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Draft Closeout Report for IHSS Group 500-2

IHSS 500-158 Radioactive Site - Building 551

• Environmental Restoration •
Rocky Flats Environmental Technology Site

June 2004

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Draft Closeout Report for IHSS Group 500-2

IHSS 500-158 Radioactive Site - Building 551

June 2004

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IHSS 500-158 Radioactive - Site Building 551

Approval received from the Colorado Department of Public Health and Environment
( )
Approval letter is contained in the Administrative Record

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ENCLOSURE

Complete Data Set Compact Disc – Pre accelerated and Accelerated Action Data

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ACRONYMS

AAESP	Accelerated Action Ecological Screening Process
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
BMP	best management practice
CAD/ROD	Corrective Action Decision/Record of Decision
CAS	Chemical Abstracts Service
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHWA	Colorado Hazardous Waste Act
CMS/FS	Corrective Measures Study/Feasibility Study
COC	contaminant of concern
cpm	counts per minute
CRA	Comprehensive Risk Assessment
cy	cubic yard
D&D	decontamination and decommissioning
DL	detection limit
DOE	U S Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EPA	U S Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation
ft	foot
ft^2	square feet
FY	Fiscal Year
HPGe	high-purity germanium
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
K-H	Kaiser-Hill Company, L L C
LCS	laboratory control sample
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
N/A	not applicable
nCi/g	nanocuries per gram
NFAA	No Further Accelerated Action
NLR	No Longer Representative
OPWL	Original Process Waste Lines
PARCCS	precision, accuracy, representativeness, completeness, comparability and sensitivity
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
POE	Point of Evaluation
QC	quality control

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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
RIN	report identification number
RISS	Remediation, Industrial Decommissioning and Demolition, and Site Services
RL	reporting limit
RPD	relative percent difference
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
Site	Rocky Flats Environmental Technology Site
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SWD	Soil Water Database
V&V	verification and validation
VOC	volatile organic compound
WRW	wildlife refuge worker

EXECUTIVE SUMMARY

This Closeout Report summarizes accelerated action activities conducted at Individual Hazardous Substance Site (IHSS) 500-158 Radioactive Site - Building 551, IHSS Group 500-2 Activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP (IASAP) (DOE 2001), Addendum #IA-03-07 (DOE 2003a), and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2003b) Notification of the planned characterization and removal activities was provided in ER RSOP Notification #04-14 (DOE 2004)

Accelerated action activities were conducted between March 1, 2004 and May 6, 2004 and included soil characterization and removal activities Characterization analytical results indicate that one isolated occurrence of chromium exceeded the corresponding wildlife refuge worker (WRW) action level (AL) The contaminated soil was removed Results of the data quality assessment (DQA) confirm that the data collected and used are adequate for decision making

Removal activities were consistent with and contributed to the ER RSOP overall long-term remedial action objectives (RAOs) for Rocky Flats Environmental Technology Site (RFETS) soil The removal of contaminated soil contributed to the protection of human health and the environment, because potential sources of contamination were removed These actions also minimized the need for long-term maintenance and institutional or engineering controls In addition, best management practices (BMPs) were used to prevent the spread of contamination (for example, erosion and dust controls)

The subsurface soil risk screen (SSRS) and stewardship evaluation conducted as part of this accelerated action indicate that No Further Accelerated Action (NFAA) is warranted This IHSS is not located within an area considered to be subject to high erosion and landslides in accordance with Figure 1 of Attachment 5 of the RFCA Modification (DOE et al 2003) Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process Access will be restricted to limit disturbance Site access and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls

The presence of radionuclides, metals, and volatile organic compounds (VOCs) in soil will be evaluated in the Comprehensive Risk Assessment (CRA), which is part of the Resource Conservation and 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 evaluated 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 Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision (CAD/ROD), any post-closure Colorado Hazardous Waste Act (CHWA) permit that may be required, and any post-RFCA agreement

No long-term stewardship activities are recommended for IHSS 500-158 beyond the generally applicable Site requirements that may be imposed on this area in the future After current use of the area as a source for fill ceases in the short term, institutional controls will be used as

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appropriate for this area including, prohibitions on building construction, restrictions on excavation or other soil disturbance, and prohibitions on groundwater pumping in the area of IHSS 500-158

This Closeout Report and associated documentation will be retained as part of the Rocky Flats Administrative Record (AR) file 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 an NFAA Site An NFAA decision is justified based on the following

- Soil with chromium concentrations greater than the WRW AL was removed,
- All remaining contaminant concentrations are less than WRW ALs,
- No accelerated action required, based on the subsurface soil risk screen, and
- No accelerated action required, based on the stewardship evaluation

This information and the NFAA determination will be documented in the Fiscal Year (FY) 2004 (04) Historical Release Report (HRR)

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1.0 INTRODUCTION

This Closeout Report summarizes accelerated action activities conducted at Individual Hazardous Substance Site (IHSS) 500-158, which constitutes IHSS Group 500-2 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado The general location of IHSS Group 500-2 at the Site is shown on Figure 1, and IHSS 500-158 itself is shown on Figure 2

Other IHSS Groups adjacent to IHSS Group 500-2 include (Figure 2) IHSS Groups 500-1 and 500-4 IHSS Group 500-1 consists of IHSS 300-186 (Valve vaults 11, 12, and 13), IHSS 500-197 (Scrap Metal Storage Site), and IHSS 500-117 1 (North Side Chemical Storage Storage Site) IHSS Group 500-1 is currently being sampled for characterization IHSS 500-4 consists of IHSS 500-117 2 (Radioactive Site – Building 551) IHSS Group 500-4 has been characterized and is being closed out via a Data Summary Report being written concurrently with this IHSS Group 500-2 Closeout Report

Accelerated action activities at IHSS Group 500-2 were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001), IASAP Addendum #IA-03-07 (DOE 2003a) and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation Modification 1(ER RSOP) (DOE 2003b) Notification of the planned activities was provided in ER RSOP Notification #04-14 (DOE 2004), which was approved by the Colorado Department of Public Health and Environment (CDPHE) on April 24, 2004 (CDPHE 2004)

This report contains the information necessary to demonstrate attainment of cleanup objectives and final closure of IHSS 500-158, including

- Site characterization information
  - Description of site characterization activities, and
  - 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,

- Map of the project area (Figure 2) and dates and durations of specific remedial activities, and
- Photographs documenting site characterization, remediation, and reclamation activities,
- Accelerated action characterization and confirmation sampling data, including data tables and location maps, as well as a comparison of the characterization data to applicable cleanup goals,
- Description of deviations from the ER RSOP (DOE 2003b),

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- Description of the Subsurface Soil Risk Screen (SSRS),
- Description of near-term stewardship actions and long-term stewardship recommendations,
- Disposition of wastes,
- Site reclamation,
- Table of No Longer Representative (NLR) locations and sample numbers that have been remediated These data will be used to mark database records so they are not used in the Comprehensive Quality Assessment (CRA) or other Site analyses, and
- The Data Quality Assessment (DQA), including comparison of accelerated action data with project data quality objectives (DQOs)

Approval of this Closeout Report constitutes regulatory agency concurrence that this IHSS Group is a No Further Accelerated Action (NFAA) site This information and NFAA determination will be documented in the Fiscal Year (FY) 2004 (04) Annual Update for the Historical Release Report (HRR)

2.0 SITE CHARACTERIZATION

Characterization information on IHSS Group 500-2 consists of limited historical knowledge and recent historical analytical data Historical information for the IHSS is briefly summarized in Section 2 1 Historical analytical data associated with IHSS 500-158 can be found in the RFETS Industrial Area Data Summary Report (DOE 2000) and IASAP Addendum # IA-03-07 (DOE 2003a) Additional historical information on IHSS 500-158 is available from the HRRs (DOE 1992-2003) and IASAP (DOE 2001) Accelerated action data are summarized in Section 2 2

Sampling specifications, including potential contaminants of concern (PCOCs) and media sampled, are presented in Table 1 Deviations from the IASAP Addendum and confirmation samples are also presented and explained in Table 1 An actual sampling and analysis summary, including confirmation sampling, is presented in Table 2 In Table 2 the number of sampling locations increased because of the addition of four confirmation locations The number of intervals and radionuclide and metal samples increased because of additional sampling requirements imposed by the Contact Record of February 19, 2004 The number of volatile organic compound (VOC) samples decreased because of requirements imposed by the Contact Records of February 19 and March 16, 2004

A compact disc that contains a complete accelerated action data set, as of May 28, 2004, is enclosed The disc has two files containing real and quality control (QC) data for the project These files contain standardized data Chemical Abstracts Service (CAS) numbers, analyte names, and units have been standardized, and plutonium and uranium estimated values from high-purity germanium (HPGe) or alpha spectrometry analyses have been added

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Table 1
IHSS Group 500-2 Accelerated Action Characterization Specifications and Deviations

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ40-003	2082667 624	749560 344	2082667 624	749560 344	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Statistical, no significant difference
BZ40-003	2082667 624	749560 344	2082667 624	749560 344	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
BZ40-007	2082711 552	749549 746	2082711 552	749549 746	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, SAP Addendum amended "A" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04 (Appendix A)
BZ40-007	2082711 552	749549 746	2082711 552	749549 746	Subsurface soil	0 5-1 5	Radionuclides, Metals	Statistical, SAP Addendum amended "B" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04, no recovery at 1 5-2 5 ft
BZ40-007	2082711 552	749549 746	2082711 552	749549 746	Subsurface soil	5 5-7 5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended "C" interval collected in native soil (top at 5 5 ft) for radionuclides, metals, and VOCs, Contact Record - 2/19/04
BZ40-007	2082711 552	749549 746	2082711 552	749549 746	Subsurface soil	7 5-9 2	Radionuclides Metals VOCs	Statistical, SAP Addendum amended "D" interval collected in native soil for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no recovery at 9 2-9 5 ft
BZ41-006	2082671 968	749760 737	2082671 968	749760 737	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record – 3/16/04
BZ41-006	2082671 968	749760 737	2082671 968	749760 737	Subsurface soil	0 5-2 0	Radionuclides, Metals VOCs	Statistical, no recovery at 2 0-2 5 ft
BZ41-007	2082676 796	749725 062	2082676 796	749725 062	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record - 3/16/04

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ41-007	2082676 796	749725 062	2082676 796	749725 062	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, no recovery at 1 5-2 5 ft
BZ41-008	2082681 623	749689 387	2082681 623	749689 387	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record - 3/16/04
BZ41-008	2082681 623	749689 387	2082681 623	749689 387	Subsurface soil	0 5-2 0	Radionuclides Metals VOCs	Statistical, no recovery at 2 0-2 5 ft
BZ41-009	2082686 451	749653 712	2082686 451	749653 712	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record - 3/16/04
BZ41-009	2082686 451	749653 712	2082686 451	749653 712	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, no recovery at 1 5-2 5 ft
BZ41-010	2082691 278	749618 037	2082691 278	749618 037	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Statistical, no significant difference
BZ41-010	2082691 278	749618 037	2082691 278	749618 037	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
BZ41-011	2082696 105	749582 362	2082696 105	749582 362	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Statistical, no significant difference
BZ41-011	2082696 105	749582 362	2082696 105	749582 362	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
BZ41-023	2082727 867	749614 729	2082727 867	749614 729				Statistical, SAP Addendum amended "A "interval not collected, Contact Record - 2/19/04
BZ41-023	2082727 867	749614 729	2082727 867	749614 729				Statistical, SAP Addendum amended "B" interval not collected, Contact Record - 2/19/04
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	2 5-4 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling begins in fill at 2 5 ft in "C "interval for radionuclides and metals, Contact Record - 2/19/04

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	4 5-6 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling continues in fill at 4 5 ft in "D" interval for radionuclides and metals, Contact Record - 2/19/04
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	6 8-7 3	Radionuclides Metals	Statistical, SAP Addendum amended sampling continues in fill at 6 5 ft in "E" interval for radionuclides and metals, Contact Record - 2/19/04, no recovery at 6 5-6 8 and 7 3-8 5 ft
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	8 5-10 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling continues in fill at 8 5 ft in "F" interval for radionuclides and metals, Contact Record - 2/19/04
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	10 5-12 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling continues in fill at 10 5 ft in "G" interval for radionuclides and metals, Contact Record - 2/19/04
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	12 5-14 5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended sampling begins in native soil (top at 12 5 ft) in "H" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04
BZ41-023	2082727 867	749614 729	2082727 867	749614 729	Subsurface soil	14 5-16 5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended sampling continues in native soil at 14 5 ft in "I" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04
BZ42-001-01	2082724 104	749840 448	2082724 104	749840 448	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication
BZ42-001-01	2082724 104	749840 448	2082724 104	749840 448	Subsurface soil	0 5-2 0	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of location code duplication, no recovery 2 0-2 5 ft

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ42-002-01	2082728 932	749804 773	2082728 932	749804 773	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication
BZ42-002-01	2082728 932	749804 773	2082728 932	749804 773	Subsurface soil	0 5-1 0	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of location code duplication
BZ42-003-01	2082733 759	749769 098	2082733 759	749769 098	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication
BZ42-003-01	2082733 759	749769 098	2082733 759	749769 098	Subsurface soil	0 5-1 0	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of location code duplication, no recovery 1 0-2 5 ft
BZ42-005-01	2082695 623	749818 430	2082695 623	749818 430	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication
BZ42-005-01	2082695 623	749818 430	2082695 623	749818 430	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of sample number duplication
BZ42-009	2082667 141	749796 412	2082667 141	749796 412	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
BZ42-009	2082667 141	749796 412	2082667 141	749796 412	Subsurface soil	0 5-2 0	Radionuclides Metals VOCs	Statistical, no recovery at 2 0-2 5 ft
CA40-014	2082857 823	749549 753	2082857 823	749549 753	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA40-014	2082857 823	749549 753	2082857 823	749549 753	Subsurface soil	0 5-1 1	Radionuclides Metals VOCs	Statistical, no recovery at 1 1-3 0 ft
CA41-017	2082862 168	749750 146	2082862 126	749750 135	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-017	2082862 168	749750 146	2082862 126	749750 135	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, no recovery at 1 5-2 5 ft
CA41-018	2082866 995	749714 471	2082867 002	749714 453	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-018	2082866 995	749714 471	2082867 002	749714 453	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, no recovery at 1 5-2 5 ft

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-019	2082871 823	749678 796	2082871 823	749678 796	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-019	2082871 823	749678 796	2082871 823	749678 796	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-020	2082876 650	749643 121	2082876 650	749643 121	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-020	2082876 650	749643 121	2082876 650	749643 121	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-023	2082833 686	749728 128	2082833 683	749728 105	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-023	2082833 686	749728 128	2082833 683	749728 105	Subsurface soil	0 5-1 2	Radionuclides Metals VOCs	Statistical, no recovery at 1 2-2 5 ft
CA41-024	2082838 514	749692 453	2082838 514	749692 453	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-024	2082838 514	749692 453	2082838 514	749692 453	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-025	2082843 341	749656 778	2082843 341	749656 778	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-025	2082843 341	749656 778	2082843 341	749656 778	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-026	2082848 168	749621 103	2082848 168	749621 103	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-026	2082848 168	749621 103	2082848 168	749621 103	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-027	2082852 996	749585 428	2082852 996	749585 428	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-027	2082852 996	749585 428	2082852 996	749585 428	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-028	2082800 377	749741 784	2082800 368	749741 815	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-028	2082800 377	749741 784	2082800 368	749741 815	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, no recovery at 1 5-2 5 ft
CA41-029	2082805 205	749706 110	2082805 176	749706 161	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-029	2082805 205	749706 110	2082805 176	749706 161	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-031	2082814 859	749634 760	2082814 859	749634 760	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, VOCs canceled Contact Record – 3/16/04
CA41-031	2082814 859	749634 760	2082814 859	749634 760	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-032	2082819 687	749599 085	2082819 687	749599 085	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-032	2082819 687	749599 085	2082819 687	749599 085	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-033	2082824 514	749563 410	2082824 514	749563 410	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-033	2082824 514	749563 410	2082824 514	749563 410	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-034	2082767 068	749755 441	2082767 068	749755 441	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA41-034	2082767 068	749755 441	2082767 068	749755 441	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-047	2082760 496	749744 696	2082760 496	749744 696	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-047	2082760 496	749744 696	2082760 496	749744 696	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-048	2082744 181	749679 713	2082744 181	749679 713	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, SAP Addendum amended "A" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-048	2082744 181	749679 713	2082744 181	749679 713	Subsurface soil	0 5-2 5	Radionuclides Metals	Statistical, SAP Addendum amended "B" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04
CA41-048	2082744 181	749679 713	2082744 181	749679 713	Subsurface soil	9 0-10 8	Radionuclides Metals VOCs	Statistical, SAP Addendum amended "C" interval collected in native soil (top at 9 ft) for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no recovery 10 8-12 0 ft
CA41-048	2082744 181	749679 713	2082744 181	749679 713	Subsurface soil	12 0-14 0	Radionuclides Metals VOCs	Statistical, SAP Addendum amended "D" interval collected in native soil for radionuclides, metals, and VOCs, Contact Record - 2/19/04
CA41-049	2082792 301	749633 092	2082792 301	749633 092	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-049	2082792 301	749633 092	2082792 301	749633 092	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA41-050	2082775 987	749568 109	2082775 987	749568 109				Statistical, SAP Addendum amended "A" interval not collected, Contact Record - 2/19/04
CA41-050	2082775 987	749568 109	2082775 987	749568 109				Statistical, SAP Addendum amended "B" interval not collected, Contact Record - 2/19/04
CA41-050	2082775 987	749568 109	2082775 987	749568 109	Subsurface soil	2 5-4 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling begins in fill at 2 5 ft in "C" interval for radionuclides and metals, Contact Record - 2/19/04
CA41-050	2082775 987	749568 109	2082775 987	749568 109	Subsurface soil	4 5-6 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling continues in fill at 4 5 ft in "D" interval for radionuclides and metals, Contact Record - 2/19/04

