

# **NOTICE**

**All drawings located at the end of the document.**

**CLOSEOUT REPORT  
FOR IHSS GROUP 000-1  
SOLAR EVAPORATION PONDS  
AREA OF CONCERN**



**June 2003**

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FOR IHSS GROUP 000-1  
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AREA OF CONCERN**

**Approval received from the Colorado Department of Public Health and Environment**

**Approval letter contained in the Administrative Record.**

**June 2003**

## TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 0 INTRODUCTION	4
2 0 SITE CHARACTERIZATION	8
3 0 ACCELERATED ACTION	37
4 0 HOT SPOT REMOVAL AND CONFIRMATION SAMPLING	41
5 0 RCRA UNIT CLOSURE	42
6 0 STEWARDSHIP EVALUATION	56
7 0 DEVIATIONS FROM THE ER RSOP	57
8 0 POST-REMEDICATION CONDITIONS	57
9 0 WASTE MANAGEMENT	65
10 0 SITE RECLAMATION	65
11 0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS	65
12 0 COMPLETION OF REMEDIAL ACTION OBJECTIVES	65
13 0 DATA QUALITY ASSESSMENT	75
14 0 CONCLUSION	84
15 0 REFERENCES	86

## LIST OF FIGURES

Figure 1 IHSS Group 000-1 Location Map	5
Figure 2 Solar Evaporation Ponds Area of Concern	6
Figure 3 Solar Evaporation Ponds Area of Concern Hot Spots	10
Figure 4 Accelerated Action Sampling Locations at SEP AOC	22
Figure 5 Accelerated Action Sampling Results at SEP AOC	23
Figure 6 RFCA Tier II Sum of Ratios for Non-Radionuclides in Surface Soil, Based on Accelerated Action Characterization	33
Figure 7 RFCA Tier II Sum of Ratios for Radionuclides in Surface Soil, Based on Accelerated Action Characterization	34
Figure 8 RFCA Tier II Sum of Ratios for Non-Radionuclides in Subsurface Soil, Based on Accelerated Action Characterization	35
Figure 9 RFCA Tier II Sum of Ratios for Radionuclides in Subsurface Soil, Based on Accelerated Action Characterization	36
Figure 10 SEP AOC Items Removed, Remaining, and Not Found	39
Figure 11 Hot Spot Confirmation Sampling Locations and Results	55
Figure 12 Tier II Sum of Ratios for Non-Radionuclides in Surface Soil, Based on Residual Contamination	61
Figure 13 Tier II Sum of Ratios for Radionuclides in Surface Soil, Based on Residual Contamination	62

Figure 14 Tier II Sum of Ratios for Non-Radionuclides in Subsurface Soil, Based on Residual Contamination	63
Figure 15 Tier II Sum of Ratios for Radionuclides in Subsurface Soil, Based on Residual Contamination	64
Figure 16 No Longer Representative Sampling Locations	74

### **LIST OF TABLES**

Table 1 Pre-Accelerated Action Data for OPWL Within the SEP AOC	8
Table 2 SEP AOC Characterization Sampling Specifications	11
Table 3 Deviations From the IASAP Addendum	16
Table 4 SEP AOC Accelerated Action Characterization Data Greater Than Background Means Plus Two Standard Deviations or Method Detection Limits	24
Table 5 RFCA Tier II Exceedances	30
Table 6 RFCA Sum of Ratios for SEP AOC Surface Soil	31
Table 7 RFCA Sum of Ratios for SEP AOC Subsurface Soil	32
Table 8 Dates of Accelerated Action Activities	38
Table 9 Details on Removed and Remaining Pipeline Portions	40
Table 10 Hot Spot Removal In-Process Sampling Data	43
Table 11 Hot Spot Removal Confirmation Sampling Data, by Surface and Subsurface Locations	49
Table 12 Sum of Ratios for Surface Soil Based on Remedial Contamination	58
Table 13 Sum of Ratios for Subsurface Soil Based on Remedial Contamination	59
Table 14 Waste Summary	66
Table 15 Waste Characterization Data Summary – Detected Analytes	69
Table 16 Laboratory Control Sample Evaluation	78
Table 17 Field Blank Summary	79
Table 18 Sample Matrix Spike Evaluation	80
Table 19 Sample Matrix Spike Duplicate Evaluation	81
Table 20 Field Duplicate Sample Frequency	83
Table 21 RPD Evaluation	83
Table 22 Validation and Verification Summary	85

### **LIST OF APPENDICES**

Appendix A – Project Photographs
Appendix B – Correspondence
Appendix C – Data Comparison with Proposed RCFA Action Levels

### **ENCLOSURE**

Compact Disk, Data Set for IHSS Group 000-1 AOC

## ACRONYMS

AL	action level
AOC	Area of Concern
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 Protocol for Routine Soil Remediation
ft	feet
HEPA	high-efficiency particulate absorption
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
ICP	inductively coupled plasma
IDC	Item Description Code
IHSS	Individual Hazardous Substance Site
ITS	Interceptor Trench System
K-H	Kaiser-Hill Company L L C
LCS	laboratory control sample
LLW	low-level waste
LLMW	low-level mixed waste
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MST	Modular Storage Tanks
NFAA	No Further Accelerated Action
NLR	No Longer Representative
NPWL	New Process Waste Lines
OPWL	Original Process Waste Lines
PAC	Potential Area of Concern
PAM	Proposed Action Memorandum
PARCCS	precision, accuracy, representativeness, completeness, comparability and sensitivity
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
ppb	parts per billion
ppm	parts per million
QC	quality control
RADMS	Remedial Action Decision Management System
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RL	reporting limit
RPD	Relative Percent Difference
RSOP	RFCA Standard Operating Protocol

SAP            Sampling and Analysis Plan  
SEP            Solar Evaporation Ponds  
Site            Rocky Flats Environmental Technology Site  
SOR            sum of ratio  
SVOC          semivolatile organic compound  
ug/kg         micrograms per kilogram  
ug/l            micrograms per liter  
VOC            volatile organic compound  
V&V            verification and validation  
WRW            wildlife refuge worker  
XRF            x-ray fluorescence

## **EXECUTIVE SUMMARY**

This closeout report summarizes accelerated action activities conducted at the Individual Hazardous Substance Site (IHSS) Group 000-1 Solar Evaporation Ponds Area of Concern (AOC), which is located at the Rocky Flats Environmental Technology Site (RFETS). Activities were planned and executed in accordance with the Industrial Area Sampling and Analysis Plan (IASAP), the IASAP Addendum #IA-02-07, and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol for Routine Remediation (ER RSOP). Notification of the planned characterization and removal activities was provided in ER RSOP Notification #02-08.

Activities performed under this Notification were conducted between August 6 and November 20, 2002, and involved the removal of all concrete slabs, all above-ground process waste lines, some below-ground process waste lines, a valve pit, miscellaneous valve components, all sumps and pumps, and contaminated soil (hot spots). There were only minor deviations from the Notification. Some below-ground waste lines and drain lines remain, however, all of these lines have been disrupted (plugged). Activities did not include the ponds themselves. Activities associated with the ponds (i.e., best management practices) were conducted under a separate decision document, the Proposed Action Memorandum (PAM) for the Solar Evaporation Ponds, and involved pushing in the berms and adding fill to create a gentle grade to the south. The AOC will be seeded in the near future.

The action also involved characterization, including characterization of Potential Area of Concern 900-1310 and excavations where contaminated materials were removed. Analytical results indicate that all remaining soil concentrations were below RFCA Tier II Action Levels, except for one beryllium concentration and 16 arsenic concentrations. All exceedances were significantly below the RFCA Tier I ALs. Eight arsenic concentrations and one manganese concentration exceeded the proposed Wildlife Refuge Worker (WRW) ALs. There were no exceedance of the proposed Ecological Receptor ALs. Confirmation sampling, conducted after the hot spots were removed, indicate that all soil concentrations were below RFCA Tier II Action Levels, except for one beryllium concentration, which was slightly above the RFCA Tier II Action Level. All concentrations were also below the proposed WRW and Ecological Receptor ALs. Results of the data quality assessment conducted confirmed that the data collected and used are adequate for decision-making.

Removal activities were consistent with and contributed to the ER RSOP overall long-term remedial action objectives for RFETS soil. The removal of slabs, the valve pit, valve components, sumps, and hot spots, and the removal or disruption of process waste lines contributed to the protection of human health and the environment because potential sources of contamination were removed or isolated. These actions also minimized the need for long-term maintenance and institutional or engineering controls because potential sources of contamination were removed or isolated. In addition, best management practices were used during the accelerated action to prevent the spread of contamination during the accelerated action (e.g., erosion and dust controls).

The accelerated action involved three Resource Conservation and Recovery Act (RCRA) Units (# 21, 48 and 374 3) RCRA Units 21 and 48 had been partially closed prior to the accelerated action, and removal of the remaining concrete slabs associated with Building 788, the Clarifier, and the pump transfer station at Building 308A under this accelerated action constitutes final closure of the two RCRA units No additional documentation will be submitted for the closure of these RCRA units RCRA Unit 374 3 consists of the New Process Waste Lines, and removal of the aboveground line section from Building 910 to Building 774 constitutes partial closure of the RCRA unit (refer to Section 3 0) Closure of the ponds is addressed in the PAM

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

The presence of metals and americium-241 in AOC soils will be analyzed in the Site Wide Comprehensive Risk Assessment, which is part of the RCRA Facility Investigation/Remedial Investigation and Corrective Measures Study/Feasibility Study that will be conducted for the Site The need for and extent of any, more general, long-term stewardship activities will also be analyzed in the RCRA Facility Investigation/Remedial Investigation and Corrective Measures Study/Feasibility Study and will be proposed as part of the preferred alternative in the Proposed Plan for the Site Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision, in any post-closure Colorado Hazardous Waste Act permit that may be required, and in any post-RFCA agreement

No specific long-term stewardship activities are recommended for the IHSS Group 000-1 AOC beyond the generally applicable Site requirements that may be imposed on this area in the future, which are dependent upon the final remedy selected Institutional controls that will be used as appropriate for this area include prohibitions on construction of buildings in the IA, restrictions on excavation or other soil disturbance, or prohibitions on groundwater pumping in the area of the IHSS Group 000-1 AOC

No specific engineered controls are anticipated as a result of the conditions remaining in the IHSS Group 000-1 AOC Groundwater treatment, via the Solar Pond Plume Treatment System, will continue

No specific environmental monitoring is anticipated as a result of the conditions remaining in the IHSS Group 000-1 AOC

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

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

## **1.0 INTRODUCTION**

This closeout report summarizes accelerated action activities conducted at the Individual Hazardous Substance Site (IHSS) Group 000-1 Solar Evaporation Ponds Area of Concern (AOC), which is located at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. The IHSS Group 000-1 AOC consists of the following

- Leak detection drains and collection sumps,
- Remaining concrete slabs associated with the Building 788 Permacon, the Clarifier, and the 308A Pumphouse, which are units regulated under the Resource Conservation and Recovery Act (RCRA) (RCRA Unit 21 includes the Permacon, and RCRA Unit 48 includes the Clarifier and Pumphouse),
- Portions of the Original Process Waste Lines (OPWL) and five valve pits, which are part of IHSS 121,
- Above-ground pipeline from Building 910 to Building 374, which is part of the New Process Waste Lines (NPWL) (NPWL constitutes RCRA Unit 374 3),
- Modular Storage Tanks (MST) return line to Building 910, and
- Interceptor Trench System (ITS) Water Spill area, which constitutes Potential Area of Concern (PAC) 900-1310

The location of the IHSS Group 000-1 AOC is shown on Figure 1, and the AOC components are shown on Figure 2. The five solar evaporation ponds, including the berms, are not covered by the Notification and this Closeout Report.

Characterization and removal activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001), IASAP Addendum #IA-02-07 (DOE 2002a), and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002b). Notification of the planned characterization and removal activities was provided in ER RSOP Notification #02-08 (DOE 2002c), which was approved by the Colorado Department of Public Health and Environment (CDPHE) on July 30, 2002 (CDPHE 2002).

This report contains the information necessary to demonstrate attainment of cleanup objectives and closure of the IHSS Group 000-1 SEP AOC. This information includes

- Site characterization information
  - Description of site characterization activities, and
  - Site characterization data, including data tables and maps,
- Site accelerated action information
  - Description of the accelerated action, including the rationale for the action and map of the target remediation area,
  - Map of the actual remediation area, including excavation bounds, and dates and durations of specific remedial activities, and
  - Photographs documenting site characterization, remediation, and reclamation activities,
- Confirmation sampling data, including data tables and location maps, as well as a comparison of the confirmation data to applicable cleanup goals,
- Description of RCRA unit closure activities,
- Description of deviations from the ER RSOP,,
- Description of near-term stewardship actions and long-term stewardship recommendations,
- Description of site condition after remediation that includes a map of reporting limits (RLs), RFCA action levels (ALs), and residual contamination above RFCA Tier II ALs,
- Description of waste disposition,
- Description of site reclamation,
- Table of No Longer Representative sample locations where soil has been remediated, which will be used to mark database records so they are not used in the Comprehensive Risk Assessment or other Site analyses, and
- Data quality assessment (DQA), including comparison of confirmation data with project data quality objectives (DQOs)

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

## 2.0 SITE CHARACTERIZATION

The SEP AOC was extensively characterized prior to and during the accelerated action. Pre-accelerated action data are summarized in the SEP Proposed Action Memorandum (PAM), entitled *RCRA Closure of the RFETS Solar Evaporation Ponds* (DOE 2002d), and presented in the *Human Health Risk Assessment of the Solar Evaporation Ponds* (an attachment to the PAM). Results of the risk assessment indicate minimal risk to a wildlife refuge worker (WRW). However, based on the risk assessment, six surface soil locations were identified for soil removal (i.e., SS403093, SS402893, 43793, SS440593, SS400693 and SS402793, refer to Figure 3). These locations were selected because concentrations of americium-241 or plutonium-239 resulted in an excess cancer rate for a WRW greater than  $1 \times 10^{-5}$ , or concentrations of non-radionuclides (e.g., cadmium) increased the non-carcinogenic risk to the WRW.

IASAP Addendum #IA-02-07 (DOE 2002a) presents soil sampling results from locations at OPWL Pipeline P-26, the OPWL pipeline and valve pit southeast of SEP 207C, OPWL P-40, and PAC 900-1310. Results above RFCA Tier II ALs are presented in Table 1. No Tier I AL exceedances were found within PAC 900-1310.

**Table 1**  
**Pre-Accelerated Action Data for OPWL Within the SEP AOC**

Location	Media	Contaminant	Concentration (mg/kg)	Tier II AL (mg/kg)
P-26	Surface Soil	Beryllium	3.3	1.04
	Subsurface Soil	Arsenic	24	2.99
OPWL and Valve Pit	Surface Soil	Beryllium	1.1	1.04
	Surface Soil	Beryllium	2.2	1.04
	Subsurface Soil	Arsenic	13.6	2.99
P-40	Surface Soil	Beryllium	1.8	1.04
	Subsurface Soil	Arsenic	17.1	2.99

Based on this previously collected data, only limited characterization was conducted during the accelerated action, primarily to characterize excavations where pond components and soil were removed. Analytical data were collected in accordance with IASAP Addendum #IA-02-07 (DOE 2002a). Sampling specifications, including potential contaminants of concern and media to be sampled, are presented in Table 2. Deviations from the IASAP Addendum are shown in Table 3, and sample locations are shown on Figure 4.

Accelerated action data (i.e., data above background mean plus two standard deviations or detection limits) are presented on Figure 5 and in Table 4. The raw data, as of June 10, 2003, are included in the enclosed compact disc as a separate file. All contaminant concentrations in the sampled areas were below RFCA Tier II ALs, except for one beryllium concentration and 16 arsenic concentrations. The beryllium concentration that exceeded the Tier II AL was 1.10 mg/kg, and the AL is 1.04 mg/kg. The arsenic concentrations that exceeded the Tier II AL ranged from 13.0 to 36.3 mg/kg, and the AL is 2.99 mg/kg. All exceedances were significantly below the RFCA Tier I ALs and are

14

believed to be part of the background (i.e., not DOE-added) Exceedances are highlighted in Table 4 and summarized in Table 5

Analytical results are also compared with the proposed RFCA Wildlife Refuge Worker (WRW) and Ecological Receptor ALs (DOE, CDPHE, EPA 2002) in Appendix C All contaminant concentrations in the sampled areas were below the WRW ALs, except for one manganese concentration and 8 arsenic concentrations The manganese concentration that exceeded the WRW AL was 5900 mg/kg, and the WRW AL is 3480 mg/kg The arsenic concentrations that exceeded the WRW AL ranged from 22.4 to 36.3 mg/kg, and the WRW AL is 22.2 mg/kg All contaminant concentrations were below the Ecological Receptor ALs and will be further evaluated under the IA Ecological Risk Assessment process

## 2.1 Sum of Ratios

RFCA Tier II and Tier I sum of ratios (SORs) were calculated for the SEP AOC accelerated action sample locations SOR calculations were based on accelerated action analytical data and the following list of contaminants of concern (COCs)

- Radionuclides (americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238),
- Metals (arsenic, copper, mercury, lead, etc.), and
- Organics [volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs)]

The COCs are based on data that exceed background mean plus two standard deviations or RLs Metals and organics were grouped together for non-radionuclide SOR calculations Plutonium, americium, and uranium were grouped together for radionuclide SOR calculations Table 6 presents the RFCA Tier I and Tier II SORs for surface soil, and Table 7 presents the RFCA Tier I and Tier II SORs for subsurface soils RFCA Tier II SORs are shown on Figures 6 through 9 SORs were calculated for all locations with analytical results greater than background mean plus two standard deviations or RLs No surface soil SORs for Tier I COCs or surface soil SORs for Tier II radionuclides exceeded 1 Ten surface soil SORs for Tier II non-radionuclides exceeded 1 No subsurface soil SORs for Tier I COCs or subsurface soil SORs for Tier II radionuclides exceeded 1 Seven subsurface soil SORs for Tier II non-radionuclides exceeded 1 SORs, based on accelerated action and confirmation analytical data, are presented in Section 8.0, Post-Remediation Condition

Tier II SORs greater than 1 are due to the presence of multiple metals, including beryllium and arsenic concentrations exceeding Tier II ALs However, all exceedances were significantly below the RFCA Tier I ALs In accordance with RFCA, additional actions are not warranted

Table 2  
SEP AOC Characterization Sampling Specifications

IHSS Group	IHSS/PAC	Location	Easting	Northing	Media	Begin Depth (ft)	End Depth (ft)	Analyte	Method
000-1	SEP AOC	CJ46-000	2084597 28	750700 806	Subsurface Soil	11	11	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
		CJ46-001	2084605 76	750700 423	Subsurface Soil	11	11	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
		CJ46-002	2084601 35	750704 637	Subsurface Soil	11	11	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
		CJ46-003	2084602 4	750693 713	Subsurface Soil	11	11	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
		CJ46-004	2084599 47	750696 964	Subsurface Soil	11	11	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
CJ49-DR01	2084820 9	751197 426	Subsurface Soil	4	4	Radionuclides	Gamma Spec		
						Metals	X-ray Fluorescence		
						Nitrate	Ion Chromatography		
CK48-003	2084917 58	751048 913	Subsurface Soil	3	3	Radionuclides	Gamma Spec		
						Metals	X-ray Fluorescence		
						Nitrate	Ion Chromatography		
CK48-004	2084917 58	751048 913	Subsurface Soil	3	3	Radionuclides	Gamma Spec		
						Metals	X-ray Fluorescence		
						Nitrate	Ion Chromatography		
CK48-005	2084917 58	751048 913	Subsurface Soil	3	3	Radionuclides	Gamma Spec		
						Metals	X-ray Fluorescence		
						Nitrate	Ion Chromatography		

Final Report for IHSS Group 000-1, Solar Evaporation Ponds Area Concern

IHSS Group	IHSS/PAC	Location	Fasting	Nothing	Media	Begin Depth (ft)	End Depth (ft)	Analyte	Method
		CK48-000	2084925 79	750960 476	Subsurface Soil	6	6	Radionuclides Metals	Gamma Spec ICP
		CK48-001	2084910 36	750963 508	Subsurface Soil	6	6	Radionuclides Metals	Gamma Spec ICP
		CK47-002	2084935 7	750957 076	Subsurface Soil	6	6	Radionuclides Metals	Gamma Spec ICP
		CK47-000	2084927 8	750943 958	Subsurface Soil	6	6	Radionuclides Metals	Gamma Spec ICP
		CK47-001	2084910 36	750944 838	Subsurface Soil	6	6	Radionuclides Metals	Gamma Spec ICP
		CH48-000	2084272 54	751019 513	Subsurface Soil	4 5	6 5	Radionuclides Metals	Gamma Spec X-ray Fluorescence
		CH48-016	2084373 83	751011 291	Subsurface Soil	4 5	6 5	Nitrate Radionuclides Metals	Ion Chromatography Gamma Spec X-ray Fluorescence
		CI48-000	2084427 65	750996 427	Subsurface Soil	0	3	Radionuclides Metals	Gamma Spec X-ray Fluorescence
		CI48-001	2084575 11	751005 476	Subsurface Soil	4 5	6 5	Radionuclides Metals Nitrate	Gamma Spec X-ray Fluorescence Ion Chromatography
		CI48-002	2084475 69	751007 846	Subsurface Soil	4 5	6 5	Radionuclides Metals Nitrate	Gamma Spec X-ray Fluorescence Ion Chromatography
		CJ46-DR01	2084622 9	750703 025	Subsurface Soil	7 5	7 5	Radionuclides Metals Nitrate	Gamma Spec X-ray Fluorescence Ion Chromatography
		CJ47-000	2084595 74	750942 76	Surface Soil	0 0	0 5	Radionuclides Metals	Gamma Spec 6010
		CJ47-001	2084596 83	750920 713	Surface Soil	0 0	0 5	Radionuclides	Gamma Spec

