NOTICE

All drawings located at the end of the document.

REF 03-RF 01847, JLB-048-03

KAISER•HILL
COMPANY

Data Summary Report
IHSS Group 900-3

December 2003

1/50

Data Summary Report
IHSS Group 900-3

Approval received from the Colorado Department of Public Health and Environment

December 17, 2003

Approval letter contained in the Administrative Record

December 2003

2

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ENCLOSURES

Compact Disc - IHSS Group 900-3 Real and QC Data

ACRONYMS

AL	action level
AR	Administrative Record
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
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 Procedure
HPGE	high-purity germanium detector
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
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
mg/kg	milligram per kilogram
MS/MSD	matrix spike/matrix spike duplicate
N/A	not applicable
ND	not detected
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocurie per gram
POC	Point of Compliance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SD	standard deviation
SEP	Solar Evaporation Ponds
SOR	sum of ratio
SVOC	semi-volatile organic compound
ug/kg	microgram per kilogram
VOC	volatile organic compound
V&V	verification and validation

1.0 INTRODUCTION

This data summary report summarizes characterization activities conducted at Individual Hazardous Substance Site (IHSS) Group 900-3 (904 Pad, IHSS 900-213 [Figure 1]) at the Rocky Flats Environmental Technology Site (RFETS) in Golden, Colorado Characterization activities were planned and executed in accordance with the Industrial Area Sampling and Analysis Plan (IASAP) (DOE 2001a) and IASAP Addendum #IA-03-01 (DOE 2002a)

2.0 SITE CHARACTERIZATION

IHSS Group 900-3 information consists of historical knowledge (DOE 1992-2001), 43 sampling locations with specifications as described in IASAP Addendum #IA-03-01 (DOE 2002a) and 11 sampling locations collected through the consultative process during the accelerated action investigation The sampling specifications for the characterization samples collected are listed in Table 1 Note that the majority of samples were collected from beneath the 904 Pad asphalt Reported sampling depths exclude the asphalt layer and reflect datum from the top of native soil It should be noted that some samples also contained road base material, or a mixture of road base and native soil because it was difficult to differentiate between the two soil types

The location of these samples and analytical results greater than background means plus two standard deviations or reporting limits is presented in Figure 2 and Table 2 A summary of the analytical results is presented in Table 3 Radionuclide Sum of Ratio (SOR) values are summarized in Table 4 Deviations from planned sampling specifications are presented in Table 5 The raw data are enclosed on a compact disc

Additional sampling and analysis was performed in October 2003 This sampling event was supplemental to the initial IHSS Group 900-3 investigation, which was conducted in January 2003 The second sampling event became necessary because of uncertainty from the initial sampling event and when data from a 1989 report entitled *Interim Status Closure Plan, Solid Waste Management Unit 15*–Storage *Pad 904* (Rockwell International, 1989) revealed two potential radiological "hot spots" in the northeastern corner of the 904 Pad Samples collected after excavation of contaminated soil and prior to the construction of the 904 Pad in 1987 indicated that two locations in the northeastern corner had plutonium activities in the 60 pCi/g range Road base was placed across the site during the construction of the 904 Pad, therefore, it was necessary to determine whether the native soil in the northeastern potion of the site contained elevated plutonium activities

Therefore, as a condition of No Further Accelerated Action (NFAA) approval, additional sampling and analysis was performed to verify the possibility of previous contamination The area where the elevated samples were collected was located as precisely as possible based on the isopleth map from the 1989 report that showed the approximate locations of the elevated plutonium activities Step-out samples were collected from 15 feet in each compass direction from the area of the original sample In addition, one sample was collected to the north of the 904 Pad in the area not previously cored because of overhead power lines

5

Table 1
IHSS Group 900-3 Characterization Sampling Specifications

Location Code	Actual Easting	Actual Northing	Depth Interval	Analyte	Laboratory Method
CL37-000	2085116 92	748829 83	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CL37-001	2085108 21	748940 14	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CL38-000	2085109 33	749041 67	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CL39-000	2085107 09	749162 13	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-003[1]	2085202 28	748819 05	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-005[1]	2085139 72	748854 70	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-012	2085319 92	748823 27	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-014	2085264 42	748855 40	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-016[1]	2085201 87	748891 05	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-018[1]	2085139 31	748926 69	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-025	2085324 13	748887 90	0-0 5	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-027	2085264 01	748927 41	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0

Location Code	Actual Easting	Actual Northing	Depth Interval	Analyte	Laboratory Method
CM37-031	2085322 33	748766 19	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM37-032	2085200 75	748769 60	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-001[1]	2085201 46	748963 05	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-003[1]	2085138 82	748998 80	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-009	2085326 16	748963 78	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-011	2085263 60	748999 40	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-013[1]	2085201 01	749035 04	0-0 5	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-015	2085138 48	749070 78	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-023	2085325 75	749035 78	0-0.5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-025	2085263 18	749071 46	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-027[1]	2085200 69	749107 08	0-0 5	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-029[1]	2085138 11	749142 68	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-036	2085325 34	749107 76	0-0 5	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0

8

Location Code	Actual Easting	Actual Northing	Depth Interval	Analyte	Laboratory Method
CM38-038	2085262 77	749143 42	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM39-001	2085200 19	749179 07	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM39-003[1]	2085137 60	7492714 67	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM39-008	2085324 91	749179 61	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM39-010	2085262 42	749215 37	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM39-012	2085169 56	749244 63	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM39-013	2085296 64	749246 81	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN37-003	2085389 13	748856 15	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN37-009	2085388 72	748928 11	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN37-012	2085427 69	748917 12	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN37-013	2085404 41	748811 76	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN38-003	2085388 31	749000 11	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CB38-009	2085382 79	749072 30	0 0 5	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0

Location Code	Actual Easting	Actual Northing	Depth Interval	Analyte	Laboratory Method
CN38-015	2085387 48	749144 08	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN38-016	2085430 53	749116 01	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN38-017	2085428 68	749021 97	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN39-005	2085387 08	749216 11	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CN39-006	2085436 05	749242 37	0-0 5'	Radionuclides Metals VOCs Cyanide Nitrate an N	6200 HPGe 8260 SW9010B/SW9012A SW9056/E300 0
CM38-041	2085309 85	749180 00	0 3 - 1'	Radionuclides	Alpha Spectroscopy
CM39-014	2085324 85	749179 60	0- 1 1'	Radionuclides	HPGe
CM39-015	2085325 13	749194 51	1 2-2'	Radionuclides	Alpha Spectroscopy
CM39-016	2085266 89	749233 68	0-0 9'	Radionuclides	HPGe
CN38-018	2085324 35	749164 65	0 1 - 1 1'	Radionuclides	Alpha Spectroscopy
CN38-019	2085382 77	749072 29	0 1-0 9'	Radionuclides	HPGe
CN38-020	2085397 77	749072 29	0 1-1'	Radionuclides	Alpha Spectroscopy
CN38-021	2085367 77	749072 29	0 1-1 1'	Radionuclides	Alpha Spectroscopy
CN38-022	2085382 83	749057 32	0 2-1 1'	Radionuclides	Alpha Spectroscopy
CN38-023	2085383 34	749087 24	0 2-1 1'	Radionuclides	HPGe
CN39-007	2085339 84	749179 20	1 -2'	Radionuclides	HPGe

10

THIS TARGET SHEET REPRESENTS AN
OVER-SIZED MAP / PLATE FOR THIS DOCUMENT:
(Ref: 03-RF-01847; JLB-148-03)

Data Summary Report
IHSS Group 900-3

December 2003

Figure 2:

Surface Soil Sample Results Above Background Mean Plus Two Standard Deviations or MDLs at IHSS Group 900-3

File: w:\Projects\Fy2003\900-3\Confirmation\900-3_closeout_dr(rev_2).apr

December 2003

CERCLA Administrative Record Document, IA-A-001905

U S DEPARTEMENT OF ENERGY
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

11

Table 2
Surface Soil Results Greater than Background Mean Plus Two Standard Deviations or Detection Limit

