

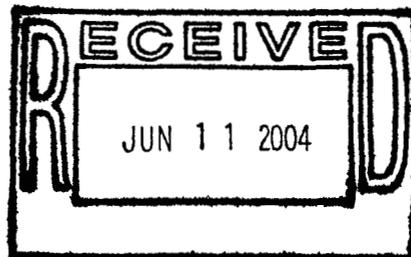
NOTICE

All drawings located at the end of the document.



**Draft Data Summary Report
IHSS Group 800-5**

**(UBC 887 – Process and Sanitary Waste Tanks
and PAC 800-177 – Building 885 Drum Storage)**



June 2004

ADMIN RECORD

IA-A-002165

45

**Draft Data Summary Report
IHSS Group 800-5**

**(UBC 887 – Process and Sanitary Waste Tanks
and PAC 800-177 – Building 885 Drum Storage)**

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Approval received from the Colorado Department of Public Health and Environment

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Approval letter contained in the Administrative Record

June 2004

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Appendix A – Correspondence

ENCLOSURE

Compact Disc Containing Standardized Real and Quality Control Data

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ACRONYMS

AAESE	Accelerated Action Ecological Screening Evaluation
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
bgs	below ground surface
CAS No	Chemical Abstract Service Number
CD	compact disk
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
DOE	U S Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EB	equipment blank
EPA	U S Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RSOP for Routine Soil Remediation
FB	field blank
ft	feet
FY	Fiscal Year
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
IMP	Integrated Monitoring Program
K-H	Kaiser-Hill Company, L L C
LCS	laboratory control sample
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFAA	No Further Accelerated Action
OPWL	Original Process Waste Lines
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocuries per gram
pCi/L	picocuries per liter

QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS or Site	Rocky Flats Environmental Technology Site
RIN	report identification number
RL	Reporting Limit
RNS	rinse blank
RPD	relative percent difference
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
SBD	sample beginning depth
SED	sample end depth
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SVOC	semivolatile organic compound
SWD	Soil Water Database
TB	trip blank
UBC	Under Building Contamination
V&V	verification and validation
VOC	volatile organic compound
WRW	wildlife refuge worker

1.0 INTRODUCTION

This Data Summary Report summarizes accelerated action characterization conducted at Individual Hazardous Substance Site (IHSS) Group 800-5 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. These activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001) and IASAP Addendum #IA-02-04 (DOE 2002a). Results are compared to wildlife refuge worker (WRW) action levels (ALs) described in the Rocky Flats Cleanup Agreement (RFCA) Modification (DOE et al 2003). Potential ecological risk associated with the results will be evaluated in the Accelerated Action Ecological Screening Evaluation (AAESE) and the ecological portion of the Sitewide Comprehensive Risk Assessment (CRA).

This IHSS Group consists of one Potential Area of Concern (PAC) and one Under Building Contamination (UBC) site

- UBC 887 – Process and Sanitary Waste Tanks, and
- PAC 800-177 – Building 885 Drum Storage

The location of IHSS Group 800-5 (UBC 887 and PAC 800-177) is shown on Figure 1

Approval of this Data Summary Report constitutes regulatory agency concurrence of IHSS Group 800-5 as a No Further Accelerated Action (NFAA) Site. This information and NFAA determination will be documented in the Fiscal Year (FY) 2004 Historical Release Report (HRR).

2.0 SITE CHARACTERIZATION

IHSS Group 800-5 information consists of historical knowledge (DOE 1992-2003), historical sampling data, and recent sampling data. Historical information and data are summarized in Section 2.1. Characterization data collected in accordance with IASAP Addendum #IA-02-04 (DOE 2002a) are presented in Section 2.2.

2.1 Historical Information and Data

Building 887 housed process waste and sanitary waste holding tanks. In 1989, a worker discovered that the process waste tanks had over-flowed on to the floor with excess water from the acid scrubbers in room 266. This incident resulted in the filing of a Resource Conservation and Recover Act (RCRA) Contingency Plan Implementation Report.

PAC 800-177 consists of Building 885 drum and paint storage. The Building 885 Drum Storage Area was first used in 1953 when Building 881 was first occupied. Drums contain waste oil, waste paints, waste solvents, and low-level radioactive waste. In 1972, the drain water from the sump that drains the floor of Building 885 was found to have a temperature of 150 degrees Fahrenheit. The cause of the elevated temperature, and the source and destination of the liquid is unknown. A Summary of Events (DOE, HRR, Appendix F, 1992) indicated an inadvertent dumping of radioactive contaminated oil sludge into an open top dumpster located at Building 885. It is not clear if there was a release to the environment.

Historic information and data for this IHSS are available in Appendix C of the IASAP (DOE 2001) and the HRRs (DOE 1992-2003)

2.2 Accelerated Action Characterization Data

Accelerated action characterization of IHSS Group 800-5 included 16 sampling locations. Sampling and analysis specifications for these locations were described in IASAP Addendum #IA-02-04 (DOE 2002a). A summary of planned and actual sampling and analysis, as well as additional sampling and analysis, is presented in Table 1. Deviations from these specifications are summarized in Table 2.

Table 1
IHSS Group 800-5 Sampling and Analysis Summary

IHSS Group	Category	Planned Total	Actual Total
800-5	Number of Sampling Locations	11	16
	Number of Samples	13	19
	Number of Metal Analyses	13	19
	Number of Radionuclide Analyses	13	19
	Number of SVOC Analyses	13	19
	Number of VOC Analyses	11	19

A total of eleven sampling locations (CF33-000, CF33-001, CF33-002, CF33-003, CF33-004, CF33-007, CF33-008, CF33-009, CF33-010, CF34-021, and CG33-000) were planned for IHSS Group 800-5 as part of the IASAP Addendum #IA-02-04 (DOE 2002a). Six additional sampling locations (CF33-011, CF33-012, CF33-013, CF34-022, CF34-23, and CF34-024) were later added to target the Original Process Waste Lines (OPWLs) in this area. Sampling location CF33-009 was replaced with sampling location CF33-013 for better areal coverage. Sampling location CG33-000 targets the sump for Building 881 footing drain outfall. The actual location and depth of the sump was measured in the field. One sampling interval was planned, however samples from two intervals were collected: one sample from the bottom of the sump, and one sample from the next deeper interval. This deviation was documented and approved in an ER Regulatory Contact Record dated March 19, 2004 (Appendix A).

Accelerated action soil sampling locations and analytical results for IHSS Group 800-5 are summarized in Table 3, and shown on Figure 2. Only results greater than background means plus two standard deviations or reporting limits (RLs) are shown. Data show that all contaminant activities and concentrations are less than RFCA WRW ALs except for benzo(a)pyrene and arsenic. Benzo(a)pyrene was detected at IHSS 800-177 surface soil sampling location CF33-007 at a concentration of 3,700 ug/kg. This is only slightly greater than the WRW AL of 3,490 ug/kg. No concentrations of benzo(a)pyrene were detected above the RL at IHSS 800-177 surface soil sampling location CF33-008, also collected directly beneath the concrete slab. Additionally, all other semivolatile organic compounds (SVOCs), including benzo(a)pyrene, detected at the 16 sampling locations for IHSS Group 800-5 were at least 2 times below the associated RFCA WRW ALs. No action was taken to remove the soil with the elevated benzo(a)pyrene concentrations as

this contaminant of concern (COC) was detected at a concentration less than three times the associated WRW ALs. This COC appears to be an anomalous exceedance, most likely due to asphaltic materials mixed in with the soils throughout the area. Arsenic was detected at UBC 887 sampling location CF33-010 (5.0 to 5.01 feet below ground surface [bgs]) at a concentration of 25.5 mg/kg, which is slightly greater than the WRW AL of 22.2 mg/kg. This COC was detected in only one other sample at a concentration of 14.0 mg/kg, which is only slightly greater than the background means plus two standard deviations of 13.140 mg/kg. Subsurface soil results are evaluated as part of the Subsurface Soil Risk Screen (SSRS) in Section 3.0.

The data, retrieved from the RFETS Soil Water Database (SWD) on June 7, 2004, are provided on the enclosed compact disk (CD). The compact disc contains standardized real and quality control (QC) data (Chemical Abstracts Service numbers [CAS No.], analyte names, and units).

Table 2
IHSS Group 800-5 Characterization Sampling Deviations

IHSS/PAC/UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Media	Actual Depth (ft)	Actual Analyte	Comments
UBC 887	CF33-000	748124 840	2083824 359	748123 827	2083816 862	Subsurface soil	16.5 - 18.5	Metals Radionuclides SVOCs VOCs	Moved to outside of building because of concerns with groundwater beneath the building
	CF33-001	748121 103	2083853 010	748120 254	2083846 079	Subsurface soil	16.5 - 18.5	Metals Radionuclides SVOCs VOCs	Moved to outside of building because of concerns with groundwater beneath the building
	CF33-002	748075 013	2083850 518	748067 871	2083844 474	Subsurface soil	16.5 - 18.5	Metals Radionuclides SVOCs VOCs	Moved to outside of building because of concerns with groundwater beneath the building
	CF33-003	748073 768	2083824 359	748068 358	2083818 272	Subsurface soil	16.5 - 18.5	Metals Radionuclides SVOCs VOCs	Moved to outside of building because of concerns with groundwater beneath the building
	CF33-004	748101 172	2083838 062	748098 540	2083832 870	Subsurface soil	16.9 - 17.4	Metals Radionuclides SVOCs VOCs	Sampling interval shortened because of sampling refusal
	CF33-009	748139 505	2083848 784	Not sampled					CF33-009 was replaced by CF33-013, which is of the six additional sample locations
	CF33-010	748131 956	2083867 655	748131 956	2083867 655	Subsurface soil	5.0 - 5.01	Metals Radionuclides SVOCs VOCs	Sample collected at D interval instead of E interval to target the actual depth of OPWL
	CF33-011	NA	NA	748143 538	2083807 896	Subsurface soil	5.0 - 5.5	Metals Radionuclides SVOCs VOCs	Additional sampling location targeting OPWL
	CF33-012	NA	NA	748147 120	2083846 837	Subsurface soil	3.0 - 3.01	Metals Radionuclides SVOCs VOCs	Additional sampling location targeting OPWL