19  
 Output Report for IHSS Group 000-1, Solar Evaporation Ponds Area Concern

IHSS Group	IHSS/PAC	Location	Sampling	Norming	Media	Begin Depth (ft)	End Depth (ft)	Analyte	Method
		CJ47-002	2084592 78	750919 788	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-003	2084611 91	750860 155	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-004	2084621 43	750843 746	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-005	2084610 35	750830 035	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-006	2084631 85	750859 651	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-007	2084631 86	750828 521	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-008	2084588 91	750883 19	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-009	2084589 14	750835 759	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-010	2084589 27	750816 652	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-011	2084606 42	750859 399	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-012	2084606 58	750835 641	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-013	2084606 8	750820 456	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-014	2084594 28	750896 955	Surface Soil	0 0	0 5	Metals	6010
								Radionuclides	Gamma Spec
		CJ47-DR01	2084536 43	750776 173	Subsurface Soil	4	4	Metals	Gamma Spec
								Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography

IHSS Group	IHSS/PAC	Location	Easting	Northing	Media	Begin Depth (ft)	End Depth (ft)	Analyte	Method
		CJ47-DR02	2084590 72	750801 171	Surface Soil	0 0	0 5	Radionuclides	Gamma Spec
		CJ48-000	2084587 69	750990 666	Surface Soil	0 0	0 5	Metals Radionuclides	X-ray Fluorescence Gamma Spec
		CJ48-001	2084613 74	750989 133	Surface Soil	0 0	0 5	Metals Radionuclides	X-ray Fluorescence Gamma Spec
		CJ48-002	2084771 92	751018 367	Subsurface Soil	4 5	6 5	Metals Radionuclides	X-ray Fluorescence Gamma Spec
		CJ48-003	2084672 17	751017 481	Subsurface Soil	4 5	6 5	Nitrate Radionuclides	Ion Chromatography Gamma Spec
		CJ48-004	2084598 87	750969 479	Subsurface Soil	0 0	6 0	Radionuclides	Gamma Spec
		CM47-000	2085240 65	750924 617	Surface Soil	0 0	0 5	Nitrate	Ion Chromatography
		CM47-001	2085234 21	750889 919	Surface Soil	0 0	0 5	Nitrate	Ion Chromatography
		CM47-002	2085246 96	750888 658	Surface Soil	0 0	0 5	Nitrate	Ion Chromatography
		CM48-000	2085236 13	750960 74	Surface Soil	0 0	0 5	Nitrate	Ion Chromatography
		CM48-001	2085249 95	750960 634	Surface Soil	0 0	0 5	Nitrate	Ion Chromatography
		CM48-002	2085215 68	751075 523	Subsurface Soil	4	4	Radionuclides	Gamma Spec
		CM48-003	2085215 68	751075 523	Subsurface Soil	4	4	Metals Radionuclides	X-ray Fluorescence Gamma Spec
		CM48-004	2085215 68	751075 523	Subsurface Soil	4	4	Metals Radionuclides	X-ray Fluorescence Gamma Spec
		CM48-005	2085247 26	751024 543	Subsurface Soil	4	4	Metals Radionuclides	X-ray Fluorescence Gamma Spec

IHSS Group	IHSS/PAC	Location	Basting	Nothing	Media	Begin Depth (ft)	End Depth (ft)	Analyte	Method
		CM48-006	2085247 26	751024 543	Subsurface Soil	4	4	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
		CM48-007	2085247 26	751024 543	Subsurface Soil	4	4	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence
								Nitrate	Ion Chromatography
	PAC 900-1310	VALVE PIT #1	2084601 42	750700 944	Subsurface Soil	8	8	Radionuclides	Gamma Spec
								Metals	X-ray Fluorescence

**Table 3  
Deviations From the IASAP Addendum**

Location	Category	Subcategory	Sample ID	Depth (ft)	Parameter	Result	Comments	
Solar Evaporation Pond - Area of Concern - PAC 900-1310 - Interceptor Trench System Water Spill	CM47-000	2085231 276	750926 308	2085240 65	750924 617	0-0 5'	Radionuclides Metals Nitrate	Offset because of field conditions
	CM47-001	2085220 549	750880 337	2085234 21	750889 919	0-0 5'	Radionuclides Metals Nitrate	Offset because of field conditions
	CM47-002	2085245 067	750878 805	2085246 96	750888 658	0-0 5'	Radionuclides Metals Nitrate	Offset because of field conditions
	CM48-000	2085219 017	750972 278	2085236 13	750960 74	0-0 5'	Radionuclides Metals Nitrate	Offset because of field conditions
	CM48-001	2085243 534	750975 342	2085249 95	750960 634	0-0 5'	Radionuclides Metals Nitrate	Offset because of field conditions
	CJ47-000	2084599 952	750938 566	2084595 74	750942 76	0-0 5'	Radionuclides Metals	Offset because of field conditions
	CJ47-001	2084590 758	750887 999	2084596 83	750920 713	0-0 5'	Radionuclides Metals	Offset because of field conditions
	CJ48-000	2084587 694	750990 666	2084587 69	750990 666	0-0 5'	Radionuclides Metals	No change
	CJ48-001	2084613 743	750989 133	2084613 74	750989 133	0-0 5'	Radionuclides Metals	No change
	CJ47-003	2084612 211	750858 885	2084611 91	750860 155	0-0 5'	Radionuclides Metals	Offset because of field conditions
RCRA Unit 21	CJ47-004	2084621 405	750845 094	2084621 43	750843 746	0-0 5'	Radionuclides Metals	Offset because of field conditions
	CJ47-005	2084606 082	750831 303	2084610 35	750830 035	0-0 5'	Radionuclides Metals	Offset because of field conditions
	CJ47-006	2084632 131	750861 949	2084631 85	750859 651	0-0 5'	Radionuclides Metals	Offset because of field conditions
	CJ47-007	2084633 664	750831 303	2084631 86	750828 521	0-0 5'	Radionuclides Metals	Offset because of field conditions and to sample beneath RCRA Unit
						4-6		
RCRA Unit 48								

Site ID	Site Name	Stability Group	Site ID	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Comments
CK47-000	2084911 017	750955 422	2084278 0	750944 0	0-0 5'	4-6	Radionuclides Metals	Offset because of field conditions and to sample beneath RCRA Unit
CK47-001	2084907 952	750946 228	2084910 36	750944 8	0-0 5'	4-6	Radionuclides Metals	Offset because of field conditions and to sample beneath RCRA Unit
CK47-002	2084918 679	750946 228	2084935 7	750957 076	0-0 5'	4-6	Radionuclides Metals	Offset because of field conditions and to sample beneath RCRA Unit
CK48-000	2084903 355	750964 616	2084925 79	750960 5	0-0 5'	4-6	Radionuclides Metals	Offset because of field conditions and to sample beneath RCRA Unit
CK48-001	2084921 743	750963 084	2084910 36	750963 508	0-0 5'	4-6	Radionuclides Metals	Offset because of field conditions and to sample beneath RCRA Unit
CK45-000	2084921 401	750425 699			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CK45-001	2084913 061	750430 703			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CK45-002	2084909 725	750417 358			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CK45-003	2084931 409	750419 027			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CL45-012	2084938 081	750432 371			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CJ45-000	2084601 141	750445 715			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CJ45-001	2084614 485	750432 371			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
CJ45-002	2084631 166	750449 051			4 5'-6 5'		Radionuclides Metals	Valve Vault not found

IHSS/OP Site	Location Code	Sampling Point	Monitoring Point	Station	Monitoring Station	Depth Interval (ft)	Depth Interval (ft)	Depth Interval (ft)	Comments
OPWL Valve Vault West of Pond 207A	CJ45-003	2084624 494	750420 695			4 5'-6 5'		Nitrate	Valve Vault not found
	CJ45-004	2084601 141	750420 695			4 5'-6 5'		Radionuclides Metals Nitrate	Valve Vault not found
	CJ46-000	2084589 465	750725 942	2084597 28	750700 806	4 5'-6 5'	11	Radionuclides	Soil was analyzed for radionuclides, metals and nitrates, offset because of field conditions
	CJ46-001	2084609 481	750729 278	2084605 76	750700 423	4 5'-6 5'	11	Radionuclides Metals Nitrate	Offset because of field conditions
Potential Leaking OPWL	CJ46-002	2084599 473	750722 606	2084601 35	750704 637	4 5'-6 5'	11	Radionuclides Metals Nitrate	Offset because of field conditions
	CJ46-003	2084609 481	750714 266	2084602 4	750693 713	4 5'-6 5'	11	Radionuclides Metals Nitrate	Offset because of field conditions
	CJ46-004	2084591 133	750714 266	2084599 47	750696 964	4 5'-6 5'	11	Radionuclides Metals Nitrate	Offset because of field conditions
	CH48-000	2084272 542	751019 513	2084272 54	751019 513	4 5'-6 5'	4 5'-6 5'	Radionuclides Metals Nitrate	No change
Miscellaneous Sumps	CK48-002	2084836 332	751002 833	2084810 8	751023 8	4 5'-6 5'	4 5'-6 5'	Radionuclides Metals Nitrate	No change
	CK48-003	2084895 607	751054 361	2084917 58	751048 913	0-0 5'		Radionuclides Metals Nitrate	This interval not sampled, sampled beneath sump
	CK48-003	2084895 607	751054 361	2084917 58	751048 913	0 5'-2 5'		Radionuclides Metals Nitrate	This interval not sampled, sampled beneath sump
	CK48-003	2084895 607	751054 361	2084917 58	751048 913	2 5'-4 5'	3	Radionuclides Metals	Offset because of field conditions





27

Output Report for IHSS Group 000-1, Solar Evaporation Ponds Area

Concern

WSP#	Group	Depth	Number	Depth	Number	Depth	Number	Depth	Number	Comments
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
	CJ47-DR01		2084556 43	750776 173				4	Radionuclides Metals Nitrates	Not in SAP Addendum SE Corner Pond 207A
	CJ47-DR02		2084590 72	750801 171				0 0-0 5	Radionuclides Metals	Not in SAP Addendum sample outside Building 788
	CJ46-DR01		2084622 9	750703 025				7 5	Radionuclides Metals Nitrates	Not in SAP Addendum western side of Pond 207A
	VALVE PIT #1		2084601 42	750700 944				8	Radionuclides Metals	Not in SAP Addendum

**Table 4**  
**SEP AOC Accelerated Action Characterization Data Greater Than Background Means Plus**  
**Two Standard Deviations or Method Detection Limits**

CK48-000	6	Cadmium	20 0	0 05	1 70	1920 00	1920 00	mg/kg
CK48-001		Cadmium	530	0 06	1 70	1920 00	1920 00	mg/kg
		Lithium	41 0	0 22	34 66	38400 00	38400 00	mg/kg
CK47-002	6	Cadmium	30 0	0 05	1 70	1920 00	1920 00	mg/kg
		Lithium	38 0	0 18	34 66	38400 00	38400 00	mg/kg
CK47-000	6	Cadmium	89 0	0 05	1 70	1920 00	1920 00	mg/kg
		Copper	41 0	0 16	38 21	71100 00	71100 00	mg/kg
		Lead	48 0	0 20	24 97	1000 00	1000 00	mg/kg
		Zinc	150	0 22	139 10	576000 00	576000 00	mg/kg
CK47-001	6	Aluminum	40000	1 50	35373 17	1000000 00	1000000 00	mg/kg
		Barium	290	0 05	289 38	133000 00	133000 00	mg/kg
CH48-000	4 5 - 6 0	Barium	841	150 00	289 38	133000 00	133000 00	mg/kg
		Cadmium	2 40	85 00	1 70	1920 00	1920 00	mg/kg
		Copper	65 0	300 00	38 21	71100 00	71100 00	mg/kg
CH48-016	4 5 - 6 0	Barium	1060	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	73 0	300 00	38 21	71100 00	71100 00	mg/kg
001	4 5 - 6 0	Barium	590	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	49 0	300 00	38 21	71100 00	71100 00	mg/kg
CI48-002	4 5 - 6 0	Barium	500	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	41 0	300 00	38 21	71100 00	71100 00	mg/kg
		Vanadium	89 0	100 00	88 49	13400 00	13400 00	mg/kg
CJ46-000	11	Americium-241	26 0	4 00	0 02	209 00	38 00	pCi/g
		Arsenic	15 0	25 00	13 14	299 00	2 99	mg/kg
		Barium	739	150 00	289 38	133000 00	133000 00	mg/kg
		Cadmium	7 30	85 00	1 70	1920 00	1920 00	mg/kg
		Chromium	79 0	90 00	68 27	44300 00	4410 00	mg/kg
		Copper	81 0	300 00	38 21	71100 00	71100 00	mg/kg
		Lead	44 7	20 00	24 97	1000 00	1000 00	mg/kg
		Nickel	65 3	60 00	62 21	38400 00	38400 00	mg/kg
		Strontium	261	250 00	211 38	1000000 00	1000000 00	mg/kg
CJ46-000		Vanadium	205	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	270	300 00	139 10	576000 00	576000 00	mg/kg
CJ46-001	11	Americium-241	5 00	4 00	0 02	209 00	38 00	pCi/g
		Barium	631	150 00	289 38	133000 00	133000 00	mg/kg
		Cadmium	9 30	85 00	1 70	1920 00	1920 00	mg/kg
		Copper	64 0	300 00	38 21	71100 00	71100 00	mg/kg
		Lead	25 5	20 00	24 97	1000 00	1000 00	mg/kg
		Strontium	268	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	183	100 00	88 49	13400 00	13400 00	mg/kg

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

CJ46-002	11	Americium-241	32 0	4 00	0 02	209 00	38 00	pCi/g
		Barium	809	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	61 0	300 00	38 21	71100 00	71100 00	mg/kg
		Lead	47 2	20 00	24 97	1000 00	1000 00	mg/kg
		Strontium	230	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	145	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	260	300 00	139 10	576000 00	576000 00	mg/kg
CJ46-003	11	Arsenic	18 0	25 00	13 14	299.00	2 99	mg/kg
		Barium	842	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	79 0	300 00	38 21	71100 00	71100 00	mg/kg
		Lead	29 4	20 00	24 97	1000 00	1000 00	mg/kg
		Strontium	240	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	155	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	140	300 00	139 10	576000 00	576000 00	mg/kg
CJ46-004	11	Americium-241	5 50	4 00	0 02	209 00	38 00	pCi/g
		Barium	664	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	65 0	300 00	38 21	71100 00	71100 00	mg/kg
		Lead	29 8	20 00	24 97	1000 00	1000 00	mg/kg
		Vanadium	221	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	170	300 00	139 10	576000 00	576000 00	mg/kg
000	00-05	Arsenic	34 2	25	10 09	299 00	2 99	mg/kg
		Barium	669	150	141 26	133000 00	133000 00	mg/kg
		Chromium	26 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	47 0	300	18 06	71100 00	71100 00	mg/kg
		Strontium	467	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	112	100	45 59	13400 00	13400 00	mg/kg
CJ47-001	00-05	Arsenic	33.5	25	10 09	299 00	2 99	mg/kg
		Barium	669	150	141 26	133000 00	133000 00	mg/kg
		Copper	91 0	300	18 06	71100 00	71100 00	mg/kg
		Strontium	429	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	80 0	100	45 59	13400 00	13400 00	mg/kg
CJ47-002	00-05	Arsenic	30.5	25	10 09	299.00	2.99	mg/kg
		Barium	657	150	141 26	133000 00	133000 00	mg/kg
		Chromium	23 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	35 0	300	18 06	71100 00	71100 00	mg/kg
		Strontium	430	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	88 0	100	45 59	13400 00	13400 00	mg/kg
CJ47-003	00-05	Aluminum	17000	11	16902	1000000 00	1000000 00	mg/kg
		Chromium	17 0	0 54	16 99	44300 00	4410 00	mg/kg
		Lithium	15 0	5 4	11 55	38400 00	38400 00	mg/kg
CJ47-005	00-05	Aluminum	20000	10	16902	1000000 00	1000000 00	mg/kg
		Beryllium	1.10	0 52	0 966	104 00	1 04	mg/kg
		Chromium	19 0	0 52	16 99	44300 00	4410 00	mg/kg

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Location	Depth	Element	Result	Re-De- Limit	Result	Re-De- Limit	Unit	
CJ47-006	0 0 - 0 5	Lithium	17 0	5 2	11 55	38400 00	38400 00	mg/kg
		Nickel	15 0	4 2	14 91	38400 00	38400 00	mg/kg
		Cadmium	4 80	0 52	1 612	1920 00	1920 00	mg/kg
		Chromium	20 0	0 52	16 99	44300 00	4410 00	mg/kg
		Lithium	12 0	5 2	11 55	38400 00	38400 00	mg/kg
		Strontium	54 0	1	48 94	1000000 00	1000000 00	mg/kg
CJ47-007	0 0 - 0 5	Barium	250	1	141 26	133000 00	133000 00	mg/kg
		Lithium	14 0	5 2	11 55	38400 00	38400 00	mg/kg
		Zinc	80 0	2 1	73 76	576000 00	576000 00	mg/kg
CJ47-009	0 0 - 0 5	Americium-241	13 0	4	0 0227	215 00	38 00	pCi/g
CJ47-010	0 0 - 0 5	Americium-241	10 0	4	0 0227	215 00	38 00	pCi/g
CJ47-011	0 0 - 0 5	Americium-241	16 0	4	0 0227	215 00	38 00	pCi/g
CJ47-014	0 0 - 0 5	Barium	640	150	141 26	133000 00	133000 00	mg/kg
		Cadmium	5 70	85	1 612	1920 00	1920 00	mg/kg
		Chromium	158	90	16 99	44300 00	4410 00	mg/kg
		Lead	56 9	20	54 62	1000 00	1000 00	mg/kg
		Manganese	574	200	365 08	83600 00	83600 00	mg/kg
		Strontium	255	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	141	100	45 59	13400 00	13400 00	mg/kg
CJ48-000	0 0 - 0 5	Arsenic	36.3	25	10 09	299 00	2 99	mg/kg
		Barium	624	150	141 26	133000 00	133000 00	mg/kg
		Chromium	17 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	45 0	300	18 06	71100 00	71100 00	mg/kg
		Strontium	428	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	83 0	100	45 59	13400 00	13400 00	mg/kg
CJ48-001	0 0 - 0 5	Arsenic	31 1	25	10 09	299 00	2.99	mg/kg
		Barium	669	150	141 26	133000 00	133000 00	mg/kg
		Chromium	23 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	55 0	300	18 06	71100 00	71100 00	mg/kg
		Strontium	430	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	98 0	100	45 59	13400 00	13400 00	mg/kg
CJ48-002	4 5 - 6 5	Barium	611	150 00	289 38	133000 00	133000 00	mg/kg
CJ48-003	4 5 - 6 5	Barium	639	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	67 0	300 00	38 21	71100 00	71100 00	mg/kg
		Strontium	343	250 00	211 38	1000000 00	1000000 00	mg/kg
CK48-002	4 5 - 6 5	Barium	537	150 00	289 38	133000 00	133000 00	mg/kg
		Copper	48 0	300 00	38 21	71100 00	71100 00	mg/kg
		Vanadium	95 0	100 00	88 49	13400 00	13400 00	mg/kg
CK48-003	3	Arsenic	15 1	25 00	13 14	299 00	2 99	mg/kg
		Barium	909	150 00	289 38	133000 00	133000 00	mg/kg
		Cadmium	267	85 00	1 70	1920 00	1920 00	mg/kg
		Chromium	86 2	90 00	68 27	44300 00	4410 00	mg/kg
		Copper	120	300 00	38 21	71100 00	71100 00	mg/kg

32

Closeout Report for IHSS Group 000-1 Solar Evaporation Ponds Area of Concern

								Unit
		Iron	49100	2500 00	41046 52	576000 00	576000 00	mg/kg
		Lead	35 4	20 00	24 97	1000 00	1000 00	mg/kg
		Manganese	5900	200 00	901 62	83600 00	83600 00	mg/kg
		Nickel	253	60 00	62 21	38400 00	38400 00	mg/kg
		Strontium	248	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	223	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	223	300 00	139 10	576000 00	576000 00	mg/kg
CK48-004	3	Arsenic	22 4	25 00	13 14	299 00	2 99	mg/kg
		Barium	969	150 00	289 38	133000 00	133000 00	mg/kg
		Cadmium	75 9	85 00	1 70	1920 00	1920 00	mg/kg
		Copper	104	300 00	38 21	71100 00	71100 00	mg/kg
		Iron	181000	2500 00	41046 52	576000 00	576000 00	mg/kg
		Manganese	1070	200 00	901 62	83600 00	83600 00	mg/kg
		Nickel	215	60 00	62 21	38400 00	38400 00	mg/kg
		Strontium	222	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	240	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	149	300 00	139 10	576000 00	576000 00	mg/kg
CK48-005	3	Barium	853	150 00	289 38	133000 00	133000 00	mg/kg
		Cadmium	97 3	85 00	1 70	1920 00	1920 00	mg/kg
		Copper	77 9	300 00	38 21	71100 00	71100 00	mg/kg
		Iron	44900	2500 00	41046 52	576000 00	576000 00	mg/kg
		Lead	36 8	20 00	24 97	1000 00	1000 00	mg/kg
		Manganese	1510	200 00	901 62	83600 00	83600 00	mg/kg
		Nickel	114	60 00	62 21	38400 00	38400 00	mg/kg
		Strontium	219	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	233	100 00	88 49	13400 00	13400 00	mg/kg
		Zinc	141	300 00	139 10	576000 00	576000 00	mg/kg
CM47-000	00-05	Arsenic	17 0	25	10 09	299 00	2 99	mg/kg
		Barium	665	150	141 26	133000 00	133000 00	mg/kg
		Cadmium	12 0	85	1 612	1920 00	1920 00	mg/kg
		Chromium	83 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	47 0	300	18 06	71100 00	71100 00	mg/kg
		Iron	41900	2500	18037	576000 00	576000 00	mg/kg
		Manganese	460	200	365 08	83600 00	83600 00	mg/kg
		Nickel	64 9	60	14 91	38400 00	38400 00	mg/kg
		Strontium	240	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	115	100	45 59	13400 00	13400 00	mg/kg
		Zinc	120	300	73 76	576000 00	576000 00	mg/kg
CM47-001	00-0	Barium	567	150	141 26	133000 00	133000 00	mg/kg
		Cadmium	5 30	85	1 612	1920 00	1920 00	mg/kg
		Chromium	51 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	42 0	300	18 06	71100 00	71100 00	mg/kg
		Iron	31400	2500	18037	576000 00	576000 00	mg/kg