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
CL37-000	2085116 92	748829 83	Arsenic	0	0 5	12 7	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	624	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	32 1	20	268	—	16 99	mg/kg
			Copper	0	0 5	155	4	40900	—	18 06	mg/kg
			Iron	0	0 5	34800	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	613	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	50	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	241	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	126	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	165	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 19	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	4 02	1 82	351	1600	2 00	pCi/g
CL37-001	2085108 21	748940 14	Arsenic	0	0 5	10 8	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	744	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	38 3	20	268	—	16 99	mg/kg
			Copper	0	0 5	126	4	40900	—	18 06	mg/kg
			Iron	0	0 5	31500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	523	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	45 9	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	252	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	57 7	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	122	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 18	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	2 89	1 92	351	1600	2 00	pCi/g
			Naphthalene	0	0 5	1	5 1	3090000	—	NA	ug/kg
			Xylenes (total)	0	0 5	7	10	2040000	—	NA	ug/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
CL38-000	2085109 33	749041 67	Arsenic	0	0 5	16 9	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	671	98	26400	—	141 26	mg/kg
			Copper	0	0 5	153	4	40900	—	18 06	mg/kg
			Iron	0	0 5	28400	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	431	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	43 4	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	307	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	114	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	115	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 21	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	2 91	1 78	351	1600	2 00	pCi/g
CL39-000	2085107 09	749162 13	Arsenic	0	0 5	12 9	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	624	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	33 1	20	268	—	16 99	mg/kg
			Copper	0	0 5	160	4	40900	—	18 06	mg/kg
			Iron	0	0 5	48200	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1170	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	48 9	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	221	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	119	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	236	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 29	0 14	8	1900	0 09	pCi/g
			U-238	0	0 5	5 10	1 55	351	1600	2 00	pCi/g
			Acetone	0	0 5	10	100	102000000	211000	NA	ug/kg
			Ethylbenzene	0	0 5	21	5 2	4250000	—	NA	ug/kg
			Xylenes (total)	0	0 5	170	10	2040000	—	NA	ug/kg
CM37-003	2085202 28	748819 05	Arsenic	0	0 5	14 4	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	749	98	26400	—	141 26	mg/kg
			Cadmium	0	0 5	4 09	3	962	—	1 61	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Chromium	0	0 5	34 2	20	268	—	16 99	mg/kg
			Copper	0	0 5	122	4	40900	—	18 06	mg/kg
			Iron	0	0 5	44400	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1160	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	56 6	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	495	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	96 2	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	110	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 27	0 14	8	1900	0 09	pCi/g
			U-238	0	0 5	4 07	2 12	351	1600	2 00	pCi/g
			Acetone	0	0 5	20	110	102000000	211000	NA	ug/kg
CM37-005	2085139 72	748854 7	Barium	0	0 5	901	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	56	20	268	—	16 99	mg/kg
			Copper	0	0 5	145	4	40900	—	18 06	mg/kg
			Iron	0	0 5	52000	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1470	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	76 2	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	638	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	96	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	112	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 24	0 14	8	1900	0 09	pCi/g
			U-238	0	0 5	3 54	1 72	351	1600	2 00	pCi/g
			Acetone	0	0 5	10	110	102000000	211000	NA	ug/kg
			Naphthalene	0	0 5	0 9	5 4	3090000	—	NA	ug/kg
CM37-012	2085319 92	748823 27	Barium	0	0 5	661	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	116	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	306	90	1550	—	10 91	mg/kg
			Copper	0	0 5	214	4	40900	—	18 06	mg/kg
			Iron	0	0 5	56300	2190	307000	—	18037 00	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Manganese	0	0 5	1590	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	99	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	628	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	100	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	121	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 33	0 12	8	1900	0 09	pCi/g
			U-238	0	0 5	4 43	1 75	351	1600	2 00	pCi/g
			Naphthalene	0	0 5	1 7	5 2	3090000	—	NA	ug/kg
CM37-014	2085264 42	748855 4	Barium	0	0 5	922	98	26400	—	141 26	mg/kg
			Cadmium	0	0 5	3 09	3	962	—	1 61	mg/kg
			Chromium	0	0 5	53 8	20	268	—	16 99	mg/kg
			Copper	0	0 5	140	4	40900	—	18 06	mg/kg
			Iron	0	0 5	57600	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1610	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	66 7	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	718	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	143	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	130	9	307000	—	73 76	mg/kg
CM37-016	2085201 87	748891 05	Arsenic	0	0 5	11 8	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	888	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	37 4	20	268	—	16 99	mg/kg
			Copper	0	0 5	158	4	40900	—	18 06	mg/kg
			Iron	0	0 5	45300	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1240	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	58 3	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	514	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	95 6	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	122	9	307000	—	73 76	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Acetone	0	0 5	10	110	102000000	211000	NA	ug/kg
			Naphthalene	0	0 5	1	5 3	3090000	—	NA	ug/kg
CM37-018	2085139 31	748926 69	Barium	0	0 5	799	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	33	20	268	—	16 99	mg/kg
			Copper	0	0 5	192	4	40900	—	18 06	mg/kg
			Iron	0	0 5	45400	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1320	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	56 1	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	513	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	114	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	125	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 22	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	2 00	1 56	351	1600	2 00	pCi/g
			Acetone	0	0 5	15	110	102000000	211000	NA	ug/kg
CM37-025	2085324 13	748887 9	Barium	0	0 5	876	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	72	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	215	90	1550	—	10 91	mg/kg
			Copper	0	0 5	197	4	40900	—	18 06	mg/kg
			Iron	0	0 5	58000	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1840	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	92	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	705	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	128	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	125	9	307000	—	73 76	mg/kg
			U-238	0	0 5	3 39	1 83	351	1600	2 00	pCi/g
CM37-027	2085264 01	748927 41	Barium	0	0 5	878	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	55 6	20	268	—	16 99	mg/kg
			Copper	0	0 5	114	4	40900	—	18 06	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Iron	0	0 5	50500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1370	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	58 7	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	541	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	149	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	104	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 18	0 12	8	1900	0 09	pCi/g
			U-238	0	0 5	2 32	2 00	351	1600	2 00	pCi/g
			Acetone	0	0 5	30	110	102000000	211000	NA	ug/kg
CM37-031	2085322 33	748766 19	Arsenic	0	0 5	17 6	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	727	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	43 3	20	268	—	16 99	mg/kg
			Copper	0	0 5	135	4	40900	—	18 06	mg/kg
			Iron	0	0 5	37400	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	630	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	53 2	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	261	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	98 4	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	197	9	307000	—	73 76	mg/kg
			U-238	0	0 5	2 77	1 39	351	1600	2 00	pCi/g
			Ethylbenzene	0	0 5	9	5 6	4250000	—	NA	ug/kg
			Xylenes (total)	0	0 5	68	11	2040000	—	NA	ug/kg
CM37-032	2085200 75	748769 6	Arsenic	0	0 5	17 8	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	613	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	28 6	20	268	—	16 99	mg/kg
			Copper	0	0 5	150	4	40900	—	18 06	mg/kg
			Iron	0	0 5	31900	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	457	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	55 4	12	20400	—	14 91	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Strontium	0	0 5	224	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	113	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	126	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 25	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	3 05	1 89	351	1600	2 00	pCi/g
			Xylenes (total)	0	0 5	6	10	2040000	—	NA	ug/kg
CM38-001	2085201 46	748963 05	Arsenic	0	0 5	12 6	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	743	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	62 3	20	268	—	16 99	mg/kg
			Copper	0	0 5	163	4	40900	—	18 06	mg/kg
			Iron	0	0 5	49800	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1180	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	80 5	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	552	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	120	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	119	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 24	0 16	8	1900	0 09	pCi/g
			U-238	0	0 5	2 59	1 65	351	1600	2 00	pCi/g
			Acetone	0	0 5	20	110	102000000	211000	NA	ug/kg
CM38-003	2085138 82	748998 8	Arsenic	0	0 4	12 9	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 4	601	98	26400	—	141 26	mg/kg
			Chromium	0	0 4	34 9	20	268	—	16 99	mg/kg
			Copper	0	0 4	128	4	40900	—	18 06	mg/kg
			Iron	0	0 4	35500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 4	953	158	3480	—	365 08	mg/kg
			Nickel	0	0 4	46	12	20400	—	14 91	mg/kg
			Strontium	0	0 4	380	20	613000	—	48 94	mg/kg
			Vanadium	0	0 4	71 9	31	7150	292	45 59	mg/kg
			Zinc	0	0 4	103	9	307000	—	73 76	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
CM38-009	2085326 16	748963 78	Barium	0	0 5	795	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	99 3	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	285	90	1550	—	10 91	mg/kg
			Copper	0	0 5	214	4	40900	—	18 06	mg/kg
			Iron	0	0 5	59700	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1870	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	94 2	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	650	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	87 8	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	137	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 29	0 12	8	1900	0 09	pCi/g
			U-238	0	0 5	6 50	1 68	351	1600	2 00	pCi/g
CM38-011	2085263 6	748999 4	Barium	0	0 5	680	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	45 6	20	268	—	16 99	mg/kg
			Copper	0	0 5	118	4	40900	—	18 06	mg/kg
			Iron	0	0 5	39500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	988	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	50 3	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	424	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	89 6	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	103	9	307000	—	73 76	mg/kg
			U-238	0	0 5	6 25	1 49	351	1600	2 00	pCi/g
CM38-013	2085201 01	749035 04	Arsenic	0	0 5	14 1	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	706	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	30 9	20	268	—	16 99	mg/kg
			Copper	0	0 5	137	4	40900	—	18 06	mg/kg
			Iron	0	0 5	33400	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	651	158	3480	—	365 08	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Nickel	0	0 5	50 5	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	297	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	82 2	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	105	9	307000	—	73 76	mg/kg
			U-238	0	0 5	3 39	1 96	351	1600	2 00	pCi/g
			2-butanone	0	0 5	19	110	192000000	433000	NA	ug/kg
			Acetone	0	0 5	83	110	102000000	211000	NA	ug/kg
CM38-015	2085138 48	749070 78	Barium	0	0 4	355	98	26400	—	141 26	mg/kg
			Chromium	0	0 4	26 3	20	268	—	16 99	mg/kg
			Copper	0	0 4	42 9	4	40900	—	18 06	mg/kg
			Iron	0	0 4	21200	2190	307000	—	18037 00	mg/kg
			Nickel	0	0 4	33 4	12	20400	—	14 91	mg/kg
			Strontium	0	0 4	183	20	613000	—	48 94	mg/kg
			Vanadium	0	0 4	70 9	31	7150	292	45 59	mg/kg
			U-235	0	0 4	0 25	0 18	8	1900	0 09	pCi/g
			U-238	0	0 4	2 91	1 88	351	1600	2 00	pCi/g
			Acetone	0	0 4	50	120	102000000	211000	NA	ug/kg
CM38-023	2085325 75	749035 78	Arsenic	0	0 5	18 7	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	612	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	84 9	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	189	90	1550	—	10 91	mg/kg
			Copper	0	0 5	198	4	40900	—	18 06	mg/kg
			Iron	0	0 5	39600	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	626	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	60 4	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	242	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	119	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	136	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 23	0 12	8	1900	0 09	pCi/g