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-050	2082775 987	749568 109	2082775 987	749568 109	Subsurface soil	6 5-8 5	Radionuclides Metals	Statistical, SAP Addendum amended sampling continues in fill at 6 5 ft in "E" interval for radionuclides and metals, Contact Record - 2/19/04
CA41-050	2082775 987	749568 109	2082775 987	749568 109	Subsurface soil	8 5-10 5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended sampling begins in native soil (top at 8 5 ft) in F interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04
CA41-050	2082775 987	749568 109	2082775 987	749568 109	Subsurface soil	10 5-12 5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended sampling continues in native soil in "G" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04
CA41-051			2082842 811	749659 516	Surface soil	0 0-0 5	Metals	Biased confirmation sample, northern excavation wall
CA41-052			2082845 420	749657 051	Surface soil	0 0-0 5	Metals	Biased confirmation sample, eastern excavation wall
CA41-053			2082843 459	749655 036	Surface soil	0 0-0 5	Metals	Biased confirmation sample, southern excavation wall
CA41-054			2082840 400	749657 150	Surface soil	0 0-0 5	Metals	Biased confirmation sample, western excavation wall
CA42-015	2082852 513	749821 495	2082847 267	749821 052	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, relocated 5 ft west because of water main
CA42-015	2082852 513	749821 495	2082847 267	749821 052	Subsurface soil	0 5-1 6	Radionuclides Metals VOCs	Statistical, relocated 5 ft west because of water main, no recovery at 1 6-2 5 ft
CA42-016	2082857 341	749785 821	2082846 729	749787 208	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, relocated 10 ft west because of water main
CA42-016	2082857 341	749785 821	2082846 729	749787 208	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, relocated 10 ft west because of water main
CA42-019	2082824 031	749799 477	2082824 038	749799 503	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA42-019	2082824 031	749799 477	2082824 038	749799 503	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-020	2082828 859	749763 802	2082828 319	749770 177	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, relocated 7 ft north because of water main
CA42-020	2082828 859	749763 802	2082828 319	749770 177	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, relocated 7 ft north because of water main, no recovery at 1 5-2 5 ft
CA42-024	2082795 550	749777 459	2082795 520	749777 448	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA42-024	2082795 550	749777 459	2082795 520	749777 448	Subsurface soil	0 5-1 8	Radionuclides Metals VOCs	Statistical, no recovery at 1 8-2 5 ft
CA42-026	2082757 413	749826 791	2082757 413	749826 791	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA42-026	2082757 413	749826 791	2082757 413	749826 791	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-027	2082762 241	749791 116	2082762 241	749791 116	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA42-027	2082762 241	749791 116	2082762 241	749791 116	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-030	2082876 151	749823 087	2082876 151	749823 087	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA42-030	2082876 151	749823 087	2082876 151	749823 087	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-030	2082876 151	749823 087	2082876 151	749823 087	Subsurface soil	2 5-4 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-030	2082876 151	749823 087	2082876 151	749823 087	Subsurface soil	4 5-6 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-030	2082876 151	749823 087	2082876 151	749823 087	Subsurface soil	6 5-8 5	Radionuclides Metals VOCs	Statistical, no significant difference

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA42-030	2082876 151	749823 087	2082876 151	749823 087	Subsurface soil	8 5-10 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-031	2082872 467	749814 982	2082872 539	749815 003	Surface soil	0 0-0 5	Radionuclides Metals	Statistical, no significant difference
CA42-031	2082872 467	749814 982	2082872 539	749815 003	Subsurface soil	0 5-1 5	Radionuclides Metals VOCs	Statistical, no recovery at 1 5-2 5 ft
CA42-031	2082872 467	749814 982	2082872 539	749815 003	Subsurface soil	2 5-4 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-031	2082872 467	749814 982	2082872 539	749815 003	Subsurface soil	4 5-6 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-031	2082872 467	749814 982	2082872 539	749815 003	Subsurface soil	6 5-8 5	Radionuclides Metals VOCs	Statistical, no significant difference
CA42-031	2082872 467	749814 982	2082872 539	749815 003	Subsurface soil	8 5-9 5	Radionuclides Metals VOCs	Statistical, no recovery 9 5-10 5 ft
CA42-032	2082797 716	749804 961	2082797 693	749804 988	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Biased, no significant difference
CA42-032	2082797 716	749804 961	2082797 693	749804 988	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Biased, "B" interval added for VOCs, Contact Record - 3/16/04, radionuclides and metals extra
CA42-032	2082797 716	749804 961	2082797 693	749804 988	Subsurface soil	2 5-4 5	Radionuclides Metals VOCs	Biased, no significant difference
CA42-033	2082797 316	749845 369	2082797 316	749845 369	Surface soil	0 0-0 5	Radionuclides Metals VOCs	Biased, no significant difference
CA42-033	2082797 316	749845 369	2082797 316	749845 369	Subsurface soil	0 5-2 5	Radionuclides Metals VOCs	Biased, "B" interval added for VOCs, Contact Record - 3/16/04, radionuclides and metals extra
CA42-033	2082797 316	749845 369	2082797 316	749845 369	Subsurface soil	2 5-4 5	Radionuclides Metals VOCs	Biased, no significant difference

VOC = volatile organic compound ft = feet

Table 2
IHSS Group 500-2 Accelerated Action and Confirmation Sampling and Analysis Summary

Criteria	SAP Addendum	Actual
Number of Sampling Locations	45	49
Number of Samples	98	116
Number of Radionuclides Samples	98	116
Number of Metal Samples	98	116
Number of VOC Samples	69	66

2.1 IHSS 500-158 Radioactive Site - Building 551

Building 551 was located within the IA on the northern side of Central Avenue (Figure 2) The original building footprint was approximately 21600 square feet (ft^2) Building 551 was placed in service in 1953, as the plant warehouse An addition to the northern portion of the building was constructed in the mid-1960s, and was used as a sheet metal fabrication shop An area to the northeast of the original Building 551 was used as a general warehouse storage yard prior to September 1959 until the early 1970s

Several radioactive releases or incidents at or near the original Building 551 were reported in the HRR (1992) Construction of the northern addition to Building 551 covered some of these potential release sites In September 1959, activities measuring up to 40,000 counts per minute (cpm) were discovered north of Building 551 due to releases from waste boxes being loaded onto rail cars

In 1961, isolated areas of contamination measuring up to 8,000 cpm were measured on the loading dock and helium storage area of Building 553 Contaminated drums measuring up to 1,200 cpm on the exterior surfaces and up to 7,000 cpm on the interior surfaces were received at Building 551 in 1962 Other incidents that occurred in 1963 and 1970 include radioactive contaminated equipment and drums that were received at Building 551

Pre-accelerated action soil sampling results at IHSS Group 500-2 IHSS 500-158 indicated that all PCOC concentrations were less than wildlife refuge worker (WRW) action levels (ALs) (DOE 2003a)

2.2 Accelerated Action Characterization Data

Accelerated action characterization soil sampling locations and analytical results for IHSS 500-158 are presented on Figure 3 and Figure 4 and in Table 3 Figure 3 presents surface and subsurface soil results for the northern half of IHSS 158, and Figure 4 presents surface and subsurface soil results for the southern half of IHSS 158 Only results greater than background means plus two standard deviations or reporting limits (RLs) are shown Results indicate one surface soil sampling location, CA41-025, where chromium (2600 milligrams per kilogram [mg/kg]) that exceeded the RFCA WRW AL of 268 mg/kg The remaining contaminant concentrations were below RFCA WRW ALs

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(Ref: 04-RF-00643; JLB-055-04)

Draft Closeout Report for IHSS Group 500-2

IHSS 500-158 Radioactive Site – Building 551

June 2004

Figure 3:

IHSS Group 500-2 Accelerated Action Sampling Results Greater Than Background Mean Plus Two Standard Deviations or Reporting Limit (Northern Half)

File: W:\Projects\Fy2004\500-2\Closeout\500-2_clsout_dcr.apr

June 8, 2004

CERCLA Administrative Record Document, IA-A-002168

U S DEPARTEMENT OF ENERGY
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

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Draft Closeout Report for IHSS Group 500-2

IHSS 500-158 Radioactive Site – Building 551

June 2004

Figure 3:

IHSS Group 500-2 Accelerated Action Sampling Results Greater Than Background Mean Plus Two Standard Deviations or Reporting Limit (Southern Half)

File: W:\Projects\Fy2004\500-2\Closeout\500-2_clsout_dcr.apr

June 8, 2004

CERCLA Administrative Record Document, IA-A-002168

U S DEPARTEMENT OF ENERGY
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

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Table 3
Accelerated Action Characterization Data for IHSS Group 500-2, IHSS 500-158

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
BZ40-003	2082667 6	749560 34	Chromium	18 000	NA	16 990	268	0	0 5	mg/kg
BZ40-003	2082667 6	749560 34	Copper	22 000	NA	18 060	40900	0	0 5	mg/kg
BZ40-003	2082667 6	749560 34	Zinc	180 000	NA	73 760	307000	0	0 5	mg/kg
BZ40-003	2082667 6	749560 34	Naphthalene	7.650	6 990	NA	3090000	0 5	2 5	µg/kg
BZ40-003	2082667 6	749560 34	Uranium-235	0 175	NA	0 120	8	0 5	2 5	pCi/g
BZ40-003	2082667 6	749560 34	Uranium-238	2 415	NA	1 490	351	0 5	2 5	pCi/g
BZ40-007	2082711 6	749549 75	Aluminum	18000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ40-007	2082711 6	749549 75	Arsenic	15 000	NA	13 140	22 2	5 5	7 5	mg/kg
BZ41-006	2082672	749760 74	Aluminum	21000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ41-006	2082672	749760 74	Chromium	17 000	NA	16 990	268	0	0 5	mg/kg
BZ41-006	2082672	749760 74	Lithium	12 000	NA	11 550	20400	0	0 5	mg/kg
BZ41-006	2082672	749760 74	Nickel	15 000	NA	14 910	20400	0	0 5	mg/kg
BZ41-006	2082672	749760 74	Uranium-235	0 164	NA	0 094	8	0	0 5	pCi/g
BZ41-006	2082672	749760 74	Lead	25 000	NA	24 970	1000	0 5	2	mg/kg
BZ41-006	*2082672*	*749760 74*	*Uranium-234*	*3 132*	*NA*	*2 640*	*300*	*0 5*	*2*	*pCi/g*
BZ41-006	2082672	749760 74	Uranium-235	0 237	NA	0 120	8	0 5	2	pCi/g
BZ41-006	2082672	749760 74	Uranium-238	3 132	NA	1 490	351	0 5	2	pCi/g
BZ41-007	2082676 8	749725 06	Plutonium-239/240	0 106	NA	0 066	50	0	0 5	pCi/g
BZ41-007	2082676 8	749725 06	Zinc	110 000	NA	73 760	307000	0	0 5	mg/kg
BZ41-007	2082676 8	749725 06	Lead	32 000	NA	24 970	1000	0 5	1 5	mg/kg
BZ41-007	2082676 8	749725 06	Tetrachloroethene	1 300	1 100	NA	615000	0 5	1 5	µg/kg
BZ41-008	2082681 6	749689 39	Aluminum	17000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Antimony	1 900	NA	0 470	409	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Cadmium	3 300	NA	1 612	962	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Chromium	19 000	NA	16 990	268	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Copper	19 000	NA	18 060	40900	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Lead	73 000	NA	54 620	1000	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Lithium	12 000	NA	11 550	20400	0	0 5	mg/kg
BZ41-008	2082681 6	749689 39	Zinc	570 000	NA	73 760	307000	0	0 5	mg/kg
BZ41-008	*2082681 6*	*749689 39*	*Uranium-234*	*3 345*	*NA*	*2 640*	*300*	*0 5*	*2*	*pCi/g*

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
BZ41-008	2082681 6	749689 39	Uranium-238	3 345	NA	1 490	351	0 5	2	pCi/g
BZ41-009	2082686 5	749653 71	Aluminum	17000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ41-009	2082686 5	749653 71	Chromium	48 000	NA	16 990	268	0	0 5	mg/kg
BZ41-009	2082686 5	749653 71	Nickel	28 000	NA	14 910	20400	0	0 5	mg/kg
BZ41-009	*2082686 5*	*749653 71*	*Uranium-234*	*3 891*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
BZ41-009	2082686 5	749653 71	Uranium-235	0 235	NA	0 094	8	0	0 5	pCi/g
BZ41-009	2082686 5	749653 71	Uranium-238	3 891	NA	2 000	351	0	0 5	pCi/g
BZ41-009	2082686 5	749653 71	Zinc	230 000	NA	73 760	307000	0	0 5	mg/kg
BZ41-010	2082691 3	749618 04	Uranium-235	0 115	NA	0 094	8	0	0 5	pCi/g
BZ41-010	*2082691 3*	*749618 04*	*Uranium-234*	*4 516*	*NA*	*2 640*	*300*	*0 5*	*2 5*	*pCi/g*
BZ41-010	2082691 3	749618 04	Uranium-235	0 226	NA	0 120	8	0 5	2 5	pCi/g
BZ41-010	2082691 3	749618 04	Uranium-238	4 516	NA	1 490	351	0 5	2 5	pCi/g
BZ41-011	2082696 1	749582 36	Chromium	17 000	NA	16 990	268	0	0 5	mg/kg
BZ41-011	2082696 1	749582 36	Uranium-235	0 146	NA	0 094	8	0	0 5	pCi/g
BZ41-011	2082696 1	749582 36	Uranium-238	2 034	NA	2 000	351	0	0 5	pCi/g
BZ41-011	2082696 1	749582 36	Naphthalene	12 300	5 910	NA	3090000	0 5	2 5	□g/kg
BZ41-011	2082696 1	749582 36	Uranium-238	1 798	NA	1 490	351	0 5	2 5	pCi/g
BZ41-023	2082727 9	749614 73	Uranium-238	1 563	NA	1 490	351	2 5	4 5	pCi/g
BZ41-023	*2082727 9*	*749614 73*	*Uranium-234*	*4 562*	*NA*	*2 640*	*300*	*4 5*	*6 5*	*pCi/g*
BZ41-023	2082727 9	749614 73	Uranium-235	0 285	NA	0 120	8	4 5	6 5	pCi/g
BZ41-023	2082727 9	749614 73	Uranium-238	4 562	NA	1 490	351	4 5	6 5	pCi/g
BZ41-023	2082727 9	749614 73	Uranium-235	0 141	NA	0 120	8	6 5	7 3	pCi/g
BZ41-023	2082727 9	749614 73	Arsenic	14 000	NA	13 140	22 2	8 5	10 5	mg/kg
BZ41-023	2082727 9	749614 73	Uranium-235	0 150	NA	0 120	8	8 5	10 5	pCi/g
BZ41-023	2082727 9	749614 73	Uranium-238	1 498	NA	1 490	351	8 5	10 5	pCi/g
BZ41-023	2082727 9	749614 73	Uranium-235	0 128	NA	0 120	8	10 5	12 5	pCi/g
BZ41-023	2082727 9	749614 73	Manganese	1100 000	NA	901 620	3480	12 5	14 5	mg/kg
BZ41-023	2082727 9	749614 73	Uranium-238	1 582	NA	1 490	351	14 5	16 5	pCi/g
BZ42-001-01	2082724 1	749840 45	Strontium	70 000	NA	48 940	613000	0	0 5	mg/kg
BZ42-001-01	2082724 1	749840 45	Acetone	30 000	5 200	NA	102000000	0 5	2	µg/kg
BZ42-001-01	2082724 1	749840 45	Tetrachloroethene	2 700	1 100	NA	615000	0 5	2	µg/kg
BZ42-002-01	2082728 9	749804 77	Lithium	12 000	NA	11 550	20400	0	0 5	mg/kg

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
BZ42-002-01	2082728 9	749804 77	Strontium	72 000	NA	48 940	613000	0	0 5	mg/kg
BZ42-002-01	2082728 9	749804 77	Plutonium-239/240	0 072	NA	0 020	50	0 5	1	pCi/g
BZ42-002-01	2082728 9	749804 77	Uranium-235	0 206	NA	0 120	8	0 5	1	pCi/g
BZ42-003-01	2082733 8	749769 1	Aluminum	32000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Barium	300 000	NA	141 260	26400	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Beryllium	1 300	NA	0 966	921	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Chromium	27 000	NA	16 990	268	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Copper	19 000	NA	18 060	40900	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Iron	22000 000	NA	18037 000	307000	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Lithium	18 000	NA	11 550	20400	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Nickel	18 000	NA	14 910	20400	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Uranium-235	0 181	NA	0 094	8	0	0 5	pCi/g
BZ42-003-01	2082733 8	749769 1	Vanadium	49 000	NA	45 590	7150	0	0 5	mg/kg
BZ42-003-01	2082733 8	749769 1	Arsenic	14 000	NA	13 140	22 2	0 5	1	mg/kg
BZ42-003-01	2082733 8	749769 1	Uranium-235	0 153	NA	0 120	8	0 5	1	pCi/g
BZ42-005-01	2082695 6	749818 43	Aluminum	17000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ42-005-01	2082695 6	749818 43	Chromium	17 000	NA	16 990	268	0	0 5	mg/kg
BZ42-005-01	2082695 6	749818 43	Uranium-235	0 116	NA	0 094	8	0	0 5	pCi/g
BZ42-009	2082667 1	749796 41	Aluminum	18000 000	NA	16902 000	228000	0	0 5	mg/kg
BZ42-009	2082667 1	749796 41	Uranium-235	0 158	NA	0 094	8	0	0 5	pCi/g
BZ42-009	2082667 1	749796 41	Naphthalene	7 710	5 450	NA	3090000	0 5	2	µg/kg
CA40-014	*2082857 8*	*749549 75*	*Uranium-234*	*2 364*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA40-014	2082857 8	749549 75	Uranium-235	0 214	NA	0 094	8	0	0 5	pCi/g
CA40-014	2082857 8	749549 75	Uranium-238	2 364	NA	2 000	351	0	0 5	pCi/g
CA40-014	*2082857 8*	*749549 75*	*Uranium-234*	*3 982*	*NA*	*2 640*	*300*	*0 5*	*1 1*	*pCi/g*
CA40-014	2082857 8	749549 75	Uranium-235	0 153	NA	0 120	8	0 5	1 1	pCi/g
CA40-014	2082857 8	749549 75	Uranium-238	3 982	NA	1 490	351	0 5	1 1	pCi/g
CA41-017	2082862 1	749750 14	Chromium	26 000	NA	16 990	268	0	0 5	mg/kg
CA41-017	2082862 1	749750 14	Nickel	18 000	NA	14 910	20400	0	0 5	mg/kg
CA41-017	2082862 1	749750 14	Zinc	160 000	NA	73 760	307000	0	0 5	mg/kg
CA41-017	2082862 1	749750 14	Uranium-235	0 139	NA	0 120	8	0 5	1 5	pCi/g
CA41-017	2082862 1	749750 14	Uranium-238	1 794	NA	1 490	351	0 5	1 5	pCi/g

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
CA41-018	2082867	749714 45	Chromium	17 000	NA	16 990	268	0	0 5	mg/kg
CA41-018	2082867	749714 45	Nickel	16 000	NA	14 910	20400	0	0 5	mg/kg
CA41-018	2082867	749714 45	Zinc	500 000	NA	73 760	307000	0	0 5	mg/kg
CA41-018	2082867	749714 45	Uranium-235	0 170	NA	0 120	8	0 5	1 5	pCi/g
CA41-018	2082867	749714 45	Uranium-238	1 519	NA	1 490	351	0 5	1 5	pCi/g
CA41-018	2082867	749714 45	Zinc	330 000	NA	139 100	307000	0 5	1 5	mg/kg
CA41-019	2082871 8	749678 8	Chromium	80 000	NA	16 990	268	0	0 5	mg/kg
CA41-019	2082871 8	749678 8	Copper	29 000	NA	18 060	40900	0	0 5	mg/kg
CA41-019	2082871 8	749678 8	Nickel	70 000	NA	14 910	20400	0	0 5	mg/kg
CA41-019	2082871 8	749678 8	Uranium-235	0 167	NA	0 094	8	0	0 5	pCi/g
CA41-019	2082871 8	749678 8	Zinc	1700 000	NA	73 760	307000	0	0 5	mg/kg
CA41-019	2082871 8	749678 8	Uranium-235	0 141	NA	0 120	8	0 5	2 5	pCi/g
CA41-019	2082871 8	749678 8	Zinc	310 000	NA	139 100	307000	0 5	2 5	mg/kg
CA41-020	2082876 7	749643 12	2-Butanone	5 500	4 900	NA	192000000	0 5	2 5	µg/kg
CA41-020	2082876 7	749643 12	Acetone	18 000	4 800	NA	102000000	0 5	2 5	µg/kg
CA41-023	2082833 7	749728 11	Copper	28 000	NA	18 060	40900	0	0 5	mg/kg
CA41-023	2082833 7	749728 11	Iron	22000 000	NA	18037 000	307000	0	0 5	mg/kg
CA41-023	2082833 7	749728 11	Manganese	530 000	NA	365 080	3480	0	0 5	mg/kg
CA41-023	*2082833 7*	*749728 11*	*Uranium-234*	*4 495*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-023	2082833 7	749728 11	Uranium-235	0 191	NA	0 094	8	0	0 5	pCi/g
CA41-023	2082833 7	749728 11	Uranium-238	4 495	NA	2 000	351	0	0 5	pCi/g
CA41-023	2082833 7	749728 11	Zinc	86 000	NA	73 760	307000	0	0 5	mg/kg
CA41-023	*2082833 7*	*749728 11*	*Uranium-234*	*4 208*	*NA*	*2 640*	*300*	*0 5*	*1 2*	*pCi/g*
CA41-023	2082833 7	749728 11	Uranium-235	0 222	NA	0 120	8	0 5	1 2	pCi/g
CA41-023	2082833 7	749728 11	Uranium-238	4 208	NA	1 490	351	0 5	1 2	pCi/g
CA41-024	2082838 5	749692 45	Copper	28 000	NA	18 060	40900	0	0 5	mg/kg
CA41-024	2082838 5	749692 45	Strontium	69 000	NA	48 940	613000	0	0 5	mg/kg
CA41-025	**2082843.3**	**749656 78**	**Chromium**	**2600 000**	**NA**	**16 990**	**268**	**0**	**0.5**	**mg/kg**
CA41-025	2082843 3	749656 78	Cobalt	34 000	NA	10 910	1550	0	0 5	mg/kg
CA41-025	2082843 3	749656 78	Copper	110 000	NA	18 060	40900	0	0 5	mg/kg
CA41-025	2082843 3	749656 78	Manganese	430 000	NA	365 080	3480	0	0 5	mg/kg
CA41-025	2082843 3	749656 78	Nickel	1400 000	NA	14 910	20400	0	0 5	mg/kg