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Location	Depth	Element	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Unit
CM47-002	0 0 - 0	Nickel	46 0	60	14 91	38400 00	38400 00	mg/kg
		Strontium	481	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	54 0	100	45 59	13400 00	13400 00	mg/kg
		Arsenic	15 0	25	10 09	299 00	2 99	mg/kg
		Barium	733	150	141 26	133000 00	133000 00	mg/kg
		Cadmium	5 00	85	1 612	1920 00	1920 00	mg/kg
		Chromium	59 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	87 0	300	18 06	71100 00	71100 00	mg/kg
		Iron	35600	2500	18037	576000 00	576000 00	mg/kg
		Manganese	392	200	365 08	83600 00	83600 00	mg/kg
		Nickel	51 0	60	14 91	38400 00	38400 00	mg/kg
		Strontium	350	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	102	100	45 59	13400 00	13400 00	mg/kg
		Zinc	110	300	73 76	576000 00	576000 00	mg/kg
CM48-000	0 0 - 0	Barium	613	150	141 26	133000 00	133000 00	mg/kg
		Cadmium	4 90	85	1 612	1920 00	1920 00	mg/kg
		Chromium	56 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	35 0	300	18 06	71100 00	71100 00	mg/kg
		Iron	37500	2500	18037	576000 00	576000 00	mg/kg
		Manganese	368	200	365 08	83600 00	83600 00	mg/kg
		Nickel	46 0	60	14 91	38400 00	38400 00	mg/kg
		Strontium	288	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	75 0	100	45 59	13400 00	13400 00	mg/kg
CM48-001	0 0 - 0	Arsenic	13 0	25	10 09	299 00	2 99	mg/kg
		Barium	611	150	141 26	133000 00	133000 00	mg/kg
		Cadmium	23 0	85	1 612	1920 00	1920 00	mg/kg
		Chromium	51 0	90	16 99	44300 00	4410 00	mg/kg
		Copper	52 0	300	18 06	71100 00	71100 00	mg/kg
		Iron	37500	2500	18037	576000 00	576000 00	mg/kg
		Manganese	502	200	365 08	83600 00	83600 00	mg/kg
		Nickel	55 0	60	14 91	38400 00	38400 00	mg/kg
		Strontium	220	250	48 94	1000000 00	1000000 00	mg/kg
		Vanadium	115	100	45 59	13400 00	13400 00	mg/kg
		Zinc	110	300	73 76	576000 00	576000 00	mg/kg
Valve Pit #1	8	Arsenic	16 0	25 00	13 14	299 00	2 99	mg/kg
		Barium	798	150 00	289 38	133000 00	133000 00	mg/kg
		Chromium	104	90 00	68 27	44300 00	4410 00	mg/kg
		Copper	71 0	300 00	38 21	71100 00	71100 00	mg/kg
		Iron	58100	2500 00	41046 52	576000 00	576000 00	mg/kg
		Manganese	1410	200 00	901 62	83600 00	83600 00	mg/kg
		Nickel	72 9	60 00	62 21	38400 00	38400 00	mg/kg
		Strontium	230	250 00	211 38	1000000 00	1000000 00	mg/kg
		Vanadium	121	100 00	88 49	13400 00	13400 00	mg/kg

34

Closeout Report for IHSS Group 000-1 Solar Evaporation Ponds Area of Concern

Location Code	Depth Interval (ft)	Element	Result	Reporting Limit	Result	Reporting Limit	Unit	
CJ46-DR01	7.5 - 7.5	<b>Arsenic</b>	<b>30.9</b>	<b>25.00</b>	<b>13.14</b>	<b>299.00</b>	<b>2.99</b>	mg/kg
		Barium	893	150.00	289.38	133000.00	133000.00	mg/kg
		Cadmium	4.67	85.00	1.70	1920.00	1920.00	mg/kg
		Chromium	69.8	90.00	68.27	44300.00	4410.00	mg/kg
		Copper	54.4	300.00	38.21	71100.00	71100.00	mg/kg
		Iron	58000	2500.00	41046.52	576000.00	576000.00	mg/kg
		Nickel	105	60.00	62.21	38400.00	38400.00	mg/kg
		Vanadium	267	100.00	88.49	13400.00	13400.00	mg/kg
		Zinc	188	300.00	139.10	576000.00	576000.00	mg/kg
CJ47-DR01	4 - 4	<b>Arsenic</b>	<b>24.2</b>	<b>25.00</b>	<b>13.14</b>	<b>299.00</b>	<b>2.99</b>	mg/kg
		Barium	666	150.00	289.38	133000.00	133000.00	mg/kg
		Copper	44.2	300.00	38.21	71100.00	71100.00	mg/kg
		Iron	41900	2500.00	41046.52	576000.00	576000.00	mg/kg
		Vanadium	204	100.00	88.49	13400.00	13400.00	mg/kg
CJ47-DR02	0.0 - 0.5	<b>Arsenic</b>	<b>20.4</b>	<b>25</b>	<b>10.09</b>	<b>299.00</b>	<b>2.99</b>	mg/kg
		Barium	686	150	141.26	133000.00	133000.00	mg/kg
		Chromium	36.0	90	16.99	44300.00	4410.00	mg/kg
		Copper	42.0	300	18.06	71100.00	71100.00	mg/kg
		Nickel	18.4	60	14.91	38400.00	38400.00	mg/kg
		Strontium	347	250	48.94	1000000.00	1000000.00	mg/kg
		Vanadium	100	100	45.59	13400.00	13400.00	mg/kg
CJ49-DR01	4 - 4	Barium	1100	150.00	289.38	133000.00	133000.00	mg/kg
		Vanadium	128	100.00	88.49	13400.00	13400.00	mg/kg
CK47-DR01	1 - 1	Barium	475	150.00	289.38	133000.00	133000.00	mg/kg
		Strontium	219	250.00	211.38	1000000.00	1000000.00	mg/kg

Note Bold analyte indicates result exceeded RCRA Tier II AL

Table 5  
RFCA Tier II Exceedances

Location	Analyte	Result	Detection Limit	Background	Tier I HAL	Tier II HAL	Unit
CJ46-000	Arsenic	15	25	13 14	299	2 99	mg/kg
CJ46-003	Arsenic	18	25	13 14	299	2 99	mg/kg
CJ46-DR01	Arsenic	30 9	25	13 14	299	2 99	mg/kg
CJ47-000	Arsenic	34 2	25	13 14	299	2 99	mg/kg
CJ47-001	Arsenic	33 5	25	13 14	299	2 99	mg/kg
CJ47-002	Arsenic	30 5	25	13 14	299	2 99	mg/kg
CJ47-005	Beryllium	1 10	0 52	0 966	104	1 04	mg/kg
CJ47-DR01	Arsenic	24 2	25	13 14	299	2 99	mg/kg
CJ47-DR02	Arsenic	20 49	25	13 14	299	2 99	mg/kg
CJ48-000	Arsenic	36 3	25	13 14	299	2 99	mg/kg
CJ48-001	Arsenic	31 1	25	13 14	299	2 99	mg/kg
CK48-003	Arsenic	15 1	25	13 14	299	2 99	mg/kg
CK48-004	Arsenic	22 4	25	13 14	299	2 99	mg/kg
CM47-000	Arsenic	17	25	13 14	299	2 99	mg/kg
CM47-002	Arsenic	15	25	13 14	299	2 99	mg/kg
CM48-001	Arsenic	13	25	13 14	299	2 99	mg/kg
Valve Pit #1	Arsenic	16	25	13 14	299	2 99	mg/kg

**Table 6**  
**RFCA Sum of Ratios for SEP AOC Surface Soil**

NON RAD	CJ48-000	2084587 694	750990 666	0 13	12 16
NON RAD	CJ47-000	2084595 74	750942 76	0 13	11 46
NON RAD	CJ47-001	2084596 833	750920 713	0 12	11 22
NON RAD	CJ48-001	2084613 743	750989 133	0 12	10 42
NON RAD	CJ47-002	2084592 78	750919 788	0 11	10 22
NON RAD	CM47-000	2085240 646	750924 617	0 16	5 81
NON RAD	CM47-002	2085246 958	750888 658	0 14	5 12
NON RAD	CM48-001	2085249 954	750960 634	0 14	4 46
NON RAD	CJ47-005	2084610 347	750830 035	0 03	1 08
NON RAD	CJ47-014	2084594 283	750896 955	0 09	0 12
NON RAD	CM48-000	2085236 129	750960 74	0 09	0 10
NON RAD	CM47-001	2085234 206	750889 919	0 07	0 08
NON RAD	CJ47-003	2084611 914	750860 155	0 02	0 02
NON RAD	CJ47-006	2084631 854	750859 651	0 00	0 01
NON RAD	CJ47-007	2084631 861	750828 521	0 00	0 00
NON RAD	CJ47-004	2084621 427	750843 746	NA	NA
RAD	CJ47-011	2084606 422	750859 399	0 07	0 42
RAD	CJ47-009	2084589 139	750835 759	0 06	0 34
RAD	CJ47-010	2084589 27	750816 652	0 05	0 26

N/A - Not applicable Contaminants may be present but at concentrations below backgroundmean plus two standard deviations or RL.

**Table 7**  
**RFCA Sum of Ratios for SEP AOC Subsurface Soil**

SQR	Location	2084925 791	750960 476	6 - 6	0 01	0 01
NON RAD	308A NE	2084925 791	750960 476	6 - 6	0 01	0 01
NON RAD	308A NW	2084910 361	750963 508	6 - 6	0 28	0 28
NON RAD	308A OPWL	2084935 696	750957 076	6 - 6	0 02	0 02
NON RAD	308A SE	2084927 803	750943 958	6 - 6	0 10	0 10
NON RAD	308A SW	2084910 357	750944 838	6 - 6	0 04	0 04
NON RAD	CH48-000	2084272 542	751019 513	4 5 - 6 5	0 01	0 01
NON RAD	CH48-016	2084373 825	751011 291	4 5 - 6 5	0 01	0 01
NON RAD	CI48-001	2084575 112	751005 476	4 5 - 6 5	0 01	0 01
NON RAD	CI48-002	2084475 687	751007 846	4 5 - 6 5	0 01	0 01
NON RAD	CJ46-000	2084597 275	750700 806	11 - 11	0 12	5 11
NON RAD	CJ46-001	2084605 759	750700 423	11 - 11	0 05	0 05
NON RAD	CJ46-002	2084601 353	750704 637	11 - 11	0 07	0 07
NON RAD	CJ46-003	2084602 402	750693 713	11 - 11	0 11	6 07
NON RAD	CJ46-004	2084599 472	750696 964	11 - 11	0 05	0 05
NON RAD	CJ48-002	2084771 922	751018 367	4 5 - 6 5	0 00	0 00
NON RAD	CJ48-003	2084672 168	751017 481	4 5 - 6 5	0 01	0 01
NON RAD	CK48-002	2084810 77	751023 837	4 5 - 6 5	0 01	0 01
NON RAD	CK48-003	2084917 579	751048 913	3 - 3	0 42	5 43
NON RAD	CK48-004	2084917 579	751048 913	3 - 3	0 47	7 89
NON RAD	CK48-005	2084917 579	751048 913	3 - 3	0 21	0 21
NON RAD	VALVE PIT #1	2084601 421	750700 944	8 - 8	0 19	5 51
RAD	CJ46-000	2084597 275	750700 806	11 - 11	0 12	0 68
RAD	CJ46-001	2084605 759	750700 423	11 - 11	0 02	0 13
RAD	CJ46-002	2084601 353	750704 637	11 - 11	0 15	0 84
RAD	CJ46-004	2084599 472	750696 964	11 - 11	0 03	0 14

38

### 3.0 ACCELERATED ACTION

Accelerated action objectives were developed and described in ER RSOP Notification #02-08 (DOE 2002c) ER RSOP remedial action objectives included the following

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

The accelerated action remediation goals for the IHSS Group 000-1 SEP AOC included the following

- Conduct actions consistent with the proposed future Site use as a wildlife refuge,
- Remove the RCRA Units 21 and 48 concrete slabs and dispose of off site,
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs associated with RCRA Units 21 and 48,
- Remove the OPWL (IHSS 121) valve pits and associated soil with contaminant concentrations greater than RFCA Tier I ALs,
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs at PAC 900-1310,
- Remove soil hot spots as agreed to through the consultative process,
- Remove OPWL (IHSS 121) at the edges of the SEP berms and disrupt potential pathways,
- Disrupt the MST return line,
- Disrupt the leak detection drains associated with Ponds 207B and 207C,
- Remove the collection sumps, and
- Remove the section of above-ground pipeline running from Building 910 to Building 774, a portion of RCRA Unit 374 3 (from Box 5 at Building 910 to the Building 779 fence)

All accelerated action remediation goals were met Activities were conducted between August 6 and November 20, 2002 Start and end dates of significant activities are listed in Table 8 Key components removed are shown on Figure 10, as well as those not found after a reasonable search Photographs of site activities are provided in Appendix A Related agency correspondence is presented in Appendix B

**Table 8**  
**Dates of Accelerated Action Activities**

Activity	Start Date	End Date	Duration
Characterization Sampling	August 8, 2002	October 18, 2002	73 Days
Removal of Concrete Slabs	August 6, 2002	October 18, 2002	75 Days
Removal of Waste Lines and Valve Pits	August 7, 2002	November 20, 2002	70 Days
Removal of Drains and Collection Sumps	August 15, 2002	September 23, 2002	40 Days
Removal of Contaminated Soil	October 4, 2002	October 18, 2002	15 Days

### 3.1 RCRA Slabs and Other Concrete Items

The concrete slabs associated with RCRA Units 21 and 48 (i.e., the slabs for B788 and 788A, the Clarifier, B308A, and ancillary equipment) were removed and disposed of as low-level mixed waste (LLMW). Associated foundation footings and grade beams were removed and disposed of as low-level waste (LLW). The Class 6 roadbase, which was used to keep the slabs stable, was removed and used as backfill within the IHSS Group. During removal of the Building 788 slab, another slab under Building 788A was encountered and removed. It was approximately 12' x 12', and served as the building foundation of a small shed where a transfer line pump was stationed. This slab was disposed of as LLMW. In addition, several miscellaneous concrete items were removed and disposed of as LLW, including

- Ramps and heater pads between Ponds 207A and 207B,
- The slab and retaining wall for the concrete mixer, which was located near the northeastern corner of Pond 207C, and
- Concrete pipe supports and power poles

The silo foundation pad and dry bulk storage facility, located near the site of the concrete mixer, were removed and placed on the Building 980 concrete rubble pile to be recycled.

Slabs were cut into sections using saws, and the water and slurry from saw cutting were collected using a high-efficiency particulate absorption (HEPA) vacuum. LLMW concrete was placed in lined intermodal containers. LLW concrete was placed in lined cargo containers, and foam was added to provide load stability. The water and slurry were sampled, placed into a large polyvinyl tank, and treated off site at the Alternative Waste Treatment System.

### 3.2 Waste Lines and Valve Pits

Various sections of waste lines were tapped, drained, and then removed, including sections of the OPWL (IHSS 121) less than three feet below the surface, all sections of the OPWL within the berms, and the above-ground pipeline from Building 910 to Building 374. For example, Line P-26 (IHSS 149 1/149 2) was removed across the northern side of Pond 207A (i.e., from the discharge point in the pond back to the west border of the pond). Two small sections of the reverse osmosis line were removed. The above-ground line was part of RCRA Unit 374 3 (the NPWL), and over 1,200 linear feet were removed, from Box 5 at

44

Building 910 to the southern side of Building 774. The remaining end of the line was capped. The MST return line was disrupted (i.e., cut at one location and filled with grout). In addition, two other lines were encountered when excavating on the eastern side of Pond 207B North. One is most likely the return line from the ITS Pumphouse, which pumped water back to Pond 207B North. These lines were disrupted, the valve assemblies were removed, and both ends of the lines were grouted. The section going to the pond was removed. Details on line portions removed and remaining are provided in Table 9.

**Table 9**  
**Details on Removed and Remaining Pipeline Portions**

Pipeline	Length Removed (ft)	Removal Depth (ft)	Length of Remaining Portion within AOC (ft)	Extent of Grouting (ft)	Depth of Remaining Portion	Construction Material of Remaining Portion
P-26	270	4 - 5	320	1	4 - 5	Polyethylene
P-36/P-37/38	<10	6 - 7	280	1	6 - 7	Carbon Steel
Various Small OPWL segments	<100	Various	200	1	Various	Various
Aboveground NPWL	1450	NA	0	1	NA	NA
MST Return Line	<50	5 - 6	900	1	5 - 6	HDPE
ITS Return Line	<50	5 - 6	780	1	5 - 6	PVC
Leak Detection Line (Pond 207C)	30	>3	500	1	>3	PVC
Leak Detection Line (Between Pond 207A & Pond 207B)	50	>3	580	1	>3	Clay Tile

Valve Pit #1 (southeast of Pond 207C) was removed, and lines associated with the pit were either removed or filled with grout. The two valve pits in the Pond 207B berms were not removed, because they are located more than six feet below grade. However, the valve stems and casings were removed. Other valve pits were not located, after considerable searching.

Removed line sections were filled with grout or foam. These sections and valve components were placed in IP-2 or ST-90 containers and disposed of as LLMW. The valve pit was placed in an intermodal container and disposed of as LLMW. Remaining sections of lines, including the equalizer lines between the B series ponds, were also grouted or foamed. The location of each remaining pipe end was recorded, and the inside of each end was measured for radioactivity. Data were placed in the Project File/Administrative Record. Water encountered in the lines (e.g., OPWL and the aboveground line) was sampled and placed into a large polyvinyl tank and treated off site at the Alternative Waste Treatment System. Details of line removals and disruptions, including drawings and photographs, are provided in the Project File/Administrative Record.