IHSS/PAC/UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Media	Actual Depth (ft)	Actual Analyte	Comments	
	CF33-013	NA	NA	748142 720	2083856 448	Subsurface soil	3 0 - 3 01	Metals Radionuclides SVOCs VOCs	Additional sampling location targeting OPWL	
	CF34-021	748189 865	2083861 231	748189 865	2083861 231	Subsurface soil	30 0 - 30 01	Metals Radionuclides SVOCs VOCs	Sample interval was changed because of location of OPWL near hillside	
	CF34-022	NA	NA	748188 610	2083796 230	Subsurface soil	25 0 - 25 5	Metals Radionuclides SVOCs VOCs	Additional sampling location targeting OPWL	
	CF34-023	NA	NA	748186 595	2083845 586	Subsurface soil	3 0 - 3 01	Metals Radionuclides SVOCs VOCs	Additional sampling location targeting OPWL	
	CF34-024	NA	NA	748185 698	2083855 306	Subsurface soil	3 0-3 01	Metals Radionuclides SVOCs VOCs	Additional sampling location targeting OPWL	
	CG33-000		748023 148	2083943 716	748017 059	2083938 488	Subsurface soil	17 0 - 19 0	Metals Radionuclides SVOCs VOCs	Sample targeting sump outside B887 Location and depth changed to target the actual depth and location of sump See contact record dated March 19, 2004 (Appendix A)
								19 0 - 21 0	Metals Radionuclides SVOCs VOCs	Sample targeting sump outside B887 Second depth interval collected as per the contact record dated March 19,2004 (Appendix A)
IHSS 800-177	CF33-007	748059 006	2083889 478	748059 003	2083889 449	Surface soil	0 0 - 0 5	Metals Radionuclides SVOCs VOCs	No deviations in sampling location from planned Sampling interval reflects depth under concrete pad and fill but represent the A and B intervals VOCs added to the analysis because samples were collected beneath the slab	
						Subsurface soil	0 5 - 2 5	Metals Radionuclides SVOCs VOCs		

IHSS/PAC/UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Media	Actual Depth (ft)	Actual Analyte	Comments
CF33-008	CF33-008	748059 683	2083919 698	748059 631	2083919 676	Surface soil	0.0 - 0.5	Metals Radionuclides SVOCS VOCs	No deviations in sampling location from planned Sampling interval reflects depth under concrete pad and fill but represent the A and B intervals VOCs added to the analysis because samples were collected beneath the slab
						Subsurface soil	0.5 - 2.5	Metals Radionuclides SVOCS VOCs	

Table 3
IHSS Group 800-5 Results Greater Than Background Means Plus Two Standard Deviations or Reporting Limits

IHSS, PAC, or UBC Site	Location Code	Actual Easting	Actual Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRWAL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
UBC 887	CF33-000	748123 827	2083816 862	16 50	18 50	Uranium-235	0.1399	8	0.12	-	pCi/g
	CF33-000	748123 827	2083816 862	16 50	18 50	Uranium-238	2.562	351	1.49	-	pCi/g
	CF33-001	748120 254	2083846 079	16 50	18 50	Uranium-235	0.2171	8	0.12	-	pCi/g
	CF33-001	748120 254	2083846 079	16 50	18 50	Uranium-238	2.433	351	1.49	-	pCi/g
	CF33-002	748067 871	2083844 474	16 50	18 50	Tetrachloroethene	82.3	615000	-	6.79	ug/kg
	CF33-002	748067 871	2083844 474	16 50	18 50	Trichloroethene	35.6	19600	-	6.79	ug/kg
	CF33-002	748067 871	2083844 474	16 50	18 50	Uranium-238	2.181	351	1.49	-	pCi/g
	CF33-003	748068 358	2083818 272	16 50	18 50	Arsenic	14	22.2	13.14	-	mg/kg
	CF33-003	748068 358	2083818 272	16 50	18 50	Uranium-235	0.1823	8	0.12	-	pCi/g
	CF33-003	748068 358	2083818 272	16 50	18 50	Uranium-238	1.908	351	1.49	-	pCi/g
	CF33-003	748068 358	2083818 272	16 50	18 50	Zinc	160	307000	139.1	-	mg/kg
	CF33-004	748098 540	2083832 870	16 90	17 40	Barium	700	26400	289.38	-	mg/kg
	CF33-004	748098 540	2083832 870	16 90	17 40	Uranium-238	2.117	351	1.49	-	pCi/g
	CF33-004	748098 540	2083832 870	16 90	17 40	Xylene	16.9	2040000	-	12	ug/kg
CF33-010	748131 956	2083867 655	5 00	5 01	Arsenic	25.5	22.2	13.14	-	mg/kg	

IHSS, PAC, or UBC Site	Location Code	Actual Easting	Actual Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
	CF33-010	748131 956	2083867 655	5 00	5 01	Barium	753	26400	289 38	-	mg/kg
	CF33-010	748131 956	2083867 655	5 00	5 01	Copper	93 9	40900	38 21	-	mg/kg
	CF33-010	748131 956	2083867 655	5 00	5 01	Fluoranthene	64	27200000	-	46	ug/kg
	CF33 010	748131 956	2083867 655	5 00	5 01	Lead	30 9	1000	24 97	-	mg/kg
	CF33-010	748131 956	2083867 655	5 00	5 01	Uranium-234	4 224	300	2 64	-	pCi/g
	CF33-010	748131 956	2083867 655	5 00	5 01	Uranium-235	0 2596	8	0 12	-	pCi/g
	CF33-010	748131 956	2083867 655	5 00	5 01	Uranium-238	4 224	351	1 49	-	pCi/g
	CF33-011	748143 538	2083807 896	5 00	5 50	Barium	703	26400	289 38	-	mg/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Benzo(a)anthracene	160	34900	-	46	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Benzo(a)pyrene	150	3490	-	60	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Benzo(b)fluoranthene	110	34900	-	74	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Benzo(k)fluoranthene	160	349000	-	80	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Chrysene	180	3490000	-	40	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Copper	178	40900	38 21	-	mg/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Fluoranthene	390	27200000	-	46	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Indeno(1,2,3-cd)pyrene	90	34900	-	51	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Pyrene	390	22100000	-	65	ug/kg
	CF33-011	748143 538	2083807 896	5 00	5 50	Uranium-234	4 256	300	2 64	-	pCi/g
	CF33-011	748143 538	2083807 896	5 00	5 50	Uranium-235	0 2924	8	0 12	-	pCi/g
	CF33-011	748143 538	2083807 896	5 00	5 50	Uranium-238	4 256	351	1 49	-	pCi/g
	CF33-011	748143 538	2083807 896	5 00	5 50	Vanadium	166	7150	88 49	-	mg/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Barium	419	26400	289 38	-	mg/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Benzo(a)anthracene	82	34900	-	43	ug/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Benzo(a)pyrene	70	3490	-	56	ug/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Benzo(k)fluoranthene	85	349000	-	75	ug/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Chrysene	99	3490000	-	37	ug/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Copper	59 8	40900	38 21	-	mg/kg

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IHSS, PAC, or UBC Site	Location Code	Actual Easting	Actual Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
	CF33-012	748147 120	2083846 837	3 00	3 01	Fluoranthene	230	27200000	-	43	ug/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Pyrene	210	22100000	-	61	ug/kg
	CF33-012	748147 120	2083846 837	3 00	3 01	Uranium-234	3 848	300	2 64	-	pCi/g
	CF33-012	748147 120	2083846 837	3 00	3 01	Uranium-235	0 252	8	0 12	-	pCi/g
	CF33-012	748147 120	2083846 837	3 00	3 01	Uranium-238	3 848	351	1 49	-	pCi/g
	CF33-012	748147 120	2083846 837	3 00	3 01	Vanadium	134	7150	88 49	-	mg/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Acenaphthene	57	40800000	-	50	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Barium	460	26400	289 38	-	mg/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Benzo(a)anthracene	140	34900	-	43	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Benzo(a)pyrene	140	3490	-	57	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Benzo(b)fluoranthene	110	34900	-	70	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Benzo(k)fluoranthene	140	349000	-	75	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Chrysene	160	3490000	-	38	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Copper	90 1	40900	38 21	-	mg/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Fluoranthene	360	27200000	-	43	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Indeno(1 2,3-cd)pyrene	76	34900	-	49	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Lead	26 4	1000	24 97	-	mg/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Pyrene	360	22100000	-	62	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Toluene	8	31300000	-	5 3	ug/kg
	CF33-013	748142 720	2083856 448	3 00	3 01	Uranium 234	3 928	300	2 64	-	pCi/g
	CF33-013	748142 720	2083856 448	3 00	3 01	Uranium-238	3 928	351	1 49	-	pCi/g
	CF33-013	748142 720	2083856 448	3 00	3 01	Vanadium	108	7150	88 49	-	mg/kg
	CF34-021	748189 865	2083861 231	30 00	30 01	Barium	1300	26400	289 38	-	mg/kg
	CF34-021	748189 865	2083861 231	30 00	30 01	Copper	150	40900	38 21	-	mg/kg
	CF34-021	748189 865	2083861 231	30 00	30 01	Uranium 234	4 471	300	2 64	-	pCi/g
	CF34-021	748189 865	2083861 231	30 00	30 01	Uranium-235	0 2592	8	0 12	-	pCi/g
	CF34-021	748189 865	2083861 231	30 00	30 01	Uranium-238	4 471	351	1 49	-	pCi/g