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
CA41-025	*2082843 3*	*749656 78*	*Uranium-234*	*2 617*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-025	2082843 3	749656 78	Uranium-235	0 175	NA	0 094	8	0	0 5	pCi/g
CA41-025	2082843 3	749656 78	Uranium-238	2 617	NA	2 000	351	0	0 5	pCi/g
CA41-025	*2082843 3*	*749656 78*	*Uranium-234*	*5 607*	*NA*	*2 640*	*300*	*0 5*	*2 5*	*pCi/g*
CA41-025	2082843 3	749656 78	Uranium-235	0 284	NA	0 120	8	0 5	2 5	pCi/g
CA41-025	2082843 3	749656 78	Uranium-238	5 607	NA	1 490	351	0 5	2 5	pCi/g
CA41-026	*2082848 2*	*749621 1*	*Uranium-234*	*2 513*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-026	2082848 2	749621 1	Uranium-238	2 513	NA	2 000	351	0	0 5	pCi/g
CA41-027	2082853	749585 43	Chromium	34 000	NA	16 990	268	0	0 5	mg/kg
CA41-027	2082853	749585 43	Nickel	23 000	NA	14 910	20400	0	0 5	mg/kg
CA41-027	2082853	749585 43	Uranium-235	0 207	NA	0 094	8	0	0 5	pCi/g
CA41-027	2082853	749585 43	Uranium-235	0 144	NA	0 120	8	0 5	2 5	pCi/g
CA41-028	*2082800 4*	*749741 82*	*Uranium-234*	*4 132*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-028	2082800 4	749741 82	Uranium-235	0 244	NA	0 094	8	0	0 5	pCi/g
CA41-028	2082800 4	749741 82	Uranium-238	4 132	NA	2 000	351	0	0 5	pCi/g
CA41-028	*2082800 4*	*749741 82*	*Uranium-234*	*2 839*	*NA*	*2 640*	*300*	*0 5*	*1 5*	*pCi/g*
CA41-028	2082800 4	749741 82	Uranium-235	0 193	NA	0 120	8	0 5	1 5	pCi/g
CA41-028	2082800 4	749741 82	Uranium-238	2 839	NA	1 490	351	0 5	1 5	pCi/g
CA41-029	2082805 2	749706 16	Chromium	24 000	NA	16 990	268	0	0 5	mg/kg
CA41-029	2082805 2	749706 16	Cobalt	12 000	NA	10 910	1550	0	0 5	mg/kg
CA41-029	2082805 2	749706 16	Nickel	15 000	NA	14 910	20400	0	0 5	mg/kg
CA41-029	*2082805 2*	*749706 16*	*Uranium-234*	*4 246*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-029	2082805 2	749706 16	Uranium-235	0 234	NA	0 094	8	0	0 5	pCi/g
CA41-029	2082805 2	749706 16	Uranium-238	4 246	NA	2 000	351	0	0 5	pCi/g
CA41-029	*2082805 2*	*749706 16*	*Uranium-234*	*6 392*	*NA*	*2 640*	*300*	*0 5*	*2 5*	*pCi/g*
CA41-029	2082805 2	749706 16	Uranium-238	6 392	NA	1 490	351	0 5	2 5	pCi/g
CA41-031	2082814 9	749634 76	Chromium	20 000	NA	16 990	268	0	0 5	mg/kg
CA41-031	2082814 9	749634 76	Nickel	15 000	NA	14 910	20400	0	0 5	mg/kg
CA41-032	*2082819 7*	*749599 09*	*Uranium-234*	*2 937*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-032	2082819 7	749599 09	Uranium-238	2 937	NA	2 000	351	0	0 5	pCi/g
CA41-032	*2082819 7*	*749599 09*	*Uranium-234*	*4 381*	*NA*	*2 640*	*300*	*0 5*	*2 5*	*pCi/g*
CA41-032	2082819 7	749599 09	Uranium-235	0 243	NA	0 120	8	0 5	2 5	pCi/g

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
CA41-032	2082819 7	749599 09	Uranium-238	4 381	NA	1 490	351	0 5	2 5	pCi/g
CA41-033	*2082824 5*	*749563 41*	*Uranium-234*	*4 167*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-033	2082824 5	749563 41	Uranium-235	0 281	NA	0 094	8	0	0 5	pCi/g
CA41-033	2082824 5	749563 41	Uranium-238	4 167	NA	2 000	351	0	0 5	pCi/g
CA41-033	2082824 5	749563 41	Naphthalene	26 100	5 790	NA	3090000	0 5	2 5	µg/kg
CA41-033	*2082824 5*	*749563 41*	*Uranium-234*	*3 668*	*NA*	*2 640*	*300*	*0 5*	*2 5*	*pCi/g*
CA41-033	2082824 5	749563 41	Uranium-235	0 202	NA	0 120	8	0 5	2 5	pCi/g
CA41-033	2082824 5	749563 41	Uranium-238	3 668	NA	1 490	351	0 5	2 5	pCi/g
CA41-034	2082767 1	749755 44	Aluminum	25000 000	NA	16902 000	228000	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Beryllium	1 100	NA	0 966	921	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Chromium	24 000	NA	16 990	268	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Iron	20000 000	NA	18037 000	307000	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Lithium	16 000	NA	11 550	20400	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Nickel	17 000	NA	14 910	20400	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Vanadium	46 000	NA	45 590	7150	0	0 5	mg/kg
CA41-034	2082767 1	749755 44	Acetone	12 000	5 600	NA	102000000	0 5	2 5	µg/kg
CA41-047	2082760 5	749744 7	Aluminum	22000 000	NA	16902 000	228000	0	0 5	mg/kg
CA41-047	2082760 5	749744 7	Beryllium	1 000	NA	0 966	921	0	0 5	mg/kg
CA41-047	2082760 5	749744 7	Chromium	20 000	NA	16 990	268	0	0 5	mg/kg
CA41-047	2082760 5	749744 7	Lithium	14 000	NA	11 550	20400	0	0 5	mg/kg
CA41-047	*2082760 5*	*749744 7*	*Uranium-234*	*3 448*	*NA*	*2 253*	*300*	*0*	*0 5*	*pCi/g*
CA41-047	2082760 5	749744 7	Uranium-238	3 448	NA	2 000	351	0	0 5	pCi/g
CA41-048	2082744 2	749679 71	Uranium-235	0 159	NA	0 120	8	0 5	2 5	pCi/g
CA41-048	2082744 2	749679 71	Acetone	145 000	120 000	NA	102000000	9	10 8	µg/kg
CA41-048	*2082744 2*	*749679 71*	*Uranium-234*	*2 772*	*NA*	*2 640*	*300*	*9*	*10 8*	*pCi/g*
CA41-048	2082744 2	749679 71	Uranium-235	0 204	NA	0 120	8	9	10 8	pCi/g
CA41-048	2082744 2	749679 71	Uranium-238	2 772	NA	1 490	351	9	10 8	pCi/g
CA41-049	2082792 3	749633 09	Chromium	32 000	NA	16 990	268	0	0 5	mg/kg
CA41-049	2082792 3	749633 09	Lithium	13 000	NA	11 550	20400	0	0 5	mg/kg
CA41-049	2082792 3	749633 09	Nickel	26 000	NA	14 910	20400	0	0 5	mg/kg
CA41-049	2082792 3	749633 09	Strontium	78 000	NA	48 940	613000	0	0 5	mg/kg
CA41-049	2082792 3	749633 09	Uranium-235	0 136	NA	0 094	8	0	0 5	pCi/g

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
CA41-050	2082776	749568 11	Uranium-235	0 159	NA	0 120	8	4 5	6 5	pCi/g
CA41-050	2082776	749568 11	Uranium-235	0 141	NA	0 120	8	8 5	10 5	pCi/g
CA41-050	*2082776*	*749568 11*	*Uranium-234*	*2 908*	*NA*	*2 640*	*300*	*10 5*	*12 5*	*pCi/g*
CA41-050	2082776	749568 11	Uranium-235	0 193	NA	0 120	8	10 5	12 5	pCi/g
CA41-050	2082776	749568 11	Uranium-238	2 908	NA	1 490	351	10 5	12 5	pCi/g
CA42-015	2082847 3	749821 05	Uranium-235	0 174	NA	0 094	8	0	0 5	pCi/g
CA42-015	*2082847 3*	*749821 05*	*Uranium-234*	*3 655*	*NA*	*2 640*	*300*	*0 5*	*1 6*	*pCi/g*
CA42-015	2082847 3	749821 05	Uranium-235	0·166	NA	0 120	8	0 5	1 6	pCi/g
CA42-015	2082847 3	749821 05	Uranium-238	3 655	NA	1 490	351	0 5	1 6	pCi/g
CA42-016	2082846 7	749787 21	Copper	24 000	NA	18 060	40900	0	0 5	mg/kg
CA42-016	2082846 7	749787 21	Iron	19000 000	NA	18037 000	307000	0	0 5	mg/kg
CA42-016	2082846 7	749787 21	Manganese	420 000	NA	365 080	3480	0	0 5	mg/kg
CA42-016	2082846 7	749787 21	Uranium-235	0 123	NA	0 094	8	0	0 5	pCi/g
CA42-016	2082846 7	749787 21	Uranium-235	0 146	NA	0 120	8	0 5	2 5	pCi/g
CA42-019	2082824	749799 5	Chromium	31 000	NA	16 990	268	0	0 5	mg/kg
CA42-019	2082824	749799 5	Copper	19 000	NA	18 060	40900	0	0 5	mg/kg
CA42-019	2082824	749799 5	Nickel	20 000	NA	14 910	20400	0	0 5	mg/kg
CA42-019	2082824	749799 5	Uranium-235	0 139	NA	0 094	8	0	0 5	pCi/g
CA42-019	2082824	749799 5	Zinc	82 000	NA	73 760	307000	0	0 5	mg/kg
CA42-020	2082828 3	749770 18	Copper	31 000	NA	18 060	40900	0	0 5	mg/kg
CA42-020	2082828 3	749770 18	Iron	23000 000	NA	18037 000	307000	0	0 5	mg/kg
CA42-020	2082828 3	749770 18	Manganese	490 000	NA	365 080	3480	0	0 5	mg/kg
CA42-020	2082828 3	749770 18	Uranium-235	0 129	NA	0 094	8	0	0 5	pCi/g
CA42-020	2082828 3	749770 18	Zinc	92 000	NA	73 760	307000	0	0 5	mg/kg
CA42-020	2082828 3	749770 18	Uranium-235	0 155	NA	0 120	8	0 5	1 5	pCi/g
CA42-024	2082795 5	749777 45	Acetone	7 200	5 400	NA	102000000	0 5	1 8	µg/kg
CA42-024	2082795 5	749777 45	Tetrachloroethene	1 200	1 200	NA	615000	0 5	1 8	µg/kg
CA42-026	2082757 4	749826 79	Aluminum	17000 000	NA	16902 000	228000	0	0 5	mg/kg
CA42-026	2082757 4	749826 79	Chromium	26 000	NA	16 990	268	0	0 5	mg/kg
CA42-026	2082757 4	749826 79	Nickel	19 000	NA	14 910	20400	0	0 5	mg/kg
CA42-026	2082757 4	749826 79	Uranium-235	0 159	NA	0 094	8	0	0 5	pCi/g
CA42-026	2082757 4	749826 79	Copper	210 000	NA	38 210	40900	0 5	2 5	mg/kg

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
CA42-026	2082757 4	749826 79	Iron	44000 000	NA	41046 520	307000	0 5	2 5	mg/kg
CA42-026	2082757 4	749826 79	Uranium-235	0 130	NA	0 120	8	0 5	2 5	pCi/g
CA42-026	2082757 4	749826 79	Uranium-238	1 585	NA	1 490	351	0 5	2 5	pCi/g
CA42-027	2082762 2	749791 12	Antimony	0 600	NA	0 470	409	0	0 5	mg/kg
CA42-027	2082762 2	749791 12	Strontium	73 000	NA	48 940	613000	0	0 5	mg/kg
CA42-027	2082762 2	749791 12	Uranium-235	0 169	NA	0 094	8	0	0 5	pCi/g
CA42-027	2082762 2	749791 12	Uranium-235	0 145	NA	0 120	8	0 5	2 5	pCi/g
CA42-030	2082876 2	749823 09	Zinc	230 000	NA	73 760	307000	0	0 5	mg/kg
CA42-030	2082876 2	749823 09	Lead	26 000	NA	24 970	1000	0 5	2 5	mg/kg
CA42-030	2082876 2	749823 09	Tetrachloroethene	5 500	1 100	NA	615000	0 5	2 5	µg/kg
CA42-030	2082876 2	749823 09	Tetrachloroethene	5 000	1 100	NA	615000	2 5	4 5	µg/kg
CA42-030	2082876 2	749823 09	Zinc	150 000	NA	139 100	307000	2 5	4 5	mg/kg
CA42-030	2082876 2	749823 09	Tetrachloroethene	1 200	1 100	NA	615000	4 5	6 5	µg/kg
CA42-031	2082872 5	749815	Zinc	150 000	NA	73 760	307000	0	0 5	mg/kg
CA42-031	2082872 5	749815	Acetone	7 000	5 100	NA	102000000	0 5	1 5	µg/kg
CA42-031	2082872 5	749815	Tetrachloroethene	3 200	1 100	NA	615000	0 5	1 5	µg/kg
CA42-031	2082872 5	749815	Acetone	7 400	5 700	NA	102000000	2 5	4 5	µg/kg
CA42-031	2082872 5	749815	Uranium-235	0 431	NA	0 120	8	2 5	4 5	pCi/g
CA42-031	2082872 5	749815	Acetone	9 200	5 700	NA	102000000	6 5	8 5	µg/kg
CA42-031	2082872 5	749815	Acetone	7 500	5 800	NA	102000000	8 5	9 5	µg/kg
CA42-032	2082797 7	749804 99	Aluminum	19000 000	NA	16902 000	228000	0	0 5	mg/kg
CA42-032	2082797 7	749804 99	Chromium	19 000	NA	16 990	268	0	0 5	mg/kg
CA42-032	2082797 7	749804 99	Nickel	16 000	NA	14 910	20400	0	0 5	mg/kg
CA42-032	2082797 7	749804 99	Uranium-235	0 161	NA	0 094	8	0	0 5	pCi/g
CA42-032	2082797 7	749804 99	Zinc	140 000	NA	73 760	307000	0	0 5	mg/kg
CA42-032	2082797 7	749804 99	Uranium-235	0 142	NA	0 120	8	0 5	2 5	pCi/g
CA42-032	2082797 7	749804 99	Uranium-235	0 140	NA	0 120	8	2 5	4 5	pCi/g
CA42-032	2082797 7	749804 99	Uranium-238	1 642	NA	1 490	351	2 5	4 5	pCi/g
CA42-033	2082797 3	749845 37	Aluminum	19000 000	NA	16902 000	228000	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Beryllium	1 100	NA	0 966	921	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Chromium	19 000	NA	16 990	268	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Copper	21 000	NA	18 060	40900	0	0 5	mg/kg

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	Background Mean + 2 SD	WRW AL	Start Depth (ft)	End Depth (ft)	Units
CA42-033	2082797 3	749845 37	Iron	22000 000	NA	18037 000	307000	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Lithium	12 000	NA	11 550	20400	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Nickel	16 000	NA	14 910	20400	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Uranium-235	0 133	NA	0 094	8	0	0 5	pCi/g
CA42-033	2082797 3	749845 37	Vanadium	47 000	NA	45 590	7150	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Zinc	76 000	NA	73 760	307000	0	0 5	mg/kg
CA42-033	2082797 3	749845 37	Uranium-235	0 165	NA	0 120	8	2 5	4 5	pCi/g
CA42-033	2082797 3	749845 37	Uranium-238	2 516	NA	1 490	351	2 5	4 5	pCi/g
BZ40-003	2082667 6	749560 34	Chromium	18 000	NA	16 990	268	0	0 5	mg/kg

µg/kg = micrograms per kilogram (may appear as ug/kg)
mg/kg = milligrams per kilogram
pCi/g = picocuries per gram
Bold face type denotes AL exceedance
Italic face type denotes result derived by calculation based on other analyses
NA denotes Not Applicable
ft = feet
SD = standard deviation

2.3 Sums of Ratios

Radionuclide RFCA sums of ratios (SORs) were calculated for IHSS 500-158 sampling locations based on the accelerated action analytical data for the contaminants of concern (COCs) and the WRW ALs Radionuclide SORs were calculated for all locations with analytical results greater than background means plus two standard deviations or RLs for americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238 Plutonium-239/240 activities are derived from the americium-241 activities (i e , plutonium-239/240 activity = americium-241 gamma spectroscopy activity x 5 7) where HPGe detection was used for analysis Table 4 presents the SORs for surface soil (0 - 2 5 feet) All SORs for radionuclides in soil are less than 1

Table 4
RFCA Radionuclide SORs

Location	Start Depth (ft)	End Depth (ft)	Sum of Ratio to WRW
BZ40-003	0 5	2 5	0 029
BZ41-006	0	0 5	0 020
BZ41-006	0 5	2	0 049
BZ41-007	0	0 5	0 001
BZ41-008	0 5	2	0 021
BZ41-009	0	0 5	0 053
BZ41-010	0	0 5	0 014
BZ41-010	0 5	2 5	0 056
BZ41-011	0	0 5	0 024
BZ41-011	0 5	2 5	0 005
BZ42-002-01	0 5	1	0 026
BZ42-003-01	0	0 5	0 023
BZ42-003-01	0 5	1	0 019
BZ42-005-01	0	0 5	0 014
BZ42-009	0	0 5	0 020
CA40-014	0	0 5	0 041
CA40-014	0 5	1 1	0 044
CA41-017	0 5	1 5	0 022
CA41-018	0 5	1 5	0 026
CA41-019	0	0 5	0 021
CA41-019	0 5	2 5	0 018
CA41-023	0	0 5	0 052
CA41-023	0 5	1 2	0 054
CA41-025	0	0 5	0 038
CA41-025	0 5	2 5	0 070
CA41-026	0	0 5	0 016
CA41-027	0	0 5	0 026
CA41-027	0 5	2 5	0 018
CA41-028	0	0 5	0 056
CA41-028	0 5	1 5	0 042
CA41-029	0	0 5	0 055