46

### 3.3 Drains, Sumps and Lysimeters

The Pond 207A, 207B and 207C drain/leak detection lines were disrupted where they discharged to a sump and were filled with grout or foam (refer to Table 9) The discharge ends of the 207B and 207A lines were removed Five associated sumps were removed, as well as the submersible pumps contained in each sump Numerous lysimeters in the area also were removed

Sumps, associated sediment, pumps, valve assemblies, and the removed line section were placed in IP-2 or ST-90 containers and disposed of as LLMW Water encountered in the sumps was sampled and placed in a large polyvinyl tank and will be treated offsite at the Alternative Waste Treatment System Lysimeters were placed in intermodal containers and disposed of as LLMW Excavations were backfilled with the excavated soil

### 3.4 Contaminated Soil and Asphalt

Soils associated with the six risk reduction areas (i.e., hot spots, refer to Figure 3) were removed An area approximately 1 square meter was excavated down to 0.5 foot from each of the areas At one location (43793), a lysimeter was found to be contaminated, and therefore, additional soil was removed (an area approximately 5 meters by 5 meters was excavated down 1 foot) Sampling was conducted to determine the extent of contamination and required remediation, and to confirm that residual contaminant concentrations were below the RFCA Tier II ALs (refer to Section 4.0) The excavated soil was placed in ST-90 containers and disposed of as LLMW

Asphalt in the area was removed The asphalt from the road entrance west of Pond 207A was disposed of as sanitary waste, and the asphalt close to the Building 788 pad was disposed of as LLW (placed in lined cargo containers for off-site shipment)

## 4.0 HOT SPOT REMOVAL AND CONFIRMATION SAMPLING

Based on the results of the risk assessment presented in the SEP PAM (DOE 2002d), six surface soil locations were identified for soil removal (refer to Section 2.0 and Figure 3) During removal, sampling was conducted to determine the extent of removal required In-process sampling results (those above background mean plus two standard deviations or detection limits) are presented in Table 10 Confirmation sampling was then conducted in the excavations where the six hot spot soils were removed to confirm that sufficient soil had been removed (i.e., that residual contaminant concentrations were below RFCA Tier II ALs) Confirmation samples were analyzed in conformance with the IASAP (e.g., alpha spectroscopy was used to analyze for radionuclides) The results (i.e., those above background mean plus two standard deviations or detection limits) are presented in Table 11 and on Figure 11 All contaminant concentrations were below RFCA Tier II ALs, except for one beryllium concentration, which was slightly above the RFCA Tier II AL (1.10 mg/kg vs 1.04 mg/kg at Location CJ45-005) Results are also compared to the proposed RFCA WRW and Ecological Receptor ALs in Appendix C None of the results exceeded those proposed ALs Additional information on residual contamination is presented in Section 8.1

## **5.0 RCRA UNIT CLOSURE**

The accelerated action involved RCRA Units 21, 48 and 374 3 RCRA Units 21 and 48 had been partially closed prior to the accelerated action (DOE 2002c) Removal of the remaining concrete slabs associated with Building 788, the Clarifier, and the pump transfer station at Building 308A under this accelerated action constitutes final closure of the two RCRA units The slabs included the 12' x 12' slab under the Building 788A slab where a transfer pump was stationed (refer to Section 3 0) All slabs were disposed of as LLMW (refer to Section 3 0) RCRA Unit 374 3 consists of the NPWL, and removal of the aboveground line section from Building 910 to Building 774 constitutes partial closure of the RCRA unit (refer to Section 3 0) The SEPs also were interim status units, and their closure is addressed in the SEP PAM (DOE 2002d)

The sampling locations associated with RCRA Unit 21 are located between Pond 207C and Pond 207A, and those associated with RCRA Unit 48 are located between Pond 207A and 207B (North), refer to Table 3 and Figure 4 Sampling results at these locations indicate that all contaminant concentrations were below RFCA Tier II, WRW and Ecological Receptor ALs, except for arsenic concentrations Arsenic concentrations at CJ47-000, CJ47-001, CJ47-002, CJ47-DR01 and CJ47-DR02 exceeded the Tier II AL, and arsenic concentrations at CJ47-000, CJ47-001, CJ47-002 and CJ47-DR01 exceeded the WRW AL Concentrations, however, are within the background range observed at RFETS (refer to ER Regulatory Contact Record dated December 17, 2002, included in Appendix B)

48

Table 10  
Hot Spot Removal In-Process Sampling Data

Sample ID	Sample No.	Depth	Element	Concentration	Unit				
CJ45-005	2084610 024	750543 097	Americium-241	17 00	4 00	0 02	209 00	38 00	pCi/g
			Cadmium	7 70	0 55	1 70	1920 00	1920 00	mg/kg
CJ45-006	2084610 024	750543 097	Americium-241	15 00	4 00	0 02	209 00	38 00	pCi/g
			Cadmium	7 30	0 56	1 70	1920 00	1920 00	mg/kg
CJ45-007	2084610 024	750543 097	Copper	62 00	2 10	38 21	71100 00	71100 00	mg/kg
CJ45-009	2084610 024	750543 097	Cadmium	1 80	0 53	1 70	1920 00	1920 00	mg/kg
CJ46-DR03	2084610 015	750678 013	Copper	56 00	2 2	18 06	71100 00	71100 00	mg/kg
			Iron	22000 00	11	18037	576000 00	576000 00	mg/kg
			Manganese	490 00	1 1	365 08	83600 00	83600 00	mg/kg
			Selenium	1 40	1 4	1 224	9610 00	9610 00	mg/kg
			Zinc	170 00	2 2	73 76	576000 00	576000 00	mg/kg
			Copper	29 00	2 2	18 06	71100 00	71100 00	mg/kg
CJ46-DR04	2084610 015	750678 013	Copper	19 00	2 1	18 06	71100 00	71100 00	mg/kg
			Copper	77 00	2 1	18 06	71100 00	71100 00	mg/kg
CJ46-DR05	2084610 015	750678 013	Iron	26000 00	11	18037	576000 00	576000 00	mg/kg
			Lithium	12 00	5 4	11 55	38400 00	38400 00	mg/kg
			Manganese	610 00	1 1	365 08	83600 00	83600 00	mg/kg
			Zinc	74 00	2 1	73 76	576000 00	576000 00	mg/kg
			Americium-241	5 90	4 00	0 02	209 00	38 00	pCi/g
			Cadmium	140 00	0 55	1 70	1920 00	1920 00	mg/kg
CK46-000	2084908 05	750687 859	Americium-241	16 00	4 00	0 02	209 00	38 00	pCi/g
			Cadmium	43 00	0 53	1 70	1920 00	1920 00	mg/kg
CK46-001	2084908 05	750687 859	Americium-241	8 90	4 00	0 02	209 00	38 00	pCi/g
			Cadmium	24 00	0 53	1 70	1920 00	1920 00	mg/kg
CK46-002	2084908 05	750687 859	Copper	41 00	2 10	38 21	71100 00	71100 00	mg/kg
			Americium-241	14 00	4 00	0 02	209 00	38 00	pCi/g
CK46-003	2084908 05	750687 859	Americium-241	14 00	4 00	0 02	209 00	38 00	pCi/g



Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Sample ID	Sample No.	Element	Concentration	Unit		
CK46-DR01	2084908	Cadmium	19 00	mg/kg		
		Cadmium	11 00	mg/kg		
		Cadmium	3 80	mg/kg		
		Cadmium	10 00	mg/kg		
		Cadmium	12 00	mg/kg		
		Cadmium	4 20	mg/kg		
		Americium-241	6 60	pCi/g		
		Cadmium	15 00	mg/kg		
		Cadmium	3 70	mg/kg		
		Cadmium	23 00	mg/kg		
		Chromium	20 00	mg/kg		
		Copper	41 00	mg/kg		
		Lithium	19 00	mg/kg		
		Mercury	0 31	mg/kg		
		Nickel	20 00	mg/kg		
		Cadmium	25 00	mg/kg		
		Chromium	21 00	mg/kg		
		CK46-DR02	2084889 935	Cadmium	19 00	mg/kg
Cadmium	26 00			mg/kg		
Chromium	27 00			mg/kg		
Copper	60 00			mg/kg		
Lithium	18 00			mg/kg		
Mercury	0 36			mg/kg		
Nickel	19 00			mg/kg		
Aluminum	21000 00			mg/kg		
Cadmium	20 00			mg/kg		
Chromium	26 00			mg/kg		
CK46-DR03	2084889 935			Cadmium	19 00	mg/kg
				Cadmium	11 00	mg/kg
				Cadmium	3 80	mg/kg
				Cadmium	10 00	mg/kg
				Cadmium	12 00	mg/kg
				Cadmium	4 20	mg/kg
				Americium-241	6 60	pCi/g
				Cadmium	15 00	mg/kg
		Cadmium	3 70	mg/kg		
		Cadmium	23 00	mg/kg		
		Chromium	20 00	mg/kg		
		Copper	41 00	mg/kg		
		Lithium	19 00	mg/kg		
		Mercury	0 31	mg/kg		
		Nickel	20 00	mg/kg		
		CK46-DR04	2084889 935	Cadmium	19 00	mg/kg
				Cadmium	11 00	mg/kg
				Cadmium	3 80	mg/kg
Cadmium	10 00			mg/kg		
Cadmium	12 00			mg/kg		
Cadmium	4 20			mg/kg		
Americium-241	6 60			pCi/g		
Cadmium	15 00			mg/kg		
Cadmium	3 70			mg/kg		
Cadmium	23 00			mg/kg		
Chromium	20 00			mg/kg		
Copper	41 00			mg/kg		
Lithium	19 00			mg/kg		
Mercury	0 31			mg/kg		
Nickel	20 00			mg/kg		



Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Sample ID	Element	Concentration (mg/kg)	Concentration (pCi/g)							
CK46-DR09	Chromium	26 00	0 57	16 99	44300 00	4410 00	mg/kg			
	Copper	26 00	2 3	18 06	71100 00	71100 00	mg/kg			
	Lithium	17 00	5 7	11 55	38400 00	38400 00	mg/kg			
	Nickel	19 00	4 6	14 91	38400 00	38400 00	mg/kg			
	Aluminum	22000 00	12	16902	1000000 00	1000000 00	mg/kg			
	Americium-241	41 00	4	0 0227	215 00	38 00	pCi/g			
	Barium	160 00	1 2	141 26	133000 00	133000 00	mg/kg			
	Beryllium	3 90	0 58	0 966	104 00	1 04	mg/kg			
	Cadmium	37 00	0 58	1 612	1920 00	1920 00	mg/kg			
	Chromium	47 00	0 58	16 99	44300 00	4410 00	mg/kg			
	Copper	37 00	2 3	18 06	71100 00	71100 00	mg/kg			
	Lithium	23 00	5 8	11 55	38400 00	38400 00	mg/kg			
	Nickel	28 00	4 6	14 91	38400 00	38400 00	mg/kg			
CK46-DR10	Strontium	85 00	1 2	48 94	1000000 00	1000000 00	mg/kg			
	Zinc	1900 00	2 3	73 76	576000 00	576000 00	mg/kg			
	Americium-241	12 00	4	0 0227	215 00	38 00	pCi/g			
	Cadmium	23 00	0 53	1 612	1920 00	1920 00	mg/kg			
	Chromium	46 00	0 53	16 99	44300 00	4410 00	mg/kg			
	Copper	37 00	2 1	18 06	71100 00	71100 00	mg/kg			
	Lithium	17 00	5 3	11 55	38400 00	38400 00	mg/kg			
	Nickel	18 00	4 2	14 91	38400 00	38400 00	mg/kg			
	Americium-241	5 80	4	0 0227	215 00	38 00	pCi/g			
	Cadmium	5 00	0 56	1 612	1920 00	1920 00	mg/kg			
	Chromium	22 00	0 54	16 99	44300 00	4410 00	mg/kg			
	Lithium	18 00	5 4	11 55	38400 00	38400 00	mg/kg			
	CK48-DR02	Barium	170 00	1 1	141 26	133000 00	133000 00	mg/kg		
Cadmium		2 10	0 54	1 612	1920 00	1920 00	mg/kg			
Chromium		19 00	0 54	16 99	44300 00	4410 00	mg/kg			
Iron		23000 00	1 1	18037	576000 00	576000 00	mg/kg			
CK48-DR03		Chromium	26 00	0 57	16 99	44300 00	4410 00	mg/kg		
		Copper	26 00	2 3	18 06	71100 00	71100 00	mg/kg		
		Lithium	17 00	5 7	11 55	38400 00	38400 00	mg/kg		
		Nickel	19 00	4 6	14 91	38400 00	38400 00	mg/kg		
		Aluminum	22000 00	12	16902	1000000 00	1000000 00	mg/kg		
		Americium-241	41 00	4	0 0227	215 00	38 00	pCi/g		
		Barium	160 00	1 2	141 26	133000 00	133000 00	mg/kg		
		Beryllium	3 90	0 58	0 966	104 00	1 04	mg/kg		
		Cadmium	37 00	0 58	1 612	1920 00	1920 00	mg/kg		
	Chromium	47 00	0 58	16 99	44300 00	4410 00	mg/kg			
	Copper	37 00	2 3	18 06	71100 00	71100 00	mg/kg			
	Lithium	23 00	5 8	11 55	38400 00	38400 00	mg/kg			
	Nickel	28 00	4 6	14 91	38400 00	38400 00	mg/kg			

52  
 Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

CK48-DR04	2084870 064	750992 838	0 0 - 0 5	Lithium	16 00	5 4	11 55	38400 00	38400 00	mg/kg
				Manganese	1000 00	1 1	365 08	83600 00	83600 00	mg/kg
				Nickel	15 00	4 3	14 91	38400 00	38400 00	mg/kg
				Americium-241	17 00	4	0 0227	215 00	38 00	pCi/g
				Beryllium	0 98	0 54	0 966	104 00	1 04	mg/kg
CK48-DR05	2084870 064	750992 838	0 0 - 0 5	Cadmium	5 50	0 54	1 612	1920 00	1920 00	mg/kg
				Chromium	22 00	0 54	16 99	44300 00	4410 00	mg/kg
				Lithium	16 00	5 4	11 55	38400 00	38400 00	mg/kg
				Americium-241	4 70	4	0 0227	215 00	38 00	pCi/g
				Chromium	19 00	0 51	16 99	44300 00	4410 00	mg/kg
CK48-DR05	2084870 064	750992 838	0 0 - 0 5	Lithium	14 00	5 1	11 55	38400 00	38400 00	mg/kg
				Cadmium	2 10	0 57	1 70	1920 00	1920 00	mg/kg
				Cadmium	4 00	0 59	1 70	1920 00	1920 00	mg/kg

Table 11  
Hot Spot Removal Confirmation Sampling Data, by Surface and Subsurface Locations

Location Code	Testing	Noting	Depth (ft)	Sample	Result	Decision	Background	Per II	Unit	
Surface Locations										
CJ45-005	2084610	750543	0.0 - 0.50	Beryllium	1.10	0.04	0.97	104.00	1.04	mg/kg
				Cadmium	7.70	0.04	1.61	1920.00	1920.00	mg/kg
CJ45-006	2084610	750543	0.0 - 0.50	Cadmium	7.30	0.04	1.61	1920.00	1920.00	mg/kg
				Copper	19.00	0.21	18.06	71100.00	71100.00	mg/kg
				Mercury	0.58	0.00	0.13	576.00	576.00	mg/kg
				Zinc	74.00	0.59	73.76	576000.00	576000.00	mg/kg
CJ45-007	2084610	750543	0.0 - 0.50	Beryllium	1.00	0.04	0.97	104.00	1.04	mg/kg
				Copper	62.00	0.20	18.06	71100.00	71100.00	mg/kg
				Iron	26000.00	1.70	18037.00	576000.00	576000.00	mg/kg
				Manganese	640.00	0.04	365.08	83600.00	83600.00	mg/kg
CJ45-008	2084610	750543	0.0 - 0.50	Beryllium	1.00	0.04	0.97	104.00	1.04	mg/kg
				Copper	30.00	0.20	18.06	71100.00	71100.00	mg/kg
				Iron	24000.00	1.70	18037.00	576000.00	576000.00	mg/kg
				Manganese	550.00	0.04	365.08	83600.00	83600.00	mg/kg
				Nickel	16.00	0.19	14.91	38400.00	38400.00	mg/kg
				Vanadium	49.00	0.15	45.59	13400.00	13400.00	mg/kg
CJ45-009	2084610	750543	0.0 - 0.50	Aluminum	18000.00	2.20	16902.00	1000000.00	1000000.00	mg/kg
				Cadmium	1.80	0.04	1.61	1920.00	1920.00	mg/kg
				Chromium	17.00	0.08	16.99	44300.00	4410.00	mg/kg
				Copper	20.00	0.20	18.06	71100.00	71100.00	mg/kg
				Lithium	14.00	0.12	11.55	38400.00	38400.00	mg/kg
				Strontium	57.00	0.05	48.94	1000000.00	1000000.00	mg/kg
CJ46-DR03	2084610	750678	0.0 - 0.50	Copper	56.00	0.21	18.06	71100.00	71100.00	mg/kg
				Iron	22000.00	1.70	18037.00	576000.00	576000.00	mg/kg
				Manganese	490.00	0.04	365.08	83600.00	83600.00	mg/kg
				PU-239/240	0.58	0.29	0.07	1429.00	252.00	pci/g

56  
 Scout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Location	Sample ID	Depth (cm)	Analysis	Result	Decision	Background Mean (ppm)	Standard Deviations	Reg II	Unit
			Selenium	1.40	0.55	1.22	9610.00	9610.00	mg/kg
			Zinc	170.00	0.58	73.76	576000.00	576000.00	mg/kg
CJ46-DR04	2084610	750678	Copper	29.00	0.20	18.06	71100.00	71100.00	mg/kg
CJ46-DR05	2084610	750678	AM-241	0.29	0.22	0.02	215.00	38.00	pci/g
			Copper	19.00	0.20	18.06	71100.00	71100.00	mg/kg
			U-235	0.16	0.11	0.09	135.00	24.00	pci/g
CJ46-DR06	2084610	750678	Copper	77.00	0.20	18.06	71100.00	71100.00	mg/kg
			Iron	26000.00	1.70	18037.00	576000.00	576000.00	mg/kg
			Lithium	12.00	0.12	11.55	38400.00	38400.00	mg/kg
			Manganese	610.00	0.04	365.08	83600.00	83600.00	mg/kg
			U-235	0.15	0.13	0.09	135.00	24.00	pci/g
			Zinc	74.00	0.57	73.76	576000.00	576000.00	mg/kg
CJ46-DR07	2084610	750678	U-233/234	5.63	0.24	2.25	1738.00	307.00	pci/g
			U-235	0.34	0.25	0.09	135.00	24.00	pci/g
CK46-DR01	2084890	750671	AM-241	1.66	0.36	0.02	215.00	38.00	pci/g
			Cadmium	23.00	0.04	1.61	1920.00	1920.00	mg/kg
			Chromium	20.00	0.08	16.99	44300.00	4410.00	mg/kg
			Copper	41.00	0.21	18.06	71100.00	71100.00	mg/kg
			Lithium	19.00	0.12	11.55	38400.00	38400.00	mg/kg
			Mercury	0.31	0.00	0.13	576.00	576.00	mg/kg
			Nickel	20.00	0.20	14.91	38400.00	38400.00	mg/kg
			PU-239/240	10.40	0.17	0.07	1429.00	252.00	pci/g
			U-233/234	11.00	0.18	2.25	1738.00	307.00	pci/g
			U-235	1.28	0.21	0.09	135.00	24.00	pci/g
			U-238	2.70	0.19	2.00	586.00	103.00	pci/g
CK46-DR02	2084890	750671	AM-241	1.16	0.47	0.02	215.00	38.00	pci/g
			Cadmium	25.00	0.04	1.61	1920.00	1920.00	mg/kg
			Chromium	21.00	0.08	16.99	44300.00	4410.00	mg/kg
			Copper	38.00	0.21	18.06	71100.00	71100.00	mg/kg

Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Sample ID	Sample No./Date	Depth (ft)	Analyte	Result	Detection Limit	Background Level	Deviations	Health	Unit
CK46-DR03	2084890	750671	Lithium	16 00	0 12	11 55	38400 00	38400 00	mg/kg
			Nickel	19 00	0 19	14 91	38400 00	38400 00	mg/kg
			PU-239/240	3 87	0 13	0 07	1429 00	252 00	pci/g
			U-233/234	4 26	0 06	2 25	1738 00	307 00	pci/g
			U-235	0 65	0 07	0 09	135 00	24 00	pci/g
			AM-241	0 88	0 16	0 02	215 00	38 00	pci/g
			Cadmium	26 00	0 04	1 61	1920 00	1920 00	mg/kg
			Chromium	27 00	0 08	16 99	44300 00	4410 00	mg/kg
			Copper	60 00	0 21	18 06	71100 00	71100 00	mg/kg
			Lithium	18 00	0 12	11 55	38400 00	38400 00	mg/kg
			Mercury	0 36	0 00	0 13	576 00	576 00	mg/kg
			Nickel	19 00	0 20	14 91	38400 00	38400 00	mg/kg
CK46-DR04	2084890	750671	PU-239/240	14 30	0 29	0 07	1429 00	252 00	pci/g
			U-233/234	8 47	0 13	2 25	1738 00	307 00	pci/g
			U-235	0 35	0 12	0 09	135 00	24 00	pci/g
			U-238	3 77	0 11	2 00	586 00	103 00	pci/g
			Aluminum	21000 00	2 40	16902 00	1000000 00	1000000 00	mg/kg
			AM-241	1 93	0 29	0 02	215 00	38 00	pci/g
			Cadmium	20 00	0 04	1 61	1920 00	1920 00	mg/kg
			Chromium	26 00	0 08	16 99	44300 00	4410 00	mg/kg
			Copper	47 00	0 22	18 06	71100 00	71100 00	mg/kg
			Lithium	28 00	0 12	11 55	38400 00	38400 00	mg/kg
			Mercury	0 22	0 00	0 13	576 00	576 00	mg/kg
			Nickel	22 00	0 20	14 91	38400 00	38400 00	mg/kg
CK46-DR05	2084890	750671	PU-239/240	11 00	0 28	0 07	1429 00	252 00	pci/g
			U-233/234	7 11	0 20	2 25	1738 00	307 00	pci/g
			U-235	0 29	0 24	0 09	135 00	24 00	pci/g
			U-238	2 46	0 21	2 00	586 00	103 00	pci/g
			Cadmium	23 00	0 04	1 61	1920 00	1920 00	mg/kg



Report for IHSS Group 000-1, Solar Evaporation Ponds Area Concern

Location	Sample	Sample	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Unit
Code	ID	Material	ft	ft	ft	ft	ft	ft	ft	
		Chromium	22 00	0 08	16 99	44300 00	4410 00			mg/kg
		Copper	43 00	0 20	18 06	71100 00	71100 00			mg/kg
		Lithium	18 00	0 12	11 55	38400 00	38400 00			mg/kg
		Mercury	0 25	0 00	0 13	576 00	576 00			mg/kg
		Nickel	19 00	0 19	14 91	38400 00	38400 00			mg/kg
		PU-239/240	4 87	0 23	0 07	1429 00	252 00			pci/g
		U-233/234	11 90	0 19	2 25	1738 00	307 00			pci/g
		U-235	0 53	0 20	0 09	135 00	24 00			pci/g
		U-238	4 81	0 20	2 00	586 00	103 00			pci/g
CK48-DR01	2084870	Chromium	22 00	0 08	16 99	44300 00	4410 00			mg/kg
		Lithium	18 00	0 12	11 55	38400 00	38400 00			mg/kg
		PU-239/240	0 69	0 30	0 07	1429 00	252 00			pci/g
		U-235	1 97	0 23	0 09	135 00	24 00			pci/g
		U-238	2 02	0 19	2 00	586 00	103 00			pci/g
CK48-DR02	2084870	AM-241	0 49	0 28	0 02	215 00	38 00			pci/g
		Cadmium	5 00	0 04	1 61	1920 00	1920 00			mg/kg
		Chromium	18 00	0 08	16 99	44300 00	4410 00			mg/kg
		Lithium	14 00	0 12	11 55	38400 00	38400 00			mg/kg
		U-233/234	2 55	0 07	2 25	1738 00	307 00			pci/g
		U-235	0 18	0 07	0 09	135 00	24 00			pci/g
CK48-DR03	2084870	Barium	170 00	0 37	141 26	133000 00	133000 00			mg/kg
		Cadmium	2 10	0 04	1 61	1920 00	1920 00			mg/kg
		Chromium	19 00	0 08	16 99	44300 00	4410 00			mg/kg
		Iron	23000 00	1 70	18037 00	576000 00	576000 00			mg/kg
		Lithium	16 00	0 12	11 55	38400 00	38400 00			mg/kg
		Manganese	1000 00	0 04	365 08	83600 00	83600 00			mg/kg
		Nickel	15 00	0 19	14 91	38400 00	38400 00			mg/kg
CK48-DR04	2084870	Beryllium	0 98	0 04	0 97	104 00	1 04			mg/kg
		Cadmium	5 50	0 04	1 61	1920 00	1920 00			mg/kg