IHSS, PAC, or UBC Site	Location Code	Actual Easting	Actual Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
	CF34-021	748189 865	2083861 231	30 00	30 01	Vanadium	114	7150	88 49	-	mg/kg
	CF34-022	748188 610	2083796 230	25 00	25 50	Barium	719	26400	289 38	-	mg/kg
	CF34-022	748188 610	2083796 230	25 00	25 50	Copper	47 4	40900	38 21	-	mg/kg
	CF34-022	748188 610	2083796 230	25 00	25 50	Uranium-234	3 824	300	2 64	-	pCi/g
	CF34-022	748188 610	2083796 230	25 00	25 50	Uranium-235	0 2285	8	0 12	-	pCi/g
	CF34-022	748188 610	2083796 230	25 00	25 50	Uranium-238	3 824	351	1 49	-	pCi/g
	CF34-022	748188 610	2083796 230	25 00	25 50	Vanadium	168	7150	88 49	-	mg/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Acenaphthene	360	40800000	-	46	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Anthracene	560	204000000	-	67	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Benzo(a)anthracene	1600	34900	-	40	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Benzo(a)pyrene	1500	3490	-	53	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Benzo(b)fluoranthene	1300	34900	-	65	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Benzo(k)fluoranthene	1300	349000	-	70	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Chrysene	1900	34900000	-	35	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Dibenz(a,h)anthracene	420	3490	-	64	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Dibenzofuran	130	2950000	-	51	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Fluoranthene	3300	27200000	-	40	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Fluorene	270	40800000	-	56	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Indeno(1,2,3-cd)pyrene	860	34900	-	45	ug/kg
	CF34-023	748186 595	2083845 586	3 00	3 01	Pyrene	3400	22100000	-	58	ug/kg
	CF34-024	748185 698	2083855 306	3 00	3 01	Barium	320	26400	289 38	-	mg/kg
	CF34-024	748185 698	2083855 306	3 00	3 01	Uranium 234	6 51	300	2 64	-	pCi/g
	CF34-024	748185 698	2083855 306	3 00	3 01	Uranium 235	0 918	8	0 12	-	pCi/g
	CG33-000	748017 059	2083938 488	17 00	19 00	Uranium 234	4 301	300	2 64	-	pCi/g
	CG33-000	748017 059	2083938 488	17 00	19 00	Uranium 235	0 2555	8	0 12	-	pCi/g
	CG33-000	748017 059	2083938 488	17 00	19 00	Uranium 238	4 301	351	1 49	-	pCi/g
	CG33-000	748017 059	2083938 488	19 00	21 00	Uranium 234	5 11	300	2 64	-	pCi/g

IHSS, PAC, or UBC Site	Location Code	Actual Easting	Actual Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units	
IHSS 800-177	CG33-000	748017 059	2083938 488	19 00	21 00	Uranium-235	0 2785	8	0 12	-	pCi/g	
	CG33-000	748017 059	2083938 488	19 00	21 00	Uranium-238	5 11	351	1 49	-	pCi/g	
	CF33-007	748059 003	2083889 449	0 00	0 50	Acenaphthene	220	408000000	-	37	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	*Anthracene	1500	204000000	-	29	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Benzo(a)anthracene	4300	34900	-	30	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Benzo(a)pyrene	3700	3490	-	49	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Benzo(b)fluoranthene	2800	34900	-	35	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Benzo(k)fluoranthene	3600	349000	-	39	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Chromium	18	268	16 98999977	-	-	mg/kg
	CF33-007	748059 003	2083889 449	0 00	0 50	Chrysene	5000	3490000	-	34	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Dibenz(a,h)anthracene	890	3490	-	30	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Dibenzofuran	140	2950000	-	44	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Fluoranthene	11000	27200000	-	110	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Fluorene	360	40800000	-	41	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Indeno(1,2,3-cd)pyrene	1900	34900	-	27	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Lithium	13	20400	11 55000019	-	-	mg/kg
	CF33-007	748059 003	2083889 449	0 00	0 50	Pyrene	9600	22100000	-	650	ug/kg	
	CF33-007	748059 003	2083889 449	0 00	0 50	Strontium	85	613000	48 93999863	-	-	mg/kg
	CF33-007	748059 003	2083889 449	0 00	0 50	Uranium 234	2 787	300	2 233000021	-	-	pCi/g
	CF33-007	748059 003	2083889 449	0 00	0 50	Uranium-235	0 2467	8	0 093900003	-	-	pCi/g
CF33-007	748059 003	2083889 449	0 00	0 50	Uranium 238	2 787	351	2	-	-	pCi/g	
CF33-007	748059 003	2083889 449	0 50	2 50	3'-Dichlorobenzidine	160	61300	-	-	120	ug/kg	
CF33-007	748059 003	2083889 449	0 50	2 50	Acenaphthene	65	40800000	-	-	37	ug/kg	
CF33-007	748059 003	2083889 449	0 50	2 50	Anthracene	94	204000000	-	-	29	ug/kg	
CF33-007	748059 003	2083889 449	0 50	2 50	Barium	380	26400	289 38	-	-	mg/kg	
CF33-007	748059 003	2083889 449	0 50	2 50	Benzo(a)anthracene	170	34900	-	-	30	ug/kg	

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IHSS, PAC, or UBC Site	Location Code	Actual Easting	Actual Northing	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Mean Plus Two Standard Deviations	Reporting Limit	Units
	CF33-007	748059 003	2083889 449	0 50	2 50	Benzo(a)pyrene	160	3490	-	48	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Benzo(b)fluoranthene	110	34900	-	35	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Benzo(k)fluoranthene	120	349000	-	38	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Chrysene	180	3490000	-	34	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Fluoranthene	330	27200000	-	27	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Fluorene	59	40800000	-	41	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Pyrene	320	22100000	-	160	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Tetrachloroethene	95 7	615000	-	6 18	ug/kg
	CF33-007	748059 003	2083889 449	0 50	2 50	Uranium-234	4 79	300	2 64	-	pCi/g
	CF33-007	748059 003	2083889 449	0 50	2 50	Uranium-235	0 2228	8	0 12	-	pCi/g
	CF33-007	748059 003	2083889 449	0 50	2 50	Uranium-238	4 79	351	1 49	-	pCi/g
	CF33-008	748059 631	2083919 676	0 00	0 50	Chromium	22	268	16 98999977	-	mg/kg
	CF33-008	748059 631	2083919 676	0 50	2 50	Benzo(a)anthracene	53	34900	-	30	ug/kg
	CF33-008	748059 631	2083919 676	0 50	2 50	Benzo(b)fluoranthene	53	34900	-	36	ug/kg
	CF33-008	748059 631	2083919 676	0 50	2 50	Benzo(k)fluoranthene	48	349000	-	39	ug/kg
	CF33-008	748059 631	2083919 676	0 50	2 50	Chrysene	78	3490000	-	34	ug/kg
	CF33-008	748059 631	2083919 676	0 50	2 50	Fluoranthene	50	27200000	-	28	ug/kg
	CF33-008	748059 631	2083919 676	0 50	2 50	Uranium-235	0 1727	8	0 12	-	pCi/g
	CF33-008	748059 631	2083919 676	0 50	2 50	Uranium-238	1 538	351	1 49	-	pCi/g

Italic type denotes values derived from HPGe measurement

Bold type denotes WRW exceedance

2.3 Sums of Ratios

RFCA sums of ratios (SORs) were calculated for the IHSS Group 800-5 surface soil sampling locations (to 3 feet). SOR calculations were based on accelerated action analytical data for the radionuclides of concern (americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238) with activities greater than background means plus two standard deviations. Table 4 presents the SORs. All radionuclide SORs are less than 1.

Table 4
RFCA SORs Based on IHSS Group 800-5 Radionuclide Activities

Location	Start Depth (ft)	End Depth (ft)	SOR
CF33-007	0 00	0 50	0 048
CF33-007	0 50	2 50	0 057
CF33-008	0 50	2 50	0 026
CF33-012	3 00	3 01	0 055
CF33-013	3 00	3 01	0 024
CF34-024	3 00	3 01	0 136

SORs for non-radionuclides were calculated for all surface soil sampling locations where analyte concentrations were detected at 10 percent or more of a contaminant's WRW AL. No concentrations of COCs were detected at or above 10 percent of the associated WRW AL. Subsurface soil SORs for non-radionuclides were not calculated because subsurface soil concentrations are evaluated as part of the SSRS in Section 3.0.

2.4 Summary Statistics

Summary statistics by analyte for analytes detected above background means plus two standard deviations or RLs were calculated for the IHSS Group 800-5 sampling locations and are presented in Tables 5 and 6 for surface and subsurface soil, respectively.