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Location	Start Depth (ft)	End Depth (ft)	Sum of Ratio to WRW
CA41-029	0 5	2 5	0 040
CA41-032	0	0 5	0 018
CA41-032	0 5	2 5	0 057
CA41-033	0	0 5	0 061
CA41-033	0 5	2 5	0 048
CA41-047	0	0 5	0 021
CA41-048	0 5	2 5	0 020
CA41-049	0	0 5	0 017
CA42-015	0	0 5	0 022
CA42-015	0 5	1 6	0 043
CA42-016	0	0 5	0 015
CA42-016	0 5	2 5	0 018
CA42-019	0	0 5	0 017
CA42-020	0	0 5	0 016
CA42-020	0 5	1 5	0 019
CA42-026	0	0 5	0 020
CA42-026	0 5	2 5	0 021
CA42-027	0	0 5	0 021
CA42-027	0 5	2 5	0 018
CA42-032	0	0 5	0 020
CA42-032	0 5	2 5	0 018
CA42-033	0	0 5	0 017

Surface soil SORs for non-radionuclide COCs are shown in Table 5 Non-radionuclide SORs were calculated for all locations with analytical results greater than 10 percent of the WRW ALs Aluminum, arsenic, iron, manganese, and polyaromatic hydrocarbon compounds (PAHs) were not included in the nonradionuclide SORs Except for location CA41-025, all nonradionuclide SORs for surface soil were less than one The nonradionuclide SOR for CA41-025 was greater than one because of the initial chromium detection that was above the WRW AL The soil at this location has been removed, and confirmation samples show that there is residual chromium well below the WRW ALs The confirmation samples are discussed in Section 4 0

Table 5
RFCA Non-Radionuclide Surface Soil SORs

Location	Start Depth (ft)	End Depth (ft)	Sum of Ratio to WRW
BZ41-009	0	0 5	0 179
BZ42-003-01	0	0 5	0 101
CA41-019	0	0 5	0 299
CA41-025	0	0 5	9 701
CA41-027	0	0 5	0 127
CA41-049	0	0 5	0 119
CA42-019	0	0 5	0 116

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3.0 ACCELERATED ACTION

Accelerated action objectives were developed for IHSS 158 Radioactive Site - Building 551, and are described in ER RSOP Notification #04-14 (DOE 2004) ER RSOP remedial action objectives (RAOs) include the following

- Provide a remedy consistent with the RFETS goal of protection of human health and the environment,
- Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls, and
- Minimize the spread of contaminants during implementation of accelerated actions

The accelerated action remediation goals for IHSS 158, Radioactive Site - Building 551 included the following

- Remove soil with chromium concentration greater than the RFCA WRW ALs to a depth of 6 inches
- Collect confirmation soil samples in accordance with ER RSOP Notification #04-14 (DOE 2004)

Accelerated action activities were conducted between March 1, 2004, and May 6, 2004 The area is scheduled to be reseeded Start and end dates of significant activities are listed in Table 6 The soil remediation area is shown on Figure 5 Photographs of site activities are provided in Appendix B

Table 6
Dates of Accelerated Action Activities for IHSS Group 500-2, IHSS 500-158

Activity	Start Date	End Date	Duration
Characterization Sampling	March 1, 2004	March 17, 2004	18 Days
Removal Activity	April 27, 2004	April 27, 2004	1 Day
Backfill Excavation	May 6, 2004	May 6, 2004	1 Day
Reseed	Upon final grading	Upon final grading	

[a]Planned activity not performed to date

3.1 Soil Removal Activities

All accelerated action objectives were achieved Removal activities are described below

ER RSOP Notification #04-14 (DOE 2004) accelerated action project objectives for IHSS 500-158 were achieved through the following

- Chromium-contaminated soil at location CA41-025 was removed from an area approximately 4 5 feet by 5 feet by 6 inches deep in accordance with RSOP Notification #04-14 (DOE 2004)
- Confirmation samples were collected in accordance with the IASAP (DOE 2001) to verify that COC concentrations were less than the WRW ALs

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These removal activities are described below Figure 4 presents the original contaminated location, CA41-025, and Figure 5 presents confirmation sampling results and the approximate boundary of the remediated area

3.1.1 Soil Remediation and Site Reclamation

The excavated area was backfilled with clean soil and regraded. Documentation regarding approval to backfill is provided in an ER Regulatory Contact Record dated May 6, 2004 (Appendix A)

4.0 CONFIRMATION SAMPLING

Confirmation samples were collected from the midpoints of the excavation side walls from the full 6-inch depth of the excavation These samples were analyzed at an offsite laboratory for metals Results greater than background means plus two standard deviations are shown in Figure 5 and listed in Table 7

Table 7
IHSS Group 500-2 Confirmation Samples Greater Than Background Means Plus Two Standard Deviations

Location	Easting	Northing	Analyte	Result	Reporting Limit	Background Mean +2 SD	WRW AL	Units
CA41-052	2082845 420	749657 051	Strontium	60	NA	48 94	613000	mg/kg
CA41-053	2082843 459	749655 036	Chromium	22	NA	16 99	268	mg/kg

The remedial action was deemed complete after the results from all four confirmation samples indicated metals concentrations less than WRW ALs The highest chromium value was 22 mg/kg, which is significantly less than the WRW AL of 268 mg/kg This value is within the range of the other chromium values for this IHSS group and is similar to the surface background value of 16 99 mg/kg and the subsurface background value of 68 mg/kg Based on these results, the excavation was backfilled

A confirmation sample at the center of the excavation was not required because the 0 5 to 2 5 increment the original location, CA41-025, was sampled and analyzed at an offsite laboratory during the characterization phase Metals concentrations at this location in this interval were less than WRW ALs

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5.0 RCRA UNIT CLOSURE

Not applicable There were no RCRA units to be closed

6.0 SUBSURFACE SOIL RISK SCREEN

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

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

Yes As shown in Tables 3, all subsurface soil results greater than background means plus two standard deviations from IHSS Group 500-2 are less than RFCA WRW ALs

Screen 2 – Is there a potential for subsurface soil to become surface soil (landslides and erosion areas identified on Figure 1 of the RFCA Modification)?

No IHSS Group 500-2 is not located in an area susceptible to landslides or high erosion on RFCA Modification Attachment 5, Figure 1

Screen 3 – Does subsurface soil contamination for radionuclides exceed criteria defined in RFCA Modification Section 5 3 and Attachment 14?

No As shown in Table 3, radionuclide concentrations are well below soil WRW ALs

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

Contaminant migration via erosion and groundwater are two possible pathways whereby surface water could become contaminated from IHSS Group 500-2, IHSS 500-158 soil As stated in Screen 2 above, IHSS 500-158 is not located in an area likely to be eroded Currently, runoff from IHSS 500-158 is monitored at surface water monitoring location GS10 is the RFCA surface water Point of Evaluation (POE) for IHSS Group 500-2, IHSS 500-158 Exceedances of surface water ALs have been detected at GS10, however, this station receives water from a large part of the IA, and therefore, surface water quality at GS10 is not attributable to any single IHSS Group such as 500-2 (DOE 2002d and 2003c)

Recently groundwater around IHSS 500-158 has been monitored at well locations 84602, 84702, P115589 and P115689 The following VOCs are present above groundwater ALs in at least one of these wells 1,1-dichloroethene, 1,2-dichloroethane, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride (DOE 2002b and 2003d) The 2001 RFCA Annual Groundwater Monitoring Report (DOE 2002b) concluded that the VOC contamination in the IHSS 500-158 area, for the analytes above, is part of the IA Plume Figure 8-3 from the 2001 Annual Report shows that well 84702 is in the center of an area of high tetrachloroethene concentration just to the northwest of IHSS Group 500-2 Results from IHSS Group 500-2 accelerated action soil sampling indicate that trace amounts of tetrachloroethene were detected at

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several locations within the Group Quantities of this contaminant in the soil were well below the WRW AL by several orders of magnitude and are not contributing to groundwater or surface water contamination

Other VOCs were found in soil from IHSS 500-158 during accelerated action sampling Trace amounts of acetone, 2-butanone, and naphthalene were present at several locations (Figures 3 and 4, Table 3) The quantities of these contaminants are also well below WRW ALs by several orders of magnitude

7.0 STEWARDSHIP ANALYSIS

The IHSS Group 500-2, IHSS 500-158 stewardship evaluation was conducted through ongoing consultation with the regulatory agencies Frequent informal project updates, e-mails, and telephone and personal contact occurred throughout the project Documentation associated with these contacts is provided in Appendix A

7.1 Current Site Conditions

As discussed in Section 3 1, accelerated action at IHSS 500-158 consisted of excavation of the chromium WRW AL exceedance found at location CA41-025 and backfilling upon confirmation that the contamination was removed Based on the accelerated action, the following conditions exist at IHSS 500-158

- The potential source of contamination that existed in IHSS 500-158 (chromium at location CA41-025) was removed
- Surface and subsurface contaminant concentrations in soil are greater than background means plus two standard deviations or RLs throughout IHSS 500-158
- Residual contaminant concentrations are below RFCA WRW ALs
- Building 551 was removed by Remediation, Industrial Decommissioning and Demolition (D&D), and Site Services (RISS) in early 2003

7.2 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 actions are required The potential contaminant source and pathway has been removed Contaminant concentrations in soil remaining at IHSS 500-158 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,
- Access will be restricted, and

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- Site access and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls

7.3 Long-Term Stewardship Recommendations

Based on remaining environmental conditions at IHSS 500-158, no specific long-term stewardship activities are recommended beyond the generally applicable Site requirements These requirements may be imposed on this area in the future, notably after the current use of the site as a source of fill ceases Institutional controls that will be used as appropriate for this area include the following

- Restrictions on excavation or other soil disturbance, and
- Prohibitions on groundwater pumping in the area of IHSS 500-158

No specific engineered controls or environmental monitoring are recommended as a result of the conditions remaining at IHSS 500-158 Likewise, no specific institutional or physical controls are recommended as a result of the conditions remaining at IHSS 500-158

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

IHSS 500-158 will be evaluated as part of the Accelerated Action Ecological Site Evaluation and Sitewide CRA The CRA is part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility (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 evaluated 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 Rocky Flats will ultimately be contained in the Corrective Action Design/Record of Decision (CAD/ROD), any post-closure Colorado Hazardous Waste Act (CHWA) permit that may be required, and any post-RFCA agreement

8.0 DEVIATIONS FROM THE ER RSOP

There were no deviations from the ER RSOP

9.0 POST-ACCELERATED ACTION CONDITIONS

Soil containing chromium from an excavation (4 5 feet by 5 feet by 6 inches) from around location CA41-025 was removed After confirmation samples from the midpoints of the excavation walls (locations CA41-051, CA41-052, CA41-053, and CA41-054) indicated chromium levels well below WRW ALs the excavation was backfilled and rough graded After the site ceases to be a source of fill for other RISS projects it will be graded to final contour and reseeded

The presence of residual contamination was determined based on accelerated action characterization and confirmation sampling results Results indicate no contaminant

concentrations in surface or subsurface soil greater than the RFCA WRW ALs Residual soil concentrations greater than background means plus two standard deviations or RLs at IHSS 500-158 are shown on Figures 3, 4, and 5

SORs, based on the RFCA WRW ALs for radionuclides and accelerated action data, are listed in Table 4 Plutonium-239/240 activities are derived from the americium-241 activities as described in Section 2 0 All SORs for radionuclides in surface and subsurface soil were less than 1 Non-radionuclide SORs, based on the RFCA WRW ALs and accelerated action data, are listed in Table 5 The SOR at location CA41-025 was greater than one because of the chromium exceedance at that location The location has been remediated, and residual soil chromium concentrations are less than WRW ALs

10.0 WASTE MANAGEMENT

Two 55-gallon drums were filled with the soil removed from the 4 5 ft x 5 ft x 6 inch excavation at location CA41-025, and the waste was disposed as low level mixed waste The drums are being transferred to the Material Stewardship group for storage and disposal

11.0 SITE RECLAMATION

Upon removal of the contaminated soil at location CA41-025 the excavation was backfilled with clean soil Currently the IHSS Group 500-2 area is being used as a source of fill for other Site projects When no longer used for fill, the area will be graded to final contour and reseeded

12.0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS

The surface soil data from location CA41-025 is considered NLR because it was removed during the remediation process (Section 3 1) Table 8 provides the coordinates of this location

Table 8
NLR Sampling Location

Location	Easting	Northing	Type	Start Depth (ft)	End Depth (ft)
CA41-025	2082843 341	749656 778	Surface	0	0 5

13.0 DATA QUALITY ASSESSMENT

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

- Regulatory agency-approved sampling program design IASAP Addendum #IA-03-07, approval letter of June 6, 2003 (CDPHE 2003) and ER RSOP Notification #04-14, approval letter of April 12, 2004 (CDPHE 2004),
- Samples collected in accordance with the IASAP (DOE 2001), and

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

13.1 DQA Process

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

- U S Environmental Protection Agency (EPA), 1994a, Guidance for the Data Quality Objective Process, QA/G-4,
- EPA, 1998, Guidance for the Data Quality Assessment Process, Practical Methods for Data Analysis, QA/G-9, and
- U S Department of Energy (DOE), 1999, Quality Assurance, Order 414 1A

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

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

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

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13.2 Verification and Validation of Results

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

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

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

Raw hard copy data (for example, individual analytical data packages) are currently filed by report identification (RIN) and maintained by K-H Analytical Services Division (ASD), older hard copies may reside in the Federal Center in Lakewood, Colorado Electronic data are stored in the RFETS Soil Water Database (SWD)

The data sets addressed in this report are included on the enclosed compact disc in Microsoft ACCESS 2000 format

13.2.1 Accuracy

The following measures of accuracy were evaluated

- LCS,

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- Surrogates,
- Field blanks, and
- Sample MSs

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

LCS Evaluation

LCS results are summarized in Table 9 LCS results that were outside of tolerances were reviewed to determine whether a potential bias might be indicated LCS recoveries are not indicative of matrix effects because they are not prepared using Site samples LCS results do indicate whether the laboratory may be introducing a bias in the results Recoveries reported above the upper limit may indicate the actual sample results are less than reported Because this is environmentally conservative, no further action is needed

The analytes with potentially unacceptable low recoveries were evaluated in the following manner If the maximum sample result divided by the lowest LCS recovery for that analyte is less than the WRW AL, no further action is taken because any indicated bias is not great enough to correct a false low sample result to one above the AL Except for chromium, all calculations for minimum LCS recoveries resulted in values less than the WRW Chromium failed the criteria because of the WRW AL exceedance of 2600 mg/kg at location CA41-025, this was expected The next highest chromium value, 80 mg/kg, passes the criteria indicating LCS bias would not adversely affect chromium analytical results

Therefore, LCS recoveries did not impact project decisions Any qualification of individual results because of LCS performance exceeding upper or lower tolerance limits is also captured in the V&V flags, described in Section 13 2 3

Table 9
LCS Evaluation

Test Method	CAS	Analyte	Minimum	Maximum	Result Unit
SW-846 6010	7429-90-5	Aluminum	86	105	%REC
SW-846 6010	7440-36-0	Antimony	86	98	%REC
SW-846 6010	7440-38-2	Arsenic	87	97	%REC
SW-846 6010	7440-39-3	Barium	93	103	%REC
SW-846 6010	7440-41-7	Beryllium	86	106	%REC
SW-846 6010	7440-43-9	Cadmium	86	99	%REC
SW-846 6010	7440-47-3	Chromium	91	103	%REC
SW-846 6010	7440-48-4	Cobalt	89	100	%REC
SW-846 6010	7440-50-8	Copper	91	98	%REC
SW-846 6010	7439-89-6	Iron	89	105	%REC

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Test Method	CAS	Analyte	Minimum	Maximum	Result Unit
SW-846 6010	7439-92-1	Lead	89	101	%REC
SW-846 6010	7439-93-2	Lithium	86	109	%REC
SW-846 6010	7439-96-5	Manganese	87	102	%REC
SW-846 6010	7439-97-6	Mercury	88	106	%REC
SW-846 6010	7439-98-7	Molybdenum	87	100	%REC
SW-846 6010	7440-02-0	Nickel	89	100	%REC
SW-846 6010	7782-49-2	Selenium	88	97	%REC
SW-846 6010	7440-22-4	Silver	94	105	%REC
SW-846 6010	7440-24-6	Strontium	92	101	%REC
SW-846 6010	7440-31-5	Tin	82	97	%REC
SW-846 6010	11-09-6	Uranium, Total	88	102	%REC
SW-846 6010	7440-62-2	Vanadium	92	102	%REC
SW-846 6010	7440-66-6	Zinc	85	102	%REC
SW-846 8260	71-55-6	1,1,1-Trichloroethane	57 56	123	%REC
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	57 58	128 8	%REC
SW-846 8260	79-00-5	1,1,2-Trichloroethane	53 6	115 8	%REC
SW-846 8260	75-34-3	1,1-Dichloroethane	55 78	112 3	%REC
SW-846 8260	75-35-4	1,1-Dichloroethene	63 73	138 4	%REC
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	56 09	121 9	%REC
SW-846 8260	95-50-1	1,2-Dichlorobenzene	55 35	114 6	%REC
SW-846 8260	107-06-2	1,2-Dichloroethane	53 24	130	%REC
SW-846 8260	78-87-5	1,2-Dichloropropane	55 71	111 8	%REC
SW-846 8260	106-46-7	1,4-Dichlorobenzene	55 9	114 8	%REC
SW-846 8260	78-93-3	2-Butanone	25 81	113	%REC
SW-846 8260	108-10-1	4-Methyl-2-pentanone	45 21	109 6	%REC
SW-846 8260	67-64-1	Acetone	18 02	114	%REC
SW-846 8260	71-43-2	Benzene	57 86	112 3	%REC
SW-846 8260	75-27-4	Bromodichloromethane	54 44	118	%REC
SW-846 8260	75-25-2	Bromoform	48 88	115 7	%REC
SW-846 8260	74-83-9	Bromomethane	65 32	159 1	%REC
SW-846 8260	75-15-0	Carbon Disulfide	54 95	137 4	%REC
SW-846 8260	56-23-5	Carbon Tetrachloride	58 26	127	%REC
SW-846 8260	108-90-7	Chlorobenzene	57 75	115 8	%REC
SW-846 8260	75-00-3	Chloroethane	60 07	154 2	%REC
SW-846 8260	67-66-3	Chloroform	56 56	117	%REC
SW-846 8260	74-87-3	Chloromethane	53	242 8	%REC
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	55 25	110	%REC
SW-846 8260	124-48-1	Dibromochloromethane	53 89	116 1	%REC
SW-846 8260	100-41-4	Ethylbenzene	61 63	118 4	%REC
SW-846 8260	87-68-3	Hexachlorobutadiene	59 52	127 1	%REC
SW-846 8260	75-09-2	Methylene chloride	58 21	119 2	%REC