59  
 Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Location	Sample ID	Depth (ft)	Element	Concentration	Standard	Unit
			Chromium	22.00	0.08	mg/kg
			Lithium	16.00	0.12	mg/kg
			U-233/234	3.85	0.27	pci/g
CK48-DR05	2084870	750992.8	Chromium	19.00	0.07	mg/kg
			Lithium	14.00	0.11	mg/kg
Subsurface Locations						
CJ45-005	2084610 024	750543 097	AM-241	13.50	0.34	pCi/g
			PU-239/240	2.97	0.08	pCi/g
CJ45-006	2084610 024	750543 097	AM-241	12.30	0.89	pCi/g
			PU-239/240	0.91	0.08	pCi/g
CJ45-007	2084610 024	750543 097	PU-239/240	0.08	0.07	pCi/g
CJ45-008	2084610 024	750543 097	PU-239/240	0.57	0.15	pCi/g
CJ45-009	2084610 024	750543 097	PU-239/240	4.00	0.08	pCi/g
CK46-012	2084908	750688	PU-239/240	3.55	0.07	pCi/g
			U-233/234	2.75	0.12	pCi/g
			U-235	1.38	0.16	pCi/g
CK46-013	2084908	750688	AM-241	3.68	0.54	pCi/g
			PU-239/240	1.52	0.20	pCi/g
			U-235	1.64	0.16	pCi/g
			U-238	1.56	0.13	pCi/g
CK46-014	2084908	750688	AM-241	2.70	0.31	pCi/g
			PU-239/240	0.72	0.17	pCi/g
CK46-015	2084908	750688	AM-241	2.40	0.32	pCi/g
			PU-239/240	0.67	0.08	pCi/g
			U-235	0.86	0.11	pCi/g
CK46-016	2084908	750688	AM-241	2.49	0.12	pCi/g
			PU-239/240	0.93	0.08	pCi/g
CK46-017	2084908	750688	AM-241	1.23	0.21	pCi/g
			PU-239/240	0.34	0.18	pCi/g

Site Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Sample ID	Sample No.	Depth (ft)	Depth (m)	Result	Exposure Period (hr)	Deviation	Deviation	Unit
CK46-018	2084908	2.00 - 2.00	AM-241	5.10	0.27	0.02	209.00	pCi/g
			PU-239/240	1.74	0.08	0.02	1088.00	pCi/g
CK46-019	2084908	2.00 - 2.00	AM-241	2.36	0.40	0.02	209.00	pCi/g
			PU-239/240	0.94	0.06	0.02	1088.00	pCi/g
CK48-DR06	2084919 923	1.00 - 1.00	AM-241	0.51	0.24	0.02	209.00	pCi/g
			Cadmium	2.10	0.04	1.70	1920.00	mg/kg
			PU-239/240	0.61	0.14	0.02	1088.00	pCi/g
CK48-DR07	2084919 923	1.00 - 1.00	AM-241	0.45	0.19	0.02	209.00	pCi/g
			PU-239/240	0.36	0.20	0.02	1088.00	pCi/g
CK48-DR08	2084919 923	1.00 - 1.00	AM-241	0.42	0.26	0.02	209.00	pCi/g
			PU-239/240	0.61	0.14	0.02	1088.00	pCi/g
CK48-DR09	2084919 923	1.00 - 1.00	AM-241	0.53	0.27	0.02	209.00	pCi/g
			Cadmium	4.00	0.04	1.70	1920.00	mg/kg
			PU-239/240	0.54	0.15	0.02	1088.00	pCi/g
CK48-DR10	2084919 923	1.00 - 1.00	PU-239/240	0.36	0.14	0.02	1088.00	pCi/g
			U-233/234	34.80	0.11	2.64	1627.00	pCi/g
			U-235	3.94	0.11	0.12	113.00	pCi/g
			U-238	19.40	0.10	1.49	506.00	pCi/g

## **6.0 STEWARDSHIP EVALUATION**

### **6.1 Current Site Conditions**

As discussed in Section 3.0, accelerated actions at the IHSS Group 000-1 AOC consisted of the removal of all concrete slabs, all above-ground process waste lines, some below-ground process waste lines, a valve pit, valve components, all sumps and pumps, and contaminated soil hot spots. The Site has been regraded with soil from berms and from east of the site. Some below-ground waste lines and drain lines remain, but all of these lines have been disrupted (plugged). Removed and remaining items are shown on Figure 10. Therefore, potential sources of contamination that had existed in the AOC have been removed or isolated. Residual metal concentrations, including arsenic and beryllium that are common background constituents, are above background means. Americium-241 is above background in several places. Refer to Sections 4.0 and 8.0.

### **6.2 Near Term Management Recommendations**

The accelerated action for the IHSS Group 000-1 AOC met the objectives of the action. The concentration levels of soil contamination remaining in the AOC do not trigger any further accelerated action. Potential contaminant sources and pathways have been removed, mitigated or found not to have existed. Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process. Fencing and signs restricting access will be posted to minimize disturbance to newly-revegetated areas. Site access and security controls and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls. No other near-term management techniques are required because of environmental conditions.

### **6.3 Long Term Stewardship Recommendation**

The presence of metals and americium-241 in AOC soils will be analyzed in the Site Wide Comprehensive Risk Assessment, which is part of the RCRA Facility Investigation/Remedial Investigation and Corrective Measures Study/Feasibility Study that will be conducted for the Site. The need for and extent of any, more general, long-term stewardship activities will also be analyzed in the RCRA Facility Investigation/Remedial Investigation and Corrective Measures Study-Feasibility Study and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision, in any post-closure Colorado Hazardous Waste Act permit that may be required, and in any post-RFCA agreement.

No specific long-term stewardship activities are recommended for the IHSS Group 000-1 AOC beyond the generally applicable Site requirements that may be imposed on this area in the future, which are dependent upon the final remedy selected. Institutional controls that will be used as appropriate for this area include prohibitions on construction of buildings in the IA, restrictions on excavation or other soil disturbance, or prohibitions on groundwater pumping in the area of the IHSS Group 000-1 AOC.

No specific engineered controls are anticipated as a result of the conditions remaining in the IHSS Group 000-1 AOC. Groundwater treatment, via the Solar Pond Plume Treatment System, will continue.

No specific environmental monitoring is anticipated as a result of the conditions remaining in the IHSS Group 000-1 AOC.

This closeout report and associated documentation, including the references in Section 15, will be retained as part of the Rocky Flats administrative record file. These specific long-term stewardship recommendations will also be summarized in the Rocky Flats *Long Term Stewardship Strategy*.

## **7.0 DEVIATIONS FROM THE ER RSOP**

All accelerated action objectives specified in the ER RSOP Notification and Section 3.0 were achieved. Deviations from the ER RSOP Notification are listed below.

- Two valve pits (located in the southwestern corner of Pond 207A and the southwestern corner of Pond 207B) were never found, and therefore, could not be removed. Even though they appear in some drawings, they may never have been installed.
- The two valves in the Pond 207B berms were not removed, because they are located more than six feet below grade. The valve stems and casings were removed.
- Five sumps, instead of three, and their associated pumps were found and removed.
- A longer section of the aboveground pipeline to Building 374 was removed. Approximately 1,200 feet were removed, from Building 910 to the southern side of Building 774.
- Two unanticipated lines were encountered east of Pond 207B North. These lines were disrupted, and the valve assemblies and line going to the pond were removed.

## **8.0 POST-REMEDICATION CONDITIONS**

Post-remediation conditions at IHSS Group 000-1 are described below.

### **8.1 Residual Contamination**

Residual contamination was determined for the areas within the SEP AOC associated with the RSOP accelerated action, based on accelerated action characterization and post-soil removal confirmation sampling. Pre-accelerated action characterization indicated acceptable risk to the WRW, except for six hot spots (refer to Figure 3 and DOE 2002d). These hot spots were removed, as described in Section 3.0. Residual concentrations after soil removal were confirmed to be below RFCA Tier II ALs, except for one beryllium concentration, which was slightly above the RFCA Tier II AL (refer to Section 4.0). All contaminant concentrations were below the proposed WRW and Ecological Receptor ALs. Accelerated action characterization indicated no contaminant concentrations in surface or subsurface soil greater than RFCA Tier II ALs, except for one beryllium.

concentration and 16 arsenic concentrations (refer to Section 2 0) All exceedances were significantly below the RFCA Tier I ALs and believed to be part of the background (i e , not DOE-added) Eight arsenic concentrations and one manganese concentration exceeded the proposed WRW ALs, and all concentrations were below the proposed Ecological Receptor ALs Waste and drain lines that were not removed during the accelerated action are shown on Figure 10 As discussed in Section 3 0, the ends of waste and drain lines were grouted or foamed

SORs for RFCA Tier I and Tier II ALs were calculated for surface and subsurface soil based on accelerated action and confirmation data Data from sample locations that are no longer representative were excluded (i e , pre-accelerated action data on the hot spots, refer to Section 11 0) Tier I and Tier II SORs are listed in Tables 12 and 13, for surface and subsurface soils, respectively, and Tier II SORs are shown in Figures 12 - 15 SORs were calculated for all locations with analytical results greater than background mean plus two standard deviations or reporting limits No surface soil SORs for Tier I COCs or surface soil SORs for Tier II radionuclides exceeded 1 Thirteen surface soil SORs for Tier II non-radionuclides exceeded 1 (10 characterization locations and 3 confirmation locations) No subsurface soil SORs for Tier I COCs or subsurface soil SORs for Tier II radionuclides exceeded 1 Seven subsurface soil SORs for Tier II non-radionuclides exceeded 1 (all characterization locations) Tier II SORs greater than 1 are due to the presence of multiple metals, including arsenic, beryllium and manganese

**Table 12**  
**Sum of Ratios for Surface Soil Based on Remedial Contamination**

Characterization	NON RAD	CJ48-000	2084587 694	750990 666	0 13	12 16
Characterization	NON RAD	CJ47-000	2084595 74	750942 76	0 13	11 46
Characterization	NON RAD	CJ47-001	2084596 833	750920 713	0 12	11 22
Characterization	NON RAD	CJ48-001	2084613 743	750989 133	0 12	10 42
Characterization	NON RAD	CJ47-002	2084592 78	750919 788	0 11	10 22
Characterization	NON RAD	CJ47-DR02	2084590 72	750801 171	0 08	6 84
Characterization	NON RAD	CM47-000	2085240 646	750924 617	0 16	5 81
Characterization	NON RAD	CM47-002	2085246 958	750888 658	0 14	5 12
Characterization	NON RAD	CM48-001	2085249 954	750960 634	0 14	4 46
Characterization	NON RAD	CJ47-005	2084610 347	750830 035	0 03	1 08
Characterization	NON RAD	CJ47-014	2084594 283	750896 955	0 09	0 12
Characterization	NON RAD	CM48-000	2085236 129	750960 74	0 09	0 10
Characterization	NON RAD	CM47-001	2085234 206	750889 919	0 07	0 08
Characterization	NON RAD	CJ47-003	2084611 914	750860 155	0 02	0 02
Characterization	NON RAD	CJ47-006	2084631 854	750859 651	0 00	0 01
Characterization	NON RAD	CJ47-007	2084631 861	750828 521	0 00	0 00
Characterization	NON RAD	CJ47-004	2084621 427	750843 746	NA	NA
Characterization	RAD	CJ47-011	2084606 422	750859 399	0 07	0 42
Characterization	RAD	CJ47-009	2084589 139	750835 759	0 06	0 34
Characterization	RAD	CJ47-010	2084589.27	750816 652	0 05	0 26
Confirmation	NON RAD	CJ45-005	2084610	750543	0 01	1 06
Confirmation	NON RAD	CJ45-006	2084610	750543	0 01	0 01

64

*Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern*

Confirmation	NON RAD	CJ45-007	2084610	750543	0 06	1 02
Confirmation	NON RAD	CJ45-008	2084610	750543	0 06	1 01
Confirmation	NON RAD	CJ45-009	2084610	750543	0 02	0 02
Confirmation	NON RAD	CJ46-DR03	2084610 015	750678 013	0 05	0 05
Confirmation	NON RAD	CJ46-DR04	2084610 015	750678 013	0 00	0 00
Confirmation	NON RAD	CJ46-DR05	2084610 015	750678 013	0 00	0 00
Confirmation	NON RAD	CJ46-DR06	2084610 015	750678 013	0 05	0 05
Confirmation	NON RAD	CJ46-DR07	2084610 015	750678 013	NA	NA
Confirmation	NON RAD	CK46-DR01	2084889 935	750671 032	0 01	0 02
Confirmation	NON RAD	CK46-DR02	2084889 935	750671 032	0 01	0 02
Confirmation	NON RAD	CK46-DR03	2084889 935	750671 032	0 02	0 02
Confirmation	NON RAD	CK46-DR04	2084889 935	750671 032	0 03	0 04
Confirmation	NON RAD	CK46-DR05	2084889 935	750671 032	0 01	0 02
Confirmation	NON RAD	CK48-DR01	2084870 064	750992 838	0 00	0 01
Confirmation	NON RAD	CK48-DR02	2084870 064	750992 838	0 00	0 01
Confirmation	NON RAD	CK48-DR03	2084870 064	750992 838	0 06	0 06
Confirmation	NON RAD	CK48-DR04	2084870 064	750992 838	0 01	0 95
Confirmation	NON RAD	CK48-DR05	2084870 064	750992 838	0 00	0 00
Confirmation	RAD	CJ46-DR03	2084610 015	750678 013	0 00	0 00
Confirmation	RAD	CJ46-DR05	2084610 015	750678 013	0 00	0 01
Confirmation	RAD	CJ46-DR06	2084610 015	750678 013	0 00	0 01
Confirmation	RAD	CJ46-DR07	2084610 015	750678 013	0 01	0 03
Confirmation	RAD	CK46-DR01	2084889 935	750671 032	0 04	0 20
Confirmation	RAD	CK46-DR02	2084889 935	750671 032	0 02	0 09
Confirmation	RAD	CK46-DR03	2084889 935	750671 032	0 03	0 16
Confirmation	RAD	CK46-DR04	2084889 935	750671 032	0 03	0 15
Confirmation	RAD	CK46-DR05	2084889 935	750671 032	0 02	0 13
Confirmation	RAD	CK48-DR01	2084870 064	750992 838	0 02	0 10
Confirmation	RAD	CK48-DR02	2084870 064	750992 838	0 01	0 03
Confirmation	RAD	CK48-DR04	2084870 064	750992 838	0 00	0 01

**Table 13  
Sum of Ratios for Subsurface Soil Based on Remedial Contamination**

Characterization	NON RAD	CK48-000	2084925 791	750960 476	6 - 6	0 01	0 01
Characterization	NON RAD	CK48-001	2084910 361	750963 508	6 - 6	0 28	0 28
Characterization	NON RAD	CK47-002	2084935 696	750957 076	6 - 6	0 02	0 02
Characterization	NON RAD	CK47-000	2084927 803	750943 958	6 - 6	0 10	0 10
Characterization	NON RAD	CK47-001	2084910 357	750944 838	6 - 6	0 04	0 04
Characterization	NON RAD	CH48-000	2084272 542	751019 513	4 5 - 6 5	0 01	0 01
Characterization	NON RAD	CH48-016	2084373 825	751011 291	4 5 - 6 5	0 01	0 01
Characterization	NON RAD	CI48-001	2084575 112	751005 476	4 5 - 6 5	0 01	0 01
Characterization	NON RAD	CI48-002	2084475 687	751007 846	4 5 - 6 5	0 01	0 01
Characterization	NON RAD	CJ46-000	2084597 275	750700 806	11 - 11	0 12	5 11
Characterization	NON RAD	CJ46-001	2084605 759	750700 423	11 - 11	0 05	0 05

65

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Characterization	NON RAD	CJ46-002	2084601 353	750704 637	11 - 11	0 07	0 07
Characterization	NON RAD	CJ46-003	2084602 402	750693 713	11 - 11	0 11	6 07
Characterization	NON RAD	CJ46-004	2084599 472	750696 964	11 - 11	0 05	0 05
Characterization	NON RAD	CJ46-DR01	2084622 896	750703 025	7 5 - 7 5	0 24	10 48
Characterization	NON RAD	CJ47-DR01	2084556 433	750776 173	4 - 4	0 17	8 19
Characterization	NON RAD	CJ49-DR01	2084820 897	751197 426	4 - 4	0 02	0 02
Characterization	NON RAD	CK47-DR01	2084891 478	750941 338	1 - 1	0 00	0 00
Characterization	NON RAD	CK48-003	2084917 579	751048 913	3 - 3	0 42	5 43
Characterization	NON RAD	CK48-004	2084917 579	751048 913	3 - 3	0 47	7 89
Characterization	NON RAD	CK48-005	2084917 579	751048 913	3 - 3	0 21	0 21
Characterization	NON RAD	Valve Pit #1	2084601 421	750700 944	8 - 8	0 19	5 51
Characterization	RAD	CJ46-000	2084597 275	750700 806	11 - 11	0 12	0 68
Characterization	RAD	CJ46-001	2084605 759	750700 423	11 - 11	0 02	0 13
Characterization	RAD	CJ46-002	2084601 353	750704 637	11 - 11	0 15	0 84
Characterization	RAD	CJ46-004	2084599 472	750696 964	11 - 11	0 03	0 14
Confirmation	NON RAD	CK48-DR06	2084919 923	751074 863	1 - 1	0 00	0 00
Confirmation	NON RAD	CK48-DR07	2084919 923	751074 863	1 - 1	NA	NA
Confirmation	NON RAD	CK48-DR08	2084919 923	751074 863	1 - 1	NA	NA
Confirmation	NON RAD	CK48-DR09	2084919 923	751074 863	1 - 1	0 00	0 00
Confirmation	NON RAD	CK48-DR10	2084919 923	751074 863	1 - 1	NA	NA
Confirmation	RAD	CJ45-005	2084610 024	750543 097	1 - 1	0 07	0 37
Confirmation	RAD	CJ45-006	2084610 024	750543 097	1 - 1	0 06	0 33
Confirmation	RAD	CJ45-007	2084610 024	750543 097	1 - 1	0 00	0 00
Confirmation	RAD	CJ45-008	2084610 024	750543 097	1 - 1	0 00	0 00
Confirmation	RAD	CJ45-009	2084610 024	750543 097	1 - 1	0 00	0 02
Confirmation	RAD	CK46-012	2084908	750688	2 - 2	0 02	0 08
Confirmation	RAD	CK46-013	2084908	750688	2 - 2	0 04	0 19
Confirmation	RAD	CK46-014	2084908	750688	2 - 2	0 01	0 07
Confirmation	RAD	CK46-015	2084908	750688	2 - 2	0 02	0 10
Confirmation	RAD	CK46-016	2084908	750688	2 - 2	0 01	0 07
Confirmation	RAD	CK46-017	2084908	750688	2 - 2	0 01	0 03
Confirmation	RAD	CK46-018	2084908	750688	2 - 2	0 03	0 14
Confirmation	RAD	CK46-019	2084908	750688	2 - 2	0 01	0 07
Confirmation	RAD	CK48-DR06	2084919 923	751074 863	1 - 1	0 00	0 02
Confirmation	RAD	CK48-DR07	2084919 923	751074 863	1 - 1	0 00	0 01
Confirmation	RAD	CK48-DR08	2084919 923	751074 863	1 - 1	0 00	0 01
Confirmation	RAD	CK48-DR09	2084919 923	751074 863	1 - 1	0 00	0 02
Confirmation	RAD	CK48-DR10	2084919 923	751074 863	1 - 1	0 09	0 47

## 9.0 WASTE MANAGEMENT

Waste from the SEP AOC accelerated action consisted of waste lines, valve components, sumps and pumps, concrete, asphalt, and soil. Concrete was disposed of as LLW or LLMW, or taken to the on-site concrete rubble pile to be recycled. LLW concrete was placed in lined cargo containers, and LLMW concrete was placed in intermodal containers. Waste lines, valve components, and sumps and pumps were placed into IP-2 or ST-90 containers and disposed of as LLMW. Valve Pit # 1 and the lysimeters were placed in intermodal containers and disposed of as LLMW. Hot spot soil was placed into ST-90 containers and disposed of as LLMW. Asphalt was disposed of as sanitary waste or LLW (in lined cargo containers). Water encountered in the waste lines and sumps, and water and slurry generated during concrete sawing were placed into a large polyvinyl tank and treated off site at the Alternative Waste Treatment System. Waste types, volumes, and disposition are presented in Table 14. Waste characterization data are summarized in Table 15.