Table 5
Surface Soil Summary Statistics

Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	RL	Unit
Acenaphthene	2	50 00%	220 000	220 000	40800000 000	-	37 000	ug/kg
Anthracene	2	50 00%	1500 000	1500 000	204000000 000	-	29 000	ug/kg
Benzo(a)anthracene	2	50 00%	4300 000	4300 000	34900 000	-	30 000	ug/kg
Benzo(a)pyrene	2	50 00%	3700 000	3700 000	3490 000	-	49 000	ug/kg
Benzo(b)fluoranthene	2	50 00%	2800 000	2800 000	34900 000	-	35 000	ug/kg
Benzo(k)fluoranthene	2	50 00%	3600 000	3600 000	349000 000	-	39 000	ug/kg
Chromium	2	100 00%	20 000	22 000	268 000	16 990	-	mg/kg
Chrysene	2	50 00%	5000 000	5000 000	3490000 000	-	34 000	ug/kg
Dibenz(a,h)anthracene	2	50 00%	890 000	890 000	3490 000	-	30 000	ug/kg
Dibenzofuran	2	50 00%	140 000	140 000	2950000 000	-	44 000	ug/kg

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Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	RL	Unit
Fluoranthene	2	50 00%	11000 000	11000 000	27200000 000	-	110 000	ug/kg
Fluorene	2	50 00%	360 000	360 000	40800000 000		41 000	ug/kg
Indeno(1 2 3-cd)pyrene	2	50 00%	1900 000	1900 000	34900 000		27 000	ug/kg
Lithium	2	50 00%	13 000	13 000	20400 000	11 550	-	mg/kg
Pyrene	2	50 00%	9600 000	9600 000	22100000 000	-	650 000	ug/kg
Strontium	2	50 00%	85 000	85 000	613000 000	48 940	-	mg/kg
Uranium 234	3	33 33%	2 787	2 787	300 000	2 253	-	pCi/g
Uranium-235	3	33 33%	0 247	0 247	8 000	0 094	-	pCi/g
Uranium-238	3	33 33%	2 787	2 787	351 000	2 000		pCi/g

Table 6
Subsurface Soil Summary Statistics

Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	RL	Unit
3 3 -Dichlorobenzidine	17	5 88%	160 000	160 000	61300 000	-	120 000	ug/kg
Acenaphthene	17	17 65%	160 667	360 000	40800000 000	-	44 333	ug/kg
Anthracene	17	11 76%	327 000	560 000	204000000 000	-	48 000	ug/kg
Arsenic	17	11 76%	19 750	25 500	22 200	13 140	-	mg/kg
Barium	17	52 94%	639 333	1300 000	26400 000	289 380		mg/kg
Benzo(a)anthracene	17	35 29%	367 500	1600 000	34900 000	-	38 667	ug/kg
Benzo(a)pyrene	17	29 41%	404 000	1500 000	3490 000	-	54 800	ug/kg
Benzo(b)fluoranthene	17	29 41%	336 600	1300 000	34900 000	-	56 000	ug/kg
Benzo(k)fluoranthene	17	35 29%	308 833	1300 000	349000 000	-	62 833	ug/kg
Chrysene	17	35 29%	432 833	1900 000	3490000 000	-	36 333	ug/kg
Copper	17	35 29%	103 200	178 000	40900 000	38 210	-	mg/kg
Dibenz(a,h)anthracene	17	5 88%	420 000	420 000	3490 000	-	64 000	ug/kg
Dibenzofuran	17	5 88%	130 000	130 000	2950000 000	-	51 000	ug/kg
Fluoranthene	17	41 18%	674 857	3300 000	27200000 000	-	39 000	ug/kg
Fluorene	17	11 76%	164 500	270 000	40800000 000		48 500	ug/kg
Indeno(1 2 3 cd)pyrene	17	17 65%	342 000	860 000	34900 000	-	48 333	ug/kg
Lead	17	11 76%	28 650	30 900	1000 000	24 970	-	mg/kg
Pyrene	17	29 41%	936 000	3400 000	22100000 000	-	81 200	ug/kg
Tetrachloroethene	17	11 76%	89 000	95 700	615000 000	-	6 485	ug/kg
Toluene	17	5 88%	8 000	8 000	31300000 000	-	5 300	ug/kg
Trichloroethene	17	5 88%	35 600	35 600	19600 000	-	6 790	ug/kg
Uranium-234	17	58 82%	4 526	6 510	300 000	2 640	-	pCi/g
Uranium 235	17	76 47%	0 283	0 918	8 000	0 120	-	pCi/g
Uranium 238	17	88 24%	3 433	5 110	351 000	1 490	-	pCi/g
Vanadium	17	29 41%	138 000	168 000	7150 000	88 490	-	mg/kg

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Analyte	Number of Samples	Detection Frequency	Mean Concentration	Maximum Concentration	WRW AL	Background Mean Plus Two Standard Deviations	RL	Unit
Xylene	17	5.88%	16.900	16.900	2040000.000	-	12.000	ug/kg
Zinc	17	5.88%	160.000	160.000	3070000.000	139.100		mg/kg

3.0 SUBSURFACE SOIL RISK SCREEN

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

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

All subsurface COC concentrations are less than the WRW ALs, except for one subsurface arsenic concentration of 25.5 mg/kg at sampling location CF33-010 (5 feet bgs), which was only slightly higher than the RFCA WRW AL of 22.2 mg/kg

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

IHSS Group 800-5 is located within an area of high erosion. However, this area will be regraded as part of the land reconfiguration.

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

No. All radiological activities in this IHSS Group were below criteria specified in Section 5.3 and Attachment 14.

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

Contaminant migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated by IHSS Group 800-5 COCs. IHSS Group 800-5 is located within an area of high erosion. However, this area will be regraded as part of the land reconfiguration.

Surface water runoff from IHSS Group 800-5 flows to the South Interceptor Ditch located approximately 400 feet to the south. Four gaging stations (GS23, GS24, GS25, and GS55), as well as two surface water sampling stations (SW045 and SW046) are located downgradient, between IHSS Group 800-5 and the South Interceptor Ditch. Gaging station GS55 is a Performance Monitoring Location, which is part of the Integrated Monitoring Program (IMP) (DOE 2003). The four gaging stations and two surface water sampling locations reflect surface water conditions in this area of the IA. Surface water quality at these locations may not be attributed to any single upgradient IHSS Group. Surface water data, retrieved from SWD on May 27, 2004, was reviewed for these locations. Surface water AL exceedances at these three locations are summarized in Table 7.

Table 7
Surface Water Exceedance Summary

Location Code	Analyte	Result Range	Surface Water Action Level	Detection Limit	Background	Result Unit
Total Results						
GS23	Bromodichloromethane	0.960	0.56	-	0.220	ug/L
GS23	Chloroform	21.000	5.7	-	0.230	ug/L
GS23	Copper	0.017 - 0.033	0.016	0.015	-	mg/L
GS23	Zinc	0.666	0.141	0.155	-	mg/L
GS24	Aluminum	3.500 - 27.000	0.087	3.447	-	mg/L
GS24	Arsenic	0.007 - 0.010	0.000018	0.005	-	mg/L
GS24	Copper	0.017 - 0.041	0.016	0.015	-	mg/L
GS24	Lead	0.007 - 0.036	0.0065	0.007	-	mg/L
GS24	Plutonium-239/240	0.177 - 0.209	0.15	0.020	-	pCi/L
GS24	Zinc	0.160 - 0.600	0.141	0.155	-	mg/L
GS25	Aluminum	3.800 - 7.700	0.087	3.447	-	mg/L
GS25	Copper	0.023 - 0.130	0.016	0.015	-	mg/L
GS25	Lead	0.014 - 0.056	0.0065	0.007	-	mg/L
GS25	Zinc	0.158 - 0.700	0.141	0.155	-	mg/L
GS55	Aluminum	3.550 - 8.930	0.087	3.447	-	mg/L
GS55	Aluminum	3.680	0.087	3.447	-	mg/L
GS55	Lead	0.008 - 0.010	0.0065	0.007	-	mg/L
SW045	Mercury	0.700	0.00001	0.000	-	mg/L
SW045	Methylene chloride	10.000	4.7	-	5.000	ug/L
SW045	Tetrachloroethene	2.000 - 8.000	0.8	-	5.000	ug/L
SW045	Tritium	638.000	500	494.150	-	pCi/L
SW045	Zinc	0.190	0.141	0.155	-	mg/L
SW046	bis(2-Ethylhexyl)phthalate	2.000	1.8	-	10.000	ug/L
SW046	Lead	0.009 - 0.024	0.0065	0.007	-	mg/L
SW046	Tetrachloroethene	1.000 - 6.000	0.8	-	5.000	ug/L
SW046	Tritium	1100.000	500	494.150	-	pCi/L
SW046	Zinc	0.162	0.141	0.155	-	mg/L
Dissolved Results						
SW045	Selenium	0.018	0.0046	0.010	-	mg/L
SW045	Mercury	0.002	0.00001	0.000	-	mg/L
SW045	Plutonium-239/240	2.570	0.15	0.520	-	pCi/L
SW046	Mercury	0.001	0.00001	0.000	-	mg/L

Groundwater flow in this area is to the southeast towards Woman Creek, located approximately 900 feet to the southeast. Seven groundwater monitoring locations are located within 350 feet downgradient of IHSS Group 800-5. Groundwater data, retrieved from SWD on May 27, 2004, was reviewed for these wells. No Tier I groundwater AL exceedances were found. Only wells with Tier II groundwater AL exceedances are summarized in Table 8. These wells reflect groundwater conditions in this area of the IA. Groundwater quality at these locations may not be attributed to any single upgradient IHSS Group. Monitoring wells around the area will continue to be sampled as part of the

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IMP (DOE 2003) Further groundwater evaluation will be part of the groundwater Interim Measure/Interim Remedial Action (IM/IRA)

