-028	2084380	749038.2	Subsurface Soil	4 - 5	Radionuclides	Isotopic Am, Pu, U
						Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
						Metals	Total metals by ICP
						SVOCs	SW-846 8270
000-121	CI38-029	2084407	749040.2	Subsurface Soil	3 - 4	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						Radionuclides	Isotopic Am, Pu, U
						SVOCs	SW-846 8270
						VOCs	SW-846 8260
000-121	CI38-0031	2084368	749060.8	Subsurface Soil	4.5 - 4.5	Inorganics	Nitrite by ion chromatography
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy
						Radionuclides	Isotopic Am, Pu, U
						SVOCs	SW-846 8270
000-121	CI38-H032	2084355	749049.7	Subsurface Soil	2 - 2.5	Metals	Total metals by ICP
						Inorganics	Nitrite by ion chromatography
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
000-121	CI38-033	2084379	749053.2	Subsurface Soil	4 - 5	Radionuclides	Gamma spectroscopy
						SVOCs	SW-846 8270
						VOCs	SW-846 8260
						Radionuclides	Isotopic Am, Pu, U
						Metals	Total metals by ICP
UBC 886	CI38-A034	2084412	749049.3	Surface Soil	0 - 0.3	Radionuclides	Gamma spectroscopy
UBC 886	CI38-A035	2084413	749049.3	Surface Soil	0 - 0.3	Radionuclides	Gamma spectroscopy
UBC 886	CI38-A036	2084421	749032.5	Surface Soil	0 - 0.4	Radionuclides	Gamma spectroscopy
UBC 886	CI38-A037	2084422	749041.4	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
UBC 886	CI38-A038	2084433	749036.7	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
Concrete Spill	CI38-041	2084433	749034.5	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
Concrete Spill	CI38-042	2084432	749028.3	Surface Soil	0 – 0.5	Radionuclides	Isotopic Am, Pu, U
Concrete Spill	CI38-043	2084437	749032.1	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Radionuclides	Isotopic Am, Pu, U
Concrete Spill	CI38-044	2084432	749041	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Radionuclides	Isotopic Am, Pu, U
Concrete Spill	CI38-045	2084439	749046.4	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Radionuclides	Isotopic Am, Pu, U
000-121	CI38-0046	2084363	749065.7	Subsurface Soil	20	Metals	Total metals by ICP
						Radionuclides	Isotopic Am, Pu, U
						Inorganics	Nitrate by ion chromatography
						VOCs	SW-846 8260
						SVOCs	SW-846 8270
						Radionuclides	Gamma spectroscopy

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
000-121	CI38-0047	2084363	749046.9	Subsurface Soil	20	Inorganics	Nitrate by ion chromatography
						Metals	Total metals by ICP
						SVOCs	SW-846 8270
						Radionuclides	Isotopic Am, Pu, U
						Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
000-121	CI38-0048	2084351	749056.8	Subsurface Soil	20	SVOCs	SW-846 8270
						Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						VOCs	SW-846 8260
						Inorganics	Nitrite by ion chromatography
						Radionuclides	Isotopic Am, Pu, U
800-164.2	CI39-0001	2084364	749181.3	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Metals	Total metals by ICP
						SVOCs	SW-846 8270
						Radionuclides	Isotopic Am, Pu, U
						Radionuclides	Gamma spectroscopy
UBC 886	CI39-0002	2084400	749181.3	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Metals	Total metals by ICP
						VOCs	SW-846 8260
						Radionuclides	Gamma spectroscopy

Table 2. Characterization Sampling Specifications for IHSS Group 800-4

IHSS/PAC/ UBC Site	Sampling Location	Easting	Northing	Medium	Depth Interval (feet)	Analyte	Laboratory Method
UBC 886	CI39-0003	2084436	749181.3	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
						VOCs	SW-846 8260
				Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
						Metals	Total metals by ICP
UBC 886	CI39-0004	2084472	749181.3	Subsurface Soil	0.5 - 2.5	VOCs	SW-846 8260
						Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
						SVOCs	SW-846 8270
UBC 886	CI39-0005	2084508	749181.2	Surface Soil	0 - 0.5	Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
				Subsurface Soil	0.5 - 2.5	Radionuclides	Gamma spectroscopy
						VOCs	SW-846 8260
						Metals	Total metals by ICP
						Radionuclides	Gamma spectroscopy
UBC 886	CI39-0009	2084418	749087.7	Subsurface Soil	0.5 - 1	Metals	Total metals by ICP
UBC 886	Room 101A	2084442	749037.5	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
UBC 886	Room 101B	2084442	749042.5	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
UBC 886	Room 101C	2084436	749046.8	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy
UBC 886	Room 101D	2084433	749027.4	Surface Soil	0 - 0.5	Radionuclides	Gamma spectroscopy

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
UBC 886	CI38-0002	2084381.94	749150.045	Uranium-238	0	0.5	2.27	8	586	103	2	pCi/g
UBC 886	CI38-0002	2084381.94	749150.045	Toluene	0.5	2.5	1.7	0.92	707000.00	7070.00	NA	ug/kg
UBC 886	CI38-0002	2084381.94	749150.045	Methylene Chloride	0.5	2.5	6.3	0.95	578.00	5.78	NA	ug/kg
UBC 886	CI38-0002	2084381.94	749150.045	1,2-Dichloroethane	0.5	2.5	8.3	1.2	668.00	6.68	NA	ug/kg
UBC 886	CI38-0002	2084381.94	749150.045	1,1,1-Trichloroethane	0.5	2.5	14	1.2	94800.00	948.00	NA	ug/kg
UBC 886	CI38-0002	2084381.94	749150.045	Uranium-235	0.5	2.5	0.211	1	135	24	0.12	pCi/g
UBC 886	CI38-0002	2084381.94	749150.045	Uranium-238	0.5	2.5	2.64	8	586	103	1.49	pCi/g
UBC886	CI38-0005	2084400.038	749118.829	Strontium	1	3	235	0.0068	1000000.00	1000000.00	211.38	mg/kg
UBC886	CI38-0005	2084400.038	749118.829	Methylene Chloride	1	3	1.1	0.86	578.00	5.78	NA	ug/kg
UBC886	CI38-0005	2084400.038	749118.829	Uranium-238	1	3	2.25	8	586	103	1.49	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Aluminum	0	0.5	19500	1.4	1000000.00	1000000.00	16902	mg/kg
UBC886	CI38-0006	2084417.959	749150.09	Lithium	0	0.5	12.7	0.19	38400.00	38400.00	11.55	mg/kg
UBC886	CI38-0006	2084417.959	749150.09	Uranium-238	0	0.5	2.51	8	586	103	2	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Methylene Chloride	0.5	2.5	1.7	0.89	578.00	5.78	NA	ug/kg
UBC886	CI38-0006	2084417.959	749150.09	1,2-Dichloroethane	0.5	2.5	1.8	1.1	668.00	6.68	NA	ug/kg
UBC886	CI38-0006	2084417.959	749150.09	Acetone	0.5	2.5	33	5.1	27200000.00	272000.00	NA	ug/kg
UBC886	CI38-0006	2084417.959	749150.09	Americium-241	0.5	2.5	0.0419	0.0523	215	38	0.02	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Americium-241	0.5	2.5	0.0561	0.0865	215	38	0.02	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Uranium-235	0.5	2.5	0.128	1	135	24	0.12	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Uranium-235	0.5	2.5	0.212	1	135	24	0.12	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Uranium-238	0.5	2.5	1.7	8	586	103	1.49	pCi/g
UBC886	CI38-0006	2084417.959	749150.09	Uranium-238	0.5	2.5	3.51	8	586	103	1.49	pCi/g
UBC886	CI38-0008	2084399.995	749056.49	Uranium-238	0.5	1	2.7	8	586	103	1.49	pCi/g
UBC886	CI38-0008	2084399.995	749056.49	Methylene Chloride	1	3	1.2	0.83	578.00	5.78	NA	ug/kg
UBC886	CI38-0008	2084399.995	749056.49	Acetone	1	3	8	4.8	27200000.00	272000.00	NA	ug/kg
UBC886	CI38-0008	2084399.995	749056.49	Uranium-235	1	3	0.22	1	135	24	0.12	pCi/g
UBC886	CI38-0009	2084417.893	749087.709	Methylene Chloride	1	3	1.1	0.89	578.00	5.78	NA	ug/kg
UBC886	CI38-0009	2084417.893	749087.709	Acetone	1	3	83	5.1	27200000.00	272000.00	NA	ug/kg
UBC886	CI38-0009	2084417.893	749087.709	Uranium-235	1	3	0.302	1	135	24	0.12	pCi/g
UBC886	CI38-0009	2084417.893	749087.709	Uranium-238	1	3	2.15	8	586	103	1.49	pCi/g
UBC886	CI38-0009	2084417.893	749087.709	Uranium-238	1	3	1.95	8	586	103	1.49	pCi/g
UBC886	CI38-0010	2084436.093	749118.903	Uranium-238	0.5	1	2.14	8	586	103	1.49	pCi/g
UBC886	CI38-0010	2084436.093	749118.903	Uranium-235	0.5	1	0.279	1	135	24	0.12	pCi/g
UBC886	CI38-0010	2084436.093	749118.903	Methylene Chloride	1	3	1.2	0.91	578.00	5.78	NA	ug/kg
UBC886	CI38-0010	2084436.093	749118.903	Uranium-235	1	3	0.209	1	135	24	0.12	pCi/g
UBC886	CI38-0012	2084418.013	749025.261	Uranium-235	2	2.5	0.271	1	135	24	0.12	pCi/g
UBC886	CI38-0012	2084418.013	749025.261	Uranium-238	2	2.5	2.4	8	586	103	1.49	pCi/g
UBC886	CI38-0012	2084418.013	749025.261	Strontium	2.5	4.5	415	0.0072	1000000.00	1000000.00	211.38	mg/kg

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
UBC886	CI38-0012	2084418.013	749025.261	Methylene Chloride	2.5	4.5	1.5	0.98	578.00	5.78	NA	ug/kg
UBC886	CI38-0012	2084418.013	749025.261	Acetone	2.5	4.5	10	5.6	27200000.00	272000.00	NA	ug/kg
UBC886	CI38-0012	2084418.013	749025.261	Uranium-238	2.5	4.5	2.95	8	586	103	1.49	pCi/g
UBC886	CI38-0012	2084418.013	749025.261	Uranium-235	2.5	4.5	0.141	0.0952	135	24	0.12	pCi/g
UBC886	CI38-0012	2084418.013	749025.261	Uranium-235	2.5	4.5	0.213	0.117	135	24	0.12	pCi/g
UBC886	CI38-0012	2084418.013	749025.261	Uranium-235	2.5	4.5	0.241	1	135	24	0.12	pCi/g
UBC886	CI38-0013	2084436.017	749056.592	Uranium-235	2	2.5	0.209	1	135	24	0.12	pCi/g
UBC886	CI38-0013	2084436.017	749056.592	Uranium-238	2	2.5	2.47	8	586	103	1.49	pCi/g
UBC886	CI38-0013	2084436.017	749056.592	Methylene Chloride	2.5	4.5	1.3	0.82	578.00	5.78	NA	ug/kg
UBC886	CI38-0013	2084436.017	749056.592	Xylenes (Total)	2.5	4.5	3.4	2.9	9740000.00	97400.00	NA	ug/kg
UBC886	CI38-0013	2084436.017	749056.592	Acetone	2.5	4.5	50	4.7	27200000.00	272000.00	NA	ug/kg
UBC886	CI38-0013	2084436.017	749056.592	Uranium-238	2.5	4.5	1.68	8	586	103	1.49	pCi/g
UBC886	CI38-0016	2084489.939	749149.977	Aluminum	0	0.5	20800	1.4	1000000.00	1000000.00	16902	mg/kg
UBC886	CI38-0016	2084489.939	749149.977	Lithium	0	0.5	17.3	0.2	38400.00	38400.00	11.55	mg/kg
UBC886	CI38-0016	2084489.939	749149.977	Nickel	0	0.5	19.7	0.74	38400.00	38400.00	14.91	mg/kg
UBC886	CI38-0016	2084489.939	749149.977	Uranium-235	0	0.5	0.229	1	135	24	0.0939	pCi/g
UBC886	CI38-0016	2084489.939	749149.977	Methylene Chloride	0.5	2.5	1.8	0.93	578.00	5.78	NA	ug/kg
UBC886	CI38-0016	2084489.939	749149.977	1,2-Dichloroethane	0.5	2.5	1.4	1.1	668.00	6.68	NA	ug/kg
UBC886	CI38-0016	2084489.939	749149.977	Uranium-235	0.5	2.5	0.15	1	135	24	0.12	pCi/g
UBC886	CI38-0016	2084489.939	749149.977	Uranium-238	0.5	2.5	2.07	8	586	103	1.49	pCi/g
UBC886	CI38-0020	2084507.936	749118.851	Aluminum	0	0.5	18400	1.4	1000000.00	1000000.00	16902	mg/kg
UBC886	CI38-0020	2084507.936	749118.851	Calcium	0	0.5	21900	3.5			4467	mg/kg
UBC886	CI38-0020	2084507.936	749118.851	Lithium	0	0.5	14.2	0.19	38400.00	38400.00	11.55	mg/kg
UBC886	CI38-0020	2084507.936	749118.851	Uranium-235	0	0.5	0.171	1	135	24	0.0939	pCi/g
UBC886	CI38-0020	2084507.936	749118.851	Methylene Chloride	0.5	2.5	2.6	0.99	578.00	5.78	NA	ug/kg
UBC886	CI38-0020	2084507.936	749118.851	1,2-Dichloroethane	0.5	2.5	1.7	1.2	668.00	6.68	NA	ug/kg
UBC886	CI38-0020	2084507.936	749118.851	Acetone	0.5	2.5	8.5	5.7	27200000.00	272000.00	NA	ug/kg
UBC886	CI38-0020	2084507.936	749118.851	Uranium-235	0.5	2.5	0.135	1	135	24	0.12	pCi/g
UBC886	CI38-0020	2084507.936	749118.851	Uranium-238	0.5	2.5	2.62	8	586	103	1.49	pCi/g
UBC886	CI39-0002	2084399.895	749181.269	Methylene Chloride	0.5	2.5	1.1	1	578.00	5.78	NA	ug/kg
UBC886	CI39-0002	2084399.895	749181.269	Aluminum	0	0.5	17600	1.4	1000000.00	1000000.00	16902	mg/kg
UBC886	CI39-0002	2084399.895	749181.269	Calcium	0	0.5	14900	3.5			4467	mg/kg
UBC886	CI39-0002	2084399.895	749181.269	Lithium	0	0.5	12.8	0.19	38400.00	38400.00	11.55	mg/kg
UBC886	CI39-0002	2084399.895	749181.269	Uranium-235	0	0.5	0.142	1	135	24	0.0939	pCi/g
UBC886	CI39-0002	2084399.895	749181.269	Uranium-238	0	0.5	2.62	8	586	103	2	pCi/g
UBC886	CI39-0002	2084399.895	749181.269	Uranium-238	0.5	2.5	1.52	8	586	103	1.49	pCi/g
UBC886	CI39-0003	2084435.949	749181.29	Calcium	0	0.5	10300	3.5			4467	mg/kg
UBC886	CI39-0003	2084435.949	749181.29	Uranium-235	0	0.5	0.165	1	135	24	0.0939	pCi/g
UBC886	CI39-0003	2084435.949	749181.29	Uranium-238	0	0.5	2.23	8	586	103	2	pCi/g

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
UBC886	CI39-0003	2084435.949	749181.29	Methylene Chloride	0.5	2.5	1.2	0.95	578.00	5.78	NA	ug/kg
UBC886	CI39-0003	2084435.949	749181.29	1,2-Dichloroethane	0.5	2.5	2.1	1.2	668.00	6.68	NA	ug/kg
UBC886	CI39-0003	2084435.949	749181.29	Uranium-235	0.5	2.5	0.141	1	135	24	0.12	pCi/g
UBC886	CI39-0003	2084435.949	749181.29	Uranium-238	0.5	2.5	2.68	8	586	103	1.49	pCi/g
UBC886	CI39-0005	2084507.953	749181.232	Uranium-235	0	0.5	0.242	1	135	24	0.0939	pCi/g
UBC886	CI39-0005	2084507.953	749181.232	Methylene Chloride	0.5	2.5	2.9	0.93	578.00	5.78	NA	ug/kg
UBC886	CI39-0005	2084507.953	749181.232	Uranium-235	0.5	2.5	0.276	1	135	24	0.12	pCi/g
UBC886	CI39-0005	2084507.953	749181.232	Uranium-238	0.5	2.5	2.05	8	586	103	1.49	pCi/g
UBC886	CI39-0009	2084417.893	749087.709	Uranium-238	0.5	1	3.55	8	586	103	1.49	pCi/g
Foundation Drain	CI38-0027	2084381.606	749041.306	Methylene Chloride	12.5	14.5	1.3	0.87	578.00	5.78	NA	ug/kg
Foundation Drain	CI38-0027	2084381.606	749041.306	Acetone	12.5	14.5	15	5	27200000.00	272000.00	NA	ug/kg
Foundation Drain	CI38-0027	2084381.606	749041.306	Uranium-235	12.5	14.5	0.16	1	135	24	0.12	pCi/g
Foundation Drain	CI38-0027	2084381.606	749041.306	Uranium-235	12.5	14.5	0.22	1	135	24	0.12	pCi/g
Foundation Drain	CI38-0027	2084381.606	749041.306	Uranium-238	12.5	14.5	2.02	8	586	103	1.49	pCi/g
164.2	CI38-0001	2084363.992	749118.862	Methylene Chloride	1	3	1.5	0.9	578.00	5.78	NA	ug/kg
164.2	CI38-0001	2084363.992	749118.862	1,2-Dichloroethane	1	3	1.2	1.1	668.00	6.68	NA	ug/kg
164.2	CI38-0001	2084363.992	749118.862	Acetone	1	3	10	5.2	27200000.00	272000.00	NA	ug/kg
164.2	CI38-0001	2084363.992	749118.862	Uranium-238	0.5	1	1.87	8	586	103	1.49	pCi/g
164.2	CI38-0001	2084363.992	749118.862	Uranium-235	1	3	0.174	1	135	24	0.12	pCi/g
164.2	CI38-0001	2084363.992	749118.862	Uranium-235	1	3	0.171	1	135	24	0.12	pCi/g
164.2	CI38-0001	2084363.992	749118.862	Uranium-238	1	3	2.25	8	586	103	1.49	pCi/g
164.2	CI38-0001	2084363.992	749118.862	Uranium-238	1	3	2.52	8	586	103	1.49	pCi/g
164.2	CI38-A003	2084363.828	749054.138	Copper	0	0.5	26.3	0.2	71100.00	71100.00	18.06	mg/kg
164.2	CI38-B003	2084363.828	749054.138	Methylene Chloride	0.5	1.2	1	0.92	578.00	5.78	NA	ug/kg
164.2	CI38-B003	2084363.828	749054.138	Acetone	0.5	1.2	6.5	5.3	27200000.00	272000.00	NA	ug/kg
164.2	CI38-B003	2084363.828	749054.138	Uranium-235	0.5	1.2	0.172		135	24	0.12	pCi/g
164.2	CI38-A004	2084378.638	749094.607	Uranium-235	0	0.5	0.222		135	24	0.0939	pCi/g
164.2	CI38-B004	2084378.638	749094.607	Barium	0.5	2.5	298	0.064	133000.00	133000.00	289.38	mg/kg
164.2	CI38-B004	2084378.638	749094.607	Methylene Chloride	0.5	2.5	1.1	0.94	578.00	5.78	NA	ug/kg
164.2	CI38-B004	2084378.638	749094.607	Uranium-235	0.5	2.5	0.166		135	24	0.12	pCi/g
164.2	CI38-A007	2084376.751	749023.159	Copper	0	0.5	19.6	0.19	71100.00	71100.00	18.06	mg/kg
164.2	CI38-B007	2084376.751	749023.159	Methylene Chloride	0.5	0.9	1.2	0.9	578.00	5.78	NA	ug/kg
164.2	CI38-B007	2084376.751	749023.159	Acetone	0.5	0.9	19	5.2	27200000.00	272000.00	NA	ug/kg
164.2	CI38-B007	2084376.751	749023.159	Uranium-235	0.5	0.9	0.138		135	24	0.12	pCi/g
164.2	CI38-B007	2084376.751	749023.159	Uranium-238	0.5	0.9	2.78		586	103	1.49	pCi/g
164.2	CI38-0011	2084454.065	749150.105	Uranium-235	0	0.5	0.252	1	135	24	0.0939	pCi/g
164.2	CI38-0011	2084454.065	749150.105	Uranium-238	0	0.5	0.655	8	586	103	2	pCi/g
164.2	CI38-0011	2084454.065	749150.105	Methylene Chloride	0.5	2.5	1.2	0.92	578.00	5.78	NA	ug/kg
164.2	CI38-0011	2084454.065	749150.105	Uranium-235	0.5	2.5	0.146	1	135	24	0.12	pCi/g