## 10.0 SITE RECLAMATION

Site reclamation will involve pushing in the berms, adding fill to create a gentle grade to the south, and then seeding the AOC. Specific plans are included the SEP PAM, entitled *RCRA Closure of the RFETS Solar Evaporation Ponds* (DOE 2002d).

## 11.0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS

Sampling locations that are no longer representative include the six historical locations associated with the hot spots (i.e., SS400693, SS402793, SS400593, 43793, SS402893 and SS403093) and five in-process sampling locations (i.e., CK46-002, CK46-007, CK46-008, CK46-010 and CK46-011). These locations were removed when the hot spots were excavated. No longer representative sampling locations are shown on Figure 16. All other sampling locations are still present and representative of the residual contamination. Data from these locations can be used in future risk assessments.

## 12.0 COMPLETION OF REMEDIAL ACTION OBJECTIVES

ER RSOP Notification #02-08 accelerated action project objectives were achieved through the following:

- Removal of slabs associated with RCRA Units 21 and 48,
- Removal of OPWL valve pit, valve components, and line sections,
- Disruption of the leak detection drains, remaining OPWL sections, the MST return line, and the ITS return line,
- Removal of above-ground pipeline from B910 to B774,
- Removal of drain sumps and pumps, and
- Removal of hot spots identified in the PAM (DOE 2002d)

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

**Table 14**  
**Waste Summary**

Container Number	Extended Number	Type of Container	Volume	Type of Waste	IDC
X30463	spon00001	CST	1190	LLW	5001
X30407	spon00003	CST	1190	LLW	5001
X30494	spon00006	CST	1190	LLW	5001
X30495	spon00007	CST	1190	LLW	5001
X30373	spon00005	CST	1190	LLW	5001
X30488	spon00008	CST	1190	LLW	5001
X30405	spon00004	CST	1190	LLW	5001
X30489	spon00009	CST	1190	LLW	5001
X30361	spon00010	CST	1190	LLW	5001
X30362	spon00011	CST	1190	LLW	5001
B03908	spon00012	IP-2	106	LLM	5001
B03909	spon00013	IP-2	106	LLMW	5001
B03900	spon00014	IP-2	106	LLMW	5001
B03907	spon00015	IP-2	106	LLMW	5001
X30363	spon00016	CST	1190	LLMW	5001
X30364	spon00017	CST	1190	LLMW	5001
X30365	spon00018	CST	1190	LLMW	5001
X30358	spon00019	CST	1190	LLMW	5001
X30402	spon00020	CST	1190	LLMW	5001
X30465	spon00021	CST	1190	LLMW	5001
X30466	spon00022	CST	1190	LLMW	5001
X30467	spon00023	CST	1190	LLMW	5001
X30468	spon00024	CST	1190	LLMW	5001
X30400	spon00025	CST	1190	LLMW	5001
X30401	spon00026	CST	1190	LLMW	5001
X30462	spon00027	CST	1190	LLMW	5001
X30473	spon00028	CST	1190	LLMW	5001
B03905	spon00029	IP-2	106	LLMW	0324

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Container Number	Extended Number	Type of Container	Volume (cu ft)	Type of Waste	IDC
B03906	spon00030	IP-2	106	LLMW	0324
WATER1	N/A	Polytank	Unknown	LLMW	N/A
WATER2	N/A	Polytank	Unknown	LLMW	N/A
WATER3	N/A	Polytank	Unknown	LLMW	N/A
WATER4	N/A	Polytank	Unknown	LLMW	N/A
WATER5	N/A	Polytank	Unknown	LLMW	N/A
B03963	spon00032	IP-2	106	LLMW	0324
B03974	spon00034	IP-2	106	LLMW	5001
B03976	N/A	IP-2	106	LLMW	5001
X30442	spon00039	CST	1190	LLW	5001
X30443	spon00040	CST	1190	LLW	5001
B03971	spon00041	IP-2	106	LLMW	5001
B03972	spon00042	IP-2	106	LLMW	5001
B03973	spon00043	IP-2	106	LLMW	5001
B03976	spon00044	IP-2	106	LLMW	5001
X30319	spon00045	CST	1190	LLW	5001
X30320	spon00046	CST	1190	LLW	5001
X30444	spon00048	CST	1190	LLW	5001
X30391	spon00049	CST	1190	LLW	5001
X30593	spon00050	CST	1190	LLW	5001
X30590	spon00051	CST	1190	LLW	5001
X30591	spon00052	CST	1190	LLW	5001
X30588	spon00053	CST	1190	LLW	5001
X30377	spon00054	CST	1190	LLW	5001
X30445	spon00055	CST	1190	LLW	5001
X30481	spon00056	CST	1190	LLW	5001
X30446	spon00057	CST	1190	LLW	5001
X30447	spon00058	CST	1190	LLW	5001
B03975	spon00059	IP-2	106	LLMW	5001
X30523	spon00060	CST	1190	LLW	5001

13

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Container Number	Extended Number	Type of Container	Volume (cu ft)	Type of Waste	IDC
X30524	spon00061	CST	1190	LLW	5001
B03964	spon00062	IP-2	106	LLW	5001
BO2845	spon00063	ST-90	90	LLW	0323
B03663	spon00064	ST-90	90	LLW	0323
X30376	spon00065	CST	1190	LLW	5001
L00891	spon00066	IML	675	LLMW	5001
B03664	spon00067	ST-90	90	LLW	0323
X30607	spon00068	CST	1190	LLMW	5001
X30608	spon00069	CST	1190	LLMW	5001
L00887	spon00070	IML	675	LLMW	5001
L00888	spon00071	IML	675	LLMW	5001
L00889	spon00072	IML	675	LLMW	5001
L00890	spon00073	IML	675	LLMW	5001
B03662	spon00074	ST-90	90	LLW	0323
L00870	spon00075	IML	675	LLMW	5001
L00871	spon00076	IML	675	LLMW	5001
L00872	spon00077	IML	675	LLMW	5001
L00873	spon00078	IML	675	LLMW	5001

CST - strong tight container

IDC - item description code

IML - intermodal container

74

**Table 15  
Waste Characterization Data Summary – Detected Analytes**

				Frequency	
Concrete	AC-228	2.76	4	1	pCi/g
Concrete	AM-241	8.92	4	0.5	pCi/g
Concrete	BI-212	2	4	1	pCi/g
Concrete	BI-214	0.973	4	1	pCi/g
Concrete	CS-137	0	4	1	pCi/g
Concrete	K-40	20.3	4	1	pCi/g
Concrete	PA-234	0	4	1	pCi/g
Concrete	PA-234M	0	4	1	pCi/g
Concrete	PB-212	2.2	4	1	pCi/g
Concrete	PB-214	0.939	4	1	pCi/g
Concrete	PO-210	0	4	1	pCi/g
Concrete	RA-226	4.19	4	1	pCi/g
Concrete	TH-230	0	4	1	pCi/g
Concrete	Th-231	0	4	1	pCi/g
Concrete	TL-208	0.942	4	1	pCi/g
Sediment	Ac-228	0	1	1	pCi/g
Sediment	Bi-212	0	1	1	pCi/g
Sediment	Bi-214	0.69	1	1	pCi/g
Sediment	Cs-137	0	1	1	pCi/g
Sediment	K-40	5	1	1	pCi/g
Sediment	Pa-234	0	1	1	pCi/g
Sediment	Pa-234m	0	1	1	pCi/g
Sediment	Pb-212	0.24	1	1	pCi/g
Sediment	Pb-214	0.46	1	1	pCi/g
Sediment	Po-210	0	1	1	pCi/g
Sediment	Ra-226	0	1	1	pCi/g
Sediment	Th-230	0	1	1	pCi/g
Sediment	Th-231	0	1	1	pCi/g
Sediment	Tl-208	0.07	1	1	pCi/g
Sludge	Aluminum	11000	5	1	mg/kg
Sludge	Antimony	11.7	10	0.7	mg/kg
Sludge	Arsenic	13	10	1	mg/kg
Sludge	Barium	727	10	1	mg/kg
Sludge	Beryllium	24	5	1	mg/kg
Sludge	Cadmium	132	10	1	mg/kg
Sludge	Calcium	154000	10	1	mg/kg
Sludge	Chromium	380	10	1	mg/kg
Sludge	Cobalt	6.8	10	1	mg/kg
Sludge	Copper	1160	10	1	mg/kg
Sludge	Iron	138000	10	1	mg/kg
Sludge	Lead	374	10	1	mg/kg
Sludge	Lithium	230	5	1	mg/kg
Sludge	Magnesium	5900	5	1	mg/kg
Sludge	Manganese	648	10	1	mg/kg
Sludge	Molybdenum	17	10	1	mg/kg
Sludge	Nickel	128	10	1	mg/kg
Sludge	Nitrate as N	65	15	0.8	mg/kg
Sludge	Potassium	78200	10	1	mg/kg
Sludge	Selenium	5.3	10	0.9	mg/kg
Sludge	Silver	12	10	1	mg/kg
Sludge	Sodium	120000	5	1	mg/kg
Sludge	Strontium	700	10	1	mg/kg
Sludge	Thallium	2.5	5	0.6	mg/kg
Sludge	Tin	59.5	10	1	mg/kg

75

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Sludge	Vanadium	165	10	1	mg/kg
Sludge	Zinc	4270	10	1	mg/kg
Sludge	Ac 228	3 1	4	1	pCi/g
Sludge	AM241	64 4	2	1	pCi/g
Sludge	Am 241	78	4	0 25	pCi/g
Sludge	Br 212	1 8	4	1	pCi/g
Sludge	Br 214	1 3	4	1	pCi/g
Sludge	Cs-137	0 4	4	1	pCi/g
Sludge	K-40	42	4	1	pCi/g
Sludge	Pa 234	0	4	1	pCi/g
Sludge	Pa-234m	0	4	1	pCi/g
Sludge	Pb-212	2 9	4	1	pCi/g
Sludge	Pb-214	1 6	4	1	pCi/g
Sludge	Po-210	0	4	1	pCi/g
Sludge	PU239240	54 2	2	1	pCi/g
Sludge	Ra-226	37	4	1	pCi/g
Sludge	Th 230	0	4	1	pCi/g
Sludge	Th-231	2 5	4	1	pCi/g
Sludge	Tl 208	1	4	1	pCi/g
Sludge	U233234	28 4	2	1	pCi/g
Sludge	U235	2 23	2	1	pCi/g
Sludge	U-235	3	4	0 75	pCi/g
Sludge	U238	26 6	2	1	pCi/g
Sludge	U238/234	64	4	1	pCi/g
Sludge	1 2-Dichloroethane-d4	3889 6	2	1	ug/kg
Sludge	4-Bromofluorobenzene	3468 3	2	1	ug/kg
Sludge	Fluorobenzene	3607 5	2	1	ug/kg
Sludge	Toluene	314 6	2	1	ug/kg
Slurry	Antimony	6 7	6	1	mg/kg
Slurry	Arsenic	9 5	6	1	mg/kg
Slurry	Barium	670	6	1	mg/kg
Slurry	Cadmium	1 4	6	1	mg/kg
Slurry	Calcium	88700	6	1	mg/kg
Slurry	Chromium	64	6	1	mg/kg
Slurry	Cobalt	672	6	1	mg/kg
Slurry	Copper	130	6	1	mg/kg
Slurry	Iron	28400	6	1	mg/kg
Slurry	Lead	25 4	6	1	mg/kg
Slurry	Manganese	660	6	1	mg/kg
Slurry	Molybdenum	0	6	1	mg/kg
Slurry	Nickel	72 8	6	1	mg/kg
Slurry	Potassium	23700	6	1	mg/kg
Slurry	Selenium	0 91	6	1	mg/kg
Slurry	Silver	5 2	6	1	mg/kg
Slurry	Strontium	509	6	1	mg/kg
Slurry	Tin	5	6	1	mg/kg
Slurry	Vanadium	95	6	1	mg/kg
Slurry	Zinc	110	6	1	mg/kg
Slurry	Ac-228	2 7	6	1	pCi/g
Slurry	Am-241	7	6	0 333333	pCi/g
Slurry	Bi-212	3 5	6	1	pCi/g
Slurry	Bi-214	1 3	6	1	pCi/g
Slurry	Cs-137	0	6	1	pCi/g
Slurry	K-40	25	6	1	pCi/g
Slurry	Pa-234	0	6	1	pCi/g
Slurry	Pa-234m	0	6	1	pCi/g
Slurry	Pb-212	3 1	6	1	pCi/g

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Slurry	Pb-214	1.4	6	1	pCi/g
Slurry	Po-210	14000	6	1	pCi/g
Slurry	Ra-226	9.8	6	1	pCi/g
Slurry	Th-230	0	6	1	pCi/g
Slurry	Th-231	0	6	1	pCi/g
Slurry	Tl-208	1.2	6	1	pCi/g
Slurry	U238/234	10	6	0.666667	pCi/g
Soil	Antimony	0	3	1	mg/kg
Soil	Arsenic	30.5	3	1	mg/kg
Soil	Barium	1580	3	1	mg/kg
Soil	Cadmium	618	3	1	mg/kg
Soil	Calcium	175000	3	1	mg/kg
Soil	Chromium	158	3	1	mg/kg
Soil	Cobalt	0	3	1	mg/kg
Soil	Copper	281	3	1	mg/kg
Soil	Iron	129000	3	1	mg/kg
Soil	Lead	34.6	3	1	mg/kg
Soil	Manganese	14000	3	1	mg/kg
Soil	Molybdenum	0	3	1	mg/kg
Soil	Nickel	331	3	1	mg/kg
Soil	Potassium	19300	3	1	mg/kg
Soil	Selenium	0	3	1	mg/kg
Soil	Silver	11.4	3	1	mg/kg
Soil	Strontium	394	3	1	mg/kg
Soil	Tin	67.1	3	1	mg/kg
Soil	Vanadium	302	3	1	mg/kg
Soil	Zinc	417	3	1	mg/kg
Soil	Ac-228	8.8	2	1	pCi/g
Soil	Am-241	16	2	0.5	pCi/g
Soil	Bi-212	11	2	1	pCi/g
Soil	Bi-214	1.9	2	1	pCi/g
Soil	Cs-137	0	2	1	pCi/g
Soil	K-40	32	2	1	pCi/g
Soil	Pa-234	0	2	1	pCi/g
Soil	Pa-234m	0	2	1	pCi/g
Soil	Pb-212	8.6	2	1	pCi/g
Soil	Pb-214	2.6	2	1	pCi/g
Soil	Po-210	0	2	1	pCi/g
Soil	Ra-226	59	2	1	pCi/g
Soil	Th-230	0	2	1	pCi/g
Soil	Th-231	0	2	1	pCi/g
Soil	Tl-208	2.8	2	1	pCi/g
Soil	U238/234	54	2	0.5	pCi/g
Soil	1-Hexanol 2-Ethyl-	38	4	1	ug/kg
Soil	4-Bromofluorobenzene	67.8	2	1	ug/kg
Soil	Acetone	55	6	0.666667	ug/kg
Soil	Fluorobenzene	66.1	2	1	ug/kg
Soil	Toluene	14.5	6	0.333333	ug/kg
Solid	Ac-228	0	5	1	pCi/g
Solid	Am-241	740	6	1	pCi/g
Solid	Bi-212	8.1	5	1	pCi/g
Solid	Bi-214	0	5	1	pCi/g
Solid	Cs-137	0	5	1	pCi/g
Solid	K-40	120	5	1	pCi/g
Solid	Pa-234	0	5	1	pCi/g
Solid	Pa-234m	100	5	1	pCi/g
Solid	Pb-212	2.1	5	1	pCi/g

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Solid	Pb-214	0	5	1	pCi/g
Solid	Po-210	0	5	1	pCi/g
Solid	Pu 239	0	5	1	pCi/g
Solid	Ra-226	36	5	1	pCi/g
Solid	Th-230	0	5	1	pCi/g
Solid	Th-231	21	5	1	pCi/g
Solid	Tl 208	0 56	5	1	pCi/g
Solid	U 235	4 3	5	0 8	pCi/g
Solid	U238/234	100	5	1	pCi/g
Solid	1 2 4-Trimethylbenzene	4690 4	5	0 2	ug/kg
Solid	1 3 5 Trimethylbenzene	1527 8	5	0 2	ug/kg
Solid	4-Bromofluorobenzene	51944 0	5	1	ug/kg
Solid	4-Isopropyltoluene	932 0	5	0 2	ug/kg
Solid	Acetone	26209 5	5	1	ug/kg
Solid	Ethylbenzene	802 1	5	0 2	ug/kg
Solid	Fluorobenzene	46536 5	5	1	ug/kg
Solid	Naphthalene	2337 5	5	0 2	ug/kg
Solid	Toluene	1553 3	5	0 4	ug/kg
Aqueous	Pu239240	0 829	3	100	pCi/l
Aqueous	Am241	0 978	4	100	pCi/l
Aqueous	Mercury	1 3	12	75	ug/l
Aqueous	Cobalt	100	12	100	mg/l
Aqueous	Calcium	1000000	12	100	mg/l
Aqueous	Beryllium	11	12	50	mg/l
Aqueous	4-Methyl-2-Pentanone	11 09	4	25	ug/l
Aqueous	Zinc	11000	12	100	ug/l
Aqueous	Titanium	1200	10	80	ug/l
Aqueous	Tin	130	12	50	mg/l
Aqueous	Strontium	13000	12	100	ug/l
Aqueous	Silver	14	12	42	mg/l
Aqueous	Cadmium	170	12	83	mg/l
Aqueous	Aluminum	170000	12	100	mg/l
Aqueous	Copper	1800	12	92	mg/l
Aqueous	Selenium	21	12	50	mg/l
Aqueous	Acetone	2178 2	4	50	ug/l
Aqueous	Iron	260000	12	100	mg/l
Aqueous	Sodium	2600000	12	100	mg/l
Aqueous	Barium	2800	12	92	mg/l
Aqueous	Lithium	2800	12	100	mg/l
Aqueous	2-Butanone	327 6	4	25	ug/l
Aqueous	Molybdenum	360	12	92	mg/l
Aqueous	Vanadium	360	12	92	mg/l
Aqueous	Antimony	37	12	58	mg/l
Aqueous	Manganese	4100	12	100	ug/l
Aqueous	Uranium	4200	10	80	ug/l
Aqueous	Chromium	450	12	100	mg/l
Aqueous	Magnesium	450000	12	100	mg/l
Aqueous	U235	46 1	4	75	pCi/l
Aqueous	Nickel	490	12	100	mg/l
Aqueous	1 4-Dichlorobenzene-D4	50	4	100	ug/l
Aqueous	Chlorobenzene-D5	50	4	100	ug/l
Aqueous	Fluorobenzene	50	4	100	ug/l
Aqueous	Toluene-D8	53 33	4	100	ug/l
Aqueous	4-Bromofluorobenzene	54 44	4	100	ug/l
Aqueous	1,2-Dichloroethane-D4	59 41	4	100	ug/l
Aqueous	2-Hexanone	6 82	4	25	ug/l
Aqueous	Boron	6400	10	100	ug/l

78

*Closeout Report for IHSS Group 000-1 Solar Evaporation Ponds Area of Concern*

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Aqueous	U238	681	4	100	pci/l
Aqueous	Benzene	7.49	4	25	ug/l
Aqueous	Silica As SiO2 Dissolved	75000	10	100	ug/l
Aqueous	Arsenic	77	12	83	mg/l
Aqueous	Lead	890	12	83	mg/l
Aqueous	Thallium	9.2	12	33	mg/l
Aqueous	Potassium	940000	12	100	mg/l
Aqueous	U233234	993	4	100	pci/l

RAO 1 Provide a remedy consistent with the RFETS goal of protection of human health and the environment. The removal of slabs, the valve pit, valve components, line sections, sumps, and hot spots, and the disruption of remaining lines contributed to the protection of human health and the environment because potential sources of contamination were removed or isolated.

RAO 2 Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls. The removal of slabs, the valve pit, valve components, line sections, sumps, and hot spots, and the disruption of remaining lines minimize the need for long-term maintenance and institutional or engineering controls because potential sources of contamination were removed or isolated.

RAO 3 Minimize the spread of contamination during implementation of accelerated actions. Best management practices were used to prevent the spread of contamination during the accelerated action (e.g., erosion and dust controls). Air monitoring data during the accelerated action did not indicate any exceedances.

### **13.0 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 02-07 [DOE 2002a]),
- Collection of samples in accordance with the sampling design,
- Results of the Data Quality Assessment (DQA) as described in the following sections.

#### **13.1 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, and
- Kaiser-Hill Company, L L C (K-H) V&V Guidelines
- General Guidelines for Data Verification and Validation, DA-GR01-v1, 1997a
- V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v1, 1998
- V&V Guidelines for Volatile Organics, DA-SS01-v1, 1997b
- V&V Guidelines for Semivolatile Organics, DA-SS02-v1, 1997c
- V&V Guidelines for Metals, DA-SS05-v1, 1997d
- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5

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

### **13.2 Verification and Validation of Results**

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

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

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 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.

Both real and QC data, as of June 10, 2003, are included on the enclosed compact discs.

### **13.2.1 Accuracy**

The following measures of accuracy were evaluated:

- Laboratory Control Sample Evaluation,
- Surrogate Evaluation,
- Field Blanks, and
- Sample Matrix Spike 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 quality control (QC) results could indicate unacceptable levels of uncertainty for decision-making purposes.