**Table 8
Groundwater Exceedance Summary**

Location Code	Analyte	Result Range	Background	Detection Limit	Tier I	Tier II	Units
Total Results							
5387	Aluminum	66 300	11 240	-	3650	36 5	mg/L
5387	Beryllium	0 006	0 003	-	0 4	0 004	mg/L
5387	Copper	2 440	0 035	-	130	1 3	mg/L
5387	Lead	0 076	0 011	-	1 5	0 015	mg/L
5387	Methylene chloride	8 000	-	1 000	500	5	ug/L
5387	Nickel	0 597	0 030	-	14	0 14	mg/L
35691	alpha-BHC	0 120	-	0 050	1 35	0 0135	ug/L
35691	Antimony	0 066	0 045	-	0 6	0 006	mg/L
35691	beta-BHC	0 055	-	0 050	4 73	0 0473	ug/L
Dissolved Results							
5387	Nickel	0 269 - 0 345	0 021	-	14	0 14	mg/L
5487	Copper	3 130	0 014	-	130	1 3	mg/L
5487	Manganese	1 730	0 162	-	172	1 72	mg/L
5487	Molybdenum	0 520	0 088	-	18 3	0 183	mg/L
5487	Nickel	2 090 - 4 950	0 021	-	14	0 14	mg/L
5487	Zinc	43 500	0 050	-	1100	11	mg/L
35691	Selenium	0 059	0 044	-	5	0 05	mg/L
35691	Strontium-90	1 800 - 1 400	0 960	-	85 2	0 852	pCi/L
35691	Thallium	0 010	0 005	-	0 2	0 002	mg/L
35691	Uranium-235	2 508	1 480	-	101	1 01	pCi/L

4.0 NFAA SUMMARY

Based on analytical results and the SSRS, action is not required, and an NFAA determination is justified for IHSS Group 800-5 because of the following

- Concentrations of COCs were not detected above RFCA WRW ALs except for arsenic and benzo(a)pyrene Both COCs were only slightly higher than the associated RFCA WRW ALs
- IHSS Group 800-5 is located within an area of high erosion However, this area will be regraded as part of the land reconfiguration
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS Group 800-5 (DOE 2003) Further groundwater evaluation will be part of the groundwater IM/IRA

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Approval of this Data Summary Report constitutes regulatory agency concurrence that IHSS Group 800-5 is an NFAA site. This information and the NFAA determination will be documented in the FY04 HRR. Ecological factors will be evaluated in the AAESE and the CRA.

5.0 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-02-04 [DOE 2002a]), modified due to field conditions, in accordance with the IASAP (DOE 2001),
- Collection of samples in accordance with the sampling design, and
- Results of the Data Quality Assessment (DQA), as described in the following sections

5.1 Data Quality Assessment Process

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

- U.S. Environmental Protection Agency (EPA) 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
- U.S. Department of Energy (DOE) Order 414 1A, 1999, Quality Assurance

Verification and validation (V&V) of 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-v1, 2002a

- V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v1, 2002b
- V&V Guidelines for Volatile Organics, DA-SS01-v1, 2002c
- V&V Guidelines for Semivolatile Organics, DA-SS02-v1, 2002d
- V&V Guidelines for Metals, DA-SS05-v1, 2002e, and
- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5

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

5.2 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 (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.

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

Both real and QC data are included on the enclosed CD.

5.2.1 Accuracy

The following measures of accuracy were evaluated:

- LCS evaluation,
- Surrogate evaluation,
- Field blank evaluation, and
- Sample MS evaluation.

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

Laboratory Control Sample Evaluation

The minimum and maximum LCS results are tabulated in Table 9 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 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. Since this is environmentally conservative, no further action is needed. The analytes with unacceptable low recoveries were evaluated. If the highest sample result divided by the lowest LCS recovery for that analyte is less than the AL, no further action is taken because any indicated bias is not great enough to make a falsely low sample result be above the AL. 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 5.2.3.

Table 9
LCS Evaluation Summary

CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Test Method
71-55-6	1,1,1-Trichloroethane	85.78	110.6	SW-846 8260
79-34-5	1,1,2,2-Tetrachloroethane	84.25	110.2	SW-846 8260
79-00-5	1,1,2-Trichloroethane	87.83	101.7	SW-846 8260
75-34-3	1,1-Dichloroethane	82.77	112.6	SW-846 8260
75-35-4	1,1-Dichloroethene	87.5	126.2	SW-846 8260
120-82-1	1,2,4-Trichlorobenzene	66	74	SW-846 8270
95-50-1	1,2-Dichlorobenzene	93.76	114.7	SW-846 8260
107-06-2	1,2-Dichloroethane	81.9	99.5	SW-846 8260
78-87-5	1,2-Dichloropropane	87.37	105.4	SW-846 8260
106-46-7	1,4-Dichlorobenzene	93.2	118.4	SW-846 8260
95-95-4	2,4,5-Trichlorophenol	60	78	SW-846 8270
88-06-2	2,4,6-Trichlorophenol	63	77	SW-846 8270
120-83-2	2,4-Dichlorophenol	63	75	SW-846 8270
105-67-9	2,4-Dimethylphenol	67	74	SW-846 8270
51-28-5	2,4-Dinitrophenol	39	67	SW-846 8270
121-14-2	2,4-Dinitrotoluene	67	79	SW-846 8270
606-20-2	2,6-Dinitrotoluene	66	77	SW-846 8270
78-93-3	2-Butanone	50.68	100.7	SW-846 8260
91-58-7	2-Chloronaphthalene	61	75	SW-846 8270
95-57-8	2-Chlorophenol	63	75	SW-846 8270
91-57-6	2-Methylnaphthalene	65	74	SW-846 8270
95-48-7	2-Methylphenol	65	73	SW-846 8270
88-74-4	2-Nitroaniline	64	77	SW-846 8270
91-94-1	3,3-Dichlorobenzidine	46	58	SW-846 8270
534-52-1	4,6-Dinitro-2-methylphenol	49	66	SW-846 8270
106-47-8	4-Chloroaniline	30	57	SW-846 8270
108-10-1	4-Methyl-2-pentanone	72.5	110.6	SW-846 8260
106-44-5	4-Methylphenol	64	73	SW-846 8270
100-02-7	4-Nitrophenol	59	79	SW-846 8270
83-32-9	Acenaphthene	61	75	SW-846 8270
67-64-1	Acetone	30.88	100.7	SW-846 8260
7429-90-5	Aluminum	84	101	SW-846 6010
120-12-7	Anthracene	62	76	SW-846 8270
7440-36-0	Antimony	89	96	SW-846 6010
7440-38-2	Arsenic	89	97	SW-846 6010
7440-39-3	Barium	94	99	SW-846 6010
71-43-2	Benzene	88.42	109.7	SW-846 8260
56-55-3	Benzo(a)anthracene	59	75	SW-846 8270
50-32-8	Benzo(a)pyrene	61	77	SW-846 8270

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CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Test Method
205-99-2	Benzo(b)fluoranthene	56	79	SW-846 8270
207-08-9	Benzo(k)fluoranthene	57	74	SW-846 8270
65-85-0	Benzoic Acid	33	59	SW-846 8270
100-51-6	Benzyl Alcohol	64	78	SW-846 8270
7440-41-7	Beryllium	95	105	SW-846 6010
111-44-4	bis(2-Chloroethyl)ether	59	79	SW-846 8270
39638-32-9	bis(2-Chloroisopropyl)ether	59	83	SW-846 8270
117-81-7	bis(2-Ethylhexyl)phthalate	56	74	SW-846 8270
75-27-4	Bromodichloromethane	94 11	103 7	SW 846 8260
75-25-2	Bromoform	89 86	107 3	SW-846 8260
74-83-9	Bromomethane	58 06	128 9	SW-846 8260
85-68-7	Butylbenzylphthalate	54	75	SW-846 8270
7440-43-9	Cadmium	89	93	SW-846 6010
75-15-0	Carbon Disulfide	84 18	129 8	SW-846 8260
56-23-5	Carbon Tetrachloride	82 6	110 5	SW-846 8260
108-90-7	Chlorobenzene	87 18	111 6	SW-846 8260
75-00-3	Chloroethane	75 1	125 2	SW-846 8260
67-66-3	Chloroform	87 18	106 1	SW-846 8260
74-87-3	Chloromethane	46 48	137 6	SW-846 8260
7440-47-3	Chromium	92	100	SW-846 6010
218-01-9	Chrysene	60	76	SW-846 8270
10061-01-5	cis-1,3-Dichloropropene	71	100	SW-846 8260
7440-48-4	Cobalt	89	96	SW-846 6010
7440-50-8	Copper	88	94	SW-846 6010
84-74-2	Di-n-butylphthalate	58	78	SW 846 8270
117-84-0	Di-n-octylphthalate	53	72	SW-846 8270
53-70 3	Dibenz(a h)anthracene	62	75	SW 846 8270
132-64-9	Dibenzofuran	66	76	SW-846 8270
124-48-1	Dibromochloromethane	91 21	106 8	SW-846 8260
84-66-2	Diethylphthalate	63	78	SW-846 8270
131-11-3	Dimethylphthalate	63	75	SW-846 8270
100-41-4	Ethylbenzene	88 53	115 3	SW-846 8260
206-44-0	Fluoranthene	61	78	SW-846 8270
86 73 7	Fluorene	63	76	SW-846 8270
118-74-1	Hexachlorobenzene	65	77	SW-846 8270
87-68 3	Hexachlorobutadiene	65	77	SW-846 8270
77-47-4	Hexachlorocyclopentadiene	48	73	SW-846 8270
67-72 1	Hexachloroethane	62	73	SW-846 8270
193-39-5	Indeno(1 2 3-cd)pyrene	62	76	SW-846 8270
7439-89-6	Iron	93	102	SW-846 6010
78-59-1	Isophorone	62	96	SW-846 8270