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			U-238	0	0 5	4 72	1 53	351	1600	2 00	pCi/g
CM38-025	2085263 18	749071 46	Barium	0	0 5	493	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	29 3	20	268	—	16 99	mg/kg
			Copper	0	0 5	104	4	40900	—	18 06	mg/kg
			Iron	0	0 5	24500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	391	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	32 8	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	145	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	91 5	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	83 7	9	307000	—	73 76	mg/kg
			Am-241[1]	0	0 5	4 96	0 37	76	1900	0 02	pCi/g
			Pu-239/240[1]	0	0 5	6 64	N/A	50	3800	0 07	pCi/g
			U-235	0	0 5	0 26	0 14	8	1900	0 09	pCi/g
			U-238	0	0 5	3 28	1 52	351	1600	2 00	pCi/g
			Acetone	0	0 5	80	110	102000000	211000	NA	ug/kg
CM38-027	2085200 69	749107 08	Barium	0	0 5	483	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	24 5	20	268	—	16 99	mg/kg
			Copper	0	0 5	135	4	40900	—	18 06	mg/kg
			Iron	0	0 5	25700	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	571	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	45 1	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	350	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	71 9	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	83 1	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 21	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	3 03	1 93	351	1600	2 00	pCi/g
			Acetone	0	0 5	22	110	102000000	211000	NA	ug/kg
CM38-029	2085138 11	749142 68	Arsenic	0	0 5	12 8	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	595	98	26400	—	141 26	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Chromium	0	0 5	41 7	20	268	—	16 99	mg/kg
			Copper	0	0 5	94 8	4	40900	—	18 06	mg/kg
			Iron	0	0 5	30900	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	553	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	39 5	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	225	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	133	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	105	9	307000	—	73 76	mg/kg
			U-238	0	0 5	2 55	1 23	351	1600	2 00	pCi/g
			2-butanone	0	0 5	23	110	192000000	433000	NA	ug/kg
			Acetone	0	0 5	100	110	102000000	211000	NA	ug/kg
CM38-036	2085325 34	749107 76	Arsenic	0	0 5	10 4	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	638	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	57 9	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	259	90	1550	—	10 91	mg/kg
			Copper	0	0 5	82 1	4	40900	—	18 06	mg/kg
			Iron	0	0 5	28800	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1040	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	58 5	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	290	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	124	31	7150	292	45 59	mg/kg
			U-238	0	0 5	2 72	1 90	351	1600	2 00	pCi/g
CM38-038	2085262 77	749143 42	Barium	0	0 5	432	98	26400	—	141 26	mg/kg
			Copper	0	0 5	116	4	40900	—	18 06	mg/kg
			Nickel	0	0 5	47 6	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	247	20	613000	—	48 94	mg/kg
			U-235	0	0 5	0 24	0 16	8	1900	0 09	pCi/g
			U-238	0	0 5	5 09	2 20	351	1600	2 00	pCi/g
			2-butanone	0	0 5	20	120	192000000	433000	NA	ug/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Acetone	0	0 5	100	120	102000000	211000	NA	ug/kg
CM39-001	2085200 19	749179 07	Arsenic	0	0 4	11 5	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 4	755	98	26400	—	141 26	mg/kg
			Chromium	0	0 4	56 5	20	268	—	16 99	mg/kg
			Copper	0	0 4	137	4	40900	—	18 06	mg/kg
			Iron	0	0 4	44900	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 4	1030	158	3480	—	365 08	mg/kg
			Nickel	0	0 4	52 4	12	20400	—	14 91	mg/kg
			Strontium	0	0 4	453	20	613000	—	48 94	mg/kg
			Vanadium	0	0 4	132	31	7150	292	45 59	mg/kg
			Zinc	0	0 4	105	9	307000	—	73 76	mg/kg
			U-235	0	0 4	0 14	0 11	8	1900	0 09	pCi/g
			U-238	0	0 4	3 34	1 64	351	1600	2 00	pCi/g
			Acetone	0	0 4	60	110	102000000	211000	NA	ug/kg
CM39-003	2085137 6	749214 67	Arsenic	0	0 5	12 3	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	746	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	43	20	268	—	16 99	mg/kg
			Copper	0	0 5	127	4	40900	—	18 06	mg/kg
			Iron	0	0 5	41500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	974	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	54 6	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	410	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	144	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	112	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 26	0 15	8	1900	0 09	pCi/g
			U-238	0	0 5	4 47	2 00	351	1600	2 00	pCi/g
			2-butanone	0	0 5	20	120	192000000	433000	NA	ug/kg
			Acetone	0	0 5	100	120	102000000	211000	NA	ug/kg
			Naphthalene	0	0 5	1	6 1	3090000	—	NA	ug/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
CM39-008	2085324 91	749179 61	Arsenic	0	0 5	12	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	534	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	38 8	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	96 3	90	1550	—	10 91	mg/kg
			Copper	0	0 5	191	4	40900	—	18 06	mg/kg
			Iron	0	0 5	35400	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	778	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	36 4	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	283	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	109	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	98 1	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 13	0 12	8	1900	0 09	pCi/g
			U-238	0	0 5	2 04	1 91	351	1600	2 00	pCi/g
			2-butanone	0	0 5	20	110	192000000	433000	NA	ug/kg
			Acetone	0	0 5	70	110	102000000	211000	NA	ug/kg
			Naphthalene	0	0 5	0 9	5 6	3090000	—	NA	ug/kg
CM39-010	2085262 42	749215 37	Barium	0	0 5	914	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	34	20	268	—	16 99	mg/kg
			Copper	0	0 5	154	4	40900	—	18 06	mg/kg
			Iron	0	0 5	51000	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1580	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	63 1	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	604	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	102	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	123	9	307000	—	73 76	mg/kg
			Am-241	0	0 5	5 26	0 41	76	1900	0 02	pCi/g
			Pu-239/240 (estimated)	0	0 5	8 61	N/A	50	3800	0 07	pCi/g
			U-238	0	0 5	4 31	1 93	351	1600	2 00	pCi/g
			Acetone	0	0 5	20	110	102000000	211000	NA	ug/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
CM39-012	2085169 56	749244 63	Barium	0	0 5	574	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	21 4	20	268	—	16 99	mg/kg
			Copper	0	0 5	268	4	40900	—	18 06	mg/kg
			Iron	0	0 5	19300	2190	307000	—	18037 00	mg/kg
			Lead	**0**	**0.5**	**56.6**	**7**	**1000**	**25.6**	**54.62**	**mg/kg**
			Nickel	0	0 5	48 6	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	310	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	62 6	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	111	9	307000	—	73 76	mg/kg
			U-238	0	0 5	3 21	1 57	351	1600	2 00	pCi/g
			Xylenes (total)	0	0 5	3	11	2040000	—	NA	ug/kg
CM39-013	**2085296 64**	**749246 81**	**Arsenic**	**0**	**0 5**	**23 7**	**5**	**22.2**	**21.6**	**10.09**	**mg/kg**
			Barium	0	0 5	568	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	61 3	20	268	—	16 99	mg/kg
			Copper	0	0 5	174	4	40900	—	18 06	mg/kg
			Iron	0	0 5	47300	2190	307000	—	18037 00	mg/kg
			Nickel	0	0 5	81 8	12	20400	—	14 91	mg/kg
			Selenium	0	0 5	1 33	1	5110	—	1 22	mg/kg
			Strontium	0	0 5	130	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	166	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	137	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 39	0 23	8	1900	0 09	pCi/g
			U-238	0	0 5	4 39	1 96	351	1600	2 00	pCi/g
CN37-003	2085389 13	748856 15	Barium	0	0 5	813	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	75	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	198	90	1550	—	10 91	mg/kg
			Copper	0	0 5	216	4	40900	—	18 06	mg/kg
			Iron	0	0 5	59900	2190	307000	—	18037 00	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Manganese	0	0 5	1930	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	91 6	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	712	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	118	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	129	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 24	0 15	8	1900	0 09	pCi/g
			U-238	0	0 5	3 16	1 61	351	1600	2 00	pCi/g
CN37-009	2085388 72	748928 11	Barium	0	0 5	898	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	81 3	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	232	90	1550	—	10 91	mg/kg
			Copper	0	0 5	214	4	40900	—	18 06	mg/kg
			Iron	0	0 5	54200	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1750	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	81 1	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	681	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	104	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	127	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 28	0 18	8	1900	0 09	pCi/g
			U-238	0	0 5	3 13	2 31	351	1600	2 00	pCi/g
CN37-012	2085427 69	748917 12	Arsenic	0	0 5	13 8	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	604	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	34 3	20	268	—	16 99	mg/kg
			Copper	0	0 5	66 6	4	40900	—	18 06	mg/kg
			Iron	0	0 5	30100	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	623	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	27 2	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	284	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	63 7	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	108	9	307000	—	73 76	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			U-235	0	0 5	0 21	0 15	8	1900	0 09	pCi/g
			U-238	0	0 5	3 91	1 74	351	1600	2 00	pCi/g
			Naphthalene	0	0 5	2	5 8	3090000	—	NA	ug/kg
CN37-013	2085404 41	748811 76	Arsenic	0	0 5	15 2	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	737	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	28 2	20	268	—	16 99	mg/kg
			Copper	0	0 5	90 2	4	40900	—	18 06	mg/kg
			Iron	0	0 5	31500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	570	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	43 7	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	246	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	102	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	152	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 14	0 11	8	1900	0 09	pCi/g
			U-238	0	0 5	2 55	1 87	351	1600	2 00	pCi/g
			Ethylbenzene	0	0 5	11	5 9	4250000	—	NA	ug/kg
			Xylenes (total)	0	0 5	92	12	2040000	—	NA	ug/kg
CN38-003	2085388 31	749000 11	Arsenic	0	0 5	11 4	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	739	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	95 7	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	206	90	1550	—	10 91	mg/kg
			Copper	0	0 5	160	4	40900	—	18 06	mg/kg
			Iron	0	0 5	46800	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	1260	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	85 7	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	512	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	97	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	111	9	307000	—	73 76	mg/kg
			Am-241	0	0 5	5 13	0 47	76	1900	0 02	pCi/g

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Pu-239/240 (estimated)	0	0 5	7 73	N/A	50	3800	0 07	pCi/g
			U-235	0	0 5	0 19	0 12	8	1900	0 09	pCi/g
			U-238	0	0 5	4 05	1 62	351	1600	2 00	pCi/g
CN38-009	2085382 79	749072 3	Arsenic	0	0 5	12 3	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	703	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	69 5	20	268	—	16 99	mg/kg
			Cobalt	0	0 5	105	90	1550	—	10 91	mg/kg
			Copper	0	0 5	125	4	40900	—	18 06	mg/kg
			Iron	0	0 5	36500	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	810	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	44 3	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	322	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	99 6	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	92 6	9	307000	—	73 76	mg/kg
			Xylenes (total)	0	0 5	7	11	2040000	—	NA	ug/kg
CN38-015	2085387 48	749144 08	Arsenic	0	0 5	17	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	639	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	56 8	20	268	—	16 99	mg/kg
			Copper	0	0 5	173	4	40900	—	18 06	mg/kg
			Iron	0	0 5	33100	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	607	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	39 1	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	232	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	120	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	118	9	307000	—	73 76	mg/kg
			Am-241	0	0 5	6 26	0 59	76	1900	0 02	pCi/g
			Pu-239/240(estimated)	0	0 5	15 09	N/A	50	3800	0 07	pCi/g
			U-235	0	0 5	0 19	0 13	8	1900	0 09	pCi/g
			U-238	0	0 5	3 33	2 23	351	1600	2 00	pCi/g