#### Laboratory Control Sample Evaluation

The frequency of Laboratory Control Sample (LCS) measurements, relative to each laboratory batch, is given in Table 16. 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. Any qualifications of results due to LCS performance exceeding upper or lower tolerance limits are captured in the V&V flags, described in the Completeness Section.

#### Surrogate Evaluation

Surrogates were not evaluated because analyses for VOCs and SVOCs were not conducted.

**Table 16**  
**Laboratory Control Sample Evaluation**

CAS No	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
10-12-8	PU239/240	LC	97	105	2	2	%REC	ALPHA SPEC
10-12-8	PU239/240	LC	97	105	2	2	%REC	ALPHA SPEC
11-08-5	U233/234	LC	92	94	2	2	%REC	ALPHA SPEC
14596-10-2	AM241	LC	88	100	2	2	%REC	ALPHA SPEC
14797-55-8	NITRATE AS N	LC	93	100	10	10	%REC	SW9056 OR E300 0 PREP E300 0
14797-65-0	NITRITE AS N	LC	97	97	2	2	%REC	SW9056 OR E300 0 PREP E300 0
15117-96-1	U235	LC	93	93	1	1	%REC	ALPHA SPEC
7429-90-5	ALUMINUM	LC	97	97	1	1	%REC	SW-846 6010/6010B
7429-90-5	ALUMINUM	LC	93	101	5	5	%REC	SW-846 6010
7439-89-6	IRON	LC	94	101	5	5	%REC	SW-846 6010
7439-89-6	IRON	LC	99	99	1	1	%REC	SW-846 6010/6010B
7439-92-1	LEAD	LC	103	103	1	1	%REC	SW-846 6010/6010B
7439-92-1	LEAD	LC	93	97	5	5	%REC	SW-846 6010
7439-93-2	LITHIUM	LC	94	106	5	5	%REC	SW-846 6010
7439-93-2	LITHIUM	LC	101	101	1	1	%REC	SW-846 6010/6010B
7439-96-5	MANGANESE	LC	92	97	5	5	%REC	SW-846 6010
7439-96-5	MANGANESE	LC	101	101	1	1	%REC	SW-846 6010/6010B
7439-97-6	MERCURY	LC	101	101	1	1	%REC	SW-846 6010/6010B
7439-97-6	MERCURY	LC	95	101	5	5	%REC	SW-846 6010
7439-98-7	MOLYBDENUM	LC	88	93	5	5	%REC	SW-846 6010
7439-98-7	MOLYBDENUM	LC	100	100	1	1	%REC	SW-846 6010/6010B
7440-02-0	NICKEL	LC	104	104	1	1	%REC	SW-846 6010/6010B
7440-02-0	NICKEL	LC	93	96	5	5	%REC	SW-846 6010
7440-22-4	SILVER	LC	106	106	1	1	%REC	SW-846 6010/6010B
7440-22-4	SILVER	LC	97	101	5	5	%REC	SW-846 6010
7440-24-6	STRONTIUM	LC	106	106	1	1	%REC	SW-846 6010/6010B
7440-24-6	STRONTIUM	LC	93	98	5	5	%REC	SW-846 6010
7440-31-5	TIN	LC	100	100	1	1	%REC	SW-846 6010/6010B
7440-31-5	TIN	LC	90	94	5	5	%REC	SW-846 6010
7440-36-0	ANTIMONY	LC	103	103	1	1	%REC	SW-846 6010/6010B
7440-36-0	ANTIMONY	LC	90	94	5	5	%REC	SW-846 6010
7440-38-2	ARSENIC	LC	92	96	5	5	%REC	SW-846 6010
7440-38-2	ARSENIC	LC	100	100	1	1	%REC	SW-846 6010/6010B
7440-39-3	BARIUM	LC	107	107	1	1	%REC	SW-846 6010/6010B
7440-39-3	BARIUM	LC	94	100	5	5	%REC	SW-846 6010
7440-41-7	BERYLLIUM	LC	94	102	5	5	%REC	SW-846 6010
7440-41-7	BERYLLIUM	LC	100	100	1	1	%REC	SW-846 6010/6010B
7440-43-9	CADMIUM	LC	102	102	1	1	%REC	SW-846 6010/6010B
7440-43-9	CADMIUM	LC	92	96	5	5	%REC	SW-846 6010

64

CAS No	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
7440-48-4	COBALT	LC	97	97	1	1	%REC	SW-846 6010/6010B
7440-48-4	COBALT	LC	89	94	5	5	%REC	SW-846 6010
7440-50-8	COPPER	LC	92	97	5	5	%REC	SW-846 6010
7440-50-8	COPPER	LC	100	100	1	1	%REC	SW-846 6010/6010B
7440-61-1	U238	LC	92	95	2	2	%REC	ALPHA SPEC
7440-62-2	VANADIUM	LC	99	99	1	1	%REC	SW-846 6010/6010B
7440-62-2	VANADIUM	LC	91	97	5	5	%REC	SW-846 6010
7440-66-6	ZINC	LC	88	93	5	5	%REC	SW-846 6010
7440-66-6	ZINC	LC	97	97	1	1	%REC	SW-846 6010/6010B
7782-49-2	SELENIUM	LC	101	101	1	1	%REC	SW-846 6010/6010B
7782-49-2	SELENIUM	LC	92	96	5	5	%REC	SW-846 6010

Field Blank Evaluation

Results of the field blank analyses are given in Table 17. Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminants are detected in the associated real samples. Blank contamination was not detected for any contaminants that exceeded ALs within the data set of interest (e.g., arsenic and beryllium), therefore no significant blank contamination, or false positives, are indicated.

**Table 17  
Field Blank Summary**

Sample QC Code	Test Method Name	Analyte	Maximum Detected Value	Unit
Rinse Blank	Gamma Spectroscopy	Uranium-235	0.2	pCi/g
Rinse Blank	Gamma Spectroscopy	Uranium-238	3.7	pCi/g

Field Blanks (Trip, Rinse, Field) results greater than detection limits (not \*U\* Qualified)

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 of MS results are summarized by chemical, for the entire project in Table 18. No results are rejected based on MS recoveries alone.

85

**Table 18**  
**Sample Matrix Spike Evaluation**

CAS No	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
7429-90-5	ALUMINUM	MS	0	2810	4	4	%REC	SW-846 6010
7439-89-6	IRON	MS	0	4700	4	4	%REC	SW-846 6010
7439-92-1	LEAD	MS	84	150	4	4	%REC	SW-846 6010
7439-93-2	LITHIUM	MS	96	99	4	4	%REC	SW-846 6010
7439-96-5	MANGANESE	MS	0	215	4	4	%REC	SW-846 6010
7439-97-6	MERCURY	MS	86	102	4	4	%REC	SW-846 6010
7439-98-7	MOLYBDENUM	MS	82	87	4	4	%REC	SW-846 6010
7440-02-0	NICKEL	MS	75	94	4	4	%REC	SW-846 6010
7440-22-4	SILVER	MS	92	98	4	4	%REC	SW-846 6010
7440-24-6	STRONTIUM	MS	62	113	4	4	%REC	SW-846 6010
7440-31-5	TIN	MS	83	88	4	4	%REC	SW-846 6010
7440-36-0	ANTIMONY	MS	41	62	4	4	%REC	SW-846 6010
7440-38-2	ARSENIC	MS	88	92	4	4	%REC	SW-846 6010
7440-39-3	BARIUM	MS	76	106	4	4	%REC	SW-846 6010
7440-41-7	BERYLLIUM	MS	86	97	4	4	%REC	SW-846 6010
7440-43-9	CADMIUM	MS	0	89	4	4	%REC	SW-846 6010
7440-48-4	COBALT	MS	81	89	4	4	%REC	SW-846 6010
7440-50-8	COPPER	MS	79	105	4	4	%REC	SW-846 6010
7440-62-2	VANADIUM	MS	79	128	4	4	%REC	SW-846 6010
7440-66-6	ZINC	MS	68	130	4	4	%REC	SW-846 6010
7782-49-2	SELENIUM	MS	87	92	4	4	%REC	SW-846 6010
7429-90-5	ALUMINUM	MS	1820	1820	1	1	%REC	SW-846 6010/6010B
7439-89-6	IRON	MS	368	368	1	1	%REC	SW-846 6010/6010B
7439-92-1	LEAD	MS	111	111	1	1	%REC	SW-846 6010/6010B
7439-93-2	LITHIUM	MS	91	91	1	1	%REC	SW-846 6010/6010B
7439-96-5	MANGANESE	MS	94	94	1	1	%REC	SW-846 6010/6010B
7439-97-6	MERCURY	MS	92	92	1	1	%REC	SW-846 6010/6010B
7439-98-7	MOLYBDENUM	MS	92	92	1	1	%REC	SW-846 6010/6010B
7440-02-0	NICKEL	MS	95	95	1	1	%REC	SW-846 6010/6010B
7440-22-4	SILVER	MS	122	122	1	1	%REC	SW-846 6010/6010B
7440-24-6	STRONTIUM	MS	92	92	1	1	%REC	SW-846 6010/6010B
7440-31-5	TIN	MS	97	97	1	1	%REC	SW-846 6010/6010B
7440-36-0	ANTIMONY	MS	62	62	1	1	%REC	SW-846 6010/6010B
7440-38-2	ARSENIC	MS	109	109	1	1	%REC	SW-846 6010/6010B
7440-39-3	BARIUM	MS	97	97	1	1	%REC	SW-846 6010/6010B
7440-41-7	BERYLLIUM	MS	87	87	1	1	%REC	SW-846 6010/6010B
7440-43-9	CADMIUM	MS	94	94	1	1	%REC	SW-846 6010/6010B
7440-48-4	COBALT	MS	93	93	1	1	%REC	SW-846 6010/6010B
7440-50-8	COPPER	MS	183	183	1	1	%REC	SW-846 6010/6010B
7440-62-2	VANADIUM	MS	100	100	1	1	%REC	SW-846 6010/6010B

86

CAS No	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
7440-66-6	ZINC	MS	0	0	1	1	%REC	SW-846 6010/6010B
7782-49-2	SELENIUM	MS	114	114	1	1	%REC	SW-846 6010/6010B
14797-55-8	NITRATE AS N	MS	82	126	5	5	%REC	SW9056 OR E300 0 PREP E300 0
14797-65-0	NITRITE AS N	MS	92	92	1	1	%REC	SW9056 OR E300 0 PREP E300 0

### 13.2.2 Precision

#### Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSD. Adequate frequency of MSD measurements is indicated by at least one MSD in each laboratory batch. Table 19 indicates that MSD frequencies were adequate. While the variability for those contaminants with Relative Percent Differences (RPDs) greater than 35% is considered relatively high, the repeatability of real results were consistently below ALs. Consequently, project decisions are not altered or qualified due to the MSD results.

**Table 19**  
**Sample Matrix Spike Duplicate Evaluation**

Analyte Name	Number of Sample Pairs	Number of Laboratory Batches	Max RPD (%)
NITRATE AS N	5	5	1.09
NITRITE AS N	1	1	1.09
ALUMINUM	1	1	103.84
ALUMINUM	3	3	43.17
IRON	3	3	81.44
LEAD	4	4	57.51
LEAD	1	1	55.17
LITHIUM	1	1	10.42
LITHIUM	4	4	4.12
MANGANESE	3	3	17.10
MANGANESE	1	1	3.24
MERCURY	1	1	1.08
MERCURY	4	4	19.75
MOLYBDENUM	1	1	2.15
MOLYBDENUM	4	4	3.51
NICKEL	1	1	2.13
NICKEL	4	4	13.66
SILVER	4	4	7.84
SILVER	1	1	5.04
STRONTIUM	4	4	30.14
STRONTIUM	1	1	17.82
TIN	4	4	2.38

87

Analyte Name	Number of Sample Pairs	Number of Laboratory Batches	Max RPD (%)
TIN	1	1	2.04
ANTIMONY	4	4	21.62
ANTIMONY	1	1	20.29
ARSENIC	4	4	1.12
ARSENIC	1	1	0.92
BARIIUM	4	4	22.22
BARIIUM	1	1	30.95
BERYLLIUM	4	4	11.76
BERYLLIUM	1	1	3.39
CADMIUM	1	1	13.64
CADMIUM	2	2	58.06
COBALT	4	4	5.99
COBALT	1	1	1.08
COPPER	4	4	28.26
VANADIUM	4	4	26.37
VANADIUM	1	1	10.53
ZINC	4	4	23.38
SELENIUM	4	4	1.12
SELENIUM	1	1	0.88

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 20 indicates that sampling frequencies were adequate. A common metric for evaluating precision is the Relative Percent Difference (RPD) value, RPD values are given in Table 21. Ideally, RPDs of less than 35 percent (in soil) indicate satisfactory precision. While the variability for those contaminants with RPDs greater than 35% is considered relatively high, the repeatability of real results were consistently below ALs for those contaminants. Consequently, project decisions are not altered due to the field duplicate results.

82

**Table 20**  
**Field Duplicate Sample Frequency**

Test Method Name	Sample Code	Number of Samples	% Duplicate Samples
ALPHA SPEC	REAL	33	0 0
GAMMA SPECTROSCOPY	DUP	1	1 4
GAMMA SPECTROSCOPY	REAL	71	
SW-846 6010	DUP	1	2 7
SW-846 6010	REAL	37	
SW-846 6010/6010B	REAL	1	0 0
SW-846 6200	DUP	2	5 9
SW-846 6200	REAL	34	
SW9056 OR E300 0 PREP E300 0	DUP	1	4 2
SW9056 OR E300 0 PREP E300 0	REAL	24	

**Table 21**  
**RPD Evaluation**

ALUMINUM	0 00
ANTIMONY	2 11
ARSENIC	25 51
BARIUM	148 35
BERYLLIUM	4 49
COBALT	5 41
COPPER	47 95
IRON	7 62
LEAD	18 18
LITHIUM	0 00
MANGANESE	11 11
MERCURY	32 84
MOLYBDENUM	0 00
NICKEL	14 10
SELENIUM	1 83
SILVER	31 45
STRONTIUM	66 67
TIN	4 26
VANADIUM	19 47
ZINC	16 88

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

89

practices are consistent with quality requirements Table 22 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 Although the frequency of validation for the project is less than 25 percent for all of the analytical suites, the validation goal of 25 percent for the ER Program as a whole will be met Because the same laboratories are used for all projects under the ER Program, it is inferred that the project's analytical records are of adequate quality for making decisions

### **13.2.3 Sensitivity**

Reporting limits, in units of ug/kg for organics, mg/kg for metals, and pCi/g for radionuclides, were compared with proposed RFCA Tier I, Tier II, 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

### **13.3 Summary of Data Quality**

Data collected and used for IHSS Group 000-1 are adequate for decision-making The RPDs greater than 35 percent for field duplicate samples exceeded project goals However, all real samples for those contaminants in excess of the RPD goal were repeatable at concentrations well below their respective ALs, consequently, project decisions were not affected Although the project validation frequency is less than 25 percent, the ER program goal of 25 percent per analytical suite will be met Only a very small percentage of records were rejected If additional V&V information is received, IHSS Group 000-1 records will be updated in the Soil Water Database Data qualified as a result of additional data will be assessed as part of the Comprehensive Risk Assessment process

## **14.0 CONCLUSION**

Results of the accelerated action justify No Further Accelerated Action Justification is based on the following

- 1 No accelerated action required by surface soil data,
- 2 No accelerated action required by the subsurface soil risk screen,
- 3 No accelerated action required by the stewardship evaluation, and
- 4 No accelerated action required by ALARA consideration (i e , no elevated concentrations of radionuclides)

**Table 22**  
**Validation and Verification Summary**

Validation and Verification Summary				
No V&V	1168	1168	0	0
I	3	0	3	0
J	73	11	60	2
J1	220	0	194	26
R	7	7	0	0
R1	5	0	4	1
V	359	145	214	0
V1	1196	0	1196	0
UJ	18	2	16	0
UJ1	43	0	43	0
<b>Total</b>	<b>3092</b>	<b>1333</b>	<b>1730</b>	<b>29</b>
<b>Total Validated</b>	<b>457</b>	<b>165</b>	<b>290</b>	<b>2</b>
<b>% Validated</b>	<b>14.8%</b>	<b>12%</b>	<b>17%</b>	<b>7%</b>
<b>Total Verified</b>	<b>1467</b>	<b>165</b>	<b>1440</b>	<b>27</b>
<b>% Verified</b>	<b>47.4%</b>	<b>12%</b>	<b>83%</b>	<b>93%</b>
<b>% Rejected</b>	<b>0.4%</b>	<b>0.5%</b>	<b>0.2%</b>	<b>3%</b>
<b>Key</b>	<b>I, V1 - Verified</b>			
	<b>J, J1 - Estimated</b>			
	<b>UJ1 - Estimated detection limit</b>			
	<b>J, V - Validated</b>			

91

## **15.0 REFERENCES**

CDPHE, 2002, Environmental Restoration RFCA Standard Operating Protocol FY02 Notification #02-08 Approval Letter, July

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

DOE, 2002a, Industrial Area Sampling and Analysis Plan Addendum #IA-02-07, Rocky Flats Environmental Technology Site, Golden, CO, August

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

DOE, 2002c, Environmental Restoration RFCA Standard Operating Protocol Notification #02-08, Rocky Flats Environmental Technology Site, Golden, CO, August

DOE, 2002d, RCRA Closure of the RFETS Solar Evaporation Ponds, Proposed Action Memorandum, Rocky Flats Environmental Technology Site, Golden, CO, September

DOE, CDPHE, EPA, 2002, Proposed Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, CO, November