Test Method	CAS	Analyte	Minimum	Maximum	Result Unit
SW-846 8260	91-20-3	Naphthalene	53 83	125 6	%REC
SW-846 8260	100-42-5	Styrene	57 9	114 9	%REC
SW-846 8260	127-18-4	Tetrachloroethene	58 4	116 1	%REC
SW-846 8260	108-88-3	Toluene	59 79	116 3	%REC
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	57 33	122	%REC
SW-846 8260	79-01-6	Trichloroethene	56 62	108 5	%REC
SW-846 8260	75-01-4	Vinyl chloride	68	214 1	%REC
SW-846 8260	1330-20-7	Xylene	61 17	117 5	%REC

Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 10 Surrogate frequency was adequate based on at least one set per sample The minimum and maximum surrogate results are also tabulated, by chemical, for the entire project Surrogates are added to every VOC sample, and therefore, surrogate recoveries only impact individual samples Unacceptable surrogate recoveries can indicate potential matrix effects Surrogate recoveries reported above 100 percent may indicate the actual sample results are less than reported Because this is environmentally conservative, no further action is needed Therefore, only the lowest recoveries were evaluated If the maximum sample result divided by the lowest surrogate recovery is less than the WRW AL for that method, no further action is taken because any indicated bias is not great enough to correct a false low sample result to one above the AL All IHSS Group 500-2 VOC analysis passed this criterion Therefore, project decisions were not impacted by VOC surrogate recoveries Any qualifications of results because of surrogate results are also captured in the V&V flags, described in Section 13 2 3

Table 10
Surrogate Recovery Summary

Number of Samples	CAS	Analyte	Minimum	Maximum	Result Unit
66	460-00-4	4-Bromofluorobenzene	81	147 1	%REC
66	17060-07-0	Deuterated 1,2-dichloroethane	74	122 9	%REC
66	2037-26-5	Deuterated Toluene	86	122 8	%REC

Field Blank Evaluation

Results of the field blank analyses are provided in Table 11 Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples Evaluation consists of multiplying the field blank results by 10 (for laboratory contaminants) or by 5 (for non-laboratory contaminants) and comparing them to the WRW In this case to be conservative the factor used is 10 in all cases When the corrected field blank result is less than the WRW AL the associated real results are considered acceptable In the IHSS Group 500-2 data of the analytes detected in the blanks exceeded their WRW ALs Therefore, blank contamination did

not adversely impact project decisions Any qualifications of results because of field blank results are also captured in the V&V flags, described in Section 13 2 3

Table 11
Field Blank Summary

Sample QC Code	Test Method	Analyte	Maximum Result	Result Unit	Lab Qualifier
FB	GAMMA SPECTROSCOPY	Uranium-235	0 163	pCi/g	-
FB	GAMMA SPECTROSCOPY	Uranium-238	3 330	pCi/g	-
RNS	GAMMA SPECTROSCOPY	Uranium-235	0 168	pCi/g	-
RNS	GAMMA SPECTROSCOPY	Uranium-238	2 580	pCi/g	-
EB	GAMMAISOCS	Uranium-235	0 168	pCi/g	J
EB	GAMMAISOCS	Uranium-238	2 580	pCi/g	J
FB	GAMMAISOCS	Uranium-235	0 163	pCi/g	J
FB	GAMMAISOCS	Uranium-238	3 330	pCi/g	J
TB	SW8260B	2-Butanone	18 000	ug/L	J
FB	SW-846 6010	Barium	0 001	mg/L	B
FB	SW-846 6010	Beryllium	0 000	mg/L	B
FB	SW-846 6010	Copper	0 019	mg/L	-
FB	SW-846 6010	Copper	0 006	mg/L	B
FB	SW-846 6010	Lithium	0 001	mg/L	B
FB	SW-846 6010	Manganese	0 001	mg/L	B
FB	SW-846 6010	Strontium	0 001	mg/L	B
FB	SW-846 6010	Tin	0 006	mg/L	B
RNS	SW-846 6010	Aluminum	0 055	mg/L	B
RNS	SW-846 6010	Barium	0 002	mg/L	B
RNS	SW-846 6010	Beryllium	0 001	mg/L	B
RNS	SW-846 6010	Cadmium	0 000	mg/L	B
RNS	SW-846 6010	Chromium	0 005	mg/L	-
RNS	SW-846 6010	Copper	0 009	mg/L	B
RNS	SW-846 6010	Iron	0 210	mg/L	-
RNS	SW-846 6010	Iron	0 079	mg/L	B
RNS	SW-846 6010	Lithium	0 002	mg/L	B
RNS	SW-846 6010	Manganese	0 003	mg/L	B
RNS	SW-846 6010	Molybdenum	0 003	mg/L	B
RNS	SW-846 6010	Strontium	0 001	mg/L	B
RNS	SW-846 6010	Tin	0 046	mg/L	B
TB	SW-846 8260	2-Butanone	16 000	ug/L	-
TB	SW-846 8260	2-Butanone	18 000	ug/L	J
TB	SW-846 8260	Acetone	12 000	ug/L	-
TB	SW-846 8260	Acetone	3 700	ug/L	J

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Sample MS Evaluation

Table 12 provides a summary of the minimum and maximum MS results by chemical for the project According to the EPA data validation guidelines (EPA 1994b), if organic MS recoveries are low, then the LCS recovery is to be checked and, if acceptable, no action is taken LCS recoveries for organic analyses with potentially low unacceptable MS recoveries were reviewed For this project, these checks indicate no decisions were impacted for organic analytes with low MS recoveries (refer to previous section)

For inorganics with MS recoveries greater than zero, the maximum sample results were divided by the lowest percent recovery for each analyte If the resulting number was less than the WRW AL, decisions were not impacted Except for chromium, all inorganic results with MS recoveries greater than zero were acceptable based on this criterion This was expected because the maximum chromium value, 2600 mg/kg, was a WRW AL exceedance The next highest chromium result, 80 mg/kg passes the criterion Therefore, analytical accuracy for inorganics was not affected by MS recoveries greater than zero percent and project decisions were not impacted

Iron and manganese had minimum percent recoveries of zero The maximum iron result (44,000 mg/kg at CA42-026, 0 5 to 2 5 ft) is less than 15% of the iron WRW AL of 307,000 mg/kg The maximum manganese result (1,100 mg/kg at BZ41-023, 12 5 to 14 5 ft)) is less than 32% of the manganese WRW AL of 3480 mg/kg This brief summary suggests that project decisions were not impacted by the MS percent recoveries of zero for iron and manganese

Table 12
Sample Matrix Spike Evaluation Summary

Test Method Name	CAS	Analyte	Minimum	Maximum	Unit	Number of Samples	Number of Lab Batches
SW-846 6010	7429-90-5	Aluminum	23	4890	%REC	12	12
SW-846 6010	7440-36-0	Antimony	39	70	%REC	12	12
SW-846 6010	7440-38-2	Arsenic	86	98	%REC	12	12
SW-846 6010	7440-39-3	Barium	76	118	%REC	12	12
SW-846 6010	7440-41-7	Beryllium	86	106	%REC	12	12
SW-846 6010	7440-43-9	Cadmium	71	99	%REC	12	12
SW-846 6010	7440-47-3	Chromium	85	225	%REC	12	12
SW-846 6010	7440-48-4	Cobalt	66	99	%REC	12	12
SW-846 6010	7440-50-8	Copper	74	128	%REC	12	12
SW-846 6010	7439-89-6	Iron	0	2980	%REC	12	12
SW-846 6010	7439-92-1	Lead	73	115	%REC	12	12
SW-846 6010	7439-93-2	Lithium	85	114	%REC	12	12
SW-846 6010	7439-96-5	Manganese	0	630	%REC	12	12
SW-846 6010	7439-97-6	Mercury	42	110	%REC	13	13
SW-846 6010	7439-98-7	Molybdenum	86	96	%REC	12	12
SW-846 6010	7440-02-0	Nickel	75	115	%REC	12	12
SW-846 6010	7782-49-2	Selenium	88	99	%REC	12	12
SW-846 6010	7440-22-4	Silver	93	108	%REC	12	12

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Test Method Name	CAS	Analyte	Minimum	Maximum	Unit	Number of Samples	Number of Lab Batches
SW-846 6010	7440-24-6	Strontium	87	108	%REC	12	12
SW-846 6010	7440-31-5	Tin	80	91	%REC	12	12
SW-846 6010	11-09-6	Uranium, Total	86	102	%REC	12	12
SW-846 6010	7440-62-2	Vanadium	70	112	%REC	12	12
SW-846 6010	7440-66-6	Zinc	28	165	%REC	12	12
SW-846 8260	71-55-6	1,1,1-Trichloroethane	91 32	112	%REC	10	10
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	34 76	196	%REC	10	10
SW-846 8260	79-00-5	1,1,2-Trichloroethane	85	114	%REC	10	10
SW-846 8260	75-34-3	1,1-Dichloroethane	93 73	117	%REC	10	10
SW-846 8260	75-35-4	1,1-Dichloroethene	79 4	122	%REC	10	10
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	27	83 27	%REC	10	10
SW-846 8260	95-50-1	1,2-Dichlorobenzene	67	106	%REC	10	10
SW-846 8260	107-06-2	1,2-Dichloroethane	86 38	126	%REC	10	10
SW-846 8260	78-87-5	1,2-Dichloropropane	84 61	107	%REC	10	10
SW-846 8260	106-46-7	1,4-Dichlorobenzene	68	115	%REC	10	10
SW-846 8260	78-93-3	2-Butanone	71	202	%REC	10	10
SW-846 8260	108-10-1	4-Methyl-2-pentanone	84	126	%REC	10	10
SW-846 8260	67-64-1	Acetone	63	281 2	%REC	10	10
SW-846 8260	71-43-2	Benzene	85 93	109	%REC	10	10
SW-846 8260	75-27-4	Bromodichloromethane	89 1	110	%REC	10	10
SW-846 8260	75-25-2	Bromoform	82	103 7	%REC	10	10
SW-846 8260	74-83-9	Bromomethane	49 99	132	%REC	10	10
SW-846 8260	75-15-0	Carbon Disulfide	72	95 55	%REC	10	10
SW-846 8260	56-23-5	Carbon Tetrachloride	88 04	113	%REC	10	10
SW-846 8260	108-90-7	Chlorobenzene	74	112	%REC	10	10
SW-846 8260	75-00-3	Chloroethane	53 82	130	%REC	10	10
SW-846 8260	67-66-3	Chloroform	93 72	108	%REC	10	10
SW-846 8260	74-87-3	Chloromethane	43 62	124	%REC	10	10
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	83 99	107	%REC	10	10
SW-846 8260	124-48-1	Dibromochloromethane	85 92	110	%REC	10	10
SW-846 8260	100-41-4	Ethylbenzene	75	112 4	%REC	10	10
SW-846 8260	87-68-3	Hexachlorobutadiene	20	89 3	%REC	10	10
SW-846 8260	75-09-2	Methylene chloride	84 67	112	%REC	10	10
SW-846 8260	91-20-3	Naphthalene	38	85 59	%REC	10	10
SW-846 8260	100-42-5	Styrene	73	105 1	%REC	10	10
SW-846 8260	127-18-4	Tetrachloroethene	74	101	%REC	10	10
SW-846 8260	108-88-3	Toluene	81	125	%REC	10	10
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	77 98	122	%REC	10	10
SW-846 8260	79-01-6	Trichloroethene	82	132	%REC	10	10
SW-846 8260	75-01-4	Vinyl chloride	46 78	133	%REC	10	10
SW-846 8260	1330-20-7	Xylene	72	113 2	%REC	10	10

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13.2.2 Precision

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

MSD Evaluation

Laboratory precision is measured through the use of MSDs which are summarized in Table 13 Analytes with the highest relative percent differences (RPDs) (>35 percent) are reviewed by comparing the highest sample result to the WRW AL For analytes with RPDs exceeding 35 percent, if the highest sample results are sufficiently below the ALs, no further action is needed Aluminum, chromium, iron, manganese, mercury, zinc, 1,1,2,2-tetrachloroethane, 2-butanone, and hexachlorobutadiene had maximum RPDs greater than 35 percent The maximum results for mercury, zinc, 1,1,2,2-tetrachloroethane, 2-butanone, and hexachlorobutadiene are less that 1 percent of their WRW ALs The maximum aluminum is within about 14 percent of its WRW AL, iron is also within 14 percent, and manganese is within 32 percent The maximum chromium result from location CA41-025 (2600 mg/kg) is a WRW AL exceedance and therefore fails this criterion as expected The next highest chromium (80 mg/kg) is within 30 percent of the chromium WRW AL For this project, this review indicates project decisions were not adversely impacted by MSD RPD values greater than 35 percent

Table 13
Sample MSD Evaluation Summary

Test Method	CAS	Analyte	Maximum of RPD
SW-846 6010	7429-90-5	Aluminum	130 84
SW-846 6010	7440-36-0	Antimony	13 64
SW-846 6010	7440-38-2	Arsenic	3 31
SW-846 6010	7440-39-3	Barium	20 56
SW-846 6010	7440-41-7	Beryllium	7 91
SW-846 6010	7440-43-9	Cadmium	6 29
SW-846 6010	7440-47-3	Chromium	82 13
SW-846 6010	7440-48-4	Cobalt	21 62
SW-846 6010	7440-50-8	Copper	13 20
SW-846 6010	7439-89-6	Iron	194 23
SW-846 6010	7439-92-1	Lead	8 19
SW-846 6010	7439-93-2	Lithium	11 36
SW-846 6010	7439-96-5	Manganese	155 56
SW-846 6010	7439-97-6	Mercury	123 08
SW-846 6010	7439-98-7	Molybdenum	3 17
SW-846 6010	7440-02-0	Nickel	23 30
SW-846 6010	7782-49-2	Selenium	3 28
SW-846 6010	7440-22-4	Silver	4 08
SW-846 6010	7440-24-6	Strontium	7 65
SW-846 6010	7440-31-5	Tin	3 64
SW-846 6010	11-09-6	Uranium, Total	4 00

Test Method	CAS	Analyte	Maximum of RPD
SW-846 6010	7440-62-2	Vanadium	19 61
SW-846 6010	7440-66-6	Zinc	66 30
SW-846 8260	71-55-6	1,1,1-Trichloroethane	13 76
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	55 16
SW-846 8260	79-00-5	1,1,2-Trichloroethane	14 63
SW-846 8260	75-34-3	1,1-Dichloroethane	11 30
SW-846 8260	75-35-4	1,1-Dichloroethene	14 05
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	21 62
SW-846 8260	95-50-1	1,2-Dichlorobenzene	11 78
SW-846 8260	107-06-2	1,2-Dichloroethane	11 11
SW-846 8260	78-87-5	1,2-Dichloropropane	14 33
SW-846 8260	106-46-7	1,4-Dichlorobenzene	12 40
SW-846 8260	78-93-3	2-Butanone	64 33
SW-846 8260	108-10-1	4-Methyl-2-pentanone	15 38
SW-846 8260	67-64-1	Acetone	34 20
SW-846 8260	71-43-2	Benzene	13 17
SW-846 8260	75-27-4	Bromodichloromethane	13 16
SW-846 8260	75-25-2	Bromoform	9 33
SW-846 8260	74-83-9	Bromomethane	34 33
SW-846 8260	75-15-0	Carbon Disulfide	18 02
SW-846 8260	56-23-5	Carbon Tetrachloride	12 81
SW-846 8260	108-90-7	Chlorobenzene	13 63
SW-846 8260	75-00-3	Chloroethane	28 87
SW-846 8260	67-66-3	Chloroform	11 99
SW-846 8260	74-87-3	Chloromethane	12 24
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	11 08
SW-846 8260	124-48-1	Dibromochloromethane	10 98
SW-846 8260	100-41-4	Ethylbenzene	13 71
SW-846 8260	87-68-3	Hexachlorobutadiene	40 00
SW-846 8260	75-09-2	Methylene chloride	11 28
SW-846 8260	91-20-3	Naphthalene	19 77
SW-846 8260	100-42-5	Styrene	10 79
SW-846 8260	127-18-4	Tetrachloroethene	9 37
SW-846 8260	108-88-3	Toluene	13 41
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	10 89
SW-846 8260	79-01-6	Trichloroethene	15 05
SW-846 8260	75-01-4	Vinyl chloride	14 89
SW-846 8260	1330-20-7	Xylene	13 78

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Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent Table 14 indicates that sampling frequencies were adequate

Table 14
Field Duplicate Sample Frequency Summary

Test Method	Real	Duplicate	% Duplicate Samples	
Alpha Spectroscopy	24	8	33 33%	
Gamma Spectroscopy	112	10	8 93%	
SW-846 6010	116	10	8 62%	
SW-846 6200	4	1	25 00%	
SW-846 8260	66	7	10 61%	

Duplicate sample RPDs indicate how much variation exists in the field duplicate analyses, duplicate sample RPDs are provided in Table 15 The EPA data validation guidelines state that "there are no required review criteria for field duplicate analyses comparability" (EPA 1994b) For the DQA, the highest maximum RPDs (> 35 percent) are normally reviewed Except for arsenic all metal RPD results were greater than 35 percent However, expect for chromium, which was removed, results did not approach ALs and project decisions were not impacted

Table 15
RPD Evaluation Summary

Lab Code	Analyte	Max of Result RPD	Sort
ESTLDEN	Aluminum	146 82	m
ESTLDEN	Arsenic	6 80	m
ESTLDEN	Barium	83 76	m
ESTLDEN	Beryllium	58 82	m
ESTLDEN	Cadmium	44 83	m
ESTLDEN	Chromium	74 29	m
ESTLDEN	Cobalt	82 35	m
ESTLDEN	Copper	72 25	m
ESTLDEN	Iron	133 33	m
ESTLDEN	Lead	85 71	m
ESTLDEN	Lithium	77 23	m
ESTLDEN	Manganese	109 09	m
ESTLDEN	Mercury	61 68	m
ESTLDEN	Nickel	90 50	m
ESTLDEN	Strontium	118 18	m
ESTLDEN	Vanadium	100 00	m
ESTLDEN	Zinc	64 71	m
URS	Barium	181 07	m
URS	Cobalt	65 85	m

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Lab Code	Analyte	Max of Result RPD	Sort
URS	Copper	131 51	m
URS	Iron	94 31	m
URS	Manganese	102 79	m
URS	Nickel	111 11	m
URS	Strontium	167 78	m
URS	Zinc	111 43	m
ESTLDEN	1,1,1-Trichloroethane	4 65	v
ESTLDEN	1,1-Dichloroethane	4 65	v
ESTLDEN	1,2,4-Trichlorobenzene	4 65	v
ESTLDEN	1,2-Dichloroethane	4 65	v
ESTLDEN	4-Methyl-2-pentanone	4 26	v
ESTLDEN	Benzene	4 65	v
ESTLDEN	Bromodichloromethane	4 65	v
ESTLDEN	Bromoform	4 65	v
ESTLDEN	Carbon Disulfide	4 65	v
ESTLDEN	Chlorobenzene	4 65	v
ESTLDEN	Chloroform	4 65	v
ESTLDEN	cis-1,3-Dichloropropene	4 65	v
ESTLDEN	Dibromochloromethane	4 65	v
ESTLDEN	Methylene chloride	4 65	v
ESTLDEN	Naphthalene	4 65	v
ESTLDEN	Styrene	4 65	v
ESTLDEN	Tetrachloroethene	4 65	v
ESTLDEN	Toluene	4 65	v
ESTLDEN	trans-1,3-Dichloropropene	1 65	v
ESTLDEN	Trichloroethene	4 65	v