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			2-butanone	0	0 5	50	110	192000000	433000	NA	ug/kg
			Acetone	0	0 5	160	110	102000000	211000	NA	ug/kg
			Benzene	0	0 5	3	5 4	205000	—	NA	ug/kg
CN38-016	2085430 53	749116 01	Arsenic	0	0 5	15 1	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	692	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	25 6	20	268	—	16 99	mg/kg
			Copper	0	0 5	110	4	40900	—	18 06	mg/kg
			Iron	0	0 5	22800	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	448	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	32 3	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	320	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	57 2	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	114	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 24	0 14	8	1900	0 09	pCi/g
			U-238	0	0 5	4 52	2 07	351	1600	2 00	pCi/g
CN38-017	2085428 68	749021 97	Arsenic	0	0 5	13 9	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	605	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	32 6	20	268	—	16 99	mg/kg
			Copper	0	0 5	153	4	40900	—	18 06	mg/kg
			Iron	0	0 5	31200	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	447	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	49 5	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	261	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	107	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	120	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 12	0 11	8	1900	0 09	pCi/g
			U-238	0	0 5	3 72	2 74	351	1600	2 00	pCi/g
			Xylenes (total)	0	0 5	6	11	2040000	—	NA	ug/kg
CN39-005	2085387 08	749216 11	Arsenic	0	0 5	12 6	5	22 2	21 6	10 09	mg/kg

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
			Barium	0	0 5	800	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	43 1	20	268	—	16 99	mg/kg
			Copper	0	0 5	102	4	40900	—	18 06	mg/kg
			Iron	0	0 5	37600	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	728	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	58 5	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	265	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	78 7	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	93 8	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 28	0 16	8	1900	0 09	pCi/g
			U-238	0	0 5	4 02	1 78	351	1600	2 00	pCi/g
			Acetone	0	0 5	120	110	102000000	211000	NA	ug/kg
CN39-006	2085436 05	749242 37	Arsenic	0	0 5	11 1	5	22 2	21 6	10 09	mg/kg
			Barium	0	0 5	712	98	26400	—	141 26	mg/kg
			Chromium	0	0 5	27 1	20	268	—	16 99	mg/kg
			Copper	0	0 5	95 8	4	40900	—	18 06	mg/kg
			Iron	0	0 5	33200	2190	307000	—	18037 00	mg/kg
			Manganese	0	0 5	576	158	3480	—	365 08	mg/kg
			Nickel	0	0 5	46 7	12	20400	—	14 91	mg/kg
			Strontium	0	0 5	261	20	613000	—	48 94	mg/kg
			Vanadium	0	0 5	116	31	7150	292	45 59	mg/kg
			Zinc	0	0 5	148	9	307000	—	73 76	mg/kg
			U-235	0	0 5	0 18	0 14	8	1900	0 09	pCi/g
			U-238	0	0 5	3 72	1 84	351	1600	2 00	pCi/g
CM39-014	2085324 85	749179 60	Uranium, Total	0	0 5	13 19	5 11	2750	67 8	5 98	mg/kg
			Uranium-234	0	0 5	4 44	1 72	300	1800	2 25	pCi/g
			Uranium-235	0	0 5	0 26	0 15	8	1900	0 09	pCi/g
			Uranium-238	0	0 5	4 44	1 72	351	1600	2 00	pCi/g
CM39-015	2085325 13	749194 51	Uranium-235	0	0 5	0 15	0 14	8	1900	0 09	pCi/g

Location	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Detection Limit	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Units
CN38-019	2085382 77	749072 29	Uranium, Total	0	0 5	12 65	5 52	2750	67 8	5 98	mg/kg
			Uranium-234	0	0 5	4 26	1 86	300	1800	2 25	pCi/g
			Uranium-235	0	0 5	0 24	0 15	8	1900	0 09	pCi/g
			Uranium-238	0	0 5	4 26	1 86	351	1600	2 00	pCi/g
CN38-020	2085397 77	749072 29	Uranium-235	0	0 5	0 21	0 12	8	1900	0 09	pCi/g
CN38-021	2085367 77	749072 29	Americium-241	0	0 5	0 59	0 23	76	1900	0 02	pCi/g
			Plutonium-239/240	0	0 5	3 39	0 23	50	3800	0 07	pCi/g
CN38-022	2085382 83	749057 32	Americium-241	0	0 5	0 39	0 19	76	1900	0 02	pCi/g
			Plutonium-239/240	0	0 5	2 23	0 19	50	3800	0 07	pCi/g
			Uranium-235	0	0 5	0 13	0 09	8	1900	0 09	pCi/g

N/A – Not applicable
Bold lettering denotes Ecological Receptor Action Level Exceedance

Table 3
IHSS Group 900-3 Summary of Analytical Results

Media	Analyte Name	Number Samples	Detection Frequency	Mean	Minimum	Maximum	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background	Unit
Surface Soil	Antimony	43	21%	5 42	3 50	24 80	409	—	N/A	mg/kg
	Arsenic	**43**	**91%**	**11 43**	**2 50**	**23.70**	**22.2**	**21 6**	**10.09**	**mg/kg**
	Barium	43	100%	694 02	355 00	922 00	26400	—	141 26	mg/kg
	Cadmium	43	5%	1 60	1 50	4 09	962	—	1 61	mg/kg
	Chromium	43	95%	46 87	10 00	116 00	268	—	16 99	mg/kg
	Cobalt	43	23%	83 17	45 00	306 00	1550	—	10 91	mg/kg
	Copper	43	100%	145 36	42 90	268 00	40900	—	18 06	mg/kg
	Cyanide, total	43	70%	0 20	0 14	0 35	20400	—	N/A	mg/kg
	Iron	43	100%	39058 14	12900 00	59900 00	307000	—	18037 00	mg/kg
	Lead	**43**	**100%**	**29.89**	**11.30**	**56.60**	**1000**	**25 6**	**54 62**	**mg/kg**
	Manganese	43	100%	917 70	186 00	1930 00	3480	—	365 08	mg/kg
	Nickel	43	100%	56 65	27 20	99 00	20400	—	14 91	mg/kg
	Nitrate as n	43	93%	3 85	2 20	28 00	1000000	—	N/A	mg/kg
	Selenium	43	7%	0 55	0 50	1 33	5110	—	1 22	mg/kg
	Strontium	43	100%	384 40	130 00	718 00	613000	—	48 94	mg/kg
	Tin	43	19%	2 54	2 00	6 61	613000	—	N/A	mg/kg
	Uranium, Total	54	98	9 53	2 76	19 30	2750	67 8	5 98	mg/kg
	Vanadium	43	100%	102 94	36 00	166 00	7150	292	45 59	mg/kg
	Zinc	43	100%	117 70	46 10	236 00	307000	—	73 76	mg/kg
	Am-241[1]	54	11%	0 68	0 39	1 47	76	1900	0 02	pCi/g
	Pu-239/240[1]	54	11%	3 89	2 23	8 36	50	3800	0 07	pCi/g
	U-235	54	72%	0 22	0 12	0 39	8	1900	0 09	pCi/g
	U-238	54	98%	3 21	0 93	6 50	351	1600	2 00	pCi/g
	2-butanone	43	14%	8 01	4 82	50 00	192000000	433000	N/A	ug/kg
	Acetone	43	44%	28 02	4 84	160 00	102000000	211000	N/A	ug/kg
	Benzene	43	2%	0 49	0 39	3 00	205000	—	N/A	ug/kg
	Ethylbenzene	43	7%	1 47	0 51	21 00	4250000	—	N/A	ug/kg
	Naphthalene	43	16%	0 56	0 40	2 00	3090000	—	N/A	ug/kg
	Xylenes (total)	43	19%	9 46	1 26	170 00	2040000	—	N/A	ug/kg

[1] $Pu^{239/240}$ and Am^{241} results inferred from HPGe Am^{241}

N/A – Not applicable Bold lettering denotes Ecological Receptor Action Level Exceedance

Table 4
Radionuclide Sum of Ratio Calculations

Media	Location Code	Depth Start (feet)	Depth End (feet)	WRW SOR
Surface Soil	CL37-000	0	0 5	0 04
	CL37-001	0	0 5	0 03
	CL38-000	0	0 5	0 03
	CL39-000	0	0 5	0 05
	CM37-003	0	0 5	0 05
	CM37-005	0	0 5	0 04
	CM37-012	0	0 5	0 05
	CM37-014	0	0 5	0 00
	CM37-016	0	0 5	0 00
	CM37-018	0	0 5	0 03
	CM37-025	0	0 5	0 01
	CM37-027	0	0 5	0 03
	CM37-031	0	0 5	0 01
	CM37-032	0	0 5	0 04
	CM38-001	0	0 5	0 04
	CM38-003	0	0 4	0 00
	CM38-009	0	0 5	0 05
	CM38-011	0	0 5	0 02
	CM38-013	0	0 5	0 01
	CM38-015	0	0 4	0 04
	CM38-023	0	0 5	0 04
	CM38-025	0	0 5	0 05
	CM38-027	0	0 5	0 03
	CM38-029	0	0 5	0 01
	CM38-036	0	0 5	0 01
	CM38-038	0	0 5	0 04
	CM39-001	0	0 4	0 03
	CM39-003	0	0 5	0 04
	CM39-008	0	0 5	0 02
	CM39-010	0	0 5	0 02
	CM39-012	0	0 5	0 01
	CM39-013	0	0 5	0 06
	CM39-014	0	0 5	0 06
	CM39-015	0	0 5	0 02
	CM39-016	0	0 5	0 06
	CN37-003	0	0 5	0 04
	CN37-009	0	0 5	0 04
	CN37-012	0	0 5	0 04
	CN37-013	0	0 5	0 03
	CN38-003	0	0 5	0 04
	CN38-009	0	0 5	0 00
	CN38-015	0	0 5	0 05
	CN38-016	0	0 5	0 04
	CN38-017	0	0 5	0 03

33

Media	Location Code	Depth Start (feet)	Depth End (feet)	WRW SOR
	CN38-019	0	0 5	0 06
	CN38-020	0	0 5	0 03
	CN38-021	0	0 5	0 04
	CN38-022	0	0 5	0 04
	CN39-005	0	0 5	0 05
	CN39-006	0	0 5	0 03