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
164.2	CI38-0011	2084454.065	749150.105	Uranium-238	0.5	2.5	2.12	8	586	103	1.49	pCi/g
164.2	CI38-0014	2084454	749087.679	Uranium-238	0.5	1	2.14	8	586	103	1.49	pCi/g
164.2	CI38-0014	2084454	749087.679	Lead	1	3	54.9	0.24	1000.00	1000.00	24.97	mg/kg
164.2	CI38-0014	2084454	749087.679	Methylene Chloride	1	3	1.3	0.98	578.00	5.78	NA	ug/kg
164.2	CI38-0014	2084454	749087.679	Trichloroethene	1	3	4.3	1.1	3280.00	32.80	NA	ug/kg
164.2	CI38-0014	2084454	749087.679	1,1,1-Trichloroethane	1	3	2	1.2	94800.00	948.00	NA	ug/kg
164.2	CI38-0014	2084454	749087.679	Uranium-238	1	3	2.9	8	586	103	1.49	pCi/g
164.2	CI38-0014	2084454	749087.679	Methylene Chloride	6	8	1.4	0.83	578.00	5.78	NA	ug/kg
164.2	CI38-0014	2084454	749087.679	Acetone	6	8	5.7	4.8	27200000.00	272000.00	NA	ug/kg
164.2	CI38-0014	2084454	749087.679	Uranium-235	6	8	0.16	1	135	24	0.12	pCi/g
164.2	CI38-0014	2084454	749087.679	Uranium-238	6	8	1.68	8	586	103	1.49	pCi/g
164.2	CI38-0015	2084472.071	749118.916	Aluminum	0	0.5	22200	1.4	1000000.00	1000000.00	16902	mg/kg
164.2	CI38-0015	2084472.071	749118.916	Beryllium	0	0.5	1.2	0.034	104.00	1.04	0.966	mg/kg
164.2	CI38-0015	2084472.071	749118.916	Iron	0	0.5	18900	1.6	576000.00	576000.00	18037	mg/kg
164.2	CI38-0015	2084472.071	749118.916	Lithium	0	0.5	15.3	0.19	38400.00	38400.00	11.55	mg/kg
164.2	CI38-0015	2084472.071	749118.916	Nickel	0	0.5	16.5	0.72	38400.00	38400.00	14.91	mg/kg
164.2	CI38-0015	2084472.071	749118.916	Uranium-235	0	0.5	0.107	1	135	24	0.0939	pCi/g
164.2	CI38-0015	2084472.071	749118.916	Uranium-238	0	0.5	2.61	8	586	103	2	pCi/g
164.2	CI38-0015	2084472.071	749118.916	Methylene Chloride	0.5	2.5	2.8	1	578.00	5.78	NA	ug/kg
164.2	CI38-0015	2084472.071	749118.916	Acetone	0.5	2.5	13	5.9	27200000.00	272000.00	NA	ug/kg
164.2	CI38-0015	2084472.071	749118.916	Uranium-235	0.5	2.5	0.126	1	135	24	0.12	pCi/g
164.2	CI38-0015	2084472.071	749118.916	Uranium-238	0.5	2.5	2.35	8	586	103	1.49	pCi/g
164.2	CI38-0017	2084453.967	749025.577	Uranium-235	2	2.5	0.176	1	135	24	0.12	pCi/g
164.2	CI38-0017	2084453.967	749025.577	Uranium-238	2	2.5	2.11	8	586	103	1.49	pCi/g
164.2	CI38-0017	2084453.967	749025.577	Methylene Chloride	2.5	4.5	1.2	0.83	578.00	5.78	NA	ug/kg
164.2	CI38-0017	2084453.967	749025.577	Acetone	2.5	4.5	8.2	4.8	27200000.00	272000.00	NA	ug/kg
164.2	CI38-0017	2084453.967	749025.577	Uranium-235	2.5	4.5	0.159	1	135	24	0.12	pCi/g
164.2	CI38-0017	2084453.967	749025.577	Uranium-238	2.5	4.5	3.69	8	586	103	1.49	pCi/g
164.2	CI38-0018	2084471.974	749056.521	Uranium-235	0	0.5	0.195	1	135	24	0.0939	pCi/g
164.2	CI38-0018	2084471.974	749056.521	Uranium-238	0	0.5	2.37	8	586	103	2	pCi/g
164.2	CI38-0018	2084471.974	749056.521	Methylene Chloride	0.5	2.5	2.1	0.95	578.00	5.78	NA	ug/kg
164.2	CI38-0018	2084471.974	749056.521	Uranium-235	0.5	2.5	0.126	1	135	24	0.12	pCi/g
164.2	CI38-0018	2084471.974	749056.521	Uranium-238	0.5	2.5	1.5	8	586	103	1.49	pCi/g
164.2	CI38-0019	2084489.93	749087.731	Lithium	0	0.5	11.8	0.19	38400.00	38400.00	11.55	mg/kg
164.2	CI38-0019	2084489.93	749087.731	Strontium	0	0.5	56	0.0067	1000000.00	1000000.00	48.94	mg/kg
164.2	CI38-0019	2084489.93	749087.731	Uranium-235	0	0.5	0.202	1	135	24	0.0939	pCi/g
164.2	CI38-0019	2084489.93	749087.731	Uranium-238	0	0.5	2.01	8	586	103	2	pCi/g
164.2	CI38-0019	2084489.93	749087.731	Methylene Chloride	0.5	2.5	1.8	0.9	578.00	5.78	NA	ug/kg
164.2	CI38-0019	2084489.93	749087.731	Uranium-235	0.5	2.5	0.2	1	135	24	0.12	pCi/g

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
164.2	CI38-0019	2084489.93	749087.731	Uranium-235	0.5	2.5	0.17	1	135	24	0.12	pCi/g
164.2	CI38-0019	2084489.93	749087.731	Uranium-238	0.5	2.5	6.25	8	586	103	1.49	pCi/g
164.2	CI38-0019	2084489.93	749087.731	Uranium-238	0.5	2.5	3.37	8	586	103	1.49	pCi/g
164.2	CI38-0021	2084489.927	749025.328	Lithium	0	0.5	11.6	0.19	38400.00	38400.00	11.55	mg/kg
164.2	CI38-0021	2084489.927	749025.328	Strontium	0	0.5	171	0.0068	1000000.00	1000000.00	48.94	mg/kg
164.2	CI38-0021	2084489.927	749025.328	Uranium-235	0	0.5	0.213	1	135	24	0.0939	pCi/g
164.2	CI38-0021	2084489.927	749025.328	Methylene Chloride	0.5	2.5	2.3	1	578.00	5.78	NA	ug/kg
164.2	CI38-0021	2084489.927	749025.328	1,2-Dichloroethane	0.5	2.5	1.5	1.2	668.00	6.68	NA	ug/kg
164.2	CI38-0021	2084489.927	749025.328	Uranium-235	0.5	2.5	0.163	1	135	24	0.12	pCi/g
164.2	CI38-0021	2084489.927	749025.328	Uranium-238	0.5	2.5	2.3	8	586	103	1.49	pCi/g
164.2	CI38-0022	2084508.061	749056.581	Lithium	0	0.5	12.4	0.19	38400.00	38400.00	11.55	mg/kg
164.2	CI38-0022	2084508.061	749056.581	Strontium	0	0.5	94.4	0.0068	1000000.00	1000000.00	48.94	mg/kg
164.2	CI38-0022	2084508.061	749056.581	Uranium-235	0	0.5	0.225	1	135	24	0.0939	pCi/g
164.2	CI38-0022	2084508.061	749056.581	Uranium-238	0	0.5	4.33	8	586	103	2	pCi/g
164.2	CI38-0022	2084508.061	749056.581	Arsenic	0.5	2.5	16.6	0.63	299.00	13.14	13.14	mg/kg
164.2	CI38-0022	2084508.061	749056.581	Methylene Chloride	0.5	2.5	1.8	0.88	578.00	5.78	NA	ug/kg
164.2	CI38-0022	2084508.061	749056.581	Uranium-238	0.5	2.5	1.96	8	586	103	1.49	pCi/g
164.2	CI39-0001	2084364.06	749181.328	Lead	0	0.5	59.1	0.2	1000.00	1000.00	54.62	mg/kg
164.2	CI39-0001	2084364.06	749181.328	Uranium-235	0	0.5	0.158	1	135	24	0.0939	pCi/g
164.2	CI39-0001	2084364.06	749181.328	Uranium-238	0	0.5	2.59	8	586	103	2	pCi/g
164.2	CI39-0001	2084364.06	749181.328	Strontium	0.5	2.5	324	0.0073	1000000.00	1000000.00	211.38	mg/kg
164.2	CI39-0001	2084364.06	749181.328	Benzo(A)Anthracene	0.5	2.5	420	47	160000.00	1600.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Pyrene	0.5	2.5	1100	49	397000000.00	3970000.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Acenapthene	0.5	2.5	200	56	53400000.00	534000.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Indeno(1,2,3-Cd)Pyrene	0.5	2.5	150	58	1400000.00	14000.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Chrysene	0.5	2.5	430	65	16000000.00	160000.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Fluorene	0.5	2.5	230	92	69400000.00	694000.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Anthracene	0.5	2.5	460	95	1000000000.00	11200.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Fluoranthene	0.5	2.5	1100	100	537000000.00	5370000.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Benzo(K)Fluoranthene	0.5	2.5	320	110	4950000.00	49500.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Benzo(A)Pyrene	0.5	2.5	320	110	701000.00	7010.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Benzo(B)Fluoranthene	0.5	2.5	240	120	495000.00	4950.00	NA	ug/kg
164.2	CI39-0001	2084364.06	749181.328	Uranium-235	0.5	2.5	0.125	0.0626	135	24	0.12	pCi/g
164.2	CI39-0001	2084364.06	749181.328	Uranium-235	0.5	2.5	0.166	1	135	24	0.12	pCi/g
164.2	CI39-0001	2084364.06	749181.328	Uranium-238	0.5	2.5	2.35	8	586	103	1.49	pCi/g
164.2	CI39-0001	2084364.06	749181.328	Uranium-238	0.5	2.5	2.07	8	586	103	1.49	pCi/g
164.2	CI39-0004	2084418.02	749181.30	Strontium	0	0.5	89.1	0.0065	1000000.00	1000000.00	48.94	mg/kg
164.2	CI39-0004	2084418.02	749181.30	Uranium-235	0	0.5	0.134	1	135	24	0.0939	pCi/g
164.2	CI39-0004	2084418.02	749181.30	Uranium-238	0	0.5	2.33	8	586	103	2	pCi/g

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
164.2	CI39-0004	2084418.02	749181.30	Strontium	0.5	2.5	250	0.0065	1000000.00	1000000.00	211.38	mg/kg
164.2	CI39-0004	2084418.02	749181.30	Methylene Chloride	0.5	2.5	1.1	0.95	578.00	5.78	NA	ug/kg
164.2	CI39-0004	2084418.02	749181.30	Benzo(A)Anthracene	0.5	2.5	54	43	160000.00	1600.00	NA	ug/kg
164.2	CI39-0004	2084418.02	749181.30	Pyrene	0.5	2.5	130	44	397000000.00	3970000.00	NA	ug/kg
164.2	CI39-0004	2084418.02	749181.30	Chrysene	0.5	2.5	72	58	16000000.00	160000.00	NA	ug/kg
164.2	CI39-0004	2084418.02	749181.30	Fluoranthene	0.5	2.5	140	92	537000000.00	5370000.00	NA	ug/kg
164.2	CI39-0004	2084418.02	749181.30	Strontium	0.5	2.5	236	0.0069	1000000.00	1000000.00	211.38	mg/kg
164.2	CI39-0004	2084418.02	749181.30	Uranium-235	0.5	2.5	0.201	1	135	24	0.12	pCi/g
164.2	CI39-0004	2084418.02	749181.30	Uranium-238	0.5	2.5	2.17	8	586	103	1.49	pCi/g
000-121	CI38-0023	2084372.37	749054.44	Nitrate	4.50	4.50	4.30	0.23	1000000.00	1000000.00	NA	mg/kg
000-121	CI38-0023	2084372.37	749054.44	1,2-Dichloroethane	4.50	4.50	1.70	1.10	668.00	6.68	NA	ug/kg
000-121	CI38-0023	2084372.37	749054.44	Pyrene	4.50	4.50	54.00	42.00	397000000.00	3970000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Methylene Chloride	4.00	5.00	2.30	0.96	578.00	5.78	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Benzo(A)Anthracene	4.00	5.00	670.00	45.00	160000.00	1600.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Pyrene	4.00	5.00	1600.00	46.00	397000000.00	3970000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Acenapthene	4.00	5.00	330.00	53.00	53400000.00	534000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Dibenz(A,H)Anthracene	4.00	5.00	99.00	54.00	153000.00	1530.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Indeno(1,2,3-Cd)Pyrene	4.00	5.00	320.00	55.00	1400000.00	14000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Chrysene	4.00	5.00	630.00	61.00	16000000.00	160000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Naphthalene	4.00	5.00	210.00	81.00	10100000.00	101000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Fluorene	4.00	5.00	290.00	88.00	69400000.00	694000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Anthracene	4.00	5.00	480.00	90.00	1000000000.00	11200.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Fluoranthene	4.00	5.00	1600.00	97.00	537000000.00	5370000.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Benzo(K)Fluoranthene	4.00	5.00	590.00	110.00	4950000.00	49500.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Benzo(A)Pyrene	4.00	5.00	580.00	110.00	701000.00	7010.00	NA	ug/kg
000-121	CI38-024	2084379.83	749106.79	Benzo(B)Fluoranthene	4.00	5.00	390.00	120.00	495000.00	4950.00	NA	ug/kg
000-121	CI38-0025	2084379.18	749061.18	Cadmium	4.50	4.50	6.50	0.05	1920.00	1920.00	1.70	mg/kg
000-121	CI38-0025	2084379.18	749061.18	Pyrene	4.50	4.50	63.00	43.00	397000000.00	3970000.00	NA	ug/kg
000-121	CI38-026	2084385.65	749062.57	Barium	4.00	5.00	758.00	0.07	133000.00	133000.00	289.38	mg/kg
000-121	CI38-026	2084385.65	749062.57	Methylene Chloride	4.00	5.00	2.70	1.00	578.00	5.78	NA	ug/kg
000-121	CI38-028	2084379.66	749038.22	Strontium	4.00	5.00	320.00	0.02	1000000.00	1000000.00	211.38	mg/kg
000-121	CI38-028	2084379.66	749038.22	Methylene Chloride	4.00	5.00	2.30	1.00	578.00	5.78	NA	ug/kg
000-121	CI38-028	2084379.66	749038.22	Aluminum	4.00	5.00	36700.00	2.40	1000000.00	1000000.00	35373.17	mg/kg
000-121	CI38-029	2084406.85	749040.25	Methylene Chloride	3.00	4.00	2.20	0.94	578.00	5.78	NA	ug/kg
000-121	CI38-029	2084406.85	749040.25	Chrysene	3.00	4.00	64.00	61.00	16000000.00	160000.00	NA	ug/kg
000-121	CI38-0031	2084367.95	749060.77	Nitrate	4.50	4.50	2.70	0.22	1000000.00	1000000.00	NA	mg/kg
000-121	CI38-0031	2084367.95	749060.77	Benzo(A)Anthracene	4.50	4.50	79.00	42.00	160000.00	1600.00	NA	ug/kg
000-121	CI38-0031	2084367.95	749060.77	Pyrene	4.50	4.50	170.00	43.00	397000000.00	3970000.00	NA	ug/kg
000-121	CI38-0031	2084367.95	749060.77	Chrysene	4.50	4.50	87.00	57.00	16000000.00	160000.00	NA	ug/kg

Table 3. Characterization Data Summary for IHSS Group 800-4 - By Location (Greater than Background Mean Plus Two Standard Deviations)