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CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Test Method
7439-92-1	Lead	91	97	SW-846 6010
7439-93-2	Lithium	90	106	SW-846 6010
7439-96-5	Manganese	91	98	SW-846 6010
7439-97-6	Mercury	96	102	SW-846 6010
75-09-2	Methylene chloride	87 63	111 1	SW-846 8260
7439-98-7	Molybdenum	87	96	SW-846 6010
86-30-6	n-Nitrosodiphenylamine	69	90	SW-846 8270
621-64-7	n-Nitrosodipropylamine	60	76	SW-846 8270
91-20-3	Naphthalene	63	73	SW-846 8270
7440-02-0	Nickel	91	96	SW-846 6010
98-95-3	Nitrobenzene	63	74	SW-846 8270
87-86-5	Pentachlorophenol	48	64	SW-846 8270
108-95-2	Phenol	63	76	SW-846 8270
129-00-0	Pyrene	54	74	SW-846 8270
7782-49-2	Selenium	85	97	SW-846 6010
7440 22-4	Silver	89	96	SW-846 6010
7440-24 6	Strontium	93	98	SW-846 6010
100-42-5	Styrene	87 83	114 5	SW-846 8260
127 18-4	Tetrachloroethene	92 75	116 8	SW-846 8260
7440 31-5	Tin	87	91	SW-846 6010
108-88-3	Toluene	92 82	134 6	SW-846 8260
10061-02-6	trans-1 3-Dichloropropene	95 69	110 5	SW-846 8260
79-01-6	Trichloroethene	87 29	105 9	SW-846 8260
11 09 6	Uranium, Total	92	97	SW-846 6010
7440 62-2	Vanadium	91	98	SW-846 6010
75-01-4	Vinyl chloride	61 74	141 5	SW-846 8260
1330-20-7	Xylene	90 06	114 5	SW-846 8260
7440 66-6	Zinc	90	96	SW-846 6010

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 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 recovery is less than the WRW AL for that analyte, 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. The highest and lowest surrogate recoveries for this

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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 Section 5.2.3

Table 10
Surrogate Recovery Summary

Number of Samples	Analyte	Minimum	Maximum	Unit
VOC Surrogate Recoveries				
19	4-Bromofluorobenzene	90.91	107.1	%REC
19	Deuterated 1,2-dichloroethane	92.16	116.4	%REC
19	Deuterated Toluene	85.45	105.4	%REC
SVOC Surrogate Recoveries				
19	2-Fluorobiphenyl	47	74	%REC
19	2-Fluorophenol	55	82	%REC
19	Deuterated Nitrobenzene	54	80	%REC
19	p-Terphenyl-d14	53	83	%REC

Field Blank Evaluation

Results of the field blank analyses are given 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. When the real result is less than 10 times the blank result for laboratory contaminants and 5 times the result for non-laboratory contaminants, the real result is eliminated. While some of the blank results indicate that cross-contamination may have occurred (toluene and uranium-235), project decisions were not affected because all real results were less than the ALs.

Table 11
Field Blank Summary

Sample QC Code	Test Method	Analyte	Maximum Detected Value	Unit
TB	SW8260B	Acetone	28	ug/L
TB	SW-846 8260	Acetone	28	ug/L
TB	SW-846 8260	Acetone	10	ug/L
TB	SW8260B	Benzene	2	ug/L
TB	SW-846 8260	Benzene	2	ug/L
RNS	SW-846 8260	Bromodichloromethane	0.7	ug/L
TB	SW-846 8260	Naphthalene	1	ug/L
TB	SW8260B	Toluene	3.6	ug/L
TB	SW8260B	Toluene	1.7	ug/L
FB	SW-846 8260	Toluene	1.7	ug/L
RNS	SW-846 8260	Toluene	2.6	ug/L

Sample QC Code	Test Method	Analyte	Maximum Detected Value	Unit
TB	SW-846 8260	Toluene	3.6	ug/L
TB	SW-846 8260	Toluene	2.9	ug/L
FB	GAMMA SPECTROSCOPY	Uranium-235	0.137	pCi/g
RNS	GAMMA SPECTROSCOPY	Uranium-235	0.144	pCi/g
EB	GAMMAISOCS	Uranium-235	0.0901	pCi/g
FB	GAMMAISOCS	Uranium-235	0.128	pCi/g
EB	GAMMAISOCS	Uranium-238	1.76	pCi/g
FB	GAMMAISOCS	Uranium-238	1.93	pCi/g
FB	GAMMA SPECTROSCOPY	Uranium-238	2.32	pCi/g
RNS	GAMMA SPECTROSCOPY	Uranium-238	2.18	pCi/g

Field Blanks (TB = Trip, RNS = Rinse, FB = Field, EB = Equipment Blank) results greater than detection limits (not *U* Qualified)

Sample Matrix Spike Evaluation

The minimum and maximum MS results are summarized by chemical for the entire project in Table 12. 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, therefore no action was taken. For this project, all results were acceptable, however, barium, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and manganese had 0 percent recovery as a low. Benzo(a)pyrene exceeded the WRW AL at sampling location CF33-007. For the other analytes with low recoveries, the AL was at least a factor of three times higher than the highest sample result, therefore no decisions were impacted.

Table 12
Sample MS Evaluation Summary

CAS No	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches	Test Method
71-55-6	1,1,1-Trichloroethane	66.11	100.4	4	4	SW-846 8260
79-34-5	1,1,2,2-Tetrachloroethane	46.17	85.42	3	3	SW-846 8260
79-00-5	1,1,2-Trichloroethane	69.6	95.64	4	4	SW-846 8260
75-34-3	1,1-Dichloroethane	74.3	108.8	4	4	SW-846 8260
75-35-4	1,1-Dichloroethene	60.76	94.52	4	4	SW-846 8260
120-82-1	1,2,4-Trichlorobenzene	54	75	6	6	SW-846 8270
95-50-1	1,2-Dichlorobenzene	57.22	90.37	4	4	SW-846 8260
107-06-2	1,2-Dichloroethane	72.64	100.2	4	4	SW-846 8260

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CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches	Test Method
78-87-5	1,2-Dichloropropane	70 42	103 5	4	4	SW-846 8260
106-46-7	1,4-Dichlorobenzene	57 38	92 69	4	4	SW-846 8260
95-95-4	2,4,5-Trichlorophenol	54	77	6	6	SW-846 8270
88-06-2	2,4,6-Trichlorophenol	51	78	6	6	SW-846 8270
120-83-2	2,4-Dichlorophenol	52	80	6	6	SW-846 8270
105-67-9	2,4-Dimethylphenol	55	79	6	6	SW-846 8270
51-28-5	2,4-Dinitrophenol	26	57	6	6	SW-846 8270
121-14-2	2,4-Dinitrotoluene	57	81	6	6	SW-846 8270
606-20-2	2,6-Dinitrotoluene	56	78	6	6	SW-846 8270
78-93-3	2-Butanone	68 73	186 5	4	4	SW-846 8260
91-58-7	2-Chloronaphthalene	53	75	6	6	SW-846 8270
95-57-8	2-Chlorophenol	52	79	6	6	SW-846 8270
91-57-6	2-Methylnaphthalene	56	79	6	6	SW-846 8270
95-48-7	2-Methylphenol	54	78	6	6	SW-846 8270
88-74-4	2-Nitroaniline	59	85	6	6	SW-846 8270
91-94-1	3,3'-Dichlorobenzidine	43	68	6	6	SW-846 8270
534-52-1	4,6-Dinitro-2-methylphenol	34	60	6	6	SW-846 8270
106-47-8	4-Chloroaniline	45	72	6	6	SW-846 8270
108-10-1	4-Methyl-2-pentanone	69 27	111 2	4	4	SW-846 8260
106-44-5	4-Methylphenol	54	80	6	6	SW-846 8270
100-02-7	4-Nitrophenol	44	79	6	6	SW-846 8270
83-32-9	Acenaphthene	54	78	6	6	SW-846 8270
67-64-1	Acetone	77 67	297 4	4	4	SW-846 8260
7429-90-5	Aluminum	1800	10900	4	4	SW-846 6010
120-12-7	Anthracene	29	83	6	6	SW-846 8270
7440-36-0	Antimony	41	60	3	3	SW-846 6010
7440-38-2	Arsenic	88	94	3	3	SW-846 6010
7440-39-3	Barium	0	102	3	3	SW-846 6010
71-43-2	Benzene	71 69	99 75	4	4	SW-846 8260
56-55-3	Benzo(a)anthracene	0	79	6	6	SW-846 8270
50-32-8	Benzo(a)pyrene	0	76	6	6	SW-846 8270
205-99-2	Benzo(b)fluoranthene	1 7	78	6	6	SW-846 8270
207-08-9	Benzo(k)fluoranthene	0	73	6	6	SW-846 8270
65-85-0	Benzoic Acid	11	62	6	6	SW-846 8270
100-51-6	Benzyl Alcohol	49	83	6	6	SW-846 8270
7440-41-7	Beryllium	99	105	2	2	SW-846 6010
111-44-4	bis(2-Chloroethyl)ether	53	87	6	6	SW-846 8270
39638-32-9	bis(2-Chloroisopropyl)ether	50	89	6	6	SW-846 8270
117-81-7	bis(2-Ethylhexyl)phthalate	50	77	6	6	SW-846 8270
75-27-4	Bromodichloromethane	66 98	102 3	4	4	SW-846 8260
75-25-2	Bromoform	67 95	96 78	4	4	SW-846 8260