34

Table 5
IHSS Group 900-3 Deviations from Planned Sampling Specifications

IHSS Group	IHSS/PAC/ UBC Site	Location Code	Actual Easting	Actual Northing	Actual Depth Interval	Planned Depth Interval	Planned Location	Planned Easting	Planned Northing	Comment
900-3	900-213	CL37-000	2085116 92	748829 83	0-0 5	0-0 5	CL37-000	2085107 08	748832 02	Lateral offset due to the presence of a utility or other impediment, but closer to 904 Pad
		CL37-001	2085108 21	748940 14	0-0 5	0-0 5	CL37-001	2085108 19	748940 18	No significant variations
		CL38-000	2085109 33	749041 67	0-0 5	0-0 5	CL38-000	2085109 31	749041 66	No significant variations
		CL39-000	2085107 09	749162 13	0-0 5	0-0 5	CL39-000	2085107 08	749162 09	No significant variations
		CM37-003	2085202 28	748819 05	0-0 5	0-0 5	CM37-003	2085202 28	748819 05	No significant variations
		CM37-005	2085139 72	748854 70	0-0 5	0-0 5	CM37-005	2085139 72	748854 70	No significant variations
		CM37-012	2085319 92	748823 27	0-0 5	0-0 5	CM37-012	2085326 98	748819 76	Lateral offset due to the presence of a utility or other impediment
		CM37-014	2085264 42	748855 40	0-0 5	0-0 5	CM37-014	2085264 42	748855 41	No significant variations
		CM37-016	2085201 87	748891 05	0-0 5	0-0 5	CM37-016	2085201 87	748891 05	No significant variations
		CM37-018	2085139 31	748926 69	0-0 5	0-0 5	CM37-018	2085139 31	748926 69	No significant variations
		CM37-025	2085324 13	748887 90	0-0 5	0-0 5	CM37-025	2085326 57	748891 76	Lateral offset due to the presence of a utility or other impediment
		CM37-027	2085264 01	748927 41	0-0 5	0-0 5	CM37-027	2085264 01	748927 41	No significant variations
		CM37-031	2085322 33	748766 19	0-0 5	0-0 5	CM37-031	2085322 30	748766 23	No significant variations
		CM37-032	2085200 75	748769 60	0-0 5	0-0 5	CM37-032	2085200 75	748769 57	No significant variations
		CM38-001	2085201 46	748963 05	0-0 5	0-0 5	CM38-001	2085201 46	748963 05	No significant variations
		CM38-003	2085138 82	748998 80	0-0 4	0-0 5	CM38-003	2085138 90	748998 69	No significant variations
		CM38-009	2085326 16	748963 78	0-0 5	0-0 5	CM38-009	2085326 16	748963 76	No significant variations
		CM38-011	2085263 60	748999 40	0-0 5	0-0 5	CM38-011	2085263 60	748999 40	No significant variations
		CM38-013	2085201 01	749035 04	0-0 5	0-0 5	CM38-013	2085201 05	749035 05	No significant variations
		CM38-015	2085138 48	749070 78	0-0 4	0-0 5	CM38-015	2085138 49	749070 69	No significant variations
		CM38-023	2085325 75	749035 78	0-0 5	0-0 5	CM38-023	2085325 75	749035 76	No significant variations
		CM38-025	2085263 18	749071 46	0-0 5	0-0 5	CM38-025	2085263 19	749071 40	No significant variations
		CM38-027	2085200 69	749107 08	0-0 5	0-0 5	CM38-027	2085200 63	749107 05	No significant variations
		CM38-029	2085138 11	749142 68	0-0 5	0-0 5	CM38-029	2085138 08	749142 69	No significant variations

IHSS Group	IHSS/PAC/ UBC Site	Location Code	Actual Easting	Actual Northing	Actual Depth Interval	Planned Depth Interval	Planned Location	Planned Easting	Planned Northing	Comment
		CM38-036	2085325 34	749107 76	0-0 5	0-0 5	CM38-036	2085325 34	749107 76	No significant variations
		CM38-038	2085262 77	749143 42	0-0 5	0-0 5	CM38-038	2085262 78	749143 40	No significant variations
		CM39-001	2085200 19	749179 07	0-0 4	0-0 5	CM39-001	2085200 22	749179 05	No significant variations
		CM39-003	2085137 60	749214 67	0-0 5	0-0 5	CM39-003	2085137 67	749214 69	No significant variations
		CM39-008	2085324 91	749179 61	0-0 5	0-0 5	CM39-008	2085324 93	749179 76	No significant variations
		CM39-010	2085262 42	749215 37	0-0 5	0-0 5	CM39-010	2085262 37	749215 40	No significant variations
		CM39-012	2085169 56	749244 63	0-0 5	0-0 5	CM39-012	2085169 53	749244 61	No significant variations
		CM39-013	2085296 64	749246 81	0-0 5	0-0 5	CM39-013	2085296 65	749246 84	No significant variations
		CN37-003	2085389 13	748856 15	0-0 5	0-0 5	CN37-003	2085389 13	748856 12	No significant variations
		CN37-009	2085388 72	748928 11	0-0 5	0-0 5	CN37-009	2085388 72	748928 12	No significant variations
		CN37-012	2085427 69	748917 12	0-0 5	0-0 5	CN37-012	2085443 84	748911 19	Lateral offset due to the presence of a utility or other impediment, but closer to 904 Pad
		CN37-013	2085404 41	748811 76	0-0 5	0-0 5	CN37-013	2085422 66	748804 14	Lateral offset due to the presence of a utility or other impediment, but closer to 904 Pad
		CN38-003	2085388 31	749000 11	0-0 5	0-0 5	CN38-003	2085388 31	749000 12	No significant variations
		CN38-009	2085382 79	749072 30	0-0 5	0-0 5	CN38-009	2085387 90	749072 11	Lateral offset due to the presence of a utility or other impediment
		CN38-015	2085387 48	749144 08	0-0 5	0-0 5	CN38-015	2085387 49	749144 11	No significant variations
		CN38-016	2085430 53	749116 01	0-0 5	0-0 5	CN38-016	2085441 61	749117 49	Lateral offset due to the presence of a utility or other impediment, but closer to 904 Pad
		CN38-017	2085428 68	749021 97	0-0 5	0-0 5	CN38-017	2085442 73	749022 70	Lateral offset due to the presence of a utility or other impediment, but closer to 904 Pad
		CN39-005	2085387 08	749216 11	0-0 5	0-0 5	CN39-005	2085387 08	749216 11	No significant variations
		CN39-006	2085436 05	749242 37	0-0 5	0-0 5	CN39-006	2085436 04	749242 38	No significant variations
		CM39-015	2085325 13	749194 51	0-0 5	0-0 5	CM39-015	2085323 34	749173 96	Sample locations moved closer to area of suspected contamination
		CM39-016	2085266 89	749233 68	0-0 5	0-0 5	CM39-016	2085266 89	749233 68	No significant variations
		CM38-041	2085309 85	749180 00	0-0 5	0-0 5	CM38-041	2085289 43	749200 81	Sample locations moved closer to

IHSS Group	IHSS/PAC/ UBC Site	Location Code	Actual Easting	Actual Northing	Actual Depth Interval	Planned Depth Interval	Planned Location	Planned Easting	Planned Northing	Comment
										area of suspected contamination
		CM39-014	2085324 85	749179 60	0-0 5	0-0 5	CM39-014	2085266 89	749233 68	Sample locations moved closer to area of suspected contamination
		CN39-007	2085339 84	749179 20	0-0 5	0-0 5	CN39-007	2085359 02	749151 36	Sample locations moved closer to area of suspected contamination
		CN38-018	2085324 35	749164 65	0-0 5	0-0 5	CN38-018	2085374 21	749077 89	Sample locations moved closer to area of suspected contamination
		CN38-023	2085383 34	749087 24	0-0 5	0-0 5	CN38-023	2085400 34	749106 50	Sample locations moved closer to area of suspected contamination
		CN38-019	2085382 77	749072 29	0-0 5	0-0 5	CN38-019	2085344 18	749053 87	Sample locations moved closer to area of suspected contamination
		CN38-021	2085367 77	749072 29	0-0 5	0-0 5	CN38-021	2085401 05	749055 28	Sample locations moved closer to area of suspected contamination
		CN38-020	2085397 77	749072 29	0-0 5	0-0 5	CN38-020	2085345 60	749105 08	Sample locations moved closer to area of suspected contamination
		CN38-022	2085382 83	749057 32	0-0 5	0-0 5	CN38-022	2085356 19	749198 69	Sample locations moved closer to area of suspected contamination

Note No deviations between the planned and actual analyte *suite*

Analytical results indicate that NFAA for IHSS Group 900-3 is warranted for the following reasons

- None of the results from the October 2003 sampling event exceeded Rocky Flats Cleanup Agreement (RFCA) Wildlife Refuge Worker (WRW) or Ecological Receptor Action Levels (ALs) (DOE, et al 2003)

- All but one of the contaminants of concern (COCs) concentrations are less than RFCA WRW ALs (DOE, et al 2003) An exception includes a single arsenic value (23 7 mg/kg) in surface soil that slightly exceeded the corresponding WRW AL (22 2 mg/kg), Ecological Receptor AL (21 6 mg/kg), and background level (10 09 mg/kg),

- All but one of the COCs are less than RFCA Ecological Receptor ALs (DOE et al 2003) An exception includes one occurrence of lead in surface soil (56 6 mg/kg) that exceeded the corresponding Ecological Receptor AL (25 6 mg/kg), and

- There is no identified potential to exceed surface water standards at a Point of Compliance (POC) from this IHSS Group

Approval of this Data Summary Report constitutes regulatory agency concurrence of this IHSS Group as an NFAA This information and NFAA determination will be documented in the FY04 Historical Release Report (HRR)

2.1 Analytical Results

Several analytes including metals, radionuclides, volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs) were detected above background levels or laboratory reporting limits (RLs) at the majority of the sampling locations (Figure 2)

As shown in Figure 2, a single arsenic value (23 7 mg/kg) located north of the 904-Pad, exceeds the corresponding WRW AL (22 2 mg/kg) The magnitude of the exceedance is slightly greater than the corresponding background level (10 09 mg/kg)

A single lead occurrence (56 6 mg/kg) in surface soil, located north of the 904 Pad, exceeds the Ecological Receptor AL but is only slightly greater than the background level (54 62 mg/kg)

Because arsenic and lead ALs are only slightly greater than background, it is likely that these metal exceedances above ALs are due to natural variation in soil rather than a contaminant release Also of note is the absence of associated COCs above ALs For example, no other metals, radionuclides, or VOCs exceed ALs

2.2 Sum of Ratios

Sum of ratio (SOR) calculations are based on analytical data for the radionuclides of concern (americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238) As shown in Table 4, none of the radionuclide SOR values exceeded one Therefore, no remedial or management actions are triggered

38

3.0 DEVIATIONS FROM PLANNED SAMPLING SPECIFICATIONS

Deviations from the planned sampling specifications described in IASAP Addendum #IA-03-01 (DOE 2002a) are presented in Table 5

4.0 DATA QUALITY ASSESSMENT

The Data Quality Objectives (DQOs) for this project are described in the IASAP (DOE 2002) All DQOs for this project were achieved based on the following