IHSS/PAC/ UBC Site	Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Tier I ALs	Tier II ALs	Background Mean Plus Two Std. Deviations	Units
000-121	CI38-0031	2084367.95	749060.77	Fluoranthene	4.50	4.50	180.00	91.00	537000000.00	5370000.00	NA	ug/kg
000-121	CI38-H032	2084354.55	749049.725	Cadmium	2	2.5	2.4	0.038	1920.00	1920.00	1.7	mg/kg
000-121	CI38-H032	2084354.55	749049.725	Nitrate	2	2.5	2.4	0.28	1000000.00	1000000.00	NA	mg/kg
000-121	CI38-H032	2084354.55	749049.725	Nitrite	2	2.5	2.4	0.34	192000.00	192000.00	NA	mg/kg
000-121	CI38-H032	2084354.55	749049.725	Cobalt	2	2.5	32	0.37	115000.00	115000.00	29.04	mg/kg
000-121	CI38-H032	2084354.55	749049.725	Methylene Chloride	2	2.5	4.7	1	578.00	5.78	NA	ug/kg
000-121	CI38-H032	2084354.55	749049.725	Acetone	2	2.5	33	6	27200000.00	272000.00	NA	ug/kg
000-121	CI38-033	2084378.91	749053.20	Methylene Chloride	4.00	5.00	2.50	1.00	578.00	5.78	NA	ug/kg
000-121	CI38-041	2084432.63	749034.514	Uranium-238	0	0.5	2.31	8	586	103	2	pCi/g
000-121	CI38-042	2084432.429	749028.258	Americium-241	0	0.5	0.0643	0.138	215	38	0.0227	pCi/g
000-121	CI38-042	2084432.429	749028.258	Uranium-235	0	0.5	0.179	1	135	24	0.0939	pCi/g
000-121	CI38-043	2084436.868	749032.092	Uranium-235	0	0.5	0.188	1	135	24	0.0939	pCi/g
000-121	CI38-044	2084432.429	749040.971	Americium-241	0	0.5	0.0482	0.0482	215	38	0.0227	pCi/g
000-121	CI38-044	2084432.429	749040.971	Uranium-235	0	0.5	0.136	1	135	24	0.0939	pCi/g
000-121	CI38-045	2084439.088	749046.42	Americium-241	0	0.5	0.966	0.813	215	38	0.0227	pCi/g
000-121	CI38-045	2084439.088	749046.42	Uranium-238	0	0.5	3.52	8	586	103	2	pCi/g
000-121	CI38-0046	2084362.863	749065.651	Nitrate	20	20	3.1	0.26	1000000.00	1000000.00	NA	mg/kg
000-121	CI38-0046	2084362.863	749065.651	Methylene Chloride	20	20	1.1	0.95	578.00	5.78	NA	ug/kg
000-121	CI38-0046	2084362.863	749065.651	Naphthalene	20	20	4.4	1.1	10100000.00	101000.00	NA	ug/kg
000-121	CI38-0046	2084362.863	749065.651	1,2-Dichloroethane	20	20	7	1.2	668.00	6.68	NA	ug/kg
000-121	CI38-0046	2084362.863	749065.651	Acetone	20	20	33	5.6	27200000.00	272000.00	NA	ug/kg
000-121	CI38-0046	2084362.863	749065.651	Pyrene	20	20	77	49	397000000.00	3970000.00	NA	ug/kg
000-121	CI38-0047	2084363.015	749046.885	Nitrate	20	20	3.1	0.24	1000000.00	1000000.00	NA	mg/kg
000-121	CI38-0047	2084363.015	749046.885	Methylene Chloride	20	20	1.1	0.89	578.00	5.78	NA	ug/kg
000-121	CI38-0047	2084363.015	749046.885	Naphthalene	20	20	3.4	0.96	10100000.00	101000.00	NA	ug/kg
000-121	CI38-0047	2084363.015	749046.885	1,2-Dichloroethane	20	20	6	1.1	668.00	6.68	NA	ug/kg
000-121	CI38-0047	2084363.015	749046.885	Acetone	20	20	60	5.1	27200000.00	272000.00	NA	ug/kg
000-121	CI38-0048	2084351.345	749056.792	Methylene Chloride	20	20	1.2	0.97	578.00	5.78	NA	ug/kg
000-121	CI38-0048	2084351.345	749056.792	1,2-Dichloroethane	20	20	4	1.2	668.00	6.68	NA	ug/kg

Note: Arsenic and beryllium background values used in place of Tier II ALs.

Table 4. Characterization Data Summary - By Analyte (IHSS Group 800-4)

Medium	Analyte	Detection Frequency	Maximum Concentration	Mean Concentration	Tier I Action Level	Tier II Action Level	Background Concentration	Unit
Subsurface Soil	Aluminum	100%	36700	15031.33	1000000	1000000	35373.17	mg/kg
Subsurface Soil	Antimony	13%	3.1	0.34	768	768	16.97	mg/kg
Subsurface Soil	Arsenic	100%	16.6	5.16	299	13.14	13.14	mg/kg
Subsurface Soil	Barium	100%	758	124.47	133000	133000	289.38	mg/kg
Subsurface Soil	Beryllium	100%	1.5	0.58	104	14.2	14.2	mg/kg
Subsurface Soil	Cadmium	78%	6.5	0.33	1920	1920	1.7	mg/kg
Subsurface Soil	Cobalt	100%	32	5.18	115000	115000	29.04	mg/kg
Subsurface Soil	Copper	100%	21.9	9.60	71100	71100	38.21	mg/kg
Subsurface Soil	Iron	100%	19900	11332.33	576000	576000	41046.52	mg/kg
Subsurface Soil	Lead	100%	54.9	10.10	1000	1000	24.97	mg/kg
Subsurface Soil	Lithium	100%	27.9	12.94	38400	38400	34.66	mg/kg
Subsurface Soil	Manganese	100%	454	142.07	83600	83600	901.62	mg/kg
Subsurface Soil	Mercury	100%	0.11	0.03	576	576	1.52	mg/kg
Subsurface Soil	Molybdenum	40%	3.9	0.25	9610	9610	25.61	mg/kg
Subsurface Soil	Nickel	100%	26	12.00	38400	38400	62.21	mg/kg
Subsurface Soil	Nitrate	88%	4.3	2.98	1000000	1000000	NA	mg/kg
Subsurface Soil	Nitrite	13%	3.25	2.86	192000	192000	NA	mg/kg
Subsurface Soil	Selenium	12%	3.6	0.40	9610	9610	4.8	mg/kg
Subsurface Soil	Silver	3%	11.2	0.22	9610	9610	24.54	mg/kg
Subsurface Soil	Strontium	100%	415	124.41	1000000	1000000	211.38	mg/kg
Subsurface Soil	Tin	100%	5.4	2.77	1000000	1000000	286.31	mg/kg
Subsurface Soil	Vanadium	100%	83.7	30.58	13400	13400	88.49	mg/kg
Subsurface Soil	Zinc	100%	79.4	31.14	576000	576000	139.1	mg/kg
Subsurface Soil	Americium-241	77%	4.43	3.10	209	38	0.02	pCi/g
Subsurface Soil	Plutonium-239/240	4%	0.0674	0.00	1088	252	0.02	pCi/g
Subsurface Soil	Uranium-234	100%	11.9	2.56	1627	307	2.64	pCi/g
Subsurface Soil	Uranium-235	83%	0.919	0.15	113	24	0.12	pCi/g
Subsurface Soil	Uranium-238	100%	6.25	1.72	506	103	1.49	pCi/g
Subsurface Soil	1,1,1-Trichloroethane	4%	14	3.10	94800	948	NA	ug/kg
Subsurface Soil	1,1,2,2-Tetrachloroethane	0%	ND	2.90	168	1.68	NA	ug/kg

Table 4. Characterization Data Summary - By Analyte (IHSS Group 800-4)

Medium	Analyte	Detection Frequency	Maximum Concentration	Mean Concentration	Tier I Action Level	Tier II Action Level	Background Concentration	Unit
Subsurface Soil	1,1,2-Trichloroethane	0%	ND	2.90	1230	12.3	NA	ug/kg
Subsurface Soil	1,1-Dichloroethane	0%	ND	2.90	689000	6890	NA	ug/kg
Subsurface Soil	1,1-Dichloroethene	0%	ND	2.90	2190	21.9	NA	ug/kg
Subsurface Soil	1,2,4-Trichlorobenzene	0%	ND	59.36	433000	4330	NA	ug/kg
Subsurface Soil	1,2- Dichloroethane	28%	8.3	2.93	668	6.68	NA	ug/kg
Subsurface Soil	1,2-Dichlorobenzene	0%	ND	59.36	1320000	13200	NA	ug/kg
Subsurface Soil	1,2-Dichloropropane	0%	ND	2.90	1130	11.3	NA	ug/kg
Subsurface Soil	1,4-Dichlorobenzene	0%	ND	59.36	165000	1650	NA	ug/kg
Subsurface Soil	2,4,5-Trichlorophenol	0%	ND	193.81	279000	2790	NA	ug/kg
Subsurface Soil	2,4,6-Trichlorophenol	0%	ND	193.81	10700	107	NA	ug/kg
Subsurface Soil	2,4-Dichlorophenol	0%	ND	193.81	63500	635	NA	ug/kg
Subsurface Soil	2,4-Dimethylphenol	0%	ND	193.81	577000	5770	NA	ug/kg
Subsurface Soil	2,4-Dinitrophenol	0%	ND	933.33	5290	52.9	NA	ug/kg
Subsurface Soil	2,4-Dinitrotoluene	0%	ND	193.81	50.1	0.501	NA	ug/kg
Subsurface Soil	2,6-Dinitrotoluene	0%	ND	193.81	38.8	0.388	NA	ug/kg
Subsurface Soil	2-Chlorophenol	0%	ND	193.81	257000	2570	NA	ug/kg
Subsurface Soil	2-Methylphenol	0%	ND	193.81	706000	7060	NA	ug/kg
Subsurface Soil	3,3'-Dichlorobenzidine	0%	ND	761.90	484	4.84	NA	ug/kg
Subsurface Soil	4-Chloroaniline	0%	ND	193.81	43700	437	NA	ug/kg
Subsurface Soil	Acenapthene	10%	330	200.48	53400000	534000	NA	ug/kg
Subsurface Soil	Acetone	42%	83	16.89	27200000	272000	NA	ug/kg
Subsurface Soil	Anthracene	10%	480	220.00	1000000000	11200	NA	ug/kg
Subsurface Soil	Benzene	0%	ND	2.90	1410	14.1	NA	ug/kg
Subsurface Soil	Benzo(A)Anthracene	19%	670	216.33	160000	1600	NA	ug/kg
Subsurface Soil	Benzo(A)Pyrene	10%	580	218.10	701000	7010	NA	ug/kg
Subsurface Soil	Benzo(B)Fluoranthene	10%	390	205.24	495000	4950	NA	ug/kg
Subsurface Soil	Benzo(K)Fluoranene	10%	590	218.57	4950000	49500	NA	ug/kg
Subsurface Soil	Benzoic Acid	0%	ND	933.33	10900000	109000	NA	ug/kg
Subsurface Soil	Bis(2-Chlorethyl)Ether	0%	ND	193.81	9.73	0.0973	NA	ug/kg
Subsurface Soil	Bis(2-Ethylhexyl)Phthalate	0%	ND	193.81	311000000	3110000	NA	ug/kg

Table 4. Characterization Data Summary - By Analyte (IHSS Group 800-4)

Medium	Analyte	Detection Frequency	Maximum Concentration	Mean Concentration	Tier I Action Level	Tier II Action Level	Background Concentration	Unit
Subsurface Soil	Bromodichloromethane	0%	ND	2.90	26400	264	NA	ug/kg
Subsurface Soil	Bromoform	0%	ND	2.90	37200	372	NA	ug/kg
Subsurface Soil	Bromomethane	0%	ND	2.90	5980	59.8	NA	ug/kg
Subsurface Soil	Butyl Benzylphthalate	0%	ND	193.81	1000000000	14400000	NA	ug/kg
Subsurface Soil	Carbon Disulfide	0%	ND	2.90	988000	9880	NA	ug/kg
Subsurface Soil	Carbon Tetrachloride	0%	ND	2.90	3560	35.6	NA	ug/kg
Subsurface Soil	Chlorobenzene	0%	ND	2.90	83000	830	NA	ug/kg
Subsurface Soil	Chloroethane	0%	ND	2.90			NA	ug/kg
Subsurface Soil	Chloroform	0%	ND	2.90	21400	214	NA	ug/kg
Subsurface Soil	Chrysene	24%	630	210.14	16000000	160000	NA	ug/kg
Subsurface Soil	Cis-1,3-Dichloropropene	0%	ND	2.90	120	1.2	NA	ug/kg
Subsurface Soil	Dibenz(A,H)Anthracene	5%	220	189.48	153000	1530	NA	ug/kg
Subsurface Soil	Diethyl Phthalate	0%	ND	386.43	31000000	310000	NA	ug/kg
Subsurface Soil	Di-N-Butylphthalate	0%	ND	193.81	426000000	4260000	NA	ug/kg
Subsurface Soil	Ethylbenzene	0%	ND	2.90	932000	9320	NA	ug/kg
Subsurface Soil	Fluoranthene	19%	1600	301.90	5.37E+08	5370000	NA	ug/kg
Subsurface Soil	Fluorene	10%	290	200.00	69400000	694000	NA	ug/kg
Subsurface Soil	Hexachlorobenzene	0%	ND	193.81	189000	1890	NA	ug/kg
Subsurface Soil	Hexachlorobutadiene	0%	ND	59.36	201000	2010	NA	ug/kg
Subsurface Soil	Hexachlorocyclopentadiene	0%	ND	386.43	34400000	344000	NA	ug/kg
Subsurface Soil	Hexachloroethane	0%	ND	193.81	37700	377	NA	ug/kg
Subsurface Soil	Indeno(1,2,3-Cd)Pyrene	10%	320	197.62	1400000	14000	NA	ug/kg
Subsurface Soil	Isophorone	0%	ND	193.81	20900	209	NA	ug/kg
Subsurface Soil	Methylene Chloride	88%	6.3	1.89	578	5.78	NA	ug/kg
Subsurface Soil	Naphthalene	6%	220	59.69	10100000	101000	NA	ug/kg
Subsurface Soil	Nitrobenzene	0%	ND	193.81	5390	53.9	NA	ug/kg
Subsurface Soil	N-Nitrosodi-N-Propylamine	0%	ND	193.81	1.89	0.0189	NA	ug/kg
Subsurface Soil	N-Nitrosodiphenylamine	0%	ND	193.81	78400	784	NA	ug/kg
Subsurface Soil	Pentachlorophenol	0%	ND	933.33	2110	21.1	NA	ug/kg
Subsurface Soil	Phenol	0%	ND	193.81	3750000	37500	NA	ug/kg

Table 4. Characterization Data Summary - By Analyte (IHSS Group 800-4)

Medium	Analyte	Detection Frequency	Maximum Concentration	Mean Concentration	Tier I Action Level	Tier II Action Level	Background Concentration	Unit
Subsurface Soil	Pyrene	38%	1600	276.90	397000000	3970000	NA	ug/kg
Subsurface Soil	Styrene	0%	ND	2.90	274000	2740	NA	ug/kg
Subsurface Soil	Trichloroethene	2%	4.3	2.92	3280	32.8	NA	ug/kg
Subsurface Soil	Tetrachloroethene	0%	ND	2.90	3150	31.5	NA	ug/kg
Subsurface Soil	Toluene	2%	3.25	2.87	707000	7070	NA	ug/kg
Subsurface Soil	Trans-1,3-Dichloropropene	0%	ND	2.90	120	1.2	NA	ug/kg
Subsurface Soil	Vinyl Chloride	0%	ND	2.90	346	3.46	NA	ug/kg
Subsurface Soil	Xylenes (Total)	2%	3.4	2.91	9740000	97400	NA	ug/kg
Surface Soil	Aluminum	100%	22200	13593.33	1000000	1000000	16902	mg/kg
Surface Soil	Antimony	6%	0.59	0.26	768	768	NA	mg/kg
Surface Soil	Arsenic	100%	8.6	4.11	299	10.09	10.09	mg/kg
Surface Soil	Barium	100%	141	79.03	133000	133000	141.26	mg/kg
Surface Soil	Beryllium	100%	1.2	0.64	104	1.04	0.966	mg/kg
Surface Soil	Cadmium	67%	0.3	0.14	1920	1920	1.612	mg/kg
Surface Soil	Chromium	100%	24.8	14.41	44300	4410	16.99	mg/kg
Surface Soil	Cobalt	100%	8.7	4.74	115000	115000	10.91	mg/kg
Surface Soil	Copper	100%	26.3	12.34	71100	71100	18.06	mg/kg
Surface Soil	Iron	100%	18900	12786.67	576000	576000	18037	mg/kg
Surface Soil	Lead	100%	59.1	11.55	1000	1000	54.62	mg/kg
Surface Soil	Lithium	100%	17.3	10.55	38400	38400	11.55	mg/kg
Surface Soil	Manganese	100%	332	185.06	83600	83600	365.08	mg/kg
Surface Soil	Mercury	100%	0.054	0.03	576	576	0.134	mg/kg
Surface Soil	Molybdenum	33%	0.35	0.12	9610	9610	NA	mg/kg
Surface Soil	Nickel	100%	19.7	10.55	38400	38400	14.91	mg/kg
Surface Soil	Selenium	22%	0.85	0.32	9610	9610	1.224	mg/kg
Surface Soil	Silver	0%	ND	0.03	9610	9610	NA	mg/kg
Surface Soil	Strontium	100%	171	44.54	1000000	1000000	48.94	mg/kg
Surface Soil	Tin	100%	3.6	2.81	1000000	1000000	NA	mg/kg
Surface Soil	Vanadium	100%	44	27.77	13400	13400	45.59	mg/kg
Surface Soil	Zinc	100%	71.6	40.01	576000	576000	73.76	mg/kg

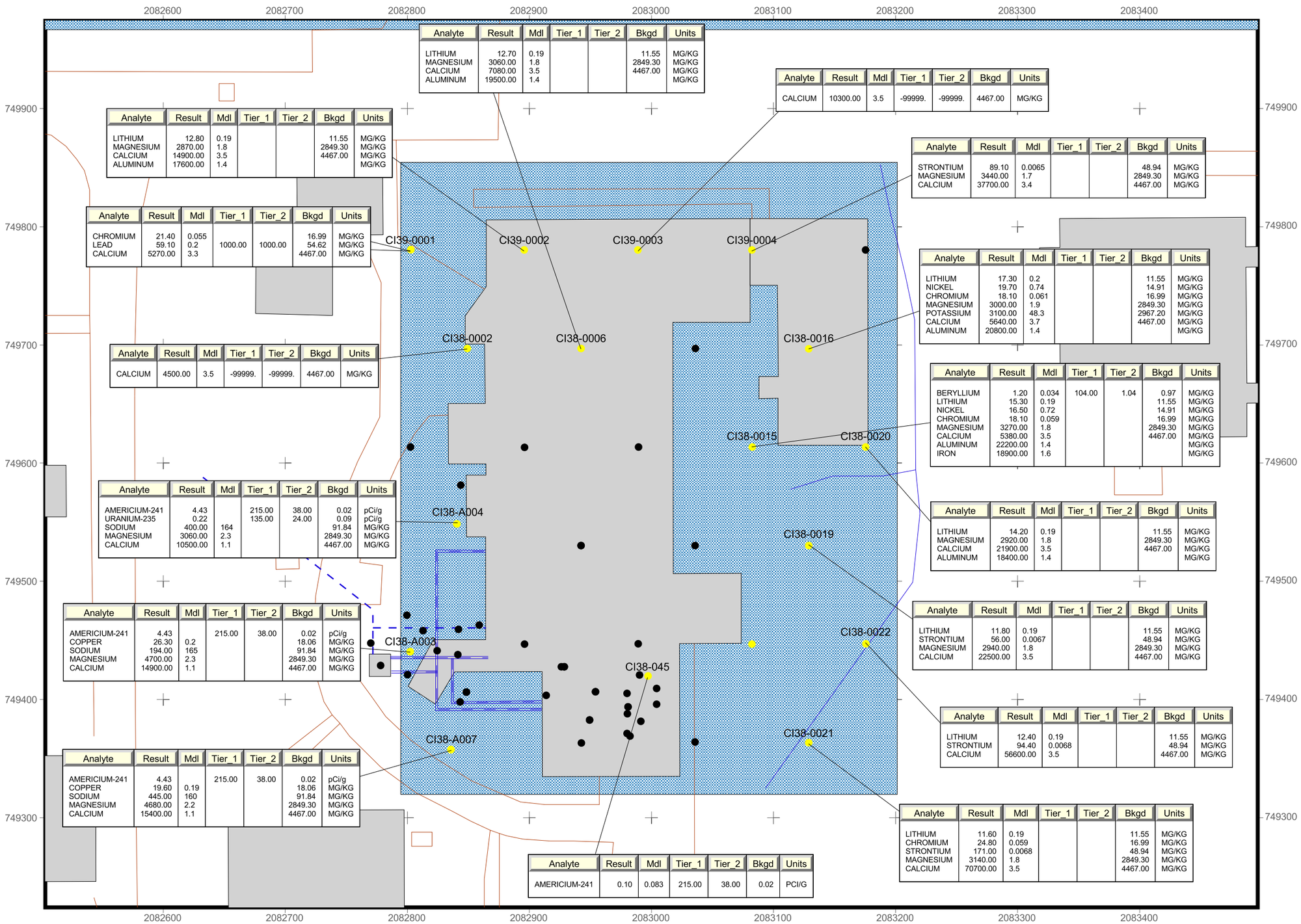
Table 4. Characterization Data Summary - By Analyte (IHSS Group 800-4)

Medium	Analyte	Detection Frequency	Maximum Concentration	Mean Concentration	Tier I Action Level	Tier II Action Level	Background Concentration	Unit
Surface Soil	Americium-241	89%	4.43	3.75	215	38	0.0227	pCi/g
Surface Soil	Plutonium-239/240	0%	ND	0.01	1429	252	0.066	pCi/g
Surface Soil	Uranium-234	100%	0.872	0.68	1738	307	2.253	pCi/g
Surface Soil	Uranium-235	84%	0.252	0.09	135	24	0.0939	pCi/g
Surface Soil	Uranium-238	100%	6.55	1.35	586	103	2	pCi/g

Note: Arsenic and beryllium background values used in place of Tier II ALs.