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CAS No	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches	Test Method
74-83-9	Bromomethane	70 35	114 1	4	4	SW-846 8260
85-68-7	Butylbenzylphthalate	48	81	6	6	SW-846 8270
7440-43-9	Cadmium	87	90	3	3	SW-846 6010
75-15-0	Carbon Disulfide	59 89	93 85	4	4	SW-846 8260
56-23-5	Carbon Tetrachloride	64 74	98 87	4	4	SW-846 8260
108-90-7	Chlorobenzene	65 71	93 33	4	4	SW-846 8260
75-00-3	Chloroethane	62 02	97 66	4	4	SW-846 8260
67-66-3	Chloroform	71 8	103 6	4	4	SW-846 8260
74-87-3	Chloromethane	74 15	159 5	4	4	SW-846 8260
7440-47-3	Chromium	105	135	3	3	SW-846 6010
218-01-9	Chrysene	0	76	6	6	SW-846 8270
10061-01-5	cis-1,3-Dichloropropene	68 65	99 06	4	4	SW-846 8260
7440-48-4	Cobalt	87	98	3	3	SW-846 6010
7440-50-8	Copper	96	101	3	3	SW-846 6010
84-74-2	Di-n-butylphthalate	51	85	6	6	SW-846 8270
117-84-0	Di-n-octylphthalate	47	77	6	6	SW-846 8270
53-70-3	Dibenz(a,h)anthracene	41	75	6	6	SW-846 8270
132-64-9	Dibenzofuran	56	78	6	6	SW-846 8270
124-48-1	Dibromochloromethane	66 36	93 28	4	4	SW-846 8260
84-66-2	Diethylphthalate	56	82	6	6	SW-846 8270
131-11-3	Dimethylphthalate	55	80	6	6	SW-846 8270
100-41-4	Ethylbenzene	64 5	89 6	4	4	SW-846 8260
206-44-0	Fluoranthene	53	87	5	5	SW-846 8270
86-73-7	Fluorene	54	78	6	6	SW-846 8270
118-74-1	Hexachlorobenzene	57	77	6	6	SW-846 8270
87-68-3	Hexachlorobutadiene	55	78	6	6	SW-846 8270
77-47-4	Hexachlorocyclopentadiene	35	70	6	6	SW-846 8270
67-72-1	Hexachloroethane	53	78	6	6	SW-846 8270
193-39-5	Indeno(1,2,3-cd)pyrene	16	78	6	6	SW-846 8270
7439-89-6	Iron	1170	2020	3	3	SW-846 6010
78-59-1	Isophorone	54	103	6	6	SW-846 8270
7439-92-1	Lead	90	94	3	3	SW-846 6010
7439-93-2	Lithium	94	110	2	2	SW-846 6010
7439-96-5	Manganese	0	98	3	3	SW-846 6010
7439-97-6	Mercury	51	82	2	2	SW-846 6010
75-09-2	Methylene chloride	71 64	92 7	4	4	SW-846 8260
7439-98-7	Molybdenum	82	90	3	3	SW-846 6010
86-30-6	n-Nitrosodiphenylamine	60	97	6	6	SW-846 8270
621-64-7	n-Nitrosodipropylamine	51	85	6	6	SW-846 8270
91-20-3	Naphthalene	54	79	6	6	SW-846 8270
7440-02-0	Nickel	90	95	3	3	SW-846 6010

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CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of Laboratory Samples	Number of Laboratory Batches	Test Method
98-95-3	Nitrobenzene	54	81	6	6	SW-846 8270
87-86-5	Pentachlorophenol	32	66	6	6	SW-846 8270
108-95-2	Phenol	52	79	6	6	SW-846 8270
129-00-0	Pyrene	49	84	5	5	SW-846 8270
7782-49-2	Selenium	86	95	3	3	SW-846 6010
7440-22-4	Silver	86	96	3	3	SW-846 6010
7440-24-6	Strontium	93	113	3	3	SW-846 6010
100-42-5	Styrene	63 16	89 38	4	4	SW-846 8260
127-18-4	Tetrachloroethene	60 04	89 98	4	4	SW-846 8260
7440-31-5	Tin	83	85	3	3	SW-846 6010
108-88-3	Toluene	65 02	89 32	4	4	SW-846 8260
10061-02-6	trans-1,3-Dichloropropene	61 49	90 43	4	4	SW-846 8260
79-01-6	Trichloroethene	70 04	136 7	4	4	SW-846 8260
11-09-6	Uranium, Total	89	94	3	3	SW-846 6010
7440-62-2	Vanadium	96	121	3	3	SW-846 6010
75-01-4	Vinyl chloride	62 07	124 9	4	4	SW-846 8260
1330-20-7	Xylene	64 46	89 1	4	4	SW-846 8260
7440-66-6	Zinc	73	102	3	3	SW-846 6010

5.2.2 Precision

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSDs which are summarized in Table 13. The analytes with the highest relative percent differences (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 indicated decisions were not impacted. While some of the RPDs appear to be high (aluminum, benzoic acid, iron, manganese, mercury, vanadium, and zinc), they would not result in rejection of data that affects project decisions.

Table 13
Sample MSD Evaluation Summary

Analyte	Max RPD (%)
1,1,1-Trichloroethane	19 45
1,1,2,2-Tetrachloroethane	15 19
1,1,2-Trichloroethane	5 40
1,1-Dichloroethane	12 67
1,1-Dichloroethene	29 30
1,2,4-Trichlorobenzene	11 27

34

Analyte	Max RPD (%)
1,2-Dichlorobenzene	6 31
1,2-Dichloroethane	5 38
1,2-Dichloropropane	5 76
1,4-Dichlorobenzene	5 46
2,4,5-Trichlorophenol	16 00
2,4,6-Trichlorophenol	12 84
2,4-Dichlorophenol	11 92
2,4-Dimethylphenol	12 08
2,4-Dinitrophenol	25 35
2,4-Dinitrotoluene	16 54
2,6-Dinitrotoluene	13 53
2-Butanone	32 92
2-Chloronaphthalene	13 56
2-Chlorophenol	13 51
2-Methylnaphthalene	13 51
2-Methylphenol	13 70
2-Nitroaniline	15 19
3,3'-Dichlorobenzidine	24 76
4,6-Dinitro-2-methylphenol	20 18
4-Chloroaniline	14 93
4-Methyl-2-pentanone	12 92
4-Methylphenol	18 46
4-Nitrophenol	24 00
Acenaphthene	13 33
Acetone	31 04
Aluminum	37 46
Anthracene	15 58
Antimony	12 99
Arsenic	1 14
Barium	3 05
Benzene	8 43
Benzo(a)anthracene	17 24
Benzo(a)pyrene	17 14
Benzo(b)fluoranthene	30 51
Benzo(k)fluoranthene	13 14
Benzoic Acid	87 18
Benzyl Alcohol	21 78
Beryllium	3 08
bis(2-Chloroethyl)ether	23 08
bis(2-Chloroisopropyl)ether	17 07
bis(2-Ethylhexyl)phthalate	25 64

Analyte	Max RPD (%)
Bromodichloromethane	6.74
Bromoform	9.00
Bromomethane	12.69
Butylbenzylphthalate	27.59
Cadmium	5.59
Carbon Disulfide	29.51
Carbon Tetrachloride	23.94
Chlorobenzene	2.24
Chloroethane	20.93
Chloroform	9.73
Chloromethane	21.37
Chromium	9.86
Chrysene	16.67
cis-1,3-Dichloropropene	3.81
Cobalt	4.17
Copper	7.04
Di-n-butylphthalate	21.14
Di-n-octylphthalate	25.45
Dibenz(a,h)anthracene	14.29
Dibenzofuran	12.24
Dibromochloromethane	4.97
Diethylphthalate	16.39
Dimethylphthalate	15.38
Ethylbenzene	7.96
Fluoranthene	23.08
Fluorene	13.70
Hexachlorobenzene	13.11
Hexachlorobutadiene	13.70
Hexachlorocyclopentadiene	14.29
Hexachloroethane	15.17
Indeno(1,2,3-cd)pyrene	16.67
Iron	138.82
Isophorone	13.11
Lead	5.18
Lithium	2.15
Manganese	63.25
Mercury	39.37
Methylene chloride	8.99
Molybdenum	3.39
n-Nitrosodiphenylamine	15.17
n-Nitrosodipropylamine	15.19

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Analyte	Max RPD (%)
Naphthalene	13.51
Nickel	10.31
Nitrobenzene	17.45
Pentachlorophenol	20.00
Phenol	13.56
Pyrene	21.05
Selenium	3.21
Silver	1.17
Strontium	21.15
Styrene	15.18
Tetrachloroethene	16.76
Tin	4.82
Toluene	11.65
trans-1,3-Dichloropropene	6.02
Trichloroethene	18.71
Uranium, Total	5.46
Vanadium	41.31
Vinyl chloride	32.65
Xylene	9.57
Zinc	73.04

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 for all samples collected.

**Table 14
Field Duplicate Sample Frequency Summary**

Test Method	Sample Code	Number of Samples	% Duplicate Samples
ALPHA SPEC	REAL	3	100.00
	DUP	3	
GAMMA SPECTROSCOPY	REAL	19	5.26
	DUP	1	
SW-846 6010/6010B	REAL	13	23.08
	DUP	3	
SW-846 6200	REAL	8	12.50
	DUP	1	
SW-846 8260	REAL	19	15.79
	DUP	3	

Test Method	Sample Code	Number of Samples	% Duplicate Samples
SW-846 8270/8270B	REAL	19	15.79
	DUP	3	

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 15), and the resulting number was compared to the AL. For this project, none of the corrected numbers were greater than the AL, therefore project decisions were not impacted.