13.2.3 Completeness

Based on original project DQOs, a minimum of 25 percent of ER Program analytical results must be formally verified and validated Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements Table 16 shows the number and percentage of validated records (codes without "1"), verified records (codes with "1"), and rejected records for each analyte group The percentage of rejected records was acceptable Because the frequency of verification and validation for the project is adequate as shown in Table 16, the results are considered adequate for use in project decisions

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Table 16
Verification and Validation Summary

Validation Qualifier Code	Total of CAS Number	Alpha Spec	Gamma Spectroscopy	SW-846 6010	SW-846 6200	SW-846 8260
J	35	10	0	23	0	2
J1	507	0	0	485	4	18
JB1	1	0	0	0	0	1
R1	1	0	0	1	0	0
UJ	20	0	0	16	0	4
UJ1	216	0	0	147	1	68
V	432	0	30	191	0	211
V1	4393	110	306	1805	71	2101
Total	5605	120	336	2668	76	2405
Validated	487	10	30	230	0	217
% Validated	8 69%	8 33%	8 93%	8 62%	0 00%	9 02%
Verified	5118	110	306	2438	76	2188
% Verified	91 31%	91 67%	91 07%	91 38%	100 00%	90 98%
Rejected	1	0	0	1	0	0
% Rejected	0 02%	0 00%	0 00%	0 04%	0 00%	0 00%

13 2.4 Sensitivity

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

13.3 Summary of Data Quality

LCS, surrogate, field blank, MS, MSD, and field duplicate frequency results were acceptable or did not impact project decisions Real-duplicate RPD maximums for metals were generally high, however, expect for chromium, which was removed, results did not approach ALs and project decisions were not impacted Only one metal analysis was rejected, however, this did not impact project decisions The impacts of the individual exceedance for chromium at location CA41-025 were found to have no impact on final project decisions Compliance with the project quality requirements and the RFETS verification and validation goal of 25 percent for all analytical records indicates these data are adequate Data collected and used for IHSS Group 500-2 are adequate for decision making

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14.0 CONCLUSION

Results of the accelerated action justify NFAA for IHSS Group 500-2 Justification is based on the following

- Soil with chromium concentrations greater than the WRW AL was removed,
- All remaining contaminant concentrations are less than WRW ALs,
- No accelerated action required based on the SSRS, and
- No accelerated action required based on the stewardship evaluation

15.0 REFERENCES

CDPHE, 2003, Approval of the Industrial Area Sampling and Analysis Plan Addendum #IA-03-07, IHSS Group 500-2, June

CDPHE, 2004, Approval of the ER RSOP Notification #04-14, IHSS Group 500-2, April

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

DOE, 1999, Order 414 1A, Quality Assurance

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

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

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

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

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-07, IHSS Group 500-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June

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

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

DOE, 2003d, Second Quarter RFCA Groundwater Monitoring Report for Calndar Year 2003, Rocky Flats Enviornmental Technology Site, Golden, Colorado, November

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-14, Rocky Flats Environmental Technology Site, Golden, Colorado, July

DOE, CDPHE and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U S Department of Energy, Colorado Department of Public Health and Environment, and U S Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June

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

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

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

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

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

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

K-H, 2002c, V&V Guidelines for Volatile Organics, DA-SS01-v2

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

K-H, 2002e, V&V Guidelines for Metals, DA-SS05-v1

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

APPENDIX A
CORRESPONDENCE

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ENVIRONMENTAL RESTORATION
REGULATORY CONTACT RECORD

Date/Time: February 19, 2004

Site Contact(s): Marla Broussard
Phone: 303-966-6007

Regulatory Contact: Harlen Ainscough, Dave Kruchek, Elizabeth Pottorff, Carl Spreng
Phone: 303-692-3300

Agency: CDPHE

Purpose of Contact: Consultative Process Meeting– Meeting Notes

Discussion:

February 19, 2004 Comment Resolution Meetings
For

IHSS 500-169 NFAA Justification
CRA SAP
Jeb Love Report Sampling
IHSS Group 500-2 Sampling
700 Area Sampling

A meeting was held on February 19, 2004 to discuss the IHSS 500-169 NFAA Justification, CRA SAP, Jeb Love Report sampling, IHSS Group 500-2 sampling, and 700 Area sampling

I Attendees

CDPHE Harlen Ainscough, Dave Kruchek, Elizabeth Pottorff, Carl Spreng
EPA Gary Kleeman
DOE Norma Castaneda
K-H Marcella Broussard
K-H Team Nick Demos, Susan Serreze

II Report Status

61

Upcoming reports include Pond C-1 NFAA Justification, Draft Closeout Report for IHSS Group 900-1, Draft Closeout Report for IHSS Group 400-8 and Draft Closeout Report for IHSS Group 800-1

III Issues

No sitewide issues were discussed

IV Specific Comments

IHSS 500-169 NFAA Justification
The following resolutions were agreed to

1 The large metallic object identified with geophysical instruments will be removed if within 3 feet of the surface as part of IHSS Group 500-1

2 CDPHE and EPA concurred that IHSS 500-169 was approved as an NFAA

CRA SAP
The following resolutions were agreed to

1 CDPHE and EPA will provide comments, if any, and approval on the CRA SAP

Jeb Love Report Sampling

1 Sampling of "mima mounds" was in accordance with CDPHE and EPA request

2 CDPHE concurred that NFAA was appropriate for Site #4

3 CDPHE and EPA will review the data and provide additional comments or NFAA for the other four sites

IHSS Group 500-2 Sampling
The following resolutions were agreed to

1 Fill beneath the northern part of former Building 551 will be sampled because the source of the fill is unknown

2 The first two depth intervals (A and B) will be sampled at two locations in the fill area beneath the northern part and the second two depth intervals (C and D) will be sampled at two locations in the fill area beneath the southern part of the building footprint A subsequent conversation between Harlen Ainscough and Marla Broussard clarified this approach so that first two depth intervals (A and B) will be sampled at one location in the fill area beneath the northern part of the building footprint and one in the fill area beneath the southern part of the building footprint and the remaining depth intervals will be sampled at one location in the fill area beneath the northern part of the building footprint and one in the fill area beneath the southern part of the building footprint

700 Area Sampling
The following resolutions were agreed to

62

1 DOE will propose additional sampling locations in the 700 Area

V Meetings

The next meeting is scheduled for Thursday, March 4, 2004 at 10 30 AM

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ER REGULATORY CONTACT RECORD

Date/Time: March 15, 2004/ 1 10

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlan Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Simple sample location moves and clarifications, IHSS Groups 500-2 and 500-5

Discussion
Two locations in IHSS Group 500-2 (IASAP Addendum #IA-03-07) will be moved to avoid obstructions

- CA42-030 is located under a cargo container in RCRA Unit 18 03 This location will be moved 3 to 5 feet west to get out of the RCRA Unit This is a biased sample and it will still be located within the previously identified area of the Retention Pond
- CA42-019 is a statistical location that fell on the fence line for RCRA Unit 18 03 It will be moved 1 to 2 feet west, away from the fence

For IHSS Group 500-5 (IASAP Addendum #IA-04-03 for IHSS Groups 500-1 and 500-5)

- The dioxin samples will be collected at the A&B intervals at CB43-038 instead of A&B intervals at CB43-037 as stated in Table 3 of the SAP CB43-038 is where the highest concentrations of Aroclor were observed previously (at 55 ppm)
- The IASAP Addendum states 22 dioxin samples will be collected However, only 4 dioxin samples are planned as shown in the accompanying Table 4

Contact Record Prepared By: Annette Primrose

Required Distribution		Additional Distribution
M Aguilar, USEPA	R McCallister, DOE-RFFO	N Demos
S Bell, DOE-RFFO	J Mead, K-H ESS	G Kelly
J Berardini, K-H	S Nesta, K-H RISS	M Ruthven
B Birk, DOE-RFFO	L Norland, K-H RISS	
L Brooks, K-H ESS	K North, K-H ESS	
M Broussard, K-H RISS	E Pottorff, CDPHE	
L Butler, K-H RISS	A Primrose, K-H RISS	

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G Carnival, K-H RISS
N Castaneda, DOE-RFFO
C Deck, K-H Legal
S Gunderson, CDPHE
M Keating, K-H RISS
G Kleeman, USEPA
D Kruchek, CDPHE
D Mayo, K-H RISS
R Schassburger, DOE-RFFO
S Serreze, K-H RISS
D Shelton, K-H ESS
C Spreng, CDPHE
S Surovchak, DOE-RFFO
K Wiemelt, K-H RISS
C Zahm, K-H Legal

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ER REGULATORY CONTACT RECORD

Date/Time: March 16, 2004/ 7 50

Site Contact(s): Mark A Ruthven
Phone: 303 966-2955

Regulatory Contact: Harlen Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Elimination of VOC samples from 'A' interval due to asphalt removal

Discussion
When the 500-2 SAP Addendum (IA-03-07) was approved, it specified that VOC samples were to be collected in the 'A' interval These sample specifications were a direct result of the area being covered with asphalt However, between the approval of the SAP and its execution, the asphalt was removed as part of the D&D of Bldg 551 Since the asphalt has been removed, the need for VOC collection in the 'A' interval was deemed as no longer being valid Therefore the following modifications to the SAP Addendum were agreed upon and will be addressed in the resulting Closeout or Data Summary Report

- VOC samples will not be collected in the 'A' interval in areas no longer covered by asphalt
- Samples were planned for the A & C intervals at locations CA42-033 and CA42-032, the former loading dock locations at B553 Because the loading docks are gone, samples will be collected at the A and B intervals, C intervals were already collected
- Collection of VOC samples in the 'B' interval will continue according to the SAP

Contact Record Prepared By: Mark A Ruthven

Required Distribution		Additional Distribution
M Aguilar, USEPA	R McCallister, DOE-RFFO	
S Bell, DOE-RFFO	J Mead, K-H ESS	
J Berardini, K-H	S Nesta, K-H RISS	
B Birk, DOE-RFFO	L Norland, K-H RISS	
L Brooks, K-H ESS	K North, K-H ESS	
M Broussard, K-H RISS	E Pottorff, CDPHE	
L Butler, K-H RISS	A Primrose, K-H RISS	
G Carnival, K-H RISS	R Schassburger, DOE-RFFO	
N Castaneda, DOE-RFFO	S Serreze, K-H RISS	
C Deck, K-H Legal	D Shelton, K-H ESS	

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S Gunderson, CDPHE
M Keating, K-H RISS
G Kleeman, USEPA
D Kruchek, CDPHE
D Mayo, K-H RISS

C Spreng, CDPHE
S Surovchak, DOE-RFFO
K Wiemelt, K-H RISS
C Zahm, K-H Legal

ER REGULATORY CONTACT RECORD

Date/Time: March 17, 2004/ 8 15

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlen Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Use of previous fill material from IHSS 500-2

Discussion
There is a large quantity of fill material associated with Building 551 located within IHSS Group 500-2 In consultation with CDPHE, samples of the fill material were collected on a statistical basis from the fill material within the IHSS group and analyzed for radionuclides, metals and volatile organic compounds

The results were recently received and are all below wildlife refuge worker action levels Even though no longer applicable, results are also below the ecological receptor action levels

Based on this, it was agreed that the material can be used as needed Sitewide for fill material

Contact Record Prepared By: Annette Primrose

Required Distribution		Additional Distribution
M Aguilar, USEPA	R McCallister, DOE-RFFO	Harlen Ainscough CDPHE
S Bell, DOE-RFFO	J Mead, K-H ESS	Mark Ruthven, KH Team
J Berardini, K-H	S Nesta, K-H RISS	
B Birk, DOE-RFFO	L Norland, K-H RISS	
L Brooks, K-H ESS	K North, K-H ESS	
M Broussard, K-H RISS	E Pottorff, CDPHE	
L Butler, K-H RISS	A Primrose, K-H RISS	
G Carnival, K-H RISS	R Schassburger, DOE-RFFO	
N Castaneda, DOE-RFFO	S Serreze, K-H RISS	
C Deck, K-H Legal	D Shelton, K-H ESS	
S Gunderson, CDPHE	C Spreng, CDPHE	
M Keating, K-H RISS	S Surovchak, DOE-RFFO	
G Kleeman, USEPA	K Wiemelt, K-H RISS	
D Kruchek, CDPHE	C Zahm, K-H Legal	
D Mayo, K-H RISS		

ER REGULATORY CONTACT RECORD

Date/Time: April 26, 2004/1 15

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlen Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Confirmation sampling at 500-2

Discussion
At the area in IHSS Group 500-2 where chromium above action levels is present, an area approximately 3 feet by 3 feet by 6 inches deep will be excavated as described in the RSOP Notification #04-14 Confirmation samples will be collected from the side walls at the approximate midpoint of each side, from the full 6 inch depth of the excavation These samples will be analyzed offsite for metals to determine if the remedial action is complete

A confirmation sample in the center at the excavation depth of 6 inches is not required as this increment was covered by the initial sampling at this location

Contact Record Prepared By: Annette Primrose

Required Distribution		Additional Distribution
M Aguilar, USEPA	R McCallister, DOE-RFFO	Harlen Ainscough CDPHE
S Bell, DOE-RFFO	J Mead, K-H ESS	Mark Ruthven, KH Team
J Berardini, K-H	S Nesta, K-H RISS	Dan Reeder, KH Team
B Birk, DOE-RFFO	L Norland, K-H RISS	
L Brooks, K-H ESS	K North, K-H ESS	
M Broussard, K-H RISS	E Pottorff, CDPHE	
L Butler, K-H RISS	A Primrose, K-H RISS	
G Carnival, K-H RISS	R Schassburger, DOE-RFFO	
N Castaneda, DOE-RFFO	S Serreze, K-H RISS	
C Deck, K-H Legal	D Shelton, K-H ESS	
S Gunderson, CDPHE	C Spreng, CDPHE	
M Keating, K-H RISS	S Surovchak, DOE-RFFO	
G Kleeman, USEPA	K Wiemelt, K-H RISS	
D Kruchek, CDPHE	C Zahm, K-H Legal	
D Mayo, K-H RISS		

ER REGULATORY CONTACT RECORD

Date/Time: May 6, 2004/11 00

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlan Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Backfill of 500-2 excavation

Discussion
All four of the confirmation samples collected for the remedial action at 500-2 were well below action levels The highest concentration of was chrome was 47 mg/kg, well below the chromium action level of 268 mg/kg This value is within the range of the other chromium values for this IHSS group and is similar to the surface background value of 16 99 mg/kg and the subsurface background value of 68 mg/kg Based on this, the excavation will be backfilled

Contact Record Prepared By: Annette Primrose

Required Distribution		Additional Distribution
M Aguilar, USEPA	R McCallister, DOE-RFFO	D Reeder, K-H RISS
S Bell, DOE-RFFO	J Mead, K-H ESS	
J Berardini, K-H	S Nesta, K-H RISS	
B Birk, DOE-RFFO	L Norland, K-H RISS	
L Brooks, K-H ESS	K North, K-H ESS	
L Butler, K-H RISS	E Pottorff, CDPHE	
G Carnival, K-H RISS	A Primrose, K-H RISS	
N Castaneda, DOE-RFFO	R Schassburger, DOE-RFFO	
C Deck, K-H Legal	S Serreze, K-H RISS	
S Gunderson, CDPHE	D Shelton, K-H ESS	
M Keating, K-H RISS	C Spreng, CDPHE	
G Kleeman, USEPA	S Surovchak, DOE-RFFO	
D Kruchek, CDPHE	K Wiemelt, K-H RISS	
D Mayo, K-H RISS	C Zahm, K-H Legal	

APPENDIX B
PROJECT PHOTOGRAPHS

COMPACT DISC
ACCELERATED ACTION DATA

71/71

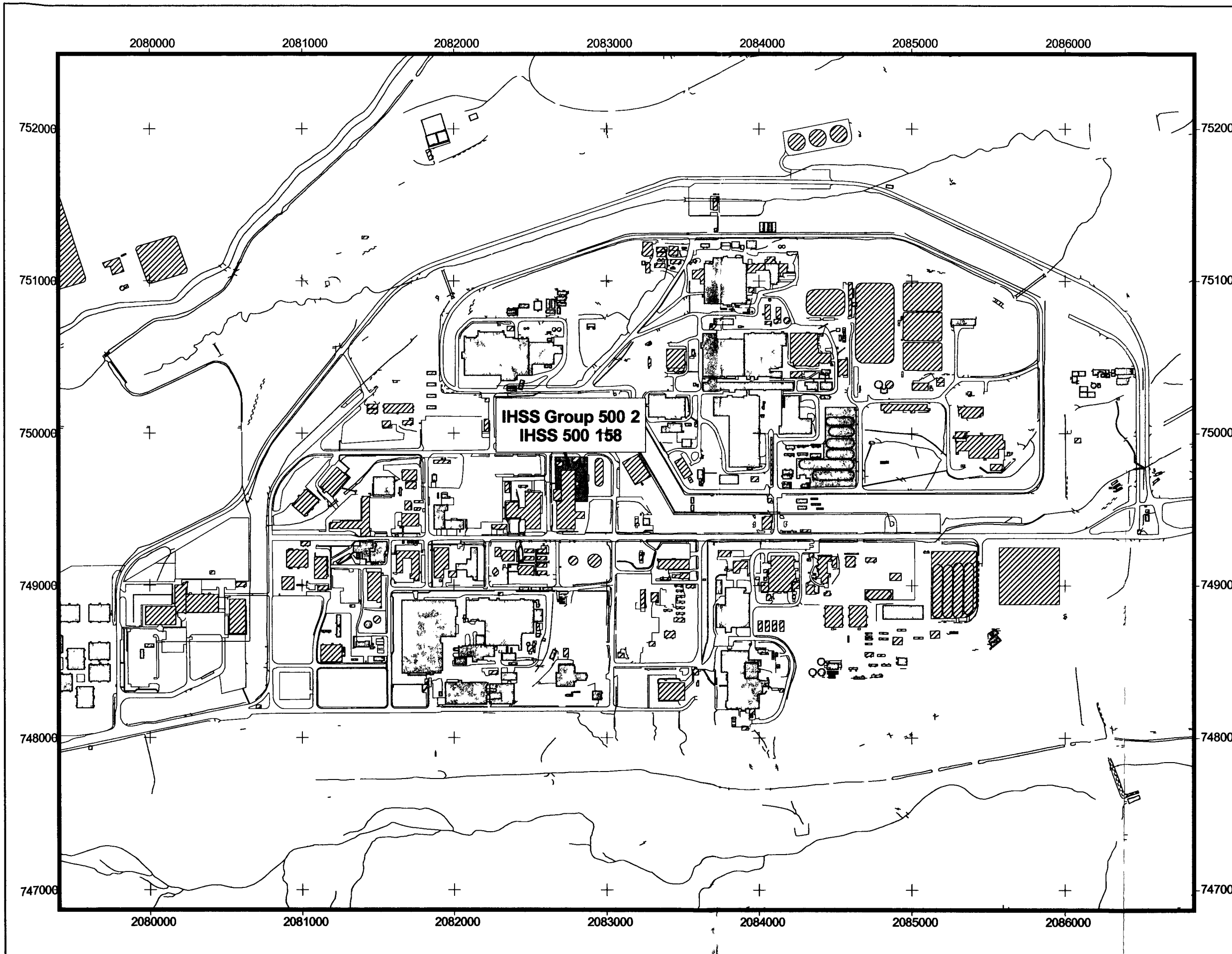


FIGURE 1

IHSS Group 500 2
General Location Map

KEY

- IHSS 500 158
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

DRAFT

W

250 0 250 500 750 Feet

Scale = 1 7500

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared for

KAISER•HILL COMPANY

Prepared by [redacted]