Figure 7a

IHSS Group 800-4 Surface Soil Characterization Sampling Results Above Detection Limits or Background



Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	12.70	0.19			11.55	MG/KG
MAGNESIUM	3060.00	1.8			2849.30	MG/KG
CALCIUM	7080.00	3.5			4467.00	MG/KG
ALUMINUM	19500.00	1.4				MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
CALCIUM	10300.00	3.5	-99999.	-99999.	4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	12.80	0.19			11.55	MG/KG
MAGNESIUM	2870.00	1.8			2849.30	MG/KG
CALCIUM	14900.00	3.5			4467.00	MG/KG
ALUMINUM	17600.00	1.4				MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
STRONTIUM	89.10	0.0065			48.94	MG/KG
MAGNESIUM	3440.00	1.7			2849.30	MG/KG
CALCIUM	37700.00	3.4			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
CHROMIUM	21.40	0.055			16.99	MG/KG
LEAD	59.10	0.2	1000.00	1000.00	54.62	MG/KG
CALCIUM	5270.00	3.3			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	17.30	0.2			11.55	MG/KG
NICKEL	19.70	0.74			14.91	MG/KG
CHROMIUM	18.10	0.061			16.99	MG/KG
MAGNESIUM	3000.00	1.9			2849.30	MG/KG
POTASSIUM	3100.00	48.3			2967.20	MG/KG
CALCIUM	5640.00	3.7			4467.00	MG/KG
ALUMINUM	20800.00	1.4				MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
CALCIUM	4500.00	3.5	-99999.	-99999.	4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
BERYLLIUM	1.20	0.034	104.00	1.04	0.97	MG/KG
LITHIUM	15.30	0.19			11.55	MG/KG
NICKEL	16.50	0.72			14.91	MG/KG
CHROMIUM	18.10	0.059			16.99	MG/KG
MAGNESIUM	3270.00	1.8			2849.30	MG/KG
CALCIUM	5380.00	3.5			4467.00	MG/KG
ALUMINUM	22200.00	1.4				MG/KG
IRON	18900.00	1.6				MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
AMERICIUM-241	4.43		215.00	38.00	0.02	pCi/g
URANIUM-235	0.22		135.00	24.00	0.09	pCi/g
SODIUM	400.00	164			91.84	MG/KG
MAGNESIUM	3060.00	2.3			2849.30	MG/KG
CALCIUM	10500.00	1.1			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	14.20	0.19			11.55	MG/KG
MAGNESIUM	2920.00	1.8			2849.30	MG/KG
CALCIUM	21900.00	3.5			4467.00	MG/KG
ALUMINUM	18400.00	1.4				MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
AMERICIUM-241	4.43		215.00	38.00	0.02	pCi/g
COPPER	26.30	0.2			18.06	MG/KG
SODIUM	194.00	165			91.84	MG/KG
MAGNESIUM	4700.00	2.3			2849.30	MG/KG
CALCIUM	14900.00	1.1			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	11.80	0.19			11.55	MG/KG
STRONTIUM	56.00	0.0067			48.94	MG/KG
MAGNESIUM	2940.00	1.8			2849.30	MG/KG
CALCIUM	22500.00	3.5			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	12.40	0.19			11.55	MG/KG
STRONTIUM	94.40	0.0068			48.94	MG/KG
CALCIUM	56600.00	3.5			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
AMERICIUM-241	4.43		215.00	38.00	0.02	pCi/g
COPPER	19.60	0.19			18.06	MG/KG
SODIUM	445.00	160			91.84	MG/KG
MAGNESIUM	4680.00	2.2			2849.30	MG/KG
CALCIUM	15400.00	1.1			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
LITHIUM	11.60	0.19			11.55	MG/KG
CHROMIUM	24.80	0.059			16.99	MG/KG
STRONTIUM	171.00	0.0068			48.94	MG/KG
MAGNESIUM	3140.00	1.8			2849.30	MG/KG
CALCIUM	70700.00	3.5			4467.00	MG/KG

Analyte	Result	Mdl	Tier_1	Tier_2	Bkgd	Units
AMERICIUM-241	0.10	0.083	215.00	38.00	0.02	PCI/G

Key

- Characterization Samples Greater Than MDLs or Background
- Characterization Samples
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale = 1:500

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared by:

KAISER•HILL COMPANY

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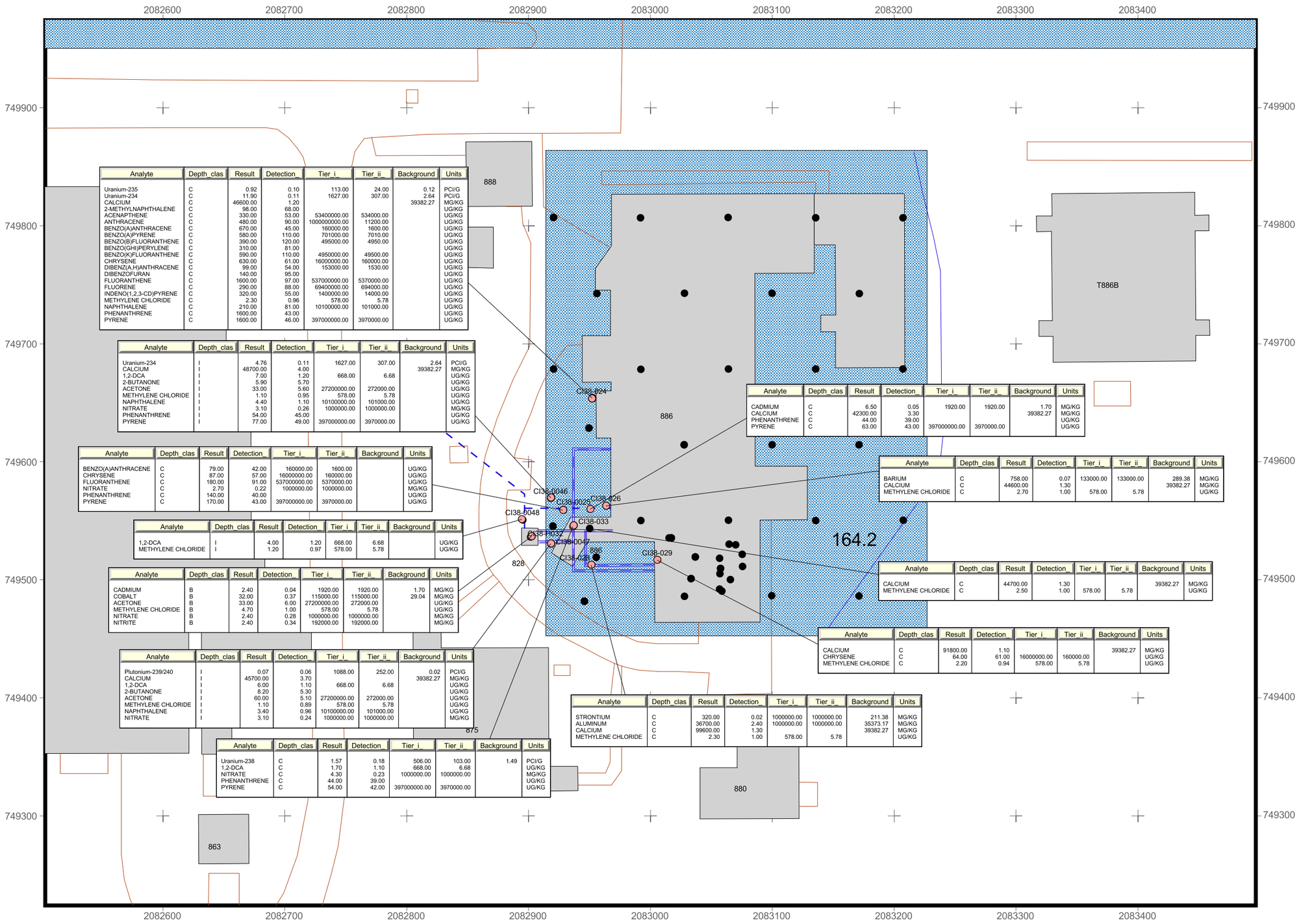

Analyte	Depth_clas	Result	Detection_	Tier_i_	Tier_ii_	Background	Units
Uranium-235	C	0.92	0.10	113.00	24.00	0.12	PCI/G
Uranium-234	C	11.90	0.11	1627.00	307.00	2.64	PCI/G
CALCIUM	C	46600.00	1.20			39382.27	MG/KG
2-METHYLNAPHTHALENE	C	98.00	68.00				UG/KG
ACENAPTHENE	C	330.00	53.00	53400000.00	534000.00		UG/KG
ANTHRACENE	C	480.00	90.00	1000000000.00	11200.00		UG/KG
BENZO(A)ANTHRACENE	C	670.00	45.00	160000.00	1600.00		UG/KG
BENZO(A)PYRENE	C	580.00	110.00	701000.00	7010.00		UG/KG
BENZO(B)FLUORANTHENE	C	390.00	120.00	495000.00	4950.00		UG/KG
BENZO(GHI)PERYLENE	C	310.00	81.00				UG/KG
BENZO(K)FLUORANTHENE	C	590.00	110.00	4950000.00	49500.00		UG/KG
CHRYSENE	C	630.00	61.00	16000000.00	160000.00		UG/KG
DIBENZ(A,H)ANTHRACENE	C	99.00	54.00	153000.00	1530.00		UG/KG
DIBENZOFURAN	C	140.00	95.00				UG/KG
FLUORANTHENE	C	1600.00	97.00	537000000.00	5370000.00		UG/KG
FLUORENE	C	290.00	88.00	69400000.00	694000.00		UG/KG
INDENO(1,2,3-CD)PYRENE	C	320.00	55.00	1400000.00	14000.00		UG/KG
METHYLENE CHLORIDE	C	2.30	0.96	578.00	5.78		UG/KG
NAPHTHALENE	C	210.00	81.00	10100000.00	101000.00		UG/KG
PHENANTHRENE	C	1600.00	43.00				UG/KG
PYRENE	C	1600.00	46.00	397000000.00	3970000.00		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i_	Tier_ii	Background	Units
Uranium-234	I	4.76	0.11	1627.00	307.00	2.64	PCI/G
CALCIUM	I	48700.00	4.00			39382.27	MG/KG
1,2-DCA	I	7.00	1.20	668.00	6.68		UG/KG
2-BUTANONE	I	5.90	5.70				UG/KG
ACETONE	I	33.00	5.60	27200000.00	272000.00		UG/KG
METHYLENE CHLORIDE	I	1.10	0.95	578.00	5.78		UG/KG
NAPHTHALENE	I	4.40	1.10	10100000.00	101000.00		UG/KG
NITRATE	I	3.10	0.26	1000000.00	1000000.00		MG/KG
PHENANTHRENE	I	54.00	45.00				UG/KG
PYRENE	I	77.00	49.00	397000000.00	3970000.00		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i_	Tier_ii	Background	Units
CADMIUM	C	6.50	0.05	1920.00	1920.00	1.70	MG/KG
CALCIUM	C	42300.00	3.30			39382.27	MG/KG
PHENANTHRENE	C	44.00	39.00				UG/KG
PYRENE	C	63.00	43.00	397000000.00	3970000.00		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i_	Tier_ii_	Background	Units
BENZO(A)ANTHRACENE	C	79.00	42.00	160000.00	1600.00		UG/KG
CHRYSENE	C	87.00	57.00	16000000.00	160000.00		UG/KG
FLUORANTHENE	C	180.00	91.00	537000000.00	5370000.00		UG/KG
NITRATE	C	2.70	0.22	1000000.00	1000000.00		MG/KG
PHENANTHRENE	C	140.00	40.00				UG/KG
PYRENE	C	170.00	43.00	397000000.00	3970000.00		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i_	Tier_ii_	Background	Units
BARIUM	C	758.00	0.07	133000.00	133000.00	289.38	MG/KG
CALCIUM	C	44600.00	1.30			39382.27	MG/KG
METHYLENE CHLORIDE	C	2.70	1.00	578.00	5.78		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i	Tier_ii	Background	Units
1,2-DCA	I	4.00	1.20	668.00	6.68		UG/KG
METHYLENE CHLORIDE	I	1.20	0.97	578.00	5.78		UG/KG

Analyte	Depth_clas	Result	Detection_	Tier_i_	Tier_ii_	Background	Units
CALCIUM	C	44700.00	1.30			39382.27	MG/KG
METHYLENE CHLORIDE	C	2.50	1.00	578.00	5.78		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i_	Tier_ii_	Background	Units
CADMIUM	B	2.40	0.04	1920.00	1920.00	1.70	MG/KG
COBALT	B	32.00	0.37	115000.00	115000.00	29.04	MG/KG
ACETONE	B	33.00	6.00	27200000.00	272000.00		UG/KG
METHYLENE CHLORIDE	B	4.70	1.00	578.00	5.78		UG/KG
NITRATE	B	2.40	0.28	1000000.00	1000000.00		MG/KG
NITRITE	B	2.40	0.34	192000.00	192000.00		MG/KG

Analyte	Depth_clas	Result	Detection	Tier_i	Tier_ii	Background	Units
CALCIUM	C	91800.00	1.10			39382.27	MG/KG
CHRYSENE	C	64.00	61.00	16000000.00	160000.00		UG/KG
METHYLENE CHLORIDE	C	2.20	0.94	578.00	5.78		UG/KG

Analyte	Depth_clas	Result	Detection_	Tier_i_	Tier_ii_	Background	Units
Plutonium-239/240	I	0.07	0.06	1088.00	252.00	0.02	PCI/G
CALCIUM	I	45700.00	3.70			39382.27	MG/KG
1,2-DCA	I	6.00	1.10	668.00	6.68		UG/KG
2-BUTANONE	I	8.20	5.30				UG/KG
ACETONE	I	60.00	5.10	27200000.00	272000.00		UG/KG
METHYLENE CHLORIDE	I	1.10	0.89	578.00	5.78		UG/KG
NAPHTHALENE	I	3.40	0.96	10100000.00	101000.00		UG/KG
NITRATE	I	3.10	0.24	1000000.00	1000000.00		MG/KG

Analyte	Depth_clas	Result	Detection_	Tier_i_	Tier_ii_	Background	Units
STRONTIUM	C	320.00	0.02	1000000.00	1000000.00	211.38	MG/KG
ALUMINUM	C	36700.00	2.40	1000000.00	1000000.00	35373.17	MG/KG
CALCIUM	C	99600.00	1.30			39382.27	MG/KG
METHYLENE CHLORIDE	C	2.30	1.00	578.00	5.78		UG/KG

Analyte	Depth_clas	Result	Detection	Tier_i_	Tier_ii_	Background	Units
Uranium-238	C	1.57	0.18	506.00	103.00	1.49	PCI/G
1,2-DCA	C	1.70	1.10	668.00	6.68		UG/KG
NITRATE	C	4.30	0.23	1000000.00	1000000.00		MG/KG
PHENANTHRENE	C	44.00	39.00				UG/KG
PYRENE	C	54.00	42.00	397000000.00	3970000.00		UG/KG

Figure 7b

IHSS Group 800-4 Subsurface Soil Characterization Sampling Results Above Detection Limits or Background

Key

- Characterization Samples Greater Than MDLs or Background
- Characterization Samples
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale = 1:650

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared by:

KAISER•HILL COMPANY

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Table 5. Characterization RFCA Sum of Ratios (IHSS Group 800-4)