**Table 15
RPD Evaluation Summary**

Analyte	Max. of RPD (%)
1,2,4-Trichlorobenzene	197.16
2,4,5-Trichlorophenol	7.41
2,4,6-Trichlorophenol	7.41
2,4-Dichlorophenol	7.41
2,4-Dimethylphenol	7.41
2,4-Dinitrophenol	7.41
2,4-Dinitrotoluene	7.41
2,6-Dinitrotoluene	7.41
2-Chloronaphthalene	7.41
2-Chlorophenol	7.41
2-Methylnaphthalene	111.48
2-Methylphenol	7.41
2-Nitroaniline	7.41
4,6-Dinitro-2-methylphenol	7.41
4-Chloroaniline	6.45
4-Methylphenol	7.41
4-Nitrophenol	7.41
Acenaphthene	92.13
Anthracene	92.13
Arsenic	19.35
Barium	137.29
Benzo(a)anthracene	75.41
Benzo(a)pyrene	71.19
Benzo(b)fluoranthene	56.60
Benzo(k)fluoranthene	7.41
Benzoic Acid	7.41
Benzyl Alcohol	6.45
bis(2-Chloroethyl)ether	7.41

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Analyte	Max of RPD (%)
bis(2-Chloroisopropyl)ether	7 41
bis(2-Ethylhexyl)phthalate	7 41
Butylbenzylphthalate	7 41
Chrysene	92 96
Copper	163 27
Di-n-butylphthalate	7 41
Di-n-octylphthalate	7 41
Dibenz(a,h)anthracene	7 41
Dibenzofuran	37 50
Diethylphthalate	7 41
Dimethylphthalate	7 41
Fluoranthene	131 88
Fluorene	82 57
Hexachlorobenzene	7 41
Hexachlorobutadiene	7 41
Hexachlorocyclopentadiene	7 41
Hexachloroethane	7 41
Indeno(1,2,3-cd)pyrene	7 41
Iron	40 71
Isophorone	7 41
n-Nitrosodiphenylamine	7 41
n-Nitrosodipropylamine	7 41
Naphthalene	197 16
Nitrobenzene	7 41
Pentachlorophenol	7 41
Phenol	7 41
Pyrene	134 73
Strontium	84 49
Vanadium	114 02
Zinc	55 28

5.2.3 Completeness

Based on original project DQOs, a minimum of 25 percent of ER Program analytical (and radiological) results must be formally verified and validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 15 shows the number and percentage of validated records (codes without "1"), the number and percentage of verified records (codes with "1"), and the percentage of rejected records for each analyte group. No alpha spectroscopy or SW-846 6200 records were verified, and only 15 percent of the SW-846 6010 records were validated. However, association with previous and subsequent validated records indicates that the data is acceptable.

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Table 15
Validation and Verification Summary

Validation Qualifier Code	Total of CAS Number	Alpha Spec	Gamma Spectroscopy	SW-846 6010	SW-846 6200	SW-846 8260	SW-846 8270
J	9	0	0	2	5	2	0
J1	41	0	0	41	0	0	0
JB	2	0	0	0	0	2	0
UJ	18	0	0	3	2	13	0
UJ1	27	0	0	10	0	16	1
V	986	15	33	41	137	343	417
V1	1108	0	27	202	0	308	571
Total	2191	15	60	299	144	684	989
Validated	1015	15	33	46	144	360	417
% Validated	46 33%	100 00%	55 00%	15 38%	100 00%	52 63%	42 16%
Verified	1176	0	27	253	0	324	572
% Verified	53 67%	0 00%	45 00%	84 62%	0 00%	47 37%	57 84%

5.2.4 Sensitivity

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

5.3 Summary of Data Quality

RPDs greater than 35 percent indicate the sampling precision limits of some analytes have been exceeded. No records were rejected. Only 15 percent of the SW-846 6010 records were validated. If additional V&V information is received, IHSS Group 800-5 records will be updated in SWD. Data qualified as a result of additional data will be assessed as part of the CRA process. Data collected and used for IHSS Group 800-5 are adequate for decision making based on ER Program Goals.

6.0 REFERENCES

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ER REGULATORY CONTACT RECORD

Date/Time March 19, 2004/12 30

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

Regulatory Contact David Kruczek
Phone 303 692-3328

Agency CDPHE

Purpose of Contact 800-5 Sample Location CG33-000

Discussion

Location CG33-000 within IHSS Group 800-5 targets the sump for the B881 footing drain outfall. The sump is an approximately 3-foot diameter corrugated metal pipe. The depth of the sump will be measured prior to sampling to determine the correct interval. This location will be sampled on the southeast side of the sump. Two sample intervals will be collected. The first at the depth corresponding to the lowest part of the sump as measured and then at the next deeper sample interval.

Contact Record Prepared By Annette Primrose

Required Distribution

M Aguilar, USEPA
 S Bell, DOE-RFFO
 J Berardini, K-H
 B Birk, DOE-RFFO
 L Brooks, K-H ESS
 M Broussard, K-H RISS
 L Butler, K-H RISS
 G Carnival, K-H RISS
 N Castaneda, DOE-RFFO
 C Deck, K-H Legal
 S Gunderson, CDPHE
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 G Kleeman, USEPA
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 D Shelton, K-H ESS
 C Spreng, CDPHE
 S Surovchak, DOE-RFFO
 K Wiemelt, K-H RISS
 C Zahm, K-H Legal

Additional Distribution

Gerry Kelly, KH Team
 _____+

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Figure 1
IHSS Group 800 5
Location Map

KEY

- Stream drainage or ditch
- Paved road
- Dirt road
- UBC
- IHSS
- Demolished structure
- Standing structure
- Pond

DRAFT



500 0 500 Feet

Scale 1 7000
 State Plane Coordinate Projection
 Colorado Central Zone
 Datum NAD 27

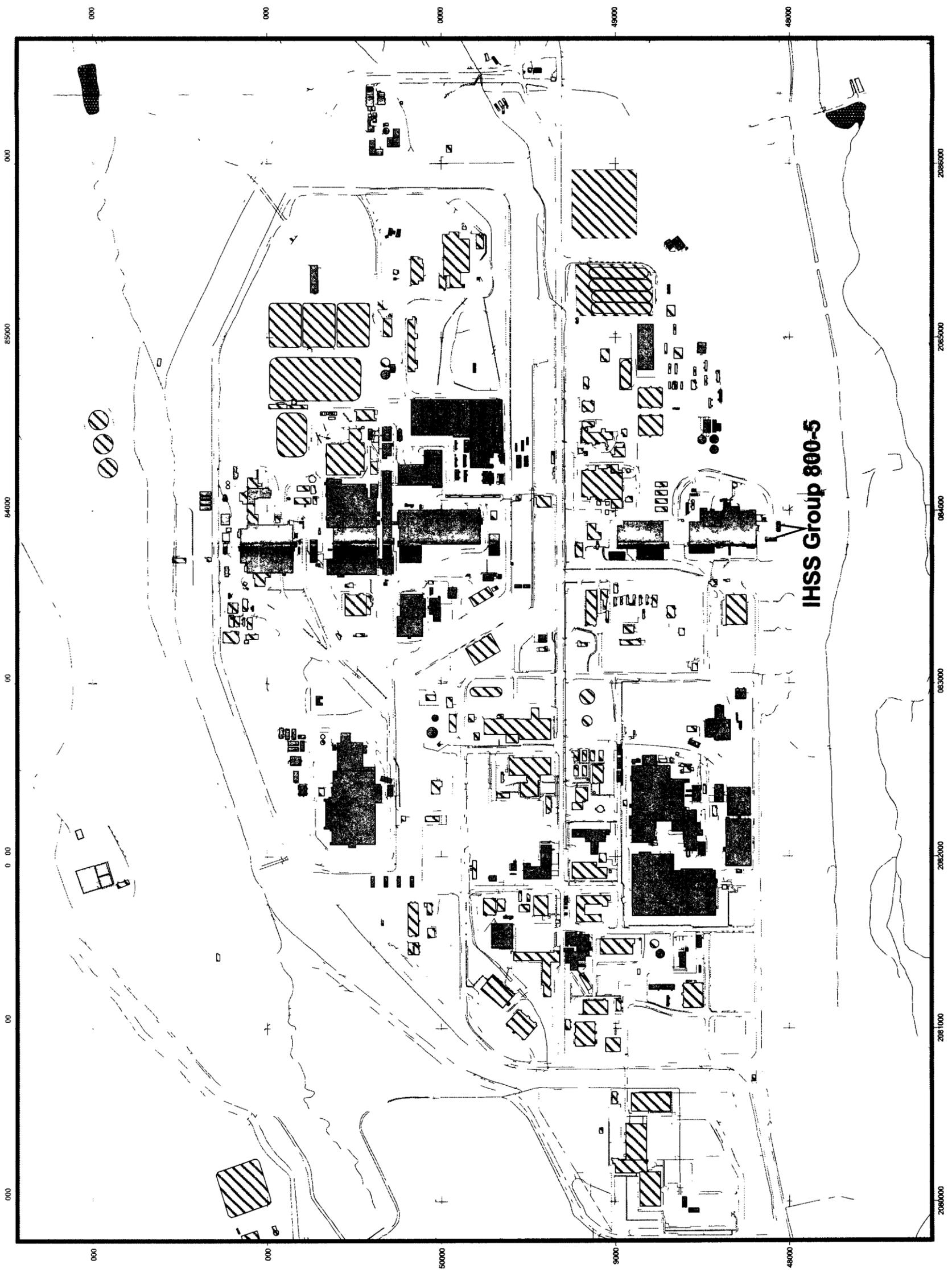
U S Department of Energy
 Rocky Flats Environmental Technology Site

Prepared by

Date June 2004



Prepared for



IHSS Group 800-5

Figure 2
IHSS Group 800 5
Soil Results
Greater than Background Means
Plus Two Standard Deviations
or Reporting Limits

KEY

Sampling Location

- Detected above WRW AL
- Detected Above Background or RL

Paved road
Dirt road

UBC
IHSS

Demolished structure
Standing structure

DRAFT

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

U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared by [Redacted] Date June 2004

Prepared for