- Regulatory agency approved sampling program design (IASAP Addendum #IA-03-01 [DOE 2002a),
- Collection of samples in accordance with the sampling design, and
- Results of the Data Quality Assessment (DQA) as described in the following sections

4.1.1 Data Quality Assessment Process

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

- EPA QA/G-4, 1994a, Guidance for the Data Quality Objective Process,
- EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process, Practical Methods for Data Analysis, and
- DOE Order 414 1A, 1999, Quality Assurance

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 540/R-94/012, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review
- EPA 540/R-94/013, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review
- Kaiser-Hill Company, L L C (K-H) V&V Guidelines
- General Guidelines for Data Verification and Validation, DA-GR01-v2, 2002a

39

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

This report will be submitted to the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA) Administrative Record (AR) for permanent storage

4.1.2 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/MSD),
- Laboratory control samples (LCS),
- 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

40

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i e , 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 Quality control (QC) samples are summarized and reported relative to two basic metrics 1) the frequency of QC measurements (e g , 1 sample per laboratory batch), and 2) the results, or performance, of the QC sample analyses Generally, a minimum number of QC samples must be analyzed, and results must fall within predefined tolerance limits, violation of either of these criteria results in qualification or rejection of the data Results are discussed relative to RFCA ALs to determine if project decisions are impacted Based on the V&V criteria, the data quality is acceptable for project decisions

Raw hardcopy data (e g , individual analytical data packages) are currently filed by RIN and are maintained by Kaiser-Hill Analytical Services Division, older hardcopies may reside in the Federal Center in Lakewood, Colorado Electronic data are stored in the RFETS Soil and Water Database (SWD)

Both real and QC data, as of December 15, 2003 are included on the enclosed CD in Microsoft ACCESS 2000 format

4.1.3 Accuracy

The following measures of accuracy were evaluated

- LCS Evaluation,
- Surrogate Evaluation,
- Blanks, and
- Sample MS Evaluation

Laboratory Control Sample Evaluation

The frequency of LCS measurements, relative to each laboratory batch, is given in Table 6 LCS frequency was adequate based on at least one LCS per batch The minimum and maximum LCS results are also tabulated, by chemical, for the entire project While not all LCS results are within tolerances, project decisions based on AL exceedances were not affected 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 since 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 unacceptable low recoveries were evaluated If the highest sample result is less than the AL divided by the lowest LCS recovery for that analyte, no further action is taken because any indicated bias is not great enough to make a falsely low sample result be above the action limit As a result of these analyses, the LCS recoveries for this project did not impact project decisions Any qualifications of individual results due to LCS performance exceeding upper or lower tolerance limits are captured in the V&V flags, described in the Completeness Section

41

Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 7 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 sample, and therefore, surrogate recoveries only impact individual samples Unacceptable surrogate recoveries can indicate potential matrix effects The highest and lowest surrogate recoveries for this project were reviewed and the associated samples results were not near enough to the AL to indicate project decisions would be impacted Any qualifications of results due to surrogate results are captured in the V&V flags, described in the Completeness Section

Blank Evaluation

Results of the field blank analyses are given in Table 8 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 When the real result is less than 10 times the blank result for laboratory contaminants and 5 times the result for nonlaboratory contaminants, the real result is eliminated None of the chemicals were detected in the blanks at concentrations greater than one-tenth the AL Therefore, no sample results at or above the AL could have been impacted by the blanks

Table 6
Laboratory Control Summary

Test Method Name	CAS	Analyte	Min (%R)	Max (%R)	Number Analytes
SW-846 8260	71-55-6	1,1,1-Trichloroethane	76 93	102 6	8
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	86 85	124	8
SW-846 8260	79-00-5	1,1,2-Trichloroethane	84 53	101 7	8
SW-846 8260	75-34-3	1,1-Dichloroethane	76 06	92 66	8
SW-846 8260	75-35-4	1,1-Dichloroethene	81 85	103 9	8
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	91 21	103 6	8
SW-846 8260	95-50-1	1,2-Dichlorobenzene	92 9	102 2	8
SW-846 8260	107-06-2	1,2-Dichloroethane	76 55	91 81	8
SW-846 8260	78-87-5	1,2-Dichloropropane	85 09	113 5	8
SW-846 8260	106-46-7	1,4-Dichlorobenzene	92 34	102 4	8
SW-846 8260	78-93-3	2-Butanone	53 57	97 77	8
SW-846 8260	108-10-1	4-Methyl-2-pentanone	84 06	119 4	8
SW-846 8260	67-64-1	Acetone	41 12	86 34	8
SW-846 8260	71-43-2	Benzene	82 14	96 97	8
SW-846 8260	75-27-4	Bromodichloromethane	88 29	113	8
SW-846 8260	75-25-2	Bromoform	91 22	128 4	8
SW-846 8260	74-83-9	Bromomethane	53 61	94 04	8
SW-846 8260	75-15-0	Carbon Disulfide	79 54	98 7	8
SW-846 8260	56-23-5	Carbon Tetrachloride	74 34	99 52	8
SW-846 8260	108-90-7	Chlorobenzene	91 17	136 2	8
SW-846 8260	75-00-3	Chloroethane	66 57	105 6	8
SW-846 8260	67-66-3	Chloroform	79 99	96 47	8

42

Test Method Name	CAS	Analyte	Min (%R)	Max (%R)	Number Analytes
SW-846 8260	74-87-3	Chloromethane	53 27	82 93	8
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	67 34	80 35	8
SW9010B OR SW9012A	57-12-5	Cyanide	93	102	8
SW-846 8260	124-48-1	Dibromochloromethane	87 64	97 69	8
SW-846 8260	100-41-4	Ethylbenzene	89 72	122 3	8
SW-846 8260	87-68-3	Hexachlorobutadiene	84 16	103 8	8
SW-846 8260	75-09-2	Methylene chloride	80 66	95 26	8
SW-846 8260	91-20-3	Naphthalene	96 67	108 8	8
SW9056 OR E300 0 PREP E300 0	14797-55-8	Nitrate	96	101	12
SW-846 8260	100-42-5	Styrene	90 09	102 2	8
SW-846 8260	127-18-4	Tetrachloroethene	88 11	101 9	8
SW-846 8260	108-88-3	Toluene	90 83	104 9	8
SW-846 8260	10061-02-6	Trans-1,3-Dichloropropene	89 4	105 2	8
SW-846 8260	79-01-6	Trichloroethene	81 22	106 5	8
SW-846 8260	75-01-4	Vinyl chloride	69 25	102	8
SW-846 8260	1330-20-7	Xylene	90 53	102 9	8

Table 7
Surrogate Recovery Summary

Number Samples	Analyte	Minimum (%R)	Maximum (%R)
43	1,2-Dichloroethane-D4	87 04	119 2
43	4-Bromofluorobenzene	87 04	130 5
43	Toluene-D8	85 19	110 9

Table 8
Blank Summary

Test Method Name	CAS	Analyte	Sample QC Code	Maximum	Result Unit	Lab Results Qualifier Code
SW-846 8260	67-64-1	Acetone	FB	10	ug/L	J
SW-846 8260	67-64-1	Acetone	RNS	10	ug/L	JB
SW-846 8260	67-64-1	Acetone	TB	20	ug/L	JB
SW8260B	67-64-1	Acetone	FB	10	ug/L	J
SW8260B	67-64-1	Acetone	TB	20	ug/L	JB
SW-846 6010	7429-90-5	Aluminum	RNS	0 044	mg/L	B
SW-846 6010	7440-39-3	Barium	RNS	0 0053	mg/L	B
SW-846 6010	7440-41-7	Beryllium	RNS	0 00067	mg/L	B
SW-846 6010	7440-50-8	Copper	RNS	0 0054	mg/L	B
E335 3, E335 4, SM4500-CN C,E	57-12-5	Cyanide	RNS	0 0066	mg/L	-
E335 3, E335 4, SM4500-CN C,E	57-12-5	Cyanide	RNS	0 0041	mg/L	B

43

Test Method Name	CAS	Analyte	Sample QC Code	Maximum	Result Unit	Lab Results Qualifier Code
SW-846 6010	7439-89-6	Iron	RNS	0 069	mg/L	B
SW-846 6010	7439-96-5	Manganese	RNS	0 031	mg/L	-
SW-846 6010	7439-96-5	Manganese	RNS	0 0034	mg/L	B
SW-846 6010	7439-97-6	Mercury	RNS	0 000017	mg/L	B
SW-846 8260	91-20-3	Naphthalene	TB	1	ug/L	J
SW8260B	91-20-3	Naphthalene	TB	1	ug/L	J
SW-846 6010	7440-02-0	Nickel	RNS	0 0059	mg/L	B
SW9056 OR E300 0	14797-55-8	Nitrate	RNS	0 21	mg/L	B
SW-846 6010	7440-24-6	Strontium	RNS	0 0013	mg/L	B
SW-846 6010	7440-31-5	Tin	RNS	0 0049	mg/L	B
GAMMA SPECTROSCOPY	15117-96-1	Uranium-235	RNS	0 193	pCi/g	-
GAMMA SPECTROSCOPY	7440-61-1	Uranium-238	RNS	2 21	pCi/g	-
SW-846 6010	7440-66-6	Zinc	RNS	0 021	mg/L	-

Sample Matrix Spike Evaluation

The frequency of MS measurements, relative to each laboratory batch, was adequate based on at least one MS per batch The minimum and maximum MS results are summarized by chemical for the entire project in Table 9 Organic analytes with unacceptable low recoveries resulted in a review of the LCS recoveries According to the EPA data validation guidelines, if organic matrix spike recoveries are low, then the LCS recovery is to be checked and, if acceptable, no action is to be taken For this project, these checks indicate no decisions were impacted for organic analytes For inorganics, the associated sample results were divided by the lowest percent recovery for each analyte If the resulting number is less than the AL, decisions were not impacted, so no action was taken

Table 9
Sample Matrix Spike Evaluation

Test Method Name	CAS	Analyte	Minimum %REC	Maximum %REC	Number Samples	Number Lab Batches
SW-846 8260	71-55-6	1,1,1-Trichloroethane	78 32	99 36	6	6
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	64 46	99 13	6	6
SW-846 8260	79-00-5	1,1,2-Trichloroethane	76 7	98 22	6	6
SW-846 8260	75-34-3	1,1-Dichloroethane	87 09	98 57	6	6
SW-846 8260	75-35-4	1,1-Dichloroethene	82 32	88 15	6	6
SW-846 8260	71-55-6	1,1,1-Trichloroethane	78 32	99 36	6	6
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	64 46	99 13	6	6
SW-846 8260	79-00-5	1,1,2-Trichloroethane	76 7	98 22	6	6
SW-846 8260	75-34-3	1,1-Dichloroethane	87 09	98 57	6	6
SW-846 8260	75-35-4	1,1-Dichloroethene	82 32	88 15	6	6