Location	Tier I SOR Radionuclide	Tier II SOR Radionuclide	Tier I SOR Nonradionuclide	Tier II SOR Nonradionuclide
Surface Soil				
CI38-0002	0.02	0.14	0.07	1.32
CI38-A003	0.02	0.13	0.06	0.69
CI38-A004	0.02	0.14	0.05	0.54
CI38-0006	0.02	0.14	0.08	1.47
CI38-A007	0.02	0.13	0.06	0.81
CI38-0011	0.03	0.19	0.07	1.18
CI38-0015	0.03	0.15	0.10	1.83
CI38-0016	0.03	0.14	0.10	1.76
CI38-0018	0.03	0.15	0.07	1.20
CI38-0019	0.03	0.14	0.07	1.16
CI38-0020	0.02	0.14	0.09	1.47
CI38-0021	0.03	0.14	0.07	0.94
CI38-0022	0.03	0.17	0.07	1.13
CI38-A034	0.02	0.12	NA	NA
CI38-A035	0.02	0.12	NA	NA
CI38-A036	0.02	0.12	NA	NA
CI38-A037	0.02	0.12	NA	NA
CI38-A038	0.02	0.12	NA	NA
CI38-041	0.02	0.14	NA	NA
CI38-042	0.02	0.13	NA	NA
CI38-043	0.02	0.13	NA	NA
CI38-044	0.02	0.13	NA	NA
CI38-045	0.05	0.28	NA	NA
CI39-0001	0.03	0.15	0.09	0.56
CI39-0002	0.03	0.15	0.07	1.12
CI39-0003	0.03	0.15	0.04	0.68
CI39-0004	0.03	0.14	0.04	0.53
CI39-0005	0.02	0.14	0.05	0.96
Room 101, A	0.05	0.26	NA	NA
Room 101, B	0.02	0.13	NA	NA
Room 101, C	0.02	0.14	NA	NA
Room 101, D	0.02	0.12	NA	NA
Subsurface Soil				
CI38-0001	0.03	0.15	0.08	0.68
CI38-0002	0.03	0.15	0.10	2.87
CI38-B003	0.03	0.14	0.09	0.69
CI38-B004	0.02	0.13	0.08	0.71
CI38-0005	0.03	0.14	0.05	0.45
CI38-0006	0.03	0.16	0.08	1.01
CI38-B007	0.03	0.15	0.07	0.62
CI38-0008	0.03	0.14	0.09	0.72
CI38-0009	0.03	0.15	0.05	0.44

Table 5. Characterization RFCA Sum of Ratios (IHSS Group 800-4)

Location	Tier I SOR Radionuclide	Tier II SOR Radionuclide	Tier I SOR Nonradionuclide	Tier II SOR Nonradionuclide
CI38-0010	0.03	0.15	0.08	0.69
CI38-0011	0.03	0.14	0.07	0.75
CI38-0012	0.03	0.15	0.07	0.48
CI38-0013	0.03	0.15	0.13	1.10
CI38-0014	0.03	0.14	0.13	1.16
CI38-0015	0.03	0.14	0.10	1.01
CI38-0016	0.03	0.14	0.05	0.92
CI38-0017	0.03	0.16	0.06	0.54
CI38-0018	0.03	0.14	0.08	0.86
CI38-0019	0.04	0.19	0.08	0.80
CI38-0020	0.03	0.15	0.08	1.42
CI38-0021	0.03	0.15	0.11	1.37
CI38-0022	0.03	0.14	0.11	1.67
CI38-0023	0.03	0.14	0.07	0.50
CI38-024	0.03	0.17	0.09	1.56
CI38-0025	0.03	0.14	0.07	0.36
CI38-026	0.03	0.14	0.10	1.07
CI38-0027	0.03	0.14	0.06	0.57
CI38-028	0.03	0.15	0.12	1.23
CI38-029	0.02	0.12	0.08	0.95
CI38-0031	0.02	0.13	0.07	0.54
CI38-H032	0.00	0.00	0.06	1.10
CI38-033	0.03	0.15	0.10	0.93
CI38-0046	0.03	0.15	0.08	1.41
CI38-0047	0.03	0.16	0.09	1.60
CI38-0048	0.02	0.13	0.10	1.38
CI39-0001	0.03	0.15	0.11	1.39
CI39-0002	0.02	0.13	0.05	0.57
CI39-0003	0.03	0.15	0.11	1.20
CI39-0004	0.03	0.15	0.08	0.93
CI39-0005	0.03	0.15	0.05	0.94
CI39-0009	0.03	0.15	0.06	0.41

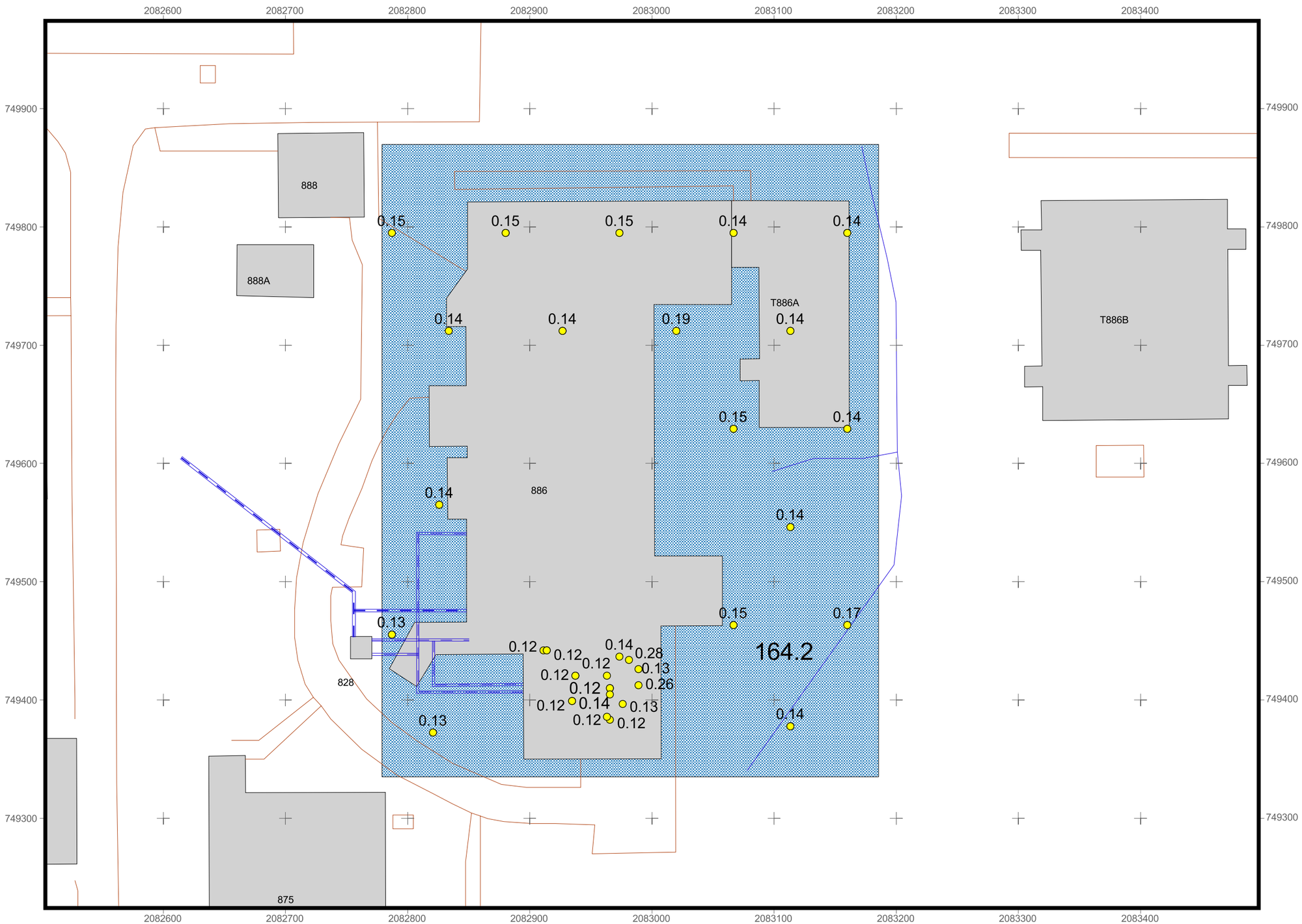

Figure 8a

IHSS Group 800-4 Surface Soil Characterization Samples RFCA Tier II Sum of Ratios (Radionuclides)

Key

- Characterization Sampling Locations
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale = 1:500

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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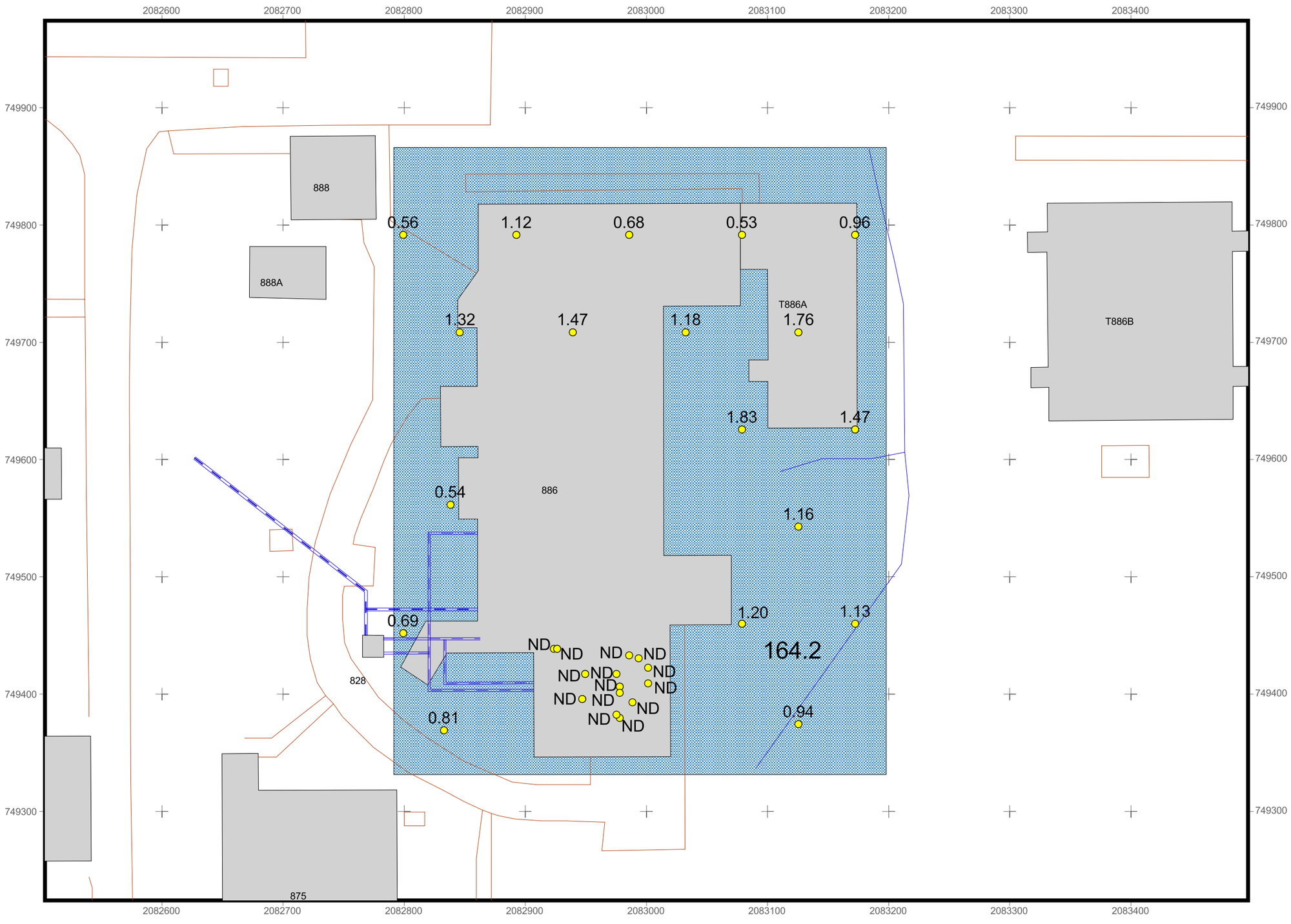

Figure 8b

IHSS Group 800-4 Surface Soil Characterization Samples RFCA Tier II Sum of Ratios (Nonradionuclides)

Key

- Characterization Sampling Locations
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

ND No Data

N

Scale = 1:500

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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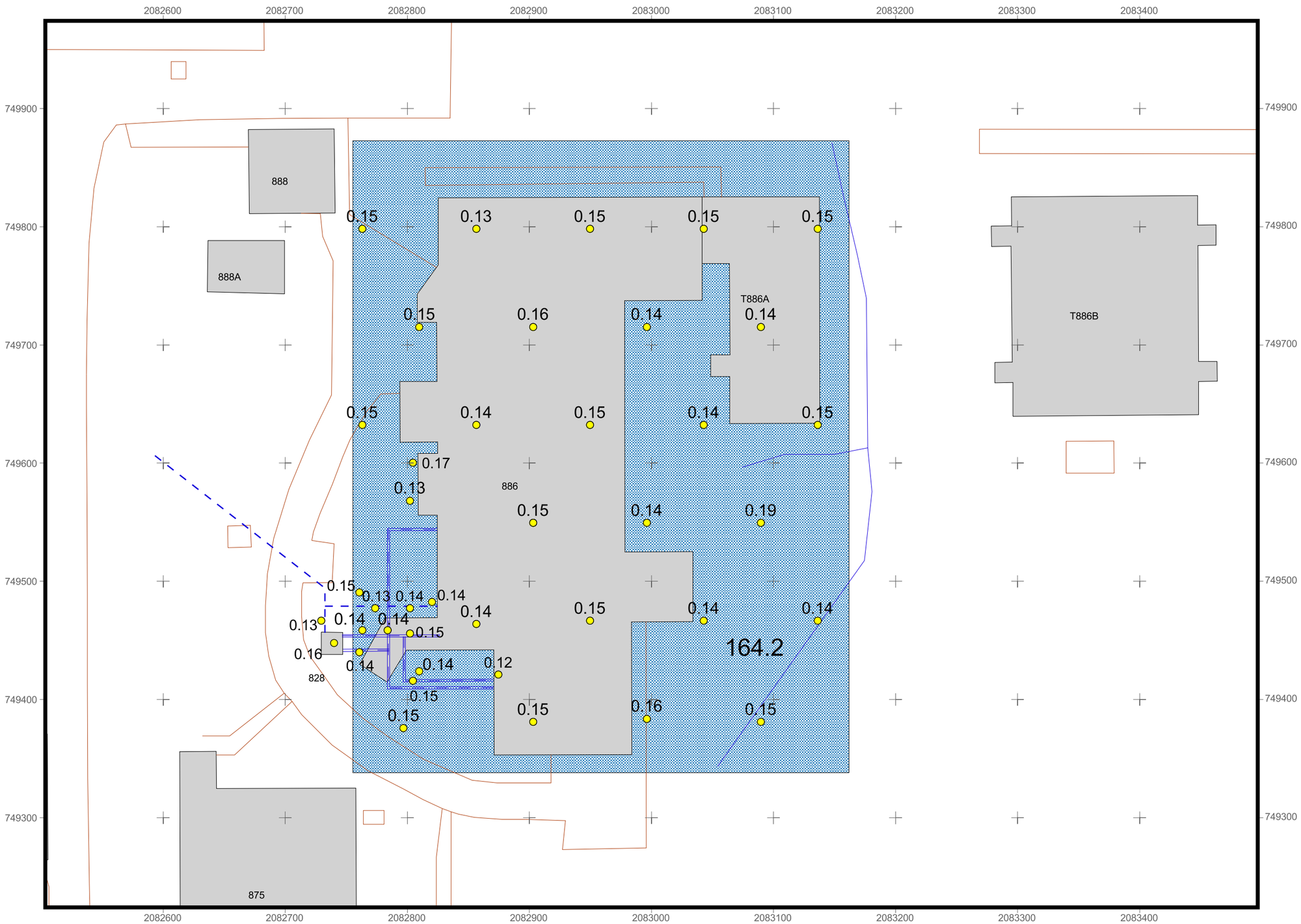

Figure 8c

IHSS Group 800-4 Subsurface Soil Characterization Samples RFCA Tier II Sum of Ratios (Radionuclides)

Key

- Characterization Sampling Locations
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale = 1:500

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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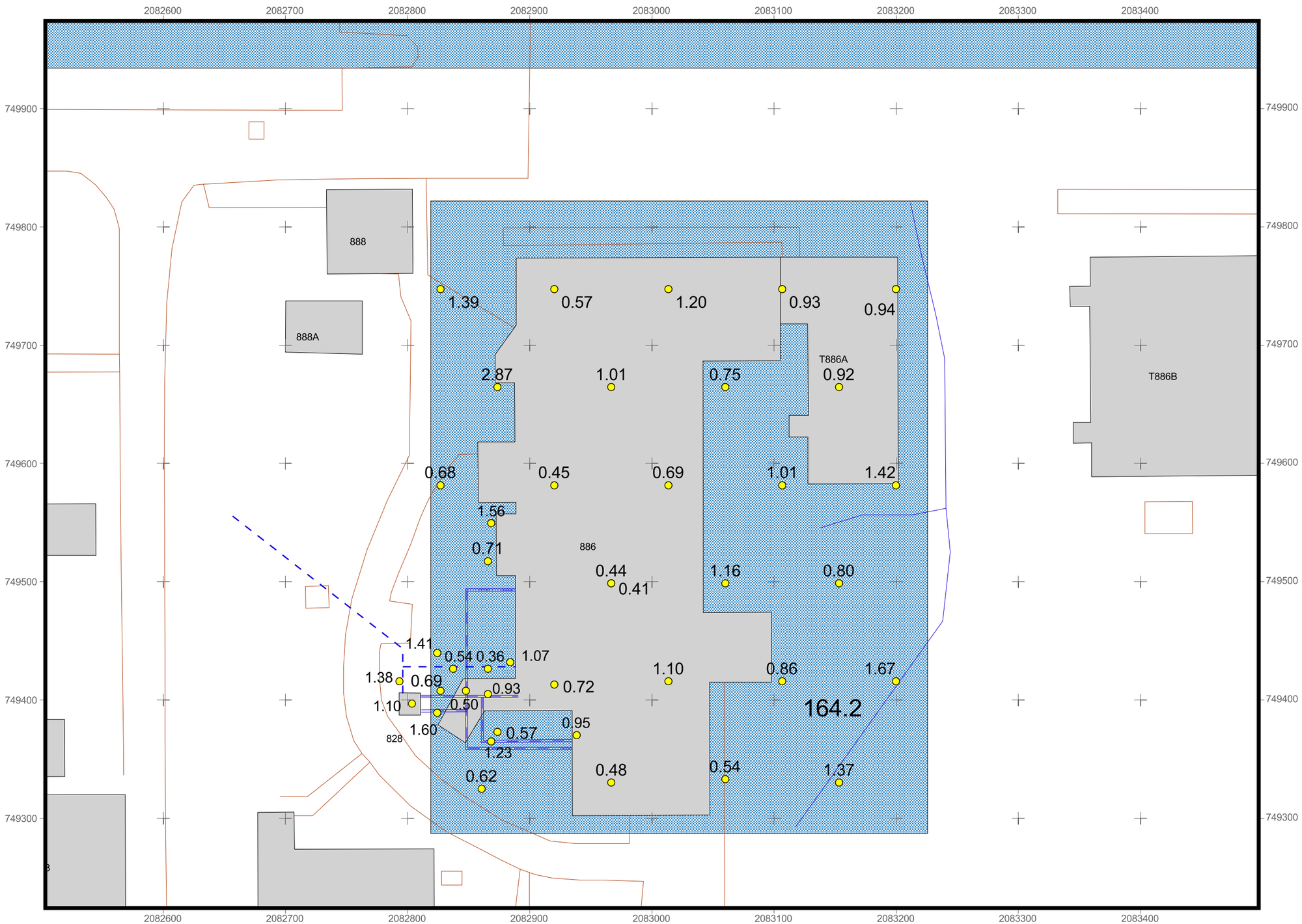