File W \Projects\Fy2004\500-2\
Closeout\500-2_clsout_dcr apr

Date 6/8/04

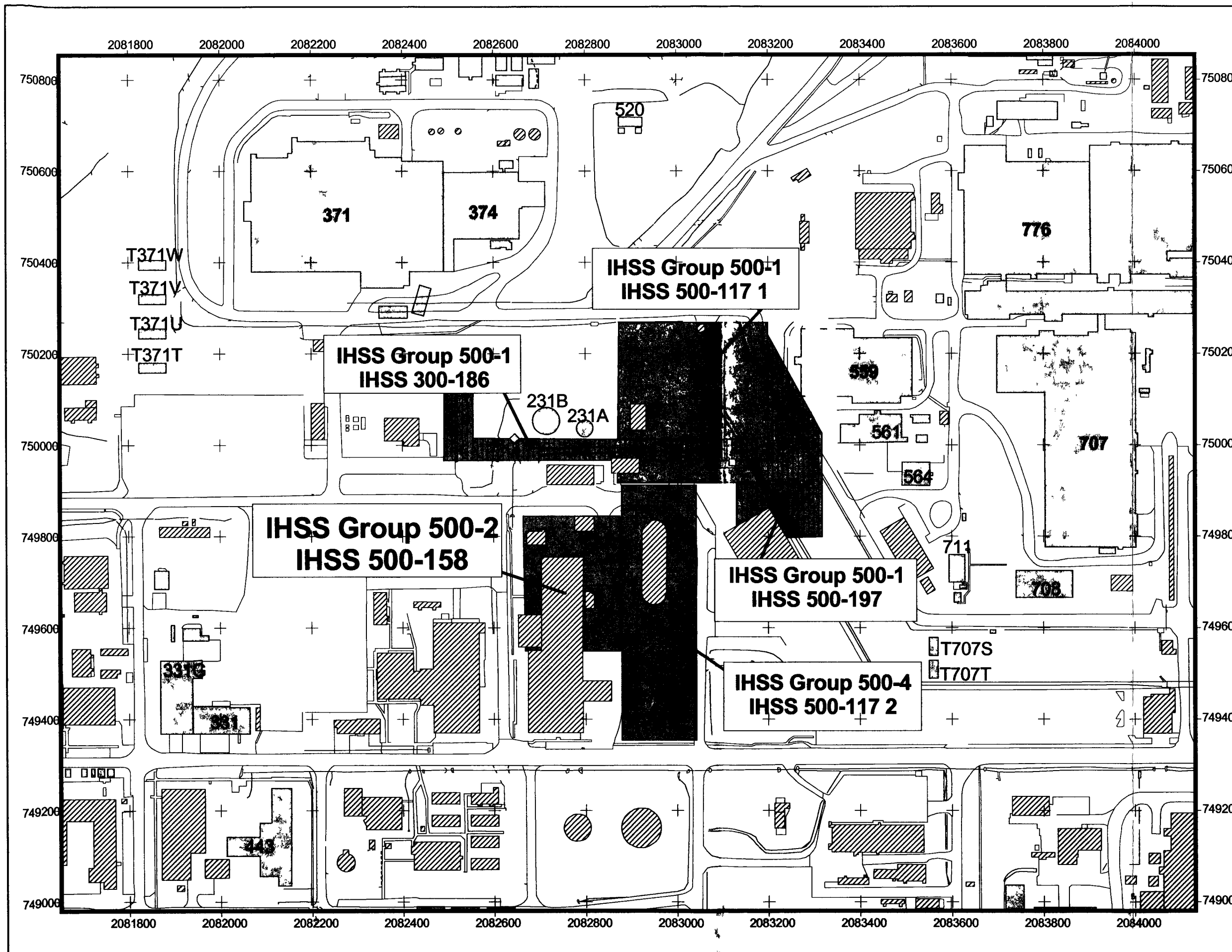


FIGURE 2

IHSS Group 500 2
Detailed Location

KEY

- IHSS
- Overlapping IHSS
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

DRAFT

W
S

100 0 100 200 300 Feet

Scale = 1 3000

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared for

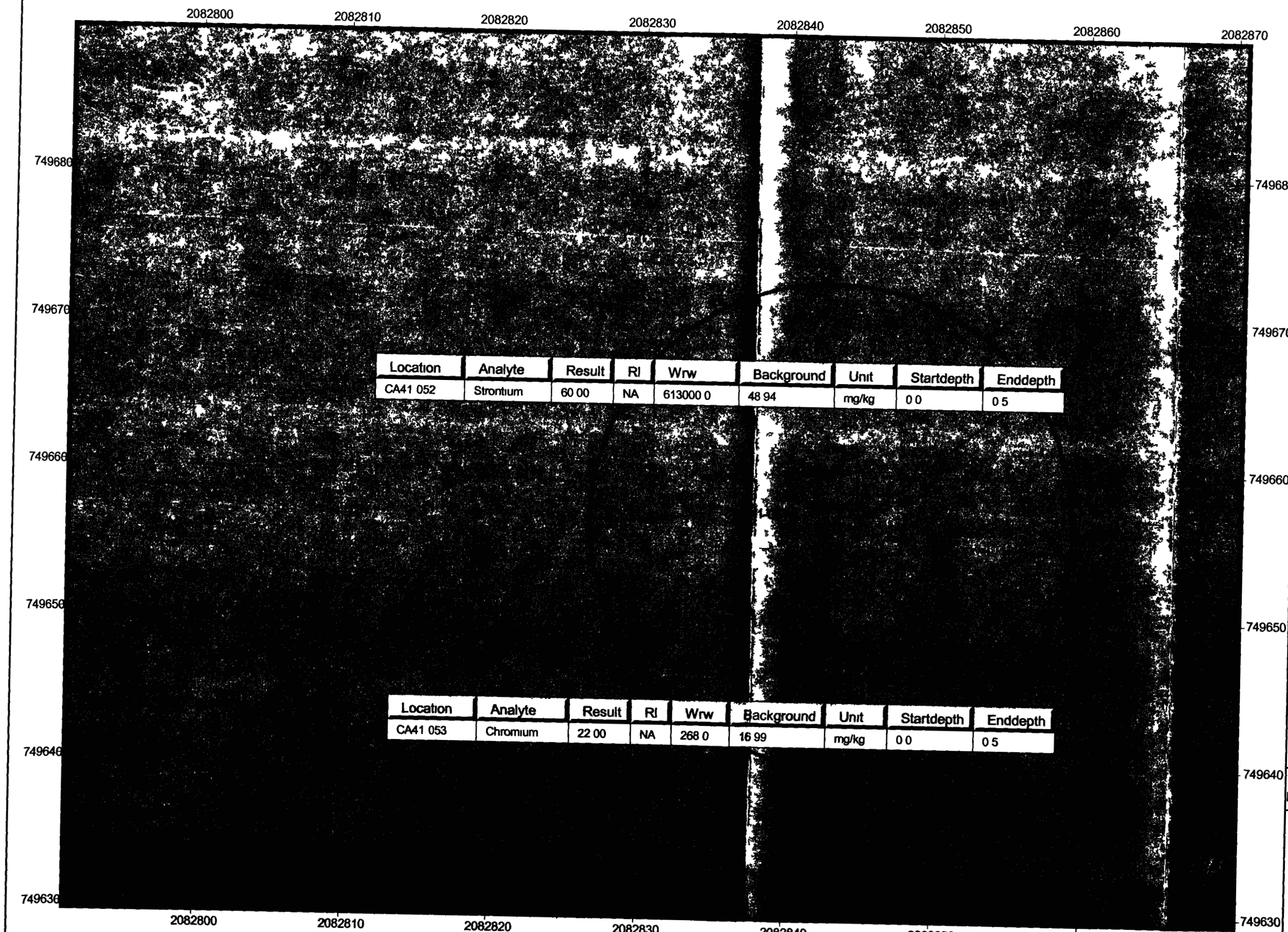
KAISER•HILL COMPANY

Prepared by

File W \Projects\Fy2004\500-2\
Closeout\500-2_closut_dcr apr

Date 6/8/04

13



Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41 052	Strontium	60 00	NA	613000 0	48 94	mg/kg	0 0	0 5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41 053	Chromium	22 00	NA	268 0	16 99	mg/kg	0 0	0 5

FIGURE 5
IHSS Group 500 2
Confirmation Sampling
Locations and Results
Near Location CA41 025

KEY

- Characterization sampling location with concentration greater than background and greater than WRW AL
- Confirmation sampling location with concentration greater than background and less than WRW AL
- Confirmation sampling location with concnetration less than background and less than WRW AL

IHSS 500 158

Remediation area from Figure 3

DRAFT

N
W
S

2 5 0 2 5 5 7 5 10 Feet

Scale = 1 80
State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

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Rocky Flats Environmental Technology Site

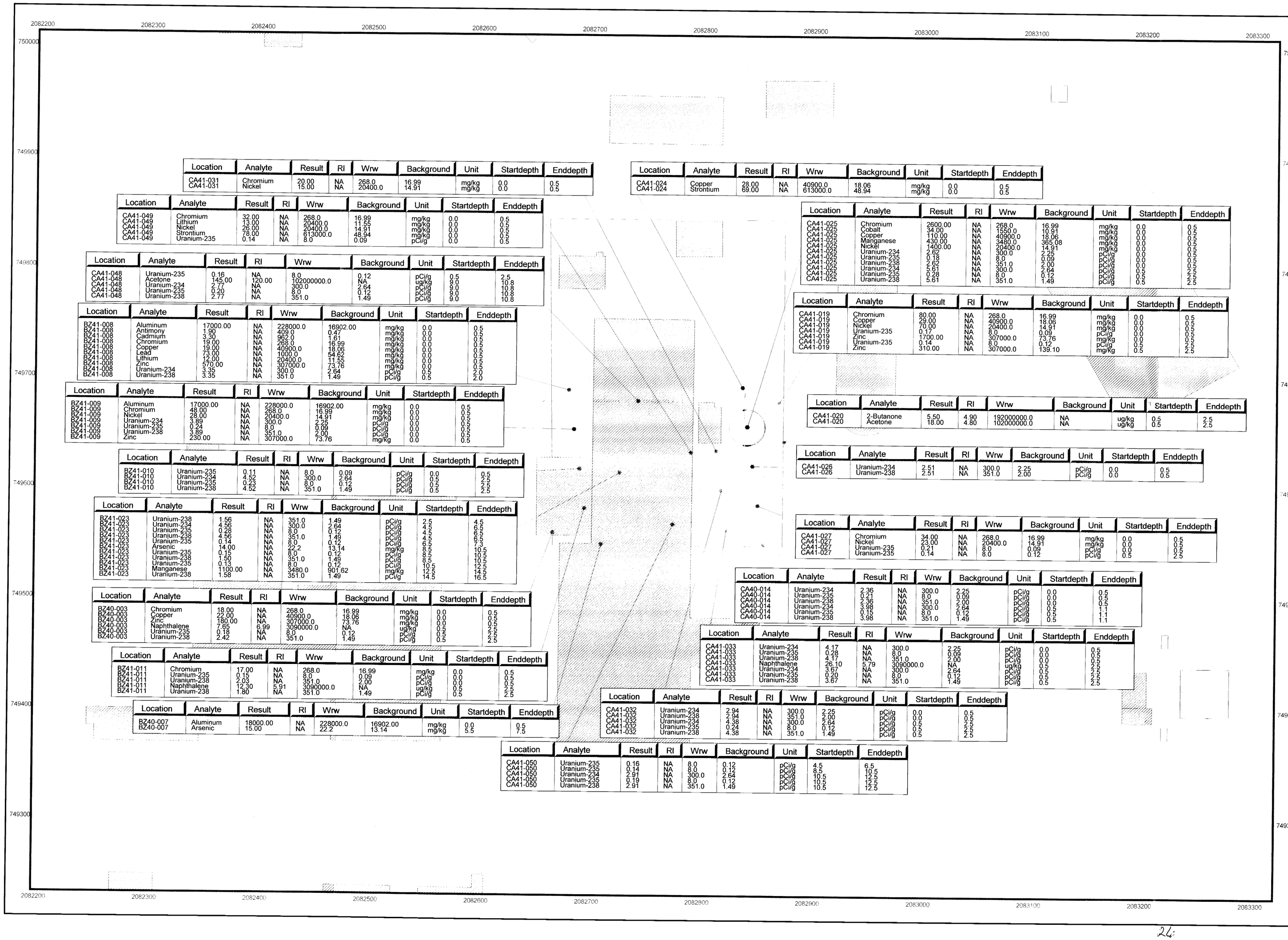
Prepared by
KAISER•HILL COMPANY

Prepared for [redacted]

File W \Projects\Fy2004\500-2\Closeout\500-2_closout_dcr apr

Date 6/8/04

FIGURE 4
IHSS Group 500-2
Accelerated Action Sampling Locations and Results Greater than Background Mean Plus Two Standard Deviations or Reporting Limit (Southern Half)



Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-031	Chromium	20.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-031	Nickel	15.00	NA	20400.0	14.91	mg/kg	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-024	Copper	28.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA41-024	Strontium	69.00	NA	613000.0	48.94	mg/kg	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-049	Chromium	32.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-049	Lithium	13.00	NA	20400.0	11.55	mg/kg	0.0	0.5
CA41-049	Nickel	26.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-049	Strontium	78.00	NA	613000.0	48.94	mg/kg	0.0	0.5
CA41-049	Uranium-235	0.14	NA	8.0	0.09	pCi/g	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-025	Chromium	2600.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-025	Cobalt	34.00	NA	1550.0	10.91	mg/kg	0.0	0.5
CA41-025	Copper	110.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA41-025	Manganese	430.00	NA	3480.0	365.08	mg/kg	0.0	0.5
CA41-025	Nickel	1400.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-025	Uranium-234	2.62	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-025	Uranium-235	0.18	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-025	Uranium-238	2.62	NA	351.0	2.00	pCi/g	0.0	0.5
CA41-025	Uranium-234	5.61	NA	300.0	2.64	pCi/g	0.5	2.5
CA41-025	Uranium-235	0.28	NA	8.0	0.12	pCi/g	0.5	2.5
CA41-025	Uranium-238	5.61	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-048	Uranium-235	0.16	NA	8.0	0.12	pCi/g	0.5	2.5
CA41-048	Acetone	145.00	120.00	102000000.0	NA	ug/kg	9.0	10.8
CA41-048	Uranium-234	2.77	NA	300.0	2.64	pCi/g	9.0	10.8
CA41-048	Uranium-235	0.20	NA	8.0	0.12	pCi/g	9.0	10.8
CA41-048	Uranium-238	2.77	NA	351.0	1.49	pCi/g	9.0	10.8

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-019	Chromium	80.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-019	Copper	29.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA41-019	Nickel	70.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-019	Uranium-235	0.17	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-019	Zinc	1700.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA41-019	Uranium-235	0.14	NA	8.0	0.12	pCi/g	0.5	2.5
CA41-019	Zinc	310.00	NA	307000.0	139.10	mg/kg	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-008	Aluminum	17000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ41-008	Antimony	1.90	NA	409.0	0.47	mg/kg	0.0	0.5
BZ41-008	Cadmium	3.30	NA	962.0	1.61	mg/kg	0.0	0.5
BZ41-008	Chromium	19.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ41-008	Copper	19.00	NA	40900.0	18.06	mg/kg	0.0	0.5
BZ41-008	Lead	73.00	NA	1000.0	54.62	mg/kg	0.0	0.5
BZ41-008	Lithium	12.00	NA	20400.0	11.55	mg/kg	0.0	0.5
BZ41-008	Zinc	570.00	NA	307000.0	73.76	mg/kg	0.0	0.5
BZ41-008	Uranium-234	3.35	NA	300.0	2.64	pCi/g	0.5	2.0
BZ41-008	Uranium-238	3.35	NA	351.0	1.49	pCi/g	0.5	2.0

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-020	2-Butanone	5.50	4.90	192000000.0	NA	ug/kg	0.5	2.5
CA41-020	Acetone	18.00	4.80	102000000.0	NA	ug/kg	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-009	Aluminum	17000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ41-009	Chromium	48.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ41-009	Nickel	28.00	NA	20400.0	14.91	mg/kg	0.0	0.5
BZ41-009	Uranium-234	3.89	NA	300.0	2.25	pCi/g	0.0	0.5
BZ41-009	Uranium-235	0.24	NA	8.0	0.09	pCi/g	0.0	0.5
BZ41-009	Uranium-238	3.89	NA	351.0	2.00	pCi/g	0.0	0.5
BZ41-009	Zinc	230.00	NA	307000.0	73.76	mg/kg	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-026	Uranium-234	2.51	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-026	Uranium-238	2.51	NA	351.0	2.00	pCi/g	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-010	Uranium-235	0.11	NA	8.0	0.09	pCi/g	0.0	0.5
BZ41-010	Uranium-234	4.52	NA	300.0	2.64	pCi/g	0.5	2.5
BZ41-010	Uranium-235	0.23	NA	8.0	0.12	pCi/g	0.5	2.5
BZ41-010	Uranium-238	4.52	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-027	Chromium	34.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-027	Nickel	23.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-027	Uranium-235	0.21	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-027	Uranium-235	0.14	NA	8.0	0.12	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-023	Uranium-238	1.56	NA	351.0	1.49	pCi/g	2.5	4.5
BZ41-023	Uranium-234	4.56	NA	300.0	2.64	pCi/g	4.5	6.5
BZ41-023	Uranium-235	0.28	NA	8.0	0.12	pCi/g	4.5	6.5
BZ41-023	Uranium-238	4.56	NA	351.0	1.49	pCi/g	4.5	6.5
BZ41-023	Uranium-235	0.14	NA	8.0	0.12	pCi/g	6.5	7.3
BZ41-023	Arsenic	14.00	NA	22.2	13.14	mg/kg	8.5	10.5
BZ41-023	Uranium-235	0.15	NA	8.0	0.12	pCi/g	8.5	10.5
BZ41-023	Uranium-238	1.50	NA	351.0	1.49	pCi/g	8.5	10.5
BZ41-023	Uranium-235	0.13	NA	8.0	0.12	pCi/g	10.5	12.5
BZ41-023	Manganese	1100.00	NA	3480.0	901.62	mg/kg	12.5	14.5
BZ41-023	Uranium-238	1.58	NA	351.0	1.49	pCi/g	14.5	16.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA40-014	Uranium-234	2.36	NA	300.0	2.25	pCi/g	0.0	0.5
CA40-014	Uranium-235	0.21	NA	8.0	0.09	pCi/g	0.0	0.5
CA40-014	Uranium-238	2.36	NA	351.0	2.00	pCi/g	0.0	0.5
CA40-014	Uranium-234	3.98	NA	300.0	2.64	pCi/g	0.5	1.1
CA40-014	Uranium-235	0.15	NA	8.0	0.12	pCi/g	0.5	1.1
CA40-014	Uranium-238	3.98	NA	351.0	1.49	pCi/g	0.5	1.1