44

Test Method Name	CAS	Analyte	Minimum %REC	Maximum %REC	Number Samples	Number Lab Batches
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	22 93	66 57	6	6
SW-846 8260	95-50-1	1,2-Dichlorobenzene	38 32	81 26	6	6
SW-846 8260	107-06-2	1,2-Dichloroethane	82 95	108 1	6	6
SW-846 8260	78-87-5	1,2-Dichloropropane	80 66	101 6	6	6
SW-846 8260	106-46-7	1,4-Dichlorobenzene	40	80 92	6	6
SW-846 8260	78-93-3	2-Butanone	96 15	140 4	6	6
SW-846 8260	108-10-1	4-Methyl-2-pentanone	62 39	94 8	6	6
SW-846 8260	67-64-1	Acetone	105 1	156 3	6	6
SW-846 8260	71-43-2	Benzene	79	96 24	6	6
SW-846 8260	75-27-4	Bromodichloromethane	74 37	96 8	6	6
SW-846 8260	75-25-2	Bromoform	61 04	103 4	6	6
SW-846 8260	74-83-9	Bromomethane	81 21	94 33	6	6
SW-846 8260	75-15-0	Carbon Disulfide	77 47	88 91	6	6
SW-846 8260	56-23-5	Carbon Tetrachloride	78 89	98 77	6	6
SW-846 8260	108-90-7	Chlorobenzene	63 65	97 87	6	6
SW-846 8260	75-00-3	Chloroethane	75 94	89 22	6	6
SW-846 8260	67-66-3	Chloroform	79 58	97 6	6	6
SW-846 8260	74-87-3	Chloromethane	90 47	120 7	6	6
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	86 65	125 8	6	6
SW9010B OR SW9012A	57-12-5	Cyanide	87	98	6	6
SW-846 8260	124-48-1	Dibromochloromethane	65 37	93 73	6	6
SW-846 8260	100-41-4	Ethylbenzene	67 46	93 62	6	6
SW-846 8260	87-68-3	Hexachlorobutadiene	27 58	68 09	6	6
SW-846 8260	75-09-2	Methylene chloride	82 82	93 91	6	6
SW-846 8260	91-20-3	Naphthalene	23 63	70 04	6	6
SW9056 OR E300 0 PREP E300 0	14797-55-8	Nitrate	79	95	4	4
SW-846 8260	100-42-5	Styrene	58 37	91 16	6	6
SW-846 8260	127-18-4	Tetrachloroethene	67 09	86 7	6	6
SW-846 8260	108-88-3	Toluene	72 37	90 4	6	6
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	66 07	91 85	6	6
SW-846 8260	79-01-6	Trichloroethene	77 75	99 26	6	6
SW-846 8260	75-01-4	Vinyl chloride	74 21	97 3	6	6
SW-846 8260	1330-20-7	Xylene	66 52	86 76	6	6

4.1.4 Precision

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSDs Adequate frequency of MSD measurements is indicated by at least one MSD in each laboratory batch Table 10 indicates that MSD frequencies were adequate This analytes with the highest RPDs were reviewed by comparing the highest sample result to the AL If the highest samples were sufficiently below the AL, no further action is needed For this project, the reviews

45

indicated decisions were not impacted While some of the relative percent differences (RPDs) appear to be high, they would not result in rejection of data that affects project decisions

Table 10
Sample Matrix Spike Duplicate Evaluation

Test Method	CAS No.	Analyte	Number Sample Pairs	Number Laboratory Batches	Maximum RPD (%)
SW-846 8260	71-55-6	1,1,1-Trichloroethane	6	6	6 94
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	6	6	7 05
SW-846 8260	79-00-5	1,1,2-Trichloroethane	6	6	8 70
SW-846 8260	75-34-3	1,1-Dichloroethane	6	6	7 48
SW-846 8260	75-35-4	1,1-Dichloroethene	6	6	6 45
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	6	6	48 42
SW-846 8260	95-50-1	1,2-Dichlorobenzene	6	6	34 50
SW-846 8260	107-06-2	1,2-Dichloroethane	6	6	7 89
SW-846 8260	78-87-5	1,2-Dichloropropane	6	6	6 95
SW-846 8260	106-46-7	1,4-Dichlorobenzene	6	6	32 00
SW-846 8260	78-93-3	2-Butanone	6	6	10 97
SW-846 8260	108-10-1	4-Methyl-2-pentanone	6	6	7 47
SW-846 8260	67-64-1	Acetone	6	6	25 82
SW-846 8260	71-43-2	Benzene	6	6	8 61
SW-846 8260	75-27-4	Bromodichloromethane	6	6	8 59
SW-846 8260	75-25-2	Bromoform	6	6	19 96
SW-846 8260	74-83-9	Bromomethane	6	6	16 28
SW-846 8260	75-15-0	Carbon Disulfide	6	6	7 10
SW-846 8260	56-23-5	Carbon Tetrachloride	6	6	7 31
SW-846 8260	108-90-7	Chlorobenzene	6	6	11 34
SW-846 8260	75-00-3	Chloroethane	6	6	16 88
SW-846 8260	67-66-3	Chloroform	6	6	8 70
SW-846 8260	74-87-3	Chloromethane	6	6	15 04
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	6	6	12 11
SW9010B OR SW9012A	57-12-5	Cyanide	6	6	2 17
SW-846 8260	124-48-1	Dibromochloromethane	6	6	9 29
SW-846 8260	100-41-4	Ethylbenzene	6	6	11 88
SW-846 8260	87-68-3	Hexachlorobutadiene	6	6	29 63
SW-846 8260	75-09-2	Methylene chloride	6	6	8 34
SW-846 8260	91-20-3	Naphthalene	6	6	53 26
SW9056 OR E300 0 PREP E300 0	14797-55-8	Nitrate	4	4	5 59
SW-846 8260	100-42-5	Styrene	6	6	27 25
SW-846 8260	127-18-4	Tetrachloroethene	6	6	10 51
SW-846 8260	108-88-3	Toluene	6	6	9 11
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	6	6	11 52
SW-846 8260	79-01-6	Trichloroethene	6	6	8 53

46

Test Method	CAS No.	Analyte	Number Sample Pairs	Number Laboratory Batches	Maximum RPD (%)
SW-846 8260	75-01-4	Vinyl chloride	6	6	13 76
SW-846 8260	1330-20-7	Xylene	6	6	15 79

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 11 indicates that sampling frequencies were adequate except for radionuclides (alpha spectroscopy)

The RPDs indicate how much variation exists in the field duplicate analyses The EPA data validation guidelines state that "there are no required review criteria for field duplicate analyses comparability" For the DQA, the highest Max RPDs were reviewed The highest sample amount for those analytes were corrected for the associated RPD (Table 12) and the resulting number was compared to the AL For this project, none of the corrected numbers were greater than the AL, so project decisions were not impacted

With an RPD of 76 percent, copper was the only reported analyte to exceed the RPD threshold of 35 percent The apparent analytical imprecision had no impact on project decisions given that copper values ranged up to 268 mg/kg, which is one-order of magnitude less than the WRW AL of 40,900 mg/kg

Table 11
Field Duplicate Sample Frequency

Test Method	Sample Code	Number Samples	Collection Frequency (%)
ALPHA SPEC	REAL	6	0%
GAMMA SPECTROSCOPY	REAL	54	7%
GAMMA SPECTROSCOPY	DUP	4	
SW-846 6200	REAL	43	7%
SW-846 6200	DUP	3	
SW-846 8260	REAL	43	7%
SW-846 8260	DUP	3	
SW9010B OR SW9012A	REAL	43	7%
SW9010B OR SW9012A	DUP	3	
SW9056 OR E300 0 PREP E300 0	REAL	41	5%
SW9056 OR E300 0 PREP E300 0	DUP	2	

47

Table 12
Field Duplicate Results

Analyte	Max of Result RPD
Barium	11
Copper	76
Iron	4
Manganese	4
Nickel	0
Nitrate	4
Strontium	4
Zinc	13

Completeness

The required number of samples were collected in accordance with the approved IASAP Addendum #IA-03-01 (DOE, 2002a) and based on the consultative process Based on this compliance, and an adequate percentage of validated sample results as explained below, the sample set is considered complete

Twenty-five percent of the Environmental Restoration (ER) Program's analytical results are targeted for formal validation 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 13 shows the number of validated records (codes without "1"), verified records (codes with "1"), and rejected records for each analytical group

The Validation percentages given in Table 13 indicate that frequency goals were not attained for all analytical suites However, these validation frequencies are within the ER Program validation goals Visual spot checks on flags applied to radionuclide results, in hardcopy data packages, indicate at least a 50 percent frequency As additional V&V information is received, IHSS Group 900-3 records will be updated in the SWD Frequency of data qualification and inferences from it will also be assessed as part of the Comprehensive Risk Assessment

4.1.5 Sensitivity

Reporting limits, in units of ug/kg for organics, mg/kg for metals, and pCi/g for radionuclides, were compared with RFCA WRW and Ecological Receptor ALs Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions Adequate sensitivity is defined as a reporting limit less than an analyte's associated AL, typically less than one-half the AL

4.1.6 Summary of Data Quality

Data quality is acceptable for project decisions based on the V&V criteria cited and with the qualifications given

48

Table 13
Validation and Verification Summary

Qualifier Code	Number Records	Radionuclides	Metals-XRF (SW6200	VOCs (SW8260)	Cyanide (SW9010/9012)	Anions (SW9056/E300)
No V&V	54	54	0	0	0	0
1	108	108	0	0	0	0
J	10	0	10	0	0	0
J1	75	0	62	3	0	10
R1	2	0	0	0	0	2
U1	1	0	0	1	0	0
V	364	54	96	214	0	0
V1	2015	138	589	1266	22	0
JB1	20	0	0	20	0	0
UJ	4	0	2	2	0	0
UJ1	109	0	15	42	21	31
Total	2762	354	774	1548	43	43
Validated	378	54	108	216	0	0
% Validated	13 69%	15 25%	13 95%	13 95%	0 00%	0 00%
Verified	2330	246	77	66	21	43
% Verified	84 36%	69 49%	9 95%	4 26%	48 84%	100 00%
% Rejected	2	0	0 00%	0 00%	0 00%	4 65%