Figure 8d

IHSS Group 800-4 Subsurface Soil Characterization Samples RFCA Tier II Sum of Ratios (Nonradionuclides)

Key

- Characterization Sampling Locations
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale = 1:500

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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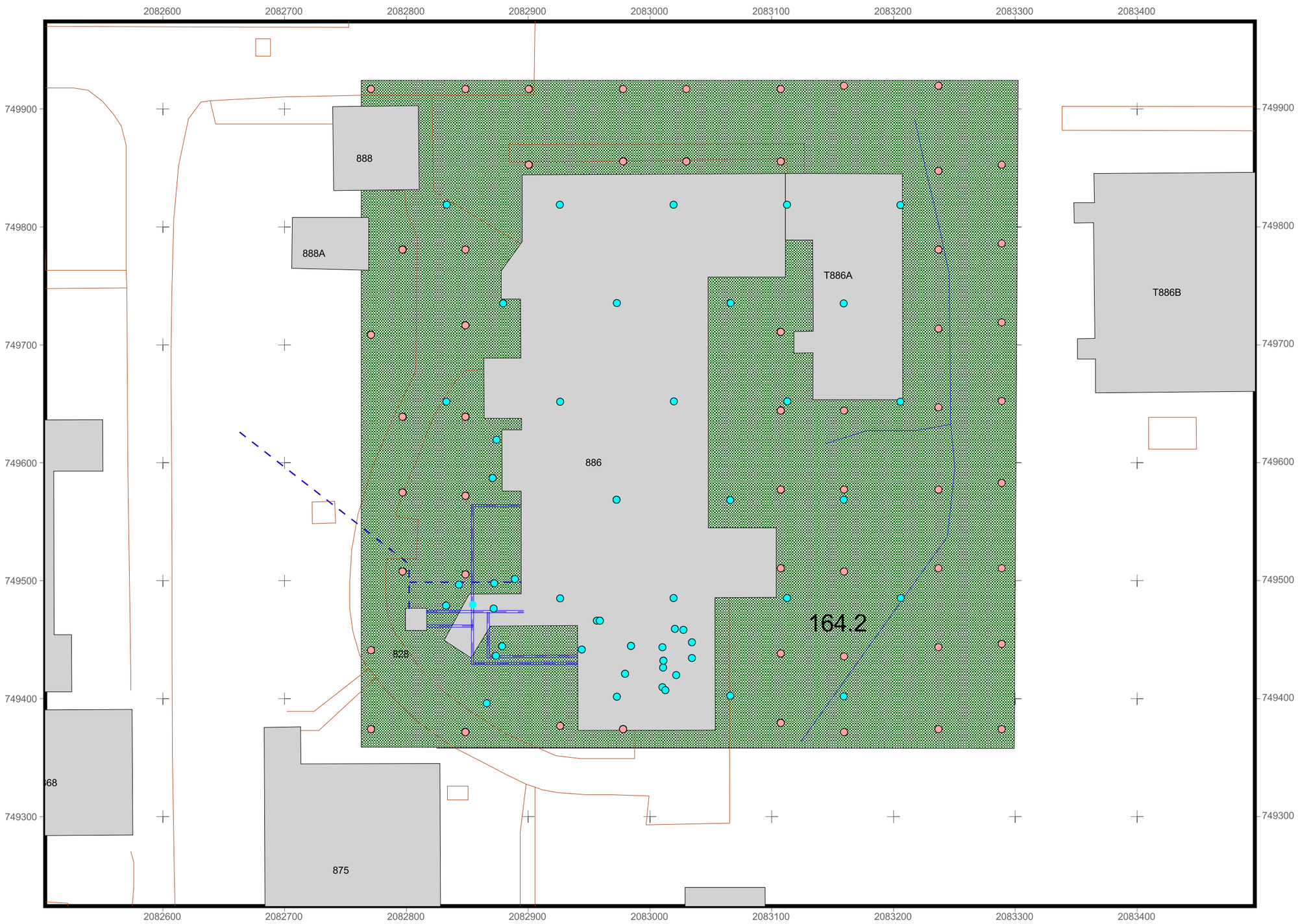

Figure 9

IHSS Group 800-4 Area of Concern

Key

- Characterization Samples Greater Than MDLs or Background
- Legacy HDDSamples Greater Than MDLs or Background
- Characterization Samples Less Than MDLs or Background
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- Area of Concern

N

Scale = 1:500

20 0 20 40 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Table 6. 95% UCL Summary for Subsurface Soil COCs

Analyte	Detection Frequency	Max	Mean	Number Samples	SD	95% UCL	Background	Tier I	Tier II	Tier II SOR	Units
Aluminum	**100.00%**	**36700**	**15031.33**	**60**	**6479.83**	**16407.45**	**35373.17**	**1000000.00**	**1000000.00**	**0.02**	**mg/kg**
Arsenic	**100.00%**	**16.6**	**5.16**	**60**	**2.64**	**5.72**	**13.14**	**299.00**	**13.14**	**0.44**	**mg/kg**
Barium	**100.00%**	**758**	**124.47**	**60**	**95.89**	**144.83**	**289.38**	**133000.00**	**133000.00**	**0.00**	**mg/kg**
Beryllium	**100.00%**	**1.5**	**0.58**	**60**	**0.27**	**0.64**	**14.20**	**104.00**	**14.20**	**0.05**	**mg/kg**
Cadmium	**78.33%**	**6.5**	**0.33**	**60**	**0.87**	**0.52**	**1.70**	**1920.00**	**1920.00**	**0.00**	**mg/kg**
Cobalt	**100.00%**	**32**	**5.18**	**60**	**4.23**	**6.08**	**29.04**	**115000.00**	**115000.00**	**0.00**	**mg/kg**
Copper	**100.00%**	**21.9**	**9.60**	**60**	**3.69**	**10.38**	**38.21**	**71100.00**	**71100.00**	**0.00**	**mg/kg**
Iron	**100.00%**	**19900**	**11332.33**	**60**	**3709.79**	**12120.18**	**41046.52**	**576000.00**	**576000.00**	**0.02**	**mg/kg**
Lead	**100.00%**	**54.9**	**10.10**	**60**	**7.47**	**11.69**	**24.97**	**1000.00**	**1000.00**	**0.01**	**mg/kg**
Lithium	**100.00%**	**27.9**	**12.94**	**60**	**5.45**	**14.10**	**34.66**	**38400.00**	**38400.00**	**0.00**	**mg/kg**
Mercury	**100.00%**	**0.11**	**0.03**	**60**	**0.02**	**0.04**	**1.52**	**576.00**	**576.00**	**0.00**	**mg/kg**
Nickel	**100.00%**	**26**	**12.00**	**60**	**5.08**	**13.07**	**62.21**	**38400.00**	**38400.00**	**0.00**	**mg/kg**
Nitrate	87.50%	4.3	2.98	8	0.60	3.33	NA	1000000.00	1000000.00	0.00	mg/kg
Nitrite	12.50%	3.25	2.86	8	0.27	3.02	NA	192000.00	192000.00	0.00	mg/kg
Sodium	**21.67%**	**1670**	**160.01**	**60**	**317.57**	**227.45**	**1251.24**	**NA**	**NA**	**NA**	**mg/kg**
Strontium	**100.00%**	**415**	**124.41**	**60**	**90.24**	**143.58**	**211.38**	**1000000.00**	**1000000.00**	**0.00**	**mg/kg**
Thallium	**16.67%**	**4.3**	**0.60**	**60**	**0.58**	**0.72**	**1.84**	**NA**	**NA**		**mg/kg**
Zinc	**100.00%**	**79.4**	**31.14**	**60**	**14.42**	**34.20**	**139.10**	**576000.00**	**576000.00**	**0.00**	**mg/kg**
1,1,1-Trichloroethane	**4.00%**	**14**	**3.10**	**50**	**1.59**	**3.46**	**NA**	**94800.00**	**948.00**	**0.00**	**ug/kg**
1,2-Dichloroethane	**28.00%**	**8.3**	**2.93**	**50**	**1.24**	**3.22**	**NA**	**668.00**	**6.68**	**0.48**	**ug/kg**
Acenapthene	9.52%	330	200.48	21	32.36	212.09	NA	53400000.00	534000.00	0.00	ug/kg
Acetone	42.00%	83	16.89	50	15.25	20.44	NA	27200000.00	272000.00	0.00	ug/kg
Anthracene	9.52%	480	220.00	21	84.16	250.21	NA	1000000000.00	11200.00	0.02	ug/kg
Benzo(A)Anthracene	19.05%	670	216.33	21	123.07	260.51	NA	160000.00	1600.00	0.16	ug/kg
Benzo(A)Pyrene	9.52%	580	218.10	21	88.31	249.80	NA	701000.00	7010.00	0.04	ug/kg
Benzo(B)Fluoranthene	9.52%	390	205.24	21	45.37	221.53	NA	495000.00	4950.00	0.04	ug/kg
Benzo(K)Fluoranthene	9.52%	590	218.57	21	90.36	251.01	NA	4950000.00	49500.00	0.01	ug/kg
Chrysene	23.81%	630	210.14	21	119.67	253.10	NA	16000000.00	160000.00	0.00	ug/kg
Dibenz(A,H)Anthracene	4.76%	220	189.48	21	24.42	198.24	NA	153000.00	1530.00	0.13	ug/kg
Fluoranthene	19.05%	1600	301.90	21	357.71	430.31	NA	537000000.00	5370000.00	0.00	ug/kg
Fluorene	9.52%	290	200.00	21	25.54	209.17	NA	69400000.00	694000.00	0.00	ug/kg

Table 6. 95% UCL Summary for Subsurface Soil COCs

Analyte	Detection Frequency	Max	Mean	Number Samples	SD	95% UCL	Background	Tier I	Tier II	Tier II SOR	Units
Indeno(1,2,3-Cd)Pyrene	9.52%	320	197.62	21	32.27	209.20	NA	1400000.00	14000.00	0.01	ug/kg
Methylene Chloride	88.00%	6.3	1.89	50	1.00	2.13	NA	578.00	5.78	0.37	ug/kg
Naphthalene	5.63%	220	59.69	71	88.45	76.95	NA	10100000.00	101000.00	0.00	ug/kg
Pyrene	38.10%	1600	276.90	21	369.52	409.55	NA	397000000.00	3970000.00	0.00	ug/kg
Trichloroethene	2.00%	4.3	2.92	100	0.27	2.96	NA	3280.00	32.80	0.09	ug/kg
Toluene	2.00%	3.25	2.87	50	0.25	2.93	NA	707000.00	7070.00	0.00	ug/kg
Xylenes (Total)	2.00%	3.4	2.91	50	0.19	2.96	NA	9740000.00	97400.00	0.00	ug/kg
RFCA Tier II SOR (excludes methylene chloride because of its status as a blank contaminant)										1.53	
RFCA Tier II SOR (compounds with 95% UCL < background were excluded from SOR calculation)										0.51	

Notes:

1. Bold typface denotes 95% UCL less than background.
2. Beryllium Tier II AL(1.04 mg/kg) replaced with background value (14.2 mg/kg).
3. Arsenic Tier II AL(2.99 mg/kg) replaced with background value (13.14 mg/kg).

Table 7 95% UCL Summary for Surface Soil COCs

Analyte	Detection Frequency	Max	Mean	Number of Samples	SD	95% UCL	Background	Tier I	Tier II	Tier II SOR	Units
Aluminum	**100%**	**22200**	**13593.33**	**18**	**4967.00**	**15519.19**	**16902**	**1000000**	**1000000**	**0.02**	**mg/kg**
Arsenic	**100%**	**8.6**	**4.11**	**18**	**1.93**	**4.86**	**10.09**	**299**	**10.09**	**0.48**	**mg/kg**
Barium	**100%**	**141**	**79.03**	**18**	**25.33**	**88.85**	**141.26**	**133000**	**133000**	**0.00**	**mg/kg**
Beryllium	**100%**	**1.2**	**0.64**	**18**	**0.24**	**0.74**	**0.966**	**104**	**1.04**	**0.71**	**mg/kg**
Cadmium	**67%**	**0.3**	**0.14**	**18**	**0.10**	**0.18**	**1.612**	**1920**	**1920**	**0.00**	**mg/kg**
Cobalt	**100%**	**8.7**	**4.74**	**18**	**1.40**	**5.28**	**10.91**	**115000**	**115000**	**0.00**	**mg/kg**
Copper	**100%**	**26.3**	**12.34**	**18**	**4.82**	**14.21**	**18.06**	**71100**	**71100**	**0.00**	**mg/kg**
Iron	**100%**	**18900**	**12786.67**	**18**	**3062.01**	**13973.90**	**18037**	**576000**	**576000**	**0.02**	**mg/kg**
Lead	**100%**	**59.1**	**11.55**	**18**	**12.13**	**16.25**	**54.62**	**1000**	**1000**	**0.02**	**mg/kg**
Lithium	100%	17.3	10.55	18	3.20	11.79	11.55	38400	38400	0.00	mg/kg
Mercury	**100%**	**0.054**	**0.03**	**18**	**0.01**	**0.03**	**0.134**	**576**	**576**	**0.00**	**mg/kg**
Nickel	**100%**	**19.7**	**10.55**	**18**	**3.83**	**12.04**	**14.91**	**38400**	**38400**	**0.00**	**mg/kg**
Strontium	100%	171	44.54	18	38.85	59.60	48.94	1000000	1000000	0.00	mg/kg
Zinc	**100%**	**71.6**	**40.01**	**18**	**16.58**	**46.43**	**73.76**	**576000**	**576000**	**0.00**	**mg/kg**
Americium-241	89%	4.43	3.71	55	1.64	4.07	0.0227	215	38	0.11	pCi/g
Plutonium-239/240	0%	ND	0.00	9	0.02	0.01	0.066	1429	252	0.00	pCi/g
Uranium-235	84%	0.263	0.09	55	0.09	0.11	0.0939	135	24	0.00	pCi/g
Uranium-238	100%	6.55	1.40	55	1.28	1.68	2	586	103	0.02	pCi/g
RFCA Tier II SOR										1.25	
RFCA Tier II SOR (compounds with 95% UCL < background were excluded from SOR calculation.										0.00	

Notes:

1. Bold typeface denotes 95% UCL less than background.

2. Arsenic Tier II AL(2.99 mg/kg) replaced with background value (10.09 mg/kg)

3.0 ACCELERATED ACTION

Accelerated action objectives were developed and described in ER RSOP Notification #02-03 (DOE 2002b). The accelerated action objectives for IHSS Group 800-4 included the following:

- Remove the Building 886 slab and dispose or disposition the concrete according to the RSOP for Recycling Concrete (DOE 1999);
- Remove contaminated soil (if any) associated with the Building 828 sump and tanks to below Tier I ALs;
- Remove contaminated subsurface soil (if any);
- Remove contaminated soil (if any) associated with OPWL to below RFCA Tier ALs; and
- Disrupt the foundation drain potential pathway.

All removal activities were completed by the Remediation, Industrial Deactivation & Decommissioning (D&D) and Site Services (RISS) organization in accordance with the Interim Measure/Interim Remedial Action (IM/IRA) Plan for the 886 Cluster (RMRS 1998); the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities (DOE 2002c); and the RSOP for Facility Disposition (DOE 2000b). The ER Program's involvement in the project was limited to characterization sampling in accordance with IASAP Addendum #IA-02-03, as detailed in Section 2.4. Sampling activities were conducted beginning March 14, 2002, and concluding on June 13, 2002. No contamination above RFCA Tier I ALs was found and no further consultation with the regulatory agencies resulted in the need to remove surface or subsurface soils. Project photographs are provided in Appendix B.

D&D activities are documented in the Final Project Closeout Report for the 886 Cluster Closure Project (K-H, 2002). Facility stripout began in the late 1990s, during which time equipment was removed from Buildings 886 and 828, and the OPWL were drained and the ends grouted closed. Facility demolition was initiated on April 1, 2002, and completed on April 23, 2002. During this time, the Building 886 slab and Building 828 Pit were removed, as were OPWL P-63 and P-64. OPWL P-65 and P-66, which appeared on facility engineering drawings, were not found and there was no evidence that they had ever been installed (i.e., there were no penetrations into the north side of the Building 828 Pit) (see Figure 10). Gravel and soils from the excavated areas were temporarily stockpiled just north of the former Building 828 Pit. Samples were collected from the soil stockpile to determine the final disposition. Results are shown in Table 8. Because analytical results from the stockpile samples did not exceed RFCA Tier II subsurface soil ALs, this material was placed back into the excavations. In addition, the foundation drain was grouted to disrupt the potential pathway to groundwater, as was the sanitary sewer line. The following remaining features are shown on Figure 10:

- Portions of the ventilation tunnel that ran between Building 886 and Building 875 (walls and floor of tunnel >3 feet below grade),
- An electrical manhole (>3 feet below grade),
- The grouted foundation drain (>3 feet below grade), and