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ40-003	Chromium	18.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ40-003	Copper	22.00	NA	40900.0	18.06	mg/kg	0.0	0.5
BZ40-003	Zinc	180.00	NA	307000.0	73.76	mg/kg	0.0	0.5
BZ40-003	Naphthalene	7.85	6.99	3090000.0	NA	ug/kg	0.5	2.5
BZ40-003	Uranium-235	0.18	NA	8.0	0.12	pCi/g	0.5	2.5
BZ40-003	Uranium-238	2.42	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-033	Uranium-234	4.17	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-033	Uranium-235	0.28	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-033	Uranium-238	4.17	NA	351.0	2.00	pCi/g	0.0	0.5
CA41-033	Naphthalene	26.10	5.79	3090000.0	NA	ug/kg	0.5	2.5
CA41-033	Uranium-234	3.67	NA	300.0	2.64	pCi/g	0.5	2.5
CA41-033	Uranium-235	0.20	NA	8.0	0.12	pCi/g	0.5	2.5
CA41-033	Uranium-238	3.67	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-011	Chromium	17.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ41-011	Uranium-235	0.15	NA	8.0	0.09	pCi/g	0.0	0.5
BZ41-011	Uranium-238	2.03	NA	351.0	2.00	pCi/g	0.0	0.5
BZ41-011	Naphthalene	12.30	5.91	3090000.0	NA	ug/kg	0.5	2.5
BZ41-011	Uranium-238	1.80	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-032	Uranium-234	2.94	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-032	Uranium-238	2.94	NA	351.0	2.00	pCi/g	0.0	0.5
CA41-032	Uranium-234	4.38	NA	300.0	2.64	pCi/g	0.5	2.5
CA41-032	Uranium-235	0.24	NA	8.0	0.12	pCi/g	0.5	2.5
CA41-032	Uranium-238	4.38	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ40-007	Aluminum	18000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ40-007	Arsenic	15.00	NA	22.2	13.14	mg/kg	5.5	7.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-050	Uranium-235	0.16	NA	8.0	0.12	pCi/g	4.5	6.5
CA41-050	Uranium-235	0.14	NA	8.0	0.12	pCi/g	8.5	10.5
CA41-050	Uranium-234	2.91	NA	300.0	2.64	pCi/g	10.5	12.5
CA41-050	Uranium-235	0.19	NA	8.0	0.12	pCi/g	10.5	12.5
CA41-050	Uranium-238	2.91	NA	351.0	1.49	pCi/g	10.5	12.5

KEY

- Characterization sampling location with concentration greater than background and greater than WRW AL
- Confirmation sampling location with concentration greater than background and less than WRW AL
- Remediation area Figure 5
- IHSS 500-158
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

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Scale = 1: 550

25 0 25 50 75 100 125 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared for: KAISER•HILL COMPANY

Prepared by: RADMS

File: W:\Projects\Fy2004\500-2\Closeout\500-2_clsout_dcr.apr

Date: 6/8/04

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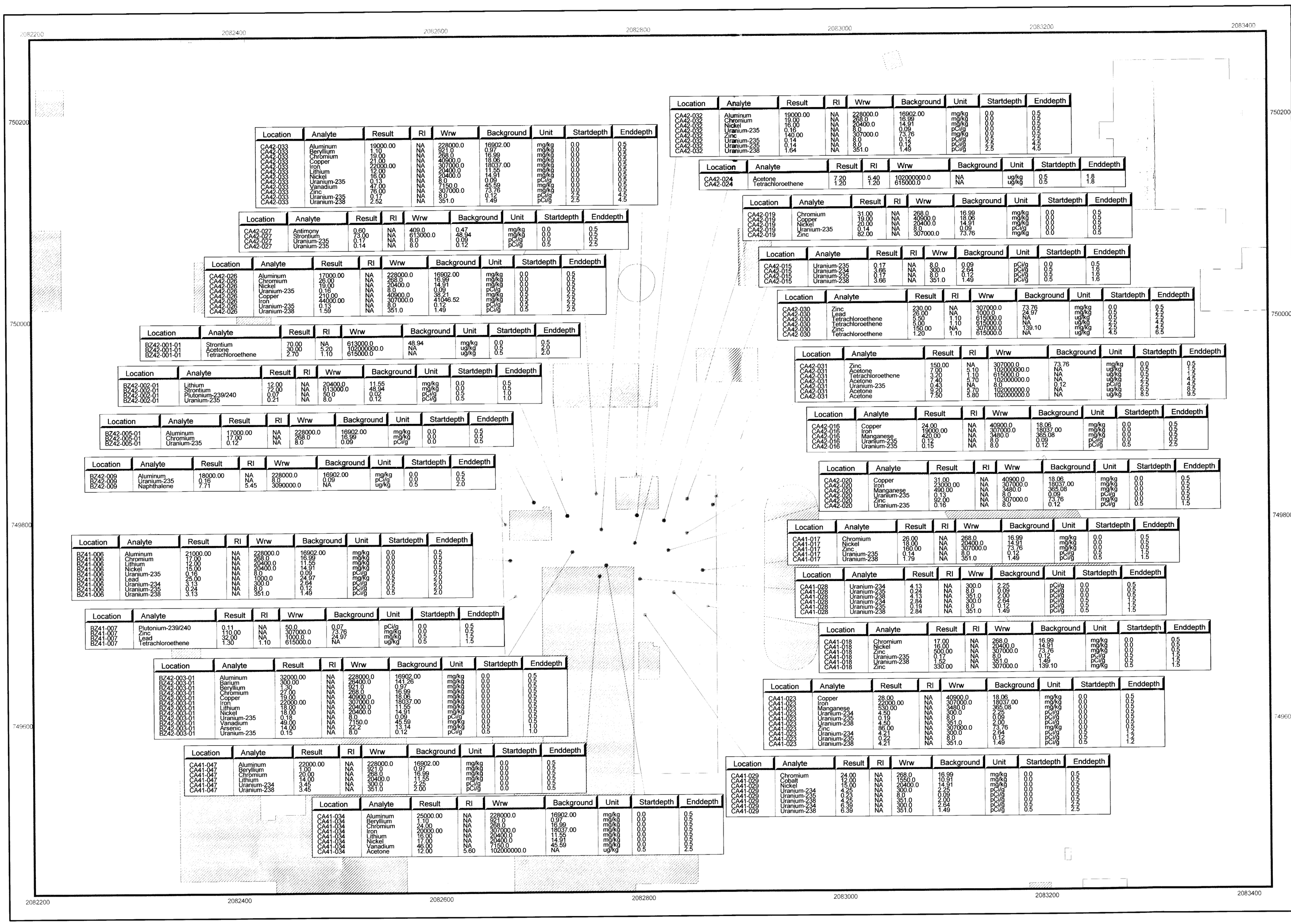
IA A002169



Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-033	Aluminum	19000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
CA42-033	Beryllium	1.10	NA	921.0	0.97	mg/kg	0.0	0.5
CA42-033	Chromium	19.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA42-033	Copper	21.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA42-033	Iron	22000.00	NA	307000.0	18037.00	mg/kg	0.0	0.5
CA42-033	Lithium	12.00	NA	20400.0	11.55	mg/kg	0.0	0.5
CA42-033	Nickel	16.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA42-033	Uranium-235	0.13	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-033	Vanadium	47.00	NA	7150.0	45.59	mg/kg	0.0	0.5
CA42-033	Zinc	76.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA42-033	Uranium-235	0.17	NA	8.0	0.12	pCi/g	2.5	4.5
CA42-033	Uranium-238	2.52	NA	351.0	1.49	pCi/g	2.5	4.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-027	Antimony	0.60	NA	409.0	0.47	mg/kg	0.0	0.5
CA42-027	Strontium	73.00	NA	613000.0	48.94	mg/kg	0.0	0.5
CA42-027	Uranium-235	0.17	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-027	Uranium-235	0.14	NA	8.0	0.12	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-026	Aluminum	17000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
CA42-026	Chromium	26.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA42-026	Nickel	19.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA42-026	Uranium-235	0.16	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-026	Copper	210.00	NA	40900.0	38.21	mg/kg	0.5	2.5
CA42-026	Iron	44000.00	NA	307000.0	41046.52	mg/kg	0.5	2.5
CA42-026	Uranium-235	0.13	NA	8.0	0.12	pCi/g	0.5	2.5
CA42-026	Uranium-238	1.59	NA	351.0	1.49	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-001-01	Strontium	70.00	NA	613000.0	48.94	mg/kg	0.0	0.5
BZ42-001-01	Acetone	30.00	5.20	102000000.0	NA	ug/kg	0.5	2.0
BZ42-001-01	Tetrachloroethene	2.70	1.10	615000.0	NA	ug/kg	0.5	2.0

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-002-01	Lithium	12.00	NA	20400.0	11.55	mg/kg	0.0	0.5
BZ42-002-01	Strontium	72.00	NA	613000.0	48.94	mg/kg	0.0	0.5
BZ42-002-01	Plutonium-239/240	0.07	NA	50.0	0.02	pCi/g	0.5	1.0
BZ42-002-01	Uranium-235	0.21	NA	8.0	0.12	pCi/g	0.5	1.0

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-005-01	Aluminum	17000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ42-005-01	Chromium	17.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ42-005-01	Uranium-235	0.12	NA	8.0	0.09	pCi/g	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-009	Aluminum	18000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ42-009	Uranium-235	0.16	NA	8.0	0.09	pCi/g	0.0	0.5
BZ42-009	Naphthalene	7.71	5.45	3090000.0	NA	ug/kg	0.5	2.0

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-006	Aluminum	21000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ41-006	Chromium	17.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ41-006	Lithium	12.00	NA	20400.0	11.55	mg/kg	0.0	0.5
BZ41-006	Nickel	15.00	NA	20400.0	14.91	mg/kg	0.0	0.5
BZ41-006	Uranium-235	0.16	NA	8.0	0.09	pCi/g	0.0	0.5
BZ41-006	Lead	25.00	NA	1000.0	24.97	mg/kg	0.5	2.0
BZ41-006	Uranium-234	3.13	NA	300.0	2.64	pCi/g	0.5	2.0
BZ41-006	Uranium-235	0.24	NA	8.0	0.12	pCi/g	0.5	2.0
BZ41-006	Uranium-238	3.13	NA	351.0	1.49	pCi/g	0.5	2.0

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-007	Plutonium-239/240	0.11	NA	50.0	0.07	pCi/g	0.0	0.5
BZ41-007	Zinc	110.00	NA	307000.0	73.76	mg/kg	0.0	0.5
BZ41-007	Lead	32.00	NA	1000.0	24.97	mg/kg	0.5	1.5
BZ41-007	Tetrachloroethene	1.30	1.10	615000.0	NA	ug/kg	0.5	1.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-003-01	Aluminum	32000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
BZ42-003-01	Barium	300.00	NA	26400.0	141.26	mg/kg	0.0	0.5
BZ42-003-01	Beryllium	1.30	NA	921.0	0.97	mg/kg	0.0	0.5
BZ42-003-01	Chromium	27.00	NA	268.0	16.99	mg/kg	0.0	0.5
BZ42-003-01	Copper	19.00	NA	40900.0	18.06	mg/kg	0.0	0.5
BZ42-003-01	Iron	22000.00	NA	307000.0	18037.00	mg/kg	0.0	0.5
BZ42-003-01	Lithium	18.00	NA	20400.0	11.55	mg/kg	0.0	0.5
BZ42-003-01	Nickel	18.00	NA	20400.0	14.91	mg/kg	0.0	0.5
BZ42-003-01	Uranium-235	0.18	NA	8.0	0.09	pCi/g	0.0	0.5
BZ42-003-01	Vanadium	49.00	NA	7150.0	45.59	mg/kg	0.0	0.5
BZ42-003-01	Arsenic	14.00	NA	22.2	13.14	mg/kg	0.5	1.0
BZ42-003-01	Uranium-235	0.15	NA	8.0	0.12	pCi/g	0.5	1.0

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-047	Aluminum	22000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
CA41-047	Beryllium	1.00	NA	921.0	0.97	mg/kg	0.0	0.5
CA41-047	Chromium	20.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-047	Lithium	14.00	NA	20400.0	11.55	mg/kg	0.0	0.5
CA41-047	Uranium-234	3.45	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-047	Uranium-238	3.45	NA	351.0	2.00	pCi/g	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-034	Aluminum	25000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
CA41-034	Beryllium	1.10	NA	921.0	0.97	mg/kg	0.0	0.5
CA41-034	Chromium	24.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-034	Iron	20000.00	NA	307000.0	18037.00	mg/kg	0.0	0.5
CA41-034	Lithium	16.00	NA	20400.0	11.55	mg/kg	0.0	0.5
CA41-034	Nickel	17.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-034	Vanadium	46.00	NA	7150.0	45.59	mg/kg	0.0	0.5
CA41-034	Acetone	12.00	5.60	1020000000.0	NA	ug/kg	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-032	Aluminum	19000.00	NA	228000.0	16902.00	mg/kg	0.0	0.5
CA42-032	Chromium	19.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA42-032	Nickel	16.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA42-032	Uranium-235	0.16	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-032	Zinc	140.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA42-032	Uranium-235	0.14	NA	8.0	0.12	pCi/g	0.5	2.5
CA42-032	Uranium-235	0.14	NA	8.0	0.12	pCi/g	2.5	4.5
CA42-032	Uranium-238	1.64	NA	351.0	1.49	pCi/g	2.5	4.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-024	Acetone	7.20	5.40	102000000.0	NA	ug/kg	0.5	1.8
CA42-024	Tetrachloroethene	1.20	1.20	615000.0	NA	ug/kg	0.5	1.8

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-019	Chromium	31.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA42-019	Copper	19.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA42-019	Nickel	20.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA42-019	Uranium-235	0.14	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-019	Zinc	82.00	NA	307000.0	73.76	mg/kg	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-015	Uranium-235	0.17	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-015	Uranium-234	3.66	NA	300.0	2.64	pCi/g	0.5	1.6
CA42-015	Uranium-235	0.17	NA	8.0	0.12	pCi/g	0.5	1.6
CA42-015	Uranium-238	3.66	NA	351.0	1.49	pCi/g	0.5	1.6

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-030	Zinc	230.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA42-030	Lead	28.00	NA	1000.0	24.97	mg/kg	0.5	2.5
CA42-030	Tetrachloroethene	2.50	1.10	615000.0	NA	ug/kg	0.5	2.5
CA42-030	Tetrachloroethene	5.00	1.10	615000.0	NA	ug/kg	2.5	4.5
CA42-030	Zinc	150.00	NA	307000.0	139.10	mg/kg	2.5	4.5
CA42 030	Tetrachloroethene	1.20	1.10	615000.0	NA	ug/kg	4.5	6.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-031	Zinc	150.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA42-031	Acetone	7.00	5.10	102000000.0	NA	ug/kg	0.5	1.5
CA42-031	Tetrachloroethene	3.20	1.10	615000.0	NA	ug/kg	0.5	1.5
CA42-031	Acetone	7.40	5.70	102000000.0	NA	ug/kg	2.5	4.5
CA42-031	Uranium-235	0.43	NA	8.0	0.12	pCi/g	2.5	4.5
CA42-031	Acetone	9.20	5.70	102000000.0	NA	ug/kg	6.5	8.5
CA42-031	Acetone	7.50	5.80	102000000.0	NA	ug/kg	8.5	9.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-016	Copper	24.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA42-016	Iron	19000.00	NA	307000.0	18037.00	mg/kg	0.0	0.5
CA42-016	Manganese	420.00	NA	3480.0	365.08	mg/kg	0.0	0.5
CA42-016	Uranium-235	0.12	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-016	Uranium-235	0.15	NA	8.0	0.12	pCi/g	0.5	2.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-020	Copper	31.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA42-020	Iron	23000.00	NA	307000.0	18037.00	mg/kg	0.0	0.5
CA42-020	Manganese	490.00	NA	3480.0	365.08	mg/kg	0.0	0.5
CA42-020	Uranium-235	0.13	NA	8.0	0.09	pCi/g	0.0	0.5
CA42-020	Zinc	92.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA42-020	Uranium-235	0.16	NA	8.0	0.12	pCi/g	0.5	1.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-017	Chromium	26.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-017	Nickel	18.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-017	Zinc	160.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA41-017	Uranium-235	0.14	NA	8.0	0.12	pCi/g	0.5	1.5
CA41-017	Uranium-238	1.79	NA	351.0	1.49	pCi/g	0.5	1.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-028	Uranium-234	4.13	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-028	Uranium-235	0.24	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-028	Uranium-238	4.13	NA	351.0	2.00	pCi/g	0.0	0.5
CA41-028	Uranium-234	2.84	NA	300.0	2.64	pCi/g	0.5	1.5
CA41-028	Uranium-235	0.19	NA	8.0	0.12	pCi/g	0.5	1.5
CA41-028	Uranium-238	2.84	NA	351.0	1.49	pCi/g	0.5	1.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-018	Chromium	17.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-018	Nickel	16.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-018	Zinc	500.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA41-018	Uranium-235	0.17	NA	8.0	0.12	pCi/g	0.5	1.5
CA41-018	Uranium-238	1.52	NA	351.0	1.49	pCi/g	0.5	1.5
CA41-018	Zinc	330.00	NA	307000.0	139.10	mg/kg	0.5	1.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-023	Copper	28.00	NA	40900.0	18.06	mg/kg	0.0	0.5
CA41-023	Iron	22000.00	NA	307000.0	18037.00	mg/kg	0.0	0.5
CA41-023	Manganese	530.00	NA	3480.0	365.08	mg/kg	0.0	0.5
CA41-023	Uranium-234	4.50	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-023	Uranium-235	0.19	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-023	Uranium-238	4.50	NA	351.0	2.00	pCi/g	0.0	0.5
CA41-023	Zinc	86.00	NA	307000.0	73.76	mg/kg	0.0	0.5
CA41-023	Uranium-234	4.21	NA	300.0	2.64	pCi/g	0.5	1.2
CA41-023	Uranium-235	0.22	NA	8.0	0.12	pCi/g	0.5	1.2
CA41-023	Uranium-238	4.21	NA	351.0	1.49	pCi/g	0.5	1.2

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-029	Chromium	24.00	NA	268.0	16.99	mg/kg	0.0	0.5
CA41-029	Cobalt	12.00	NA	1550.0	10.91	mg/kg	0.0	0.5
CA41-029	Nickel	15.00	NA	20400.0	14.91	mg/kg	0.0	0.5
CA41-029	Uranium-234	4.25	NA	300.0	2.25	pCi/g	0.0	0.5
CA41-029	Uranium-235	0.23	NA	8.0	0.09	pCi/g	0.0	0.5
CA41-029	Uranium-238	4.25	NA	351.0	2.00	pCi/g	0.0	0.5
CA41-029	Uranium-234	6.39	NA	300.0	2.64	pCi/g	0.5	2.5
CA41-029	Uranium-238	6.39	NA	351.0	1.49	pCi/g	0.5	2.5

FIGURE 3

IHSS Group 500-2
Accelerated Action Sampling
Results Greater than
Background Mean Plus Two
Standard Deviations
or Reporting Limit (Northern Half)

KEY

- Sampling location with concentration greater than background and less than WRW AL
- IHSS 500-158
- Demolished building
- Standing building
- Paved road
- Dirt road
- Stream

DRAFT

N
W E
S

Scale = 1: 600

25 0 25 50 75 100 125 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

Prepared for: RADMS

File: W:\Projects\Fy2004\500-2\Closeout\500-2_clsout_dcr.apr

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