Key
1 V1 – Verified
J, J1 - Estimated
UJ1 - Estimated detection limit
V – Validated
R, R1 - Rejected

5.0 REFERENCES

DOE, 1992-2001, Historical Release Reports for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June

DOE, 1999, Order 414 1A, Quality Assurance

DOE, 2000, Rocky Flats Cleanup Agreement (RFCA), Attachment 5, March

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

DOE, 2002a Industrial Area Sampling and Analysis Plan, FY03 Addendum #IA-03-01, IHSS Groups 300-3, 300-4, 400-8, 700-4, 800-1, and 900-3, Final

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

DOE, CDPHE, EPA, 2003, Proposed RFCA Modifications, U S Department of Energy, Colorado Department of Public Health and Environment, and U S Environmental Protection Agency, Rocky Flats Environmental Technology Site, November

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

49

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

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

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

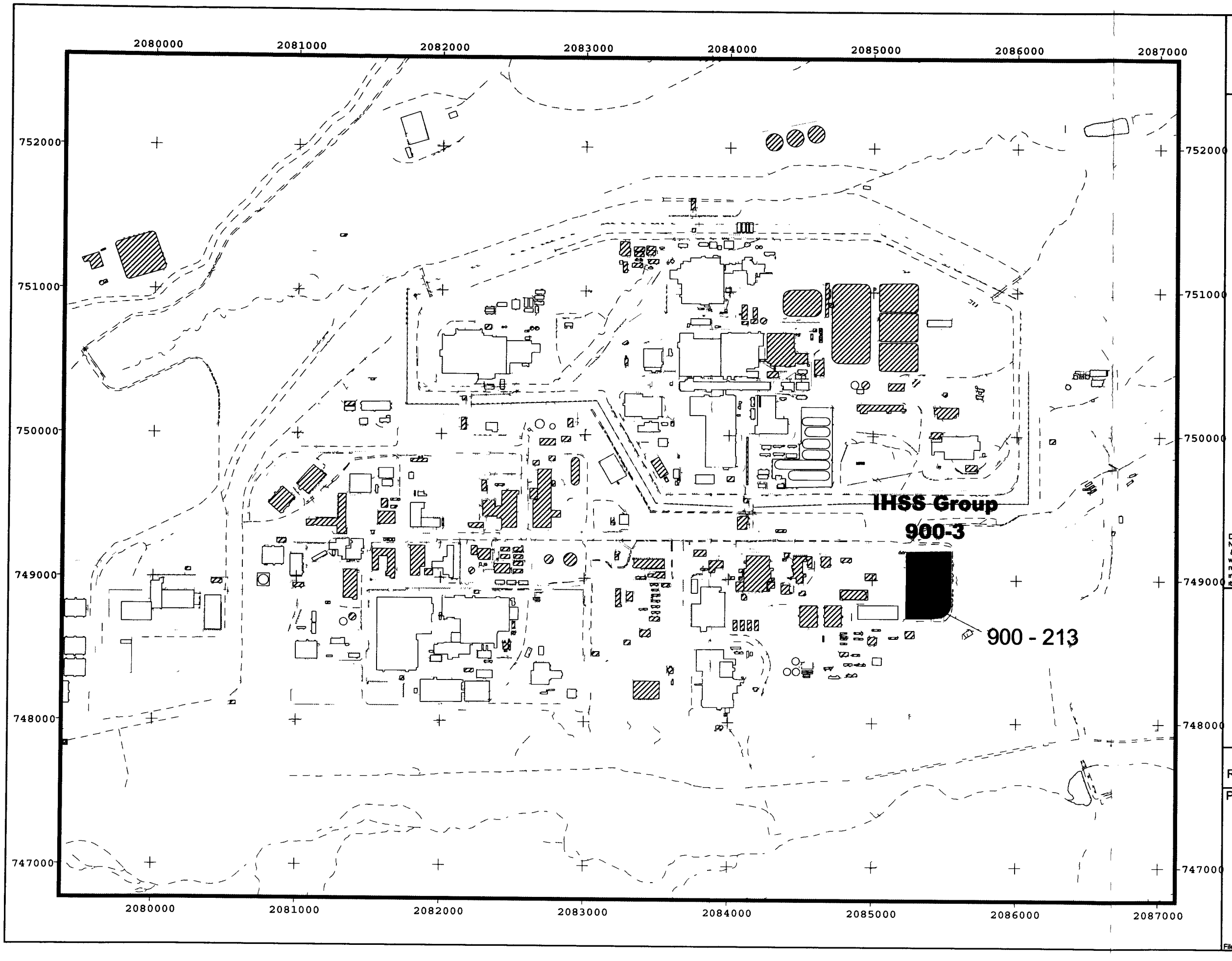
Kaiser-Hill (K-H), 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v1, December

K-H, 2002b, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DARC01-v1, February

Rockwell International, 1989, Interim Status Closure Plan, Solid Waste Management Unit 15 – Storage Pad 904, September

50/50

Figure 1
IHSS Group 900-3 Location Map



Key

- Streams
- Fence
- IHSS Group 900-3
- Dirt Road
- Paved Area

Building

- Demolished
- Stand ng

Disc mer
Neither the United States Government nor Kaiser-H LLC nor Dyncorp &ET nor ny agency thereof nor any of thei employees makes any warranty express or implied or assumes any lega bi ity or responsibility for the accuracy completeness or usefulness of any information apparatus product or process disclosed or represents that its use would not nfringe privately owned nghts

W

500 0 500 Feet

Scale = 1 10 000

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared by [redacted]

Date: July 2003

KAISER•HILL COMPANY

File:w:\Projects\FY2003\900-3\Confirmation\900-3 closeout dr(rev)apr

6

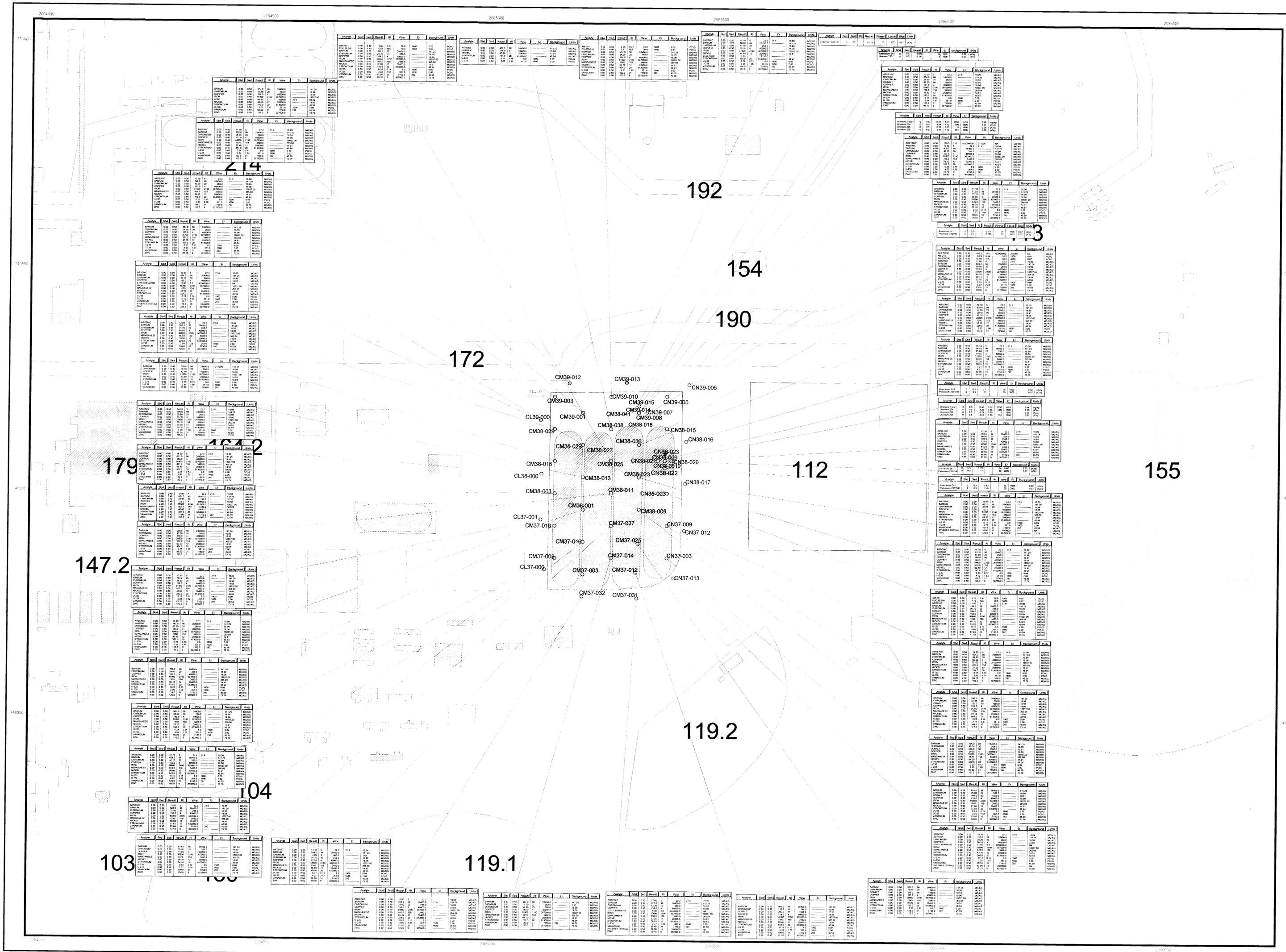


Figure 2
Surface Soil Sample Results Above Background Mean Plus Two Standard Deviations or MDLs at IHSS Group 900-3

Key

- Samples with results greater than WRW ALs
- Samples with results greater than ER ALs
- Samples with results less than ALs
- Samples with results less than background or DLs
- Streams
- Fence
- IHSS
- Dirt Road
- Paved Area

Building

- Demolished
- Standing

Samples within the 904 Pad were collected beneath the asphalt.
Depth intervals for all samples reflect datum from the top of native soil.

Scale = 1:2,800

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared By:

Date: December 2003

RADMS
REMEDIAL ACTION DECISION MANAGEMENT SYSTEM

KAISER•HILL COMPANY

File:w:\Projects\FY2003\900-3\Confirmation\900-3_closeout_dr(rev_2).apr