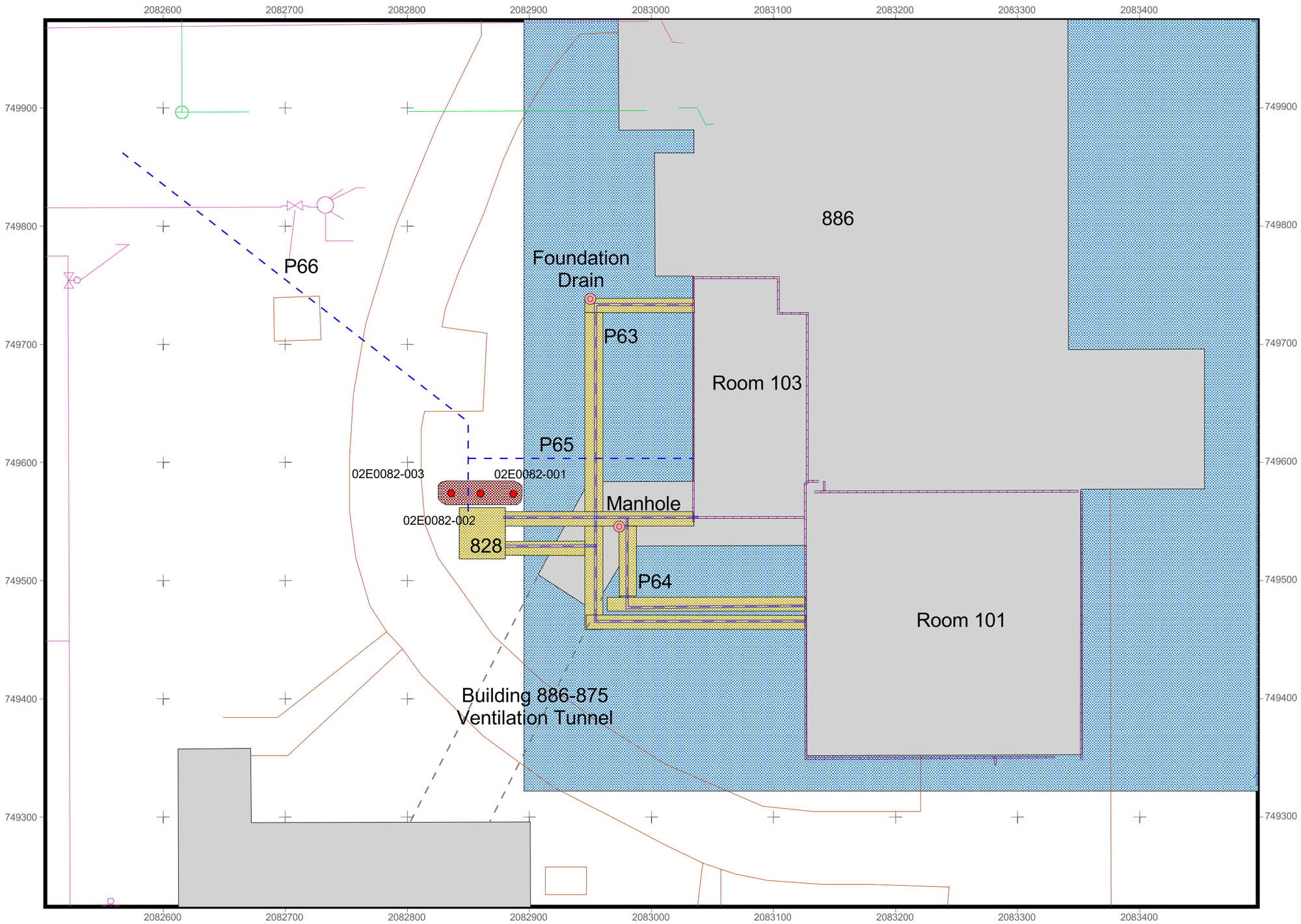

Figure 10

IHSS Group 800-4 OPWL Removed

Key

- Waste Characterization Samples
- Streams
- OPWL Removed
- OPWL Not Found
- Sewer Line Left In Place
- Water Line Left In Place
- Dirt Roads
- Building
- IHSS
- Soil Pile
- Excavation

N

Scale = 1:250

10 0 10 20 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Table 8. Sample Results for Excavated Soils

Matrix Type	Analyte	Number Samples	Maximum	Detection Frequency	Tier I AL	Tier II AL	Units
Gravel	Actinium	1	1.74	100%	NA	NA	pCi/g
Gravel	Americium-241	1	4.43	100%	215	38	pCi/g
Gravel	Bismuth-212	1	2.06	100%	NA	NA	pCi/g
Gravel	Bismuth-214	1	0.823	100%	NA	NA	pCi/g
Gravel	Cesium-134	1	0	100%	NA	NA	pCi/g
Gravel	Potassium-40	1	20.1	100%	NA	NA	pCi/g
Gravel	Protactinium-234	1	0	100%	NA	NA	pCi/g
Gravel	Protactinium-234m	1	0	100%	NA	NA	pCi/g
Gravel	Lead-212	1	1.64	100%	NA	NA	pCi/g
Gravel	Lead-214	1	0.848	100%	NA	NA	pCi/g
Gravel	Polonium-210	1	0	100%	NA	NA	pCi/g
Gravel	Radium Bromide	1	2.55	100%	NA	NA	pCi/g
Gravel	Thorium-231	1	0	100%	NA	NA	pCi/g
Gravel	Thorium-230	1	0	100%	NA	NA	pCi/g
Gravel	Thallium-208	1	0.515	100%	NA	NA	pCi/g
Gravel	Uranium-235	1	0	100%	135	24	pCi/g
Gravel	Uranium-238	1	2.62	100%	586	103	pCi/g
Soil	Actinium	8	1.49	100%	NA	NA	pCi/g
Soil	Americium-241	10	4.43	90%	215	38	pCi/g
Soil	Bismuth-212	8	1.87	100%	NA	NA	pCi/g
Soil	Bismuth-214	8	0.614	100%	NA	NA	pCi/g
Soil	Cesium-134	8	0	100%	NA	NA	pCi/g
Soil	Potassium-40	8	15.3	100%	NA	NA	pCi/g
Soil	Protactinium-234	8	0	100%	NA	NA	pCi/g
Soil	Protactinium-234m	8	0	100%	NA	NA	pCi/g
Soil	Lead-212	8	1.23	100%	NA	NA	pCi/g
Soil	Lead-214	8	0.766	100%	NA	NA	pCi/g
Soil	Polonium-210	8	0	100%	NA	NA	pCi/g
Soil	Radium Bromide	8	3.62	100%	NA	NA	pCi/g
Soil	Thorium-231	8	0	100%	NA	NA	pCi/g
Soil	Thorium-230	8	0	100%	NA	NA	pCi/g
Soil	Thallium-208	8	0.489	100%	NA	NA	pCi/g
Soil	Uranium-234	2	0.856	100%	1738	307	pCi/g
Soil	Uranium-235	10	0.263	80%	135	24	pCi/g
Soil	Uranium-238	10	3.15	100%	586	103	pCi/g

- The sanitary sewer line running west from the midpoint on the west side of Building 886, to approximately the midpoint between Building 886 and Building 865, then north to a manhole in the driveway leading to Building 865 where it was disconnected and grouted shut (approximately 6 feet deep).

4.0 ACCELERATED ACTION GOALS

ER RSOP Notification #02-03 (DOE 2002b) accelerated action project objectives were achieved through the following:

- The Building 886 concrete slab and OPWL were removed by RISS D&D in accordance with the IM/IRA IRA Plan for the 886 Cluster (RMRS 1998), the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities (DOE 2002c), and the RSOP for Facility Disposition (DOE 2000b). Concrete was disposed or dispositioned in accordance with the RSOP for Recycling Concrete (DOE 1999).

- The foundation drain was disrupted by RISS D&D to eliminate the potential pathway to surface water.

- No surface or subsurface soils were found to contain contaminant concentrations greater than RFCA Tier I ALs; therefore, no soils were removed from the area.

Removal activities were consistent with and contributed to the ER RSOP overall long-term remedial action objectives (RAOs) for RFETS soil. This contribution is described below.

- RAO 1: Provide a remedy consistent with the RFETS goal of protection of human health and the environment. Removal of the Building 886 slab and OPWL contributed to the protection of human health and the environment because potential sources of contamination have been removed.

- RAO 2: Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls. Removal of the Building 886 slab and OPWL minimizes the need for long-term maintenance and institutional or engineering controls because potential sources of contamination have been removed.

- RAO 3: Minimize the spread of contaminants during implementation of accelerated actions. Best management practices were used to prevent the spread of contaminants during the accelerated action. Air monitoring data during the accelerated action did not indicate any exceedances.

5.0 STEWARDSHIP ANALYSIS

The IHSS Group 800-4 stewardship evaluation was conducted through ongoing consultation with the regulatory agencies. The regulator agencies were informed through frequent project updates, e-mail, telephone contact, and personal contact throughout the project duration. Copies of these documents are provided in Appendix C.

5.1 Current Site Conditions

As discussed in Section 3.0, the accelerated action was limited to characterization sampling to fully characterize UBC 886, IHSS 164.2, and IHSS 000-121 in order to make an action/no further action determination. Residual contamination at characterization sampling locations and pre-accelerated action sampling locations is shown on Figures 11a and 11b.

The following conditions now exist for IHSS Group 800-4:

- Potential sources of contamination that had existed in IHSS Group 800-4 (i.e., the Building 886 slab and associated OPWLs) have been removed, or were found not to exist in the case of some OPWLs;
- A potential contaminant pathway that had existed in IHSS Group 800-4 (i.e., the Building 886 footing drain) has been disrupted;
- Surface soil contamination is present above background or MDLs (beryllium); and
- Subsurface contamination is present above background or MDLs (arsenic, 1,2-dichloroethane, and methylene chloride).

The site has been backfilled, regraded, covered with 6 inches of topsoil and seeded with Canada bluegrass using broadcast seeding methods.

5.2 Near-Term Management Recommendations

Because residual contaminant concentrations are low and potential contaminant sources were removed, mitigated or found not to have existed, no specific near-term management techniques are required. Potential contaminant sources and pathways have been removed. Contaminant concentrations in soil remaining at IHSS Group 800-4 do not trigger any further accelerated action. Near-term recommendations include the following:

- Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process;
- Fencing and signs restricting access will be posted to minimize disturbance to newly-revegetated areas; and
- Site access and security controls and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls.

5.3 Long-Term Stewardship Recommendations

Based on remaining environmental conditions at IHSS Group 800-4, no specific long-term stewardship activities are recommended for IHSS Group 800-4 beyond the generally applicable Site requirements that may be imposed on this area in the future, which are dependent upon the final remedy selected. Institutional controls that will be used as appropriate for this area include the following:

- Prohibitions on construction of buildings in the IA;
- Restrictions on excavation or other soil disturbance; and
- Prohibitions on groundwater pumping in the area of IHSS Group 800-4.

No specific engineered controls are recommended as a result of the conditions remaining in IHSS Group 800-4.

No specific environmental monitoring is recommended as a result of the conditions remaining in IHSS Group 800-4.

No specific institutional or physical controls, such as fences are recommended as a result of the conditions remaining in IHSS Group 800-4.

This closeout report and associated documentation will be retained as part of the Rocky Flats administrative record file. These specific long-term stewardship recommendations will also be summarized in the Rocky Flats *Long Term Stewardship Strategy*.

IHSS Group 800-4 will be evaluated as part of the Sitewide Comprehensive Risk Assessment, which is part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility Study (CMS/FS) that will be conducted for the Site. The need for and extent of any, more general, long-term stewardship activities will also be analyzed in RFI/RI and CMS/FS and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision, in any post-closure Colorado Hazardous Waste Act permit that may be required, and in any post-RFCA agreement.

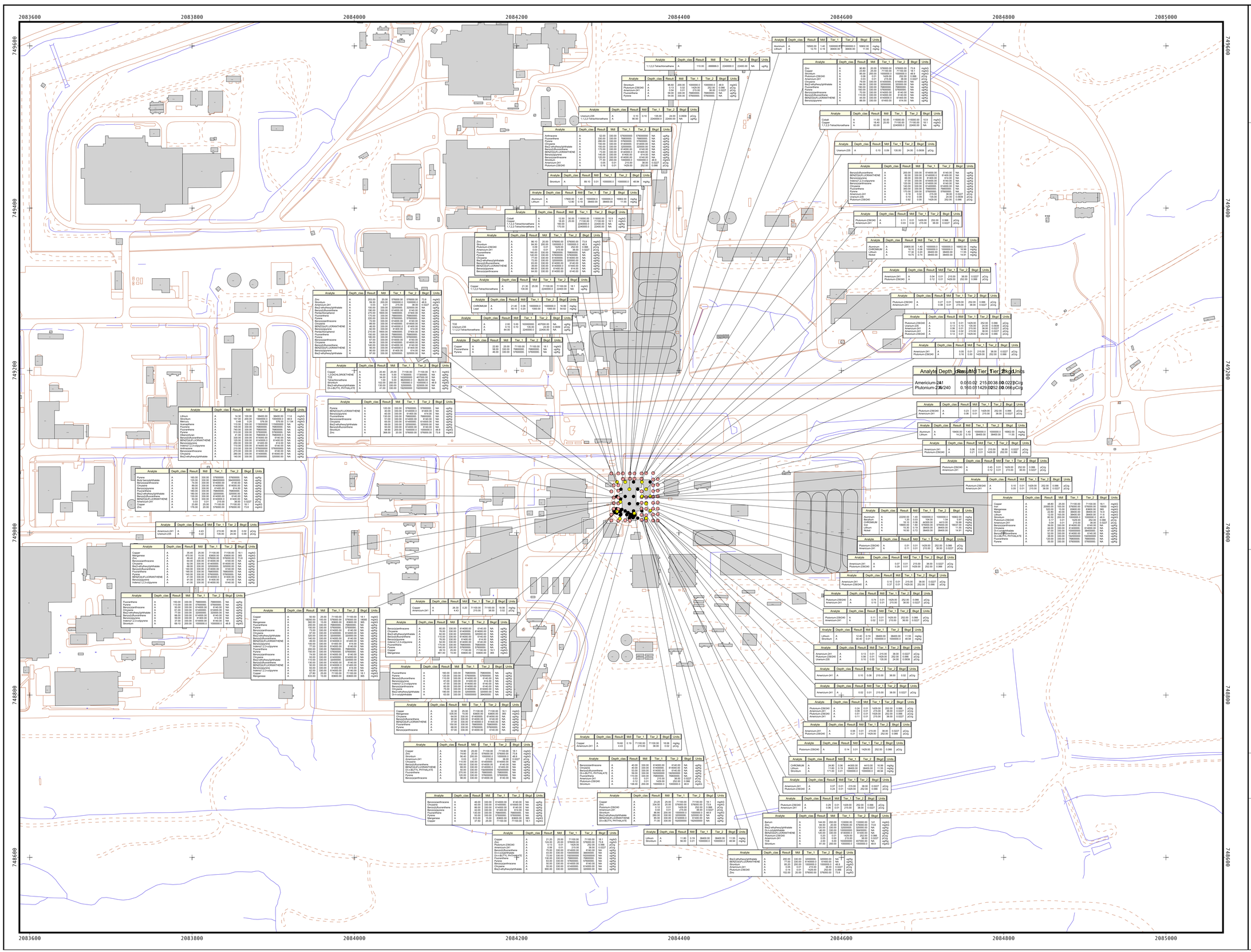

Figure 11a

Residual Surface Soil Contamination at IHSS Group 800-4

Key

- Characterization Samples Greater Than MDLs or Background
- Legacy HDDSamples Greater Than MDLs or Background
- Streams
- Dirt Roads
- Building
- IHSS

N

Scale 1:7000

200 0 200 400 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared by:

KAISER•HILL COMPANY

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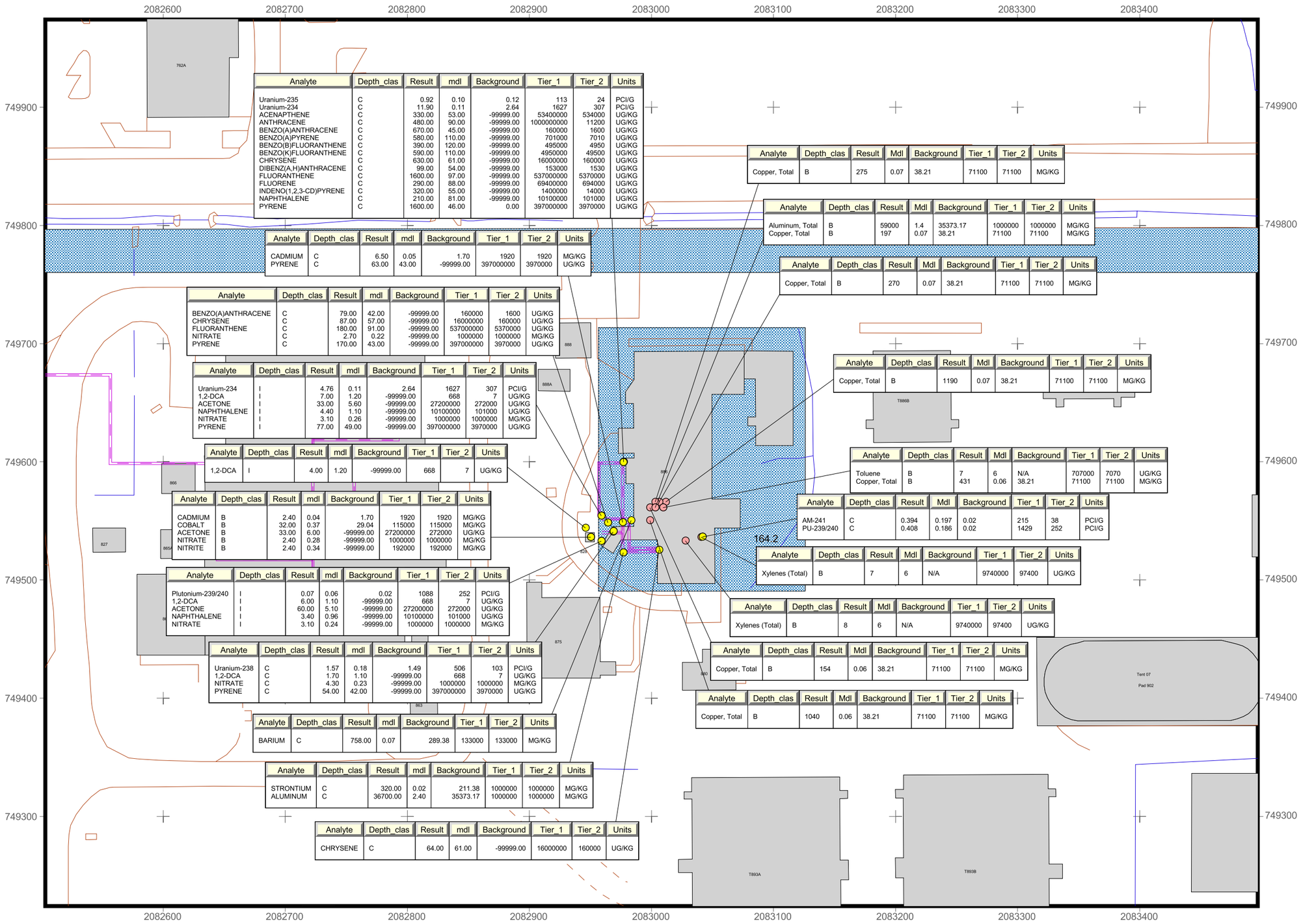
Figure 11b

Residual Subsurface Soil Contamination at IHSS Group 800-4



Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
Uranium-235	C	0.92	0.10	0.12	113	24	PCI/G
Uranium-234	C	11.90	0.11	2.64	1627	307	PCI/G
ACENAPTHENE	C	330.00	53.00	-99999.00	53400000	534000	UG/KG
ANTHRACENE	C	480.00	90.00	-99999.00	1000000000	11200	UG/KG
BENZO(A)ANTHRACENE	C	670.00	45.00	-99999.00	160000	1600	UG/KG
BENZO(A)PYRENE	C	580.00	110.00	-99999.00	701000	7010	UG/KG
BENZO(B)FLUORANTHENE	C	390.00	120.00	-99999.00	495000	4950	UG/KG
BENZO(K)FLUORANTHENE	C	590.00	110.00	-99999.00	4950000	49500	UG/KG
CHRYSENE	C	630.00	61.00	-99999.00	16000000	160000	UG/KG
DIBENZ(A,H)ANTHRACENE	C	99.00	54.00	-99999.00	153000	1530	UG/KG
FLUORANTHENE	C	1600.00	97.00	-99999.00	537000000	5370000	UG/KG
FLORENE	C	290.00	88.00	-99999.00	69400000	694000	UG/KG
INDENO(1,2,3-CD)PYRENE	C	320.00	55.00	-99999.00	1400000	14000	UG/KG
NAPHTHALENE	C	210.00	81.00	-99999.00	10100000	101000	UG/KG
PYRENE	C	1600.00	46.00	0.00	397000000	3970000	UG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
CADMIUM	C	6.50	0.05	1.70	1920	1920	MG/KG
PYRENE	C	63.00	43.00	-99999.00	397000000	3970000	UG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
BENZO(A)ANTHRACENE	C	79.00	42.00	-99999.00	160000	1600	UG/KG
CHRYSENE	C	87.00	57.00	-99999.00	16000000	160000	UG/KG
FLUORANTHENE	C	180.00	91.00	-99999.00	537000000	5370000	UG/KG
NITRATE	C	2.70	0.22	-99999.00	1000000	1000000	MG/KG
PYRENE	C	170.00	43.00	-99999.00	397000000	3970000	UG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
Uranium-234	I	4.76	0.11	2.64	1627	307	PCI/G
1,2-DCA	I	7.00	1.20	-99999.00	668	7	UG/KG
ACETONE	I	33.00	5.60	-99999.00	27200000	272000	UG/KG
NAPHTHALENE	I	4.40	1.10	-99999.00	10100000	101000	UG/KG
NITRATE	I	3.10	0.26	-99999.00	1000000	1000000	MG/KG
PYRENE	I	77.00	49.00	-99999.00	397000000	3970000	UG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
1,2-DCA	I	4.00	1.20	-99999.00	668	7	UG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
CADMIUM	B	2.40	0.04	1.70	1920	1920	MG/KG
COBALT	B	32.00	0.37	29.04	115000	115000	MG/KG
ACETONE	B	33.00	6.00	-99999.00	27200000	272000	UG/KG
NITRATE	B	2.40	0.28	-99999.00	1000000	1000000	MG/KG
NITRITE	B	2.40	0.34	-99999.00	192000	192000	MG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
Plutonium-239/240	I	0.07	0.06	0.02	1088	252	PCI/G
1,2-DCA	I	6.00	1.10	-99999.00	668	7	UG/KG
ACETONE	I	60.00	5.10	-99999.00	27200000	272000	UG/KG
NAPHTHALENE	I	3.40	0.96	-99999.00	10100000	101000	UG/KG
NITRATE	I	3.10	0.24	-99999.00	1000000	1000000	MG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
Uranium-238	C	1.57	0.18	1.49	506	103	PCI/G
1,2-DCA	C	1.70	1.10	-99999.00	668	7	UG/KG
NITRATE	C	4.30	0.23	-99999.00	1000000	1000000	MG/KG
PYRENE	C	54.00	42.00	-99999.00	397000000	3970000	UG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
BARIUM	C	758.00	0.07	289.38	133000	133000	MG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
STRONTIUM	C	320.00	0.02	211.38	1000000	1000000	MG/KG
ALUMINUM	C	36700.00	2.40	35373.17	1000000	1000000	MG/KG

Analyte	Depth_clas	Result	mdl	Background	Tier_1	Tier_2	Units
CHRYSENE	C	64.00	61.00	-99999.00	16000000	160000	UG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Copper, Total	B	275	0.07	38.21	71100	71100	MG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Aluminum, Total	B	59000	1.4	35373.17	1000000	1000000	MG/KG
Copper, Total	B	197	0.07	38.21	71100	71100	MG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Copper, Total	B	270	0.07	38.21	71100	71100	MG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Copper, Total	B	1190	0.07	38.21	71100	71100	MG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Toluene	B	7	6	N/A	707000	7070	UG/KG
Copper, Total	B	431	0.06	38.21	71100	71100	MG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
AM-241	C	0.394	0.197	0.02	215	38	PCI/G
PU-239/240	C	0.408	0.186	0.02	1429	252	PCI/G

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Xylenes (Total)	B	7	6	N/A	9740000	97400	UG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Xylenes (Total)	B	8	6	N/A	9740000	97400	UG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Copper, Total	B	154	0.06	38.21	71100	71100	MG/KG

Analyte	Depth_clas	Result	Mdl	Background	Tier_1	Tier_2	Units
Copper, Total	B	1040	0.06	38.21	71100	71100	MG/KG

Key

- Characterization Samples Greater Than MDLs or Background
- Legacy HDDSamples Greater Than MDLs or Background
- Streams
- OPWL Removed
- OPWL Not Found
- Dirt Roads
- Building
- IHSS

N

Scale = 1:1200

30 0 30 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Residual BH

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6.0 POST-ACCELERATED ACTION CONDITIONS

Residual contamination concentrations greater than background or MDLs at IHSS Group 800-4 are shown on Figures 11a and 11b.

7.0 WASTE MANAGEMENT

Waste generated as a result of the accelerated action was limited to the following:

- Approximately 10 gallons of personal protective equipment and plastic from characterization sampling activities was considered low-level waste (LLW) by default. This waste was dispositioned with like materials in accordance with the ER Waste Management Plan (K-H 2001).

- Approximately 0.65 cubic yards of soil from excess sample material (i.e., sample returns) was placed into a 55-gallon drum (#DD0946), which is being used to accumulate excess sample material from various ER projects. When full, the drum will be sampled and dispositioned in accordance with the ER Waste Management Plan (K-H 2001).

- Groundwater from the Building 828 Pit was pumped into a tanker truck containing water from the Building 886 hydrolasing activity. The combined waters (approximately 630 gallons) were sampled and analyzed in accordance with the Site's Incidental Waters Program prior to transfer to the Building 891 for treatment. Two samples were analyzed for gross alpha and gross beta. One sample contained 45 pCi/l gross alpha and 88 pCi/l gross beta. The other sample 50 pCi/l gross alpha and 85 pCi/l gross beta

Other wastes, including contaminated concrete, were dispositioned by RISS D&D, as documented in the Final Project Closeout Report for the 886 Cluster Closure Project (K-H 2002).

8.0 SITE RECLAMATION

All excavated areas were backfilled and revegetated after characterization sampling results were received and discussed with the regulatory agencies through the consultative process. Excavated soil was used as backfill in the trench that it was removed from. Additionally, backfill from offsite sources was used to bring excavated areas up to grade.

The IHSS Group 800-4 area was rough graded before 6 inches of topsoil were distributed over the site. The topsoil was graded, then scarified, and a seed mix consisting of Canada bluegrass was spread over the site using broadcast seeding methods. Hydromulch was applied to conserve moisture and prevent seed erosion.

9.0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS

Not applicable to this project, as no soils were remediated.

10.0DATA QUALITY ASSESSMENT

This DQA is based on various criteria derived from the following U.S. Environmental Protection Agency (EPA) Guidance and DOE quality requirements:

- Guidance for the Data Quality Objective Process, EPA QA/G-4, 1994.
- Guidance for the Data quality Assessment Process; Practical Methods for Data Analysis, EPA QA/G-9, 1998.
- General Guidelines for Data Verification and Validation, DA-GR01-v1, December 3, 1997.
- V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v1, 2/13/98.
- *V&V Guidelines for Volatile Organics*, DA-SS01-v1, 12/3/97.
- *V&V Guidelines for Semivolatile Organics*, DA-SS02-v1, 12/3/97.
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA 540/R-94/013.
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, EPA 540/R-94/012.
- *Evaluation of Radiochemical Data Usability*, ES/ER/MS-5, Lockheed-Martin, 1997.
- *Rocky Flats Cleanup Agreement (RFCA), Attachment 5*, March 21, 2000.
- *Industrial Area Sampling and Analysis Plan (IASAP)*, Rocky Flats Environmental Technology Site, June 2001.

10.1 DQO Decisions

Consistent with the original DQO decision rules of the project, an SOR calculation was performed on sample results. If the summation for radiological and non-radiological constituents does not exceed 1, respectively, relative to RFCA Tier I ALs, then remediation is not required. If SORs exceed one relative to Tier II, then some management action is required, but not necessarily remediation. All SORs, calculated per sample, were below 1 relative to Tier I ALs, hence no remediation within IHSS Group 800-4 is required. Several samples, listed below (4 subsurface soil and 1 surface soil, respectively), exceeded unity for SORs relative to Tier II ALs, primarily due to either 1,2-dichloroethane, arsenic, or beryllium. SOR calculations are retained within the database “xx”; peer review calculations and quality control (QC) evaluations were performed in the database “PlanvsActuals2.mdb”.

Sample Location	Field Sample Number	Primary Analyte Driving SOR
CI38-0046	02E0080-001	1,2-Dichloroethane
CI38-0047	02E0080-002	1,2-Dichloroethane
CI38-B002	02E0096-002	1,2-Dichloroethane
CI38-B022	02E0099-007	Arsenic

CI38-0015	02E0096-012	Beryllium

10.2 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 data that directly support the project decisions, such that any limitations of the data relative to project goals are stated. Verification and validation (V&V) criteria include:

- Chain of custody,
- Preservation and hold-times,
- Instrument calibrations,
- Preparation blanks,
- Interference check samples (metals),
- Matrix spike/matrix spike duplicates (MS/MSD),
- 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.

These are addressed in the following paragraphs.

10.2.1 Precision

Precision of field sampling was adequate based on 13 of 14 field duplicate samples repeating concentrations to quantities below all respective RFCA Tier II ALs. The one exception, Field Sample 02E0080-001 (Sample Location CI38-0046), exceeded the Tier II SOR threshold whereas its field duplicate did not. In this case the exceedance is treated as such and resampling was not performed.

Laboratory precision was within project goals (<30% relative percent difference [RPD]), based on MS/MSD comparisons. Exceptions were iron, aluminum, and silica, but none of these analytes exceeded Tier II ALs, thus results were repeatable to quantities below Tier II ALs and did not impact project decisions.

10.2.2 Accuracy and Bias

Distance measurements recorded on maps are within ±1ft, based on the global positioning system (GPS) technology in use (i.e., Trimble 4800 Series).

LCSs were collected at adequate frequencies (i.e., ≥1/lab batch), and were within QC tolerances, with exceptions for the SVOCs and alpha spectroscopy results, where no LCS results are provided in the electronic data deliverable (EDD). For the given LCS results, all recoveries were >84%. Analyte lists for spikes were short lists for EPA Method SWSW-846 8260. A complete list of spikes was used for SW6010. The same comments apply to MS samples. MS recoveries were relatively low for cadmium and lead, 39% and 37% respectively, in batch 2091170, which presents the possibility for low bias in Field Sample 02E0020-002 (Sample Location CI38-H032) for cadmium and lead; otherwise, minimum recoveries were >54% other than for the exceptions noted.

Methylene chloride results in real samples should be evaluated as nondetects and should not be used in SOR calculations, as the real results do not exceed 10 times their associated laboratory blank concentrations. Consequently, Field Sample 02E0058-024 (Sample Location CI38-024) which exceeded unity relative to SORs for RFCA Tier II ALs, should not be considered contaminated.

10.2.3 Representativeness

Samples acquired for the project are representative based on the number and location of samples acquired, in combination with the following criteria:

- Familiarity with Site history and current IHSS configurations, and collaborations by management and technical staff;
- Implementation of industry-standard chain of custody protocols;
- Compliance with sample preservation and hold times, with the following exceptions noted by Field Sample Number and the corresponding Sample Location Number.

Field Sample Number	Sample Location Number
02E0079-002	CI38-0031
02E0079-003	CI38-0023
02E0079-004	CI38-0023
02E0080-001	CI38-0046
02E0080-002	CI38-0047
02E0080-003	CI38-0048
02E0080-005	CI38-0046
02E0020-002	CI38-H032

Hold times were exceeded by several days for nitrite and nitrate samples, which could present the potential for low bias in the reported concentrations. Based on the relatively high ALs for

nitrites (i.e., 192,000 mg/kg), a low bias in the nitrite numbers, given the measured concentrations, is probably not significant.

- Documented and Site-approved methods, particularly standard operating procedures controlled by the subcontractor; and
- Compliance with CDPHE- and EPA-approved sampling and analysis plans (i.e., the IASAP and associated Addenda).

10.2.4 Completeness

Sampling completeness is addressed in Table 9, where the planned samples are reflected in the upper portion of the table and actual samples with usable analytical/radiological results are reflected in the middle portion. Completeness percentages for each analytical grouping are given at the bottom of the table. The completeness goal of 90% was achieved for soil matrices with exceptions ranging downward to 88% completeness. Statistical confidence in results relative to action levels is not compromised by these slight disparities (i.e., 2%), thus no additional sampling was required.

Completeness of QC water samples at greater than 90% was not critical due to the relatively low number of samples that exceeded SOR thresholds and the low magnitudes of the Tier II AL exceedances. Stated differently, false positives are not at issued within results for this project.

As shown in Table 10, all soil samples and analytical methods were validated at the required minimum frequencies (i.e., >10%), including samples analyzed by gamma spectroscopy (36 samples were validated [~36%], with no rejections). Overall, data rejection was minimal (i.e., less than the DQO of 10%), and did not affect overall completeness percentages.

10.2.5 Comparability

All results presented are comparable with nation-wide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) data and DOE complex-wide environmental data. This comparability is based on:

- Use of standardized engineering units in the reporting of measurement results;
- Consistent sensitivities of measurements, generally $\leq$ 1/2 corresponding ALs;
- Use of Site-approved procedures (e.g., contractual statements of work for laboratory analyses);
- Systematic quality controls; and
- Thorough documentation of the planning and sampling/analysis process, and data reduction into formats designed for making decisions derived from the project's original DQOs.

Table 9. Completeness of the Dataset within the RFETS Soil Water Database (IHSS Group 800-4)

Plan		**Alpha Spec**			**Metals**		**Nitrite**		**Nitrate**		**Gross Alpha/Beta**		**Gamma Spec**				**SVOC**		**VOC**	
Matrix	Total Samp_Num	ASP-A-002	ASP-A-003	ASP-A-004	MET-A-019	MET-A-023	MIS-A-026	MIS-A-042	MIS-A-025	MIS-A-041	OS01A002	OS01A004	URS10B18	RC10B019		URS10B19	SVO-A-005	SVO-A-007	VOA-A-009	VOA-A-011
Gravel	1															1				
Soil	306			31		80	9		9				1	9		95		21		51
Water	4																2		2	
Water Quality Control Matrix	75	8			8			2		2	3	3	5			4	9		30	1
solid, per suite		31			80		9		9				106				21		52	
water, per suite		8			8		2		2		6		9				11		32	
ACTUAL																				
MATRIX_LAB	Total SAMP_NUM	ASP-A-002	ASP-A-003	ASP-A-004	MET-A-019	MET-A-023	MIS-A-026	MIS-A-042	MIS-A-025	MIS-A-041	OS01A002	OS01A004	URS10B18	RC10B019	URS10B019	URS10B19	SVO-A-005	SVO-A-007	VOA-A-009	VOA-A-011
Solid			1	31	0	70	8		8					5	1	92	0	21	0	51
Liquid		5			8			2		2			8				10		26	
	solid, per suite	32			70		8		8				98				21		51	
	liquid, per suite	5			8		2		2				8				10		26	
	Completeness																			
	solid, per suite	103%			88%		89%		89%		NA/Hardcopy only		92%				100%		98%	
	liquid, per suite	63%			100%		100%		100%				89%				91%		81%	

Table 10. Summary of Validated Records in the RFETS Soil Water Database (IHSS Group 800-4)

		Rads	Metals	VOCs	SVOCs	Anions
VALIDATION_QUALIFIER _CODE	**Total Of CAS_NO**	**ALPHA SPEC**	**SW-846 6010/6010B**	**SW-846 SW-846 8260**	**SW-846 SW-846 8270B**	**SW9056 OR E300_0**
	821	12	371	322	116	
1	373	20	121	129	95	8
J	724		696	27	1	
J1	209		193	10	1	5
V	4643	40	1190	2429	984	
V1	3363	140	401	1759	1055	8
JB	30			30		
JB1	11			11		
UJ	696		130	553	13	
UJ1	268		26	237	5	
R	68		30	38		
R1	5					5
Totals	11211	212	3158	5545	2270	26
% Validated	89%	85%	84%	92%	91%	69%
% Rejected	1%	0%	1%	1%	0%	19%

Key: V = valid without qualifcation
J = estimated (semi-quantitative) value
A = acceptable w/ qualification
R = rejected
Null, N, Y, Z = not validated

10.2.6 Sensitivity

Adequate sensitivities, in units of ug/kg for organics, mg/kg for metals, and pCi/g for radionuclides were attained for all analytes, with exceptions noted below:

CAS_NO	ANALYTE_NAME
51-28-5	2,4-DINITROPHENOL
121-14-2	2,4-DINITROTOLUENE
606-20-2	2,6-DINITROTOLUENE
91-94-1	3,3'-DICHLOROBENZIDINE
111-44-4	BIS(2-CHLOROETHYL) ETHER
10061-01-5	CIS-1,3-DICHLOROPROPENE
621-64-7	N-NITROSO-DI-N-PROPYLAMINE
98-95-3	NITROBENZENE
87-86-5	PENTACHLOROPHENOL
10061-02-6	TRANS-1,3-DICHLOROPROPENE

The following four analytes also had detection limits greater than RFCA Tier I ALs:

CAS_NO	ANALYTE_NAME
121-14-2	2,4-DINITROTOLUENE
606-20-2	2,6-DINITROTOLUENE
111-44-4	BIS(2-CHLOROETHYL) ETHER
621-64-7	N-NITROSO-DI-N-PROPYLAMINE

Adequate sensitivity is typically indicated by comparing an MDL (i.e., minimum detectable activity [MDA] for radionuclides) with the analytes respective AL. Ideally, detection limits are less than one half of the analytes associated AL.

10.3 Data Quality Summary

Data quality is acceptable for the project, with the qualifications stated in this section, based on a comparison of results with the referenced V&V criteria.

11.0 REFERENCES

DOE, 1992. Final Phase I RFI/RI Work Plan, Rocky Flats Plant Original Process Waste Lines (Operable Unit 9), Rocky Flats Plant, Golden, Colorado, February.

DOE, CDPHE, EPA, 1996. Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden Colorado, June.

DOE, 1998. Historic American Engineering Record (HAER).

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

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

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

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

DOE, 2001b. Industrial Area Sampling and Analysis Plan (IASAP) Addendum #IA-02-03, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2001c. Final Data Summary Report for the Characterization of UBCs 123 and 886, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002a. RFCA Standard Operating Protocol for Routine Soil Remediation (ER RSOP), Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE ,2002b. ER RSOP Notification #02-03, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2002c. RFCA Standard Operating Protocol for Facility Component Removal, Size Reduction, and Decontamination Activities, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

K-H, 2001, Environmental Restoration Program Waste Management Plan, Rocky Flats Environmental Technology Site, Golden, Colorado.

K-H, 2002, Final Project Closeout Report for the 886 Cluster Closure Project, Revision 0, Remediation, Industrial D&D, and Site Services Project, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

RMRS, 1998. Interim Measure/Interim Remedial Action Plan for the 886 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, Revision 0, Rocky Mountain Remediation Services, L.L.C., July 30, 1998.