**Appendix A  
Project Photographs**

Best Available Copy

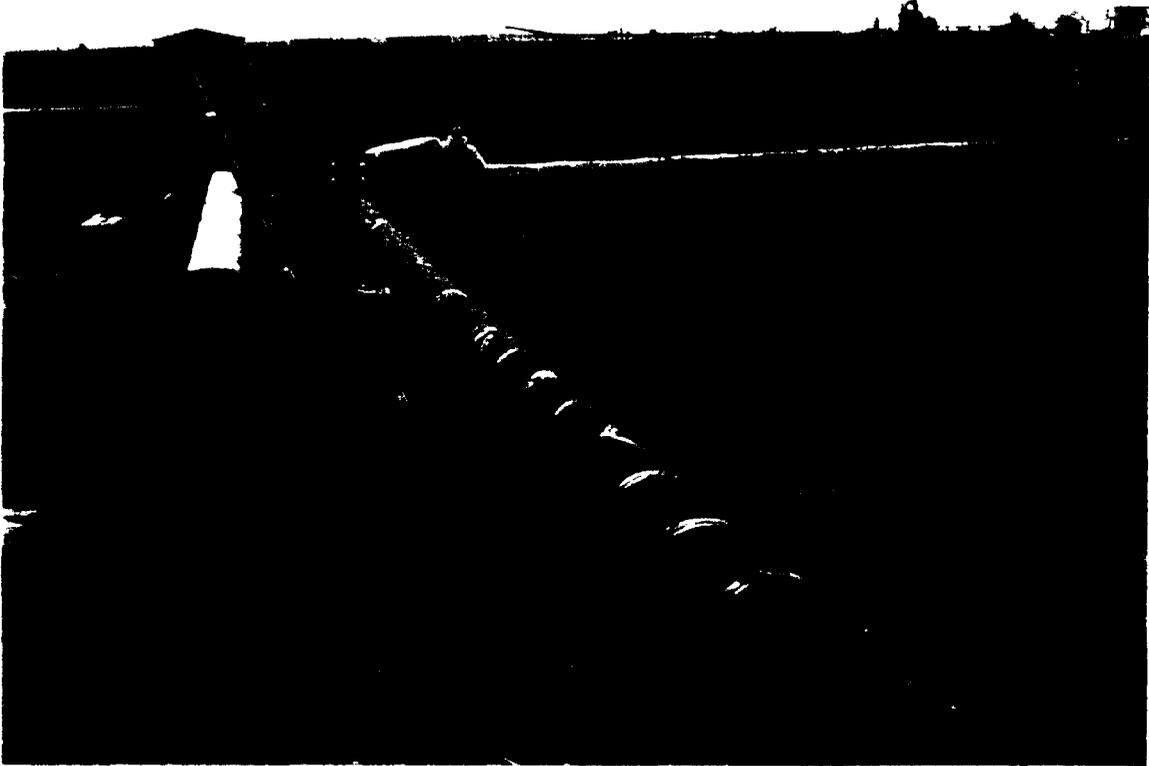
93



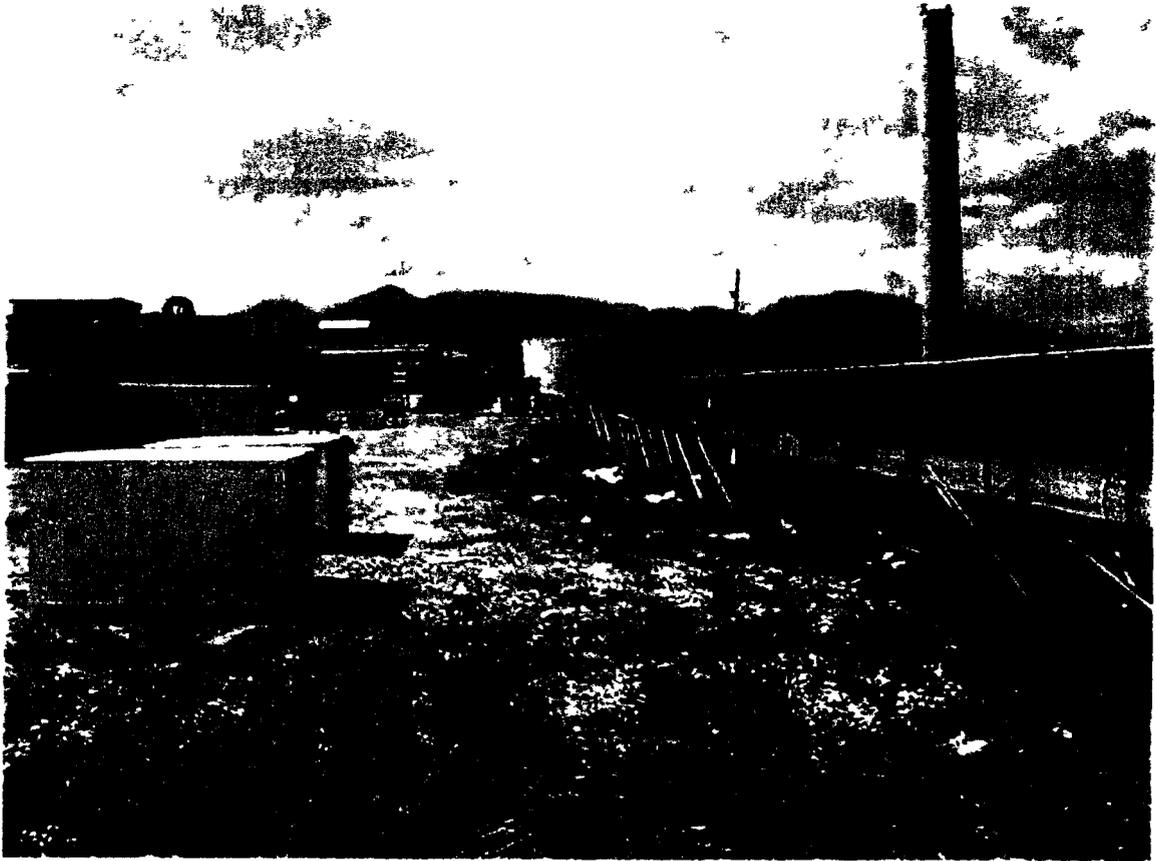
788 Roadbase Removal

94

Best Available Copy



910 - 374 NPWL Removal



910 -374 NPWL North of B779 Prior to Removal



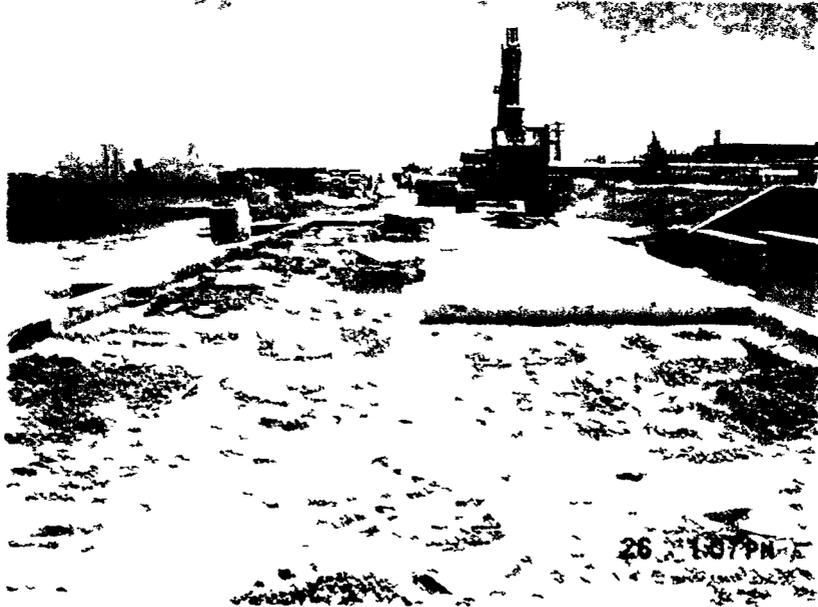
910 - 374 NPWL Removed North of B799



14 12.06 PM

B788A Slab Sawcutting

97

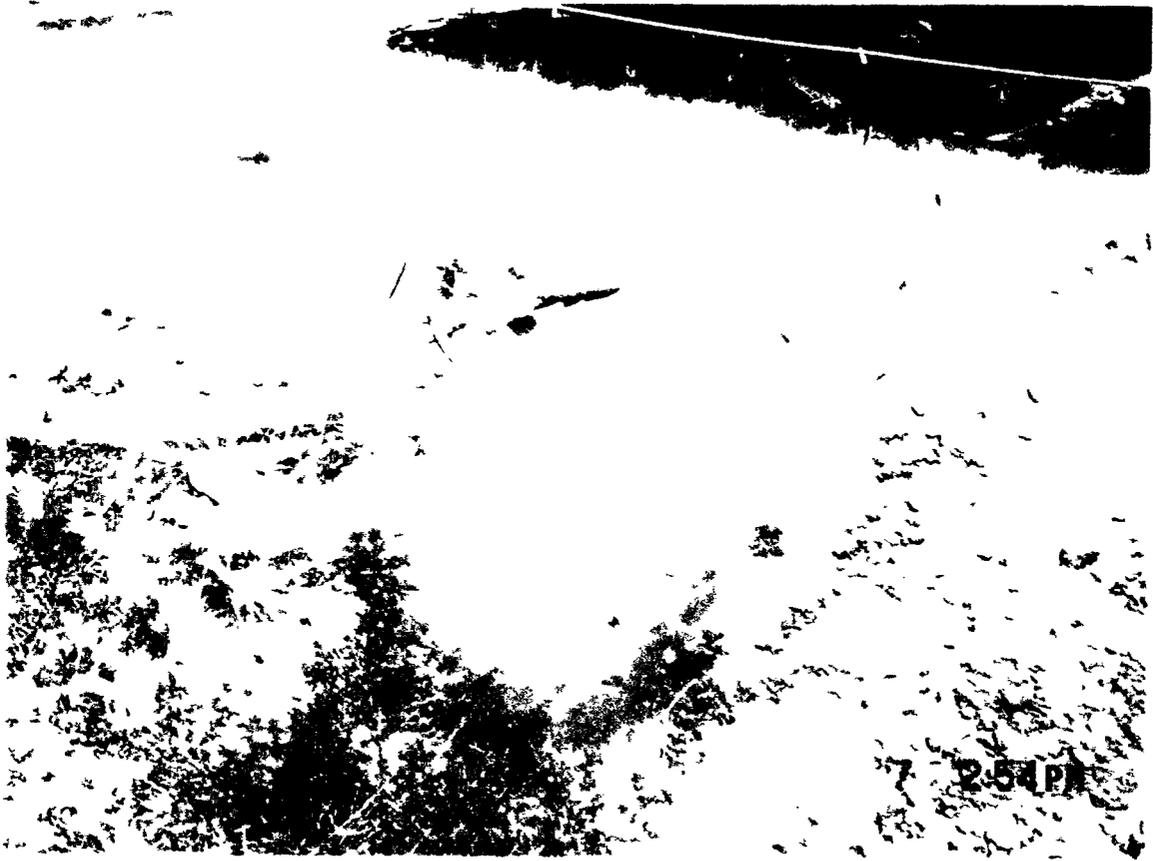


B788A Slab Removal



B788A Footing Excavated

7  
96

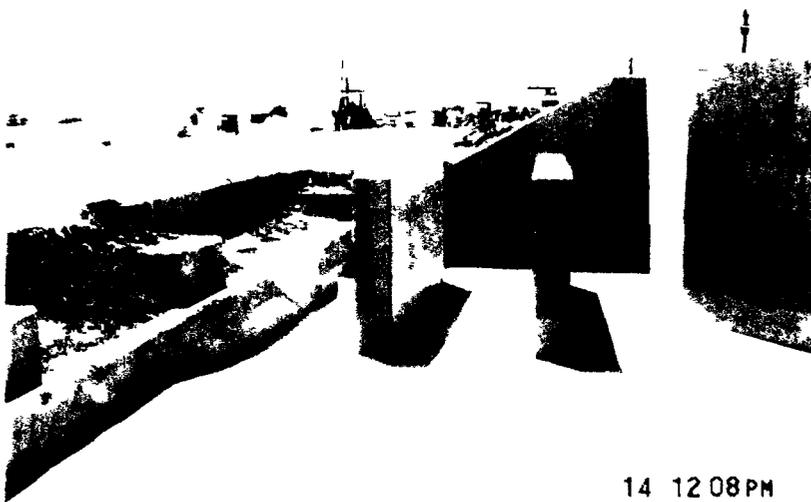


308A Clarifier Pad



308A Clarifier Pad Sawcutting

91



14 12 08 PM

Mixer Support Slab and B788A Slab



Silo and Mixer Slab Removal

180



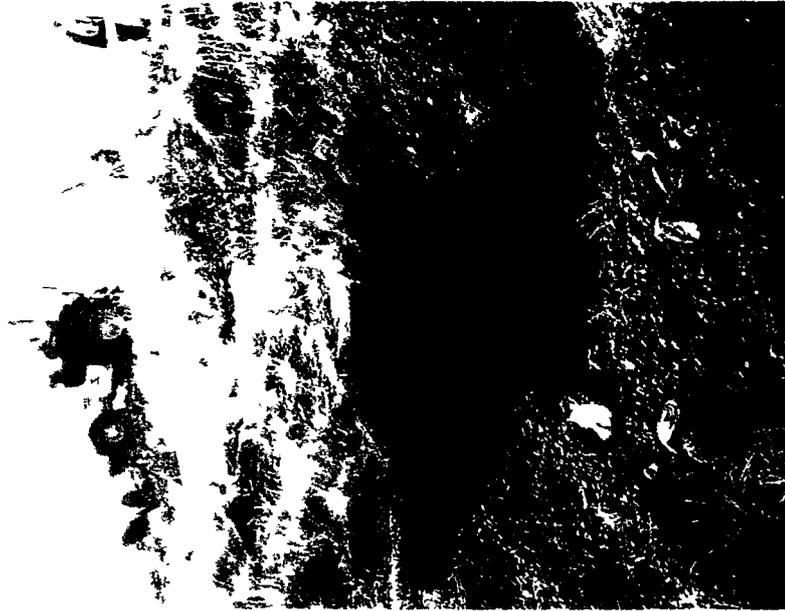
4 2 15 PM

Valve Pit #1 Removal

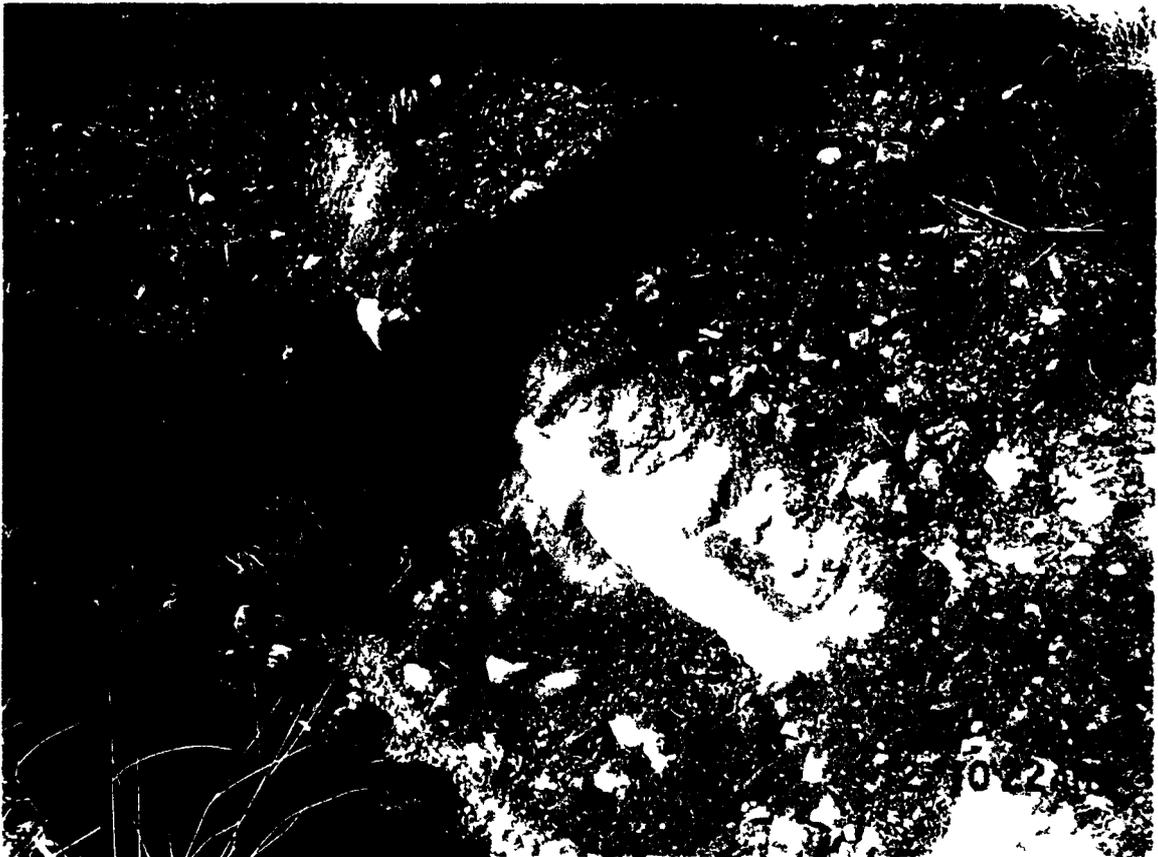


1 8 15 AM

Sump #1 Removed



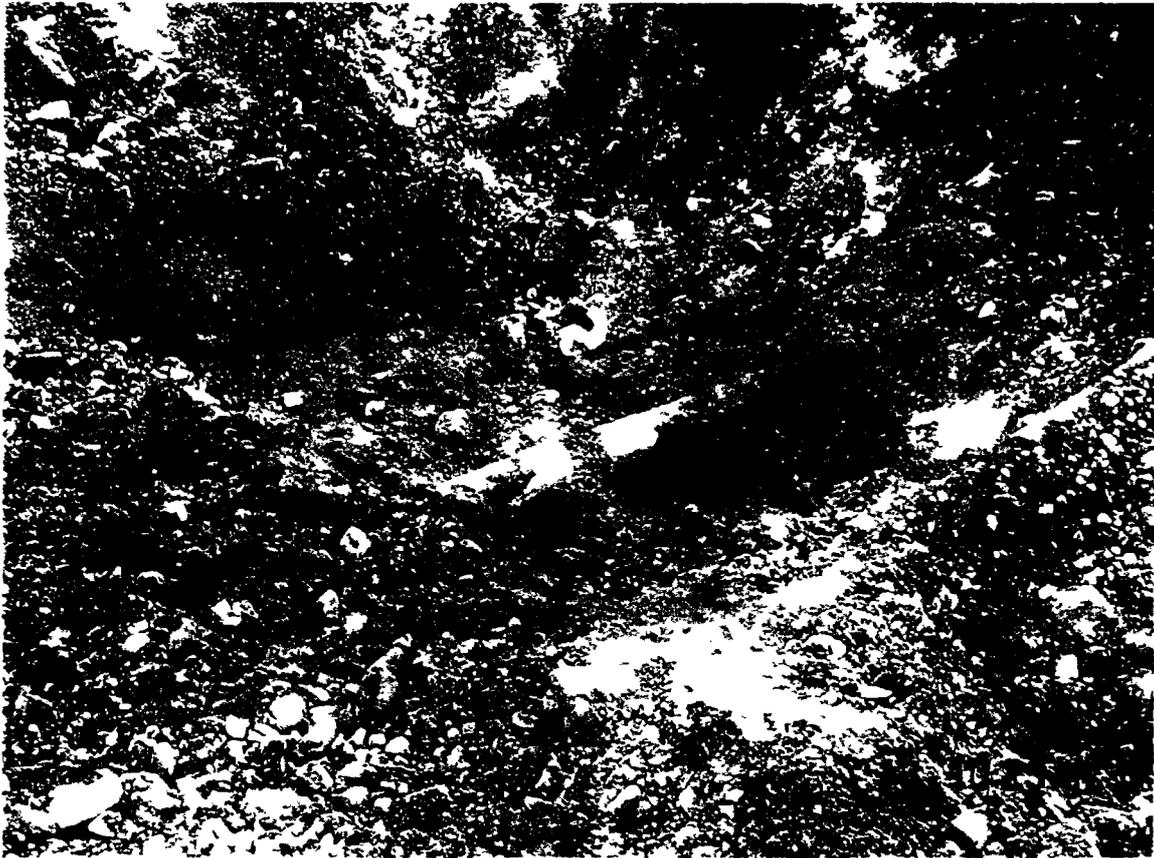
Sump #2 Removed



Pond 207B Leak Detection Drainline Excavated



Pond 207C Leak Detection Drainline Excavated



MST Return Line Disrupted and Foamed

**Appendix B  
Correspondence**

104

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE ER REGULATORY CONTACT RECORD

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**Date/Time.** September 30, 2002/ Bldg 116 CR #93 10 00 a m Meeting  
**Site Contact(s).** Tom Lindsay  
**Phone** x5705  
**Regulatory Contact.** Carl Spreng  
**Phone:** 303-692-3358  
**Agency** CDPHE

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**Purpose of Contact.** Consultative Process to Discuss Surface Soil Removals for Risk Reduction at Solar Ponds Project

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**Discussion** - On Monday, September 30, 2002, KH/ER met with the regulators and discussed the surface soil removal locations for Risk Reduction at the Solar Ponds. The following six locations were identified: SS403093, SS402893, 43793, SS440593, SS400693, and SS402793. These locations were selected based on the fact they either exceeded the Am-241 or Pu-239 PRG  $10^{-5}$  Action Level for the Wildlife Refuge Worker (WRW) or they increased non-carcinogenic risks due to non-radiological constituents such as Cadmium.

The removals will be based on a 1 square meter area, 15-24 centimeters deep (or 6-12 inches). A micro-Rad meter will be used to survey each area ahead of time and confirm the extent of activity does not exceed 1 meter square, otherwise, the area will be adjusted accordingly. After the removal, one discrete confirmation sample (not composite) will be taken for rads and metals in the center of the area. Five of the six locations are found in the berm areas and one north of 207A and 207B North ponds.

In discussion, it was noted the current Risk Assessment includes these locations and the risk assessment would be reduced even further by removing them. The PAM/NFA will not be revised to account for the surface soil removals. This work is being performed under the current ER-RSOP Notification #02-08.

After the meeting this morning a conference call was held between Marla Broussard - KH and Jean MacKenzie - EPA to brief the EPA on the discussion of the meeting.

**Attendees:** Carl Spreng - CDPHE, Russ McCalister - DOE, Marla Broussard - KH, Susan Serreze - KH, Laura Brooks - KH, Carla Rellergert - KH, Tom Lindsay - KH

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**Contact Record Prepared By:** Tom Lindsay, Bldg T-124A, 5705

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## Required Distribution

S Bell, RFFO  
L Brooks, K-H ESS  
L Butler, K-H RISS  
C Deck, K-H Legal  
R DiSalvo, RFFO  
S Gunderson, CDPHE  
J Legare, RFFO

D Mayo, K-H RISS  
J Mead, K-H ESS  
S Nesta, K-H RISS  
K North, K-H ESS  
T Rehder, USEPA  
D Shelton, K-H  
C Spreng, CDPHE

## Additional Distribution

(choose names as applicable)

M Broussard, K-H RISS  
J Hindman, CDPHE  
G Kleeman, USEPA  
D Kruchek, CDPHE  
L Norland, K-H RISS  
A Primrose, K-H RISS  
E Pottorff, CDPHE  
S Tower, DOE

Contact Record 6/20/02  
Rev 6/20/02

105

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE ER REGULATORY CONTACT RECORD

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**Date/Time.** December 17, 2002/ 3 00 pm  
**Site Contact(s):** Hanna Marschall, Reginald Tyler  
**Phone:** (303) 966-4085 (303) 966-5927  
**Regulatory Contact.** Carl Spreng  
**Phone:** (303) 692-3358  
**Agency:** CDPHE

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**Purpose of Contact:** Permission to re-grade Building 335

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### **Discussion**

While grading at the site of the former building 335, soil staining was noted at the southeast corner of the slab. An additional sample was collected for volatile organic compounds (VOC) and metals in the soil to determine if soil contamination above action levels was present. A review of the sample data indicates that all constituents are below Tier 1 and Tier 2 action levels with the exception of an arsenic concentration of 19 ppm, slightly exceeding the arsenic background value. However, this value is within the range of arsenic concentrations identified at other locations even though it is slightly above the official background value.

After review of this data and based on similar arsenic concentrations seen at several other locations that are accepted to be within the arsenic background range, both Reg Tyler, DOE and Carl Spreng, CDPHE agreed that the B335 area can be regraded.

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**Contact Record Prepared By:** Hanna Z. Marschall

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### Required Distribution

S. Bell, RFFO	D. Mayo, K-H RISS
L. Brooks, K-H ESS	J Mead, K-H ESS
L. Butler, K-H RISS	S Nesta, K-H RISS
C. Deck, K-H Legal	K North, K-H ESS
R. DiSalvo, RFFO	T. Rehder, USEPA
S. Gunderson, CDPHE	D. Shelton, K-H
J. Legare, RFFO	E. Pottorff, CDPHE
D. Kruchek, CDP	R. Tyler, RFFO

### Additional Distribution

(choose names as applicable):

M. Broussard, K-H RISS  
S. Serreze, K-H RISS  
G. Kleeman, USEPA  
G. Kelly, K-H RISS  
L. Norland, K-H RISS  
A. Primrose, K-H RISS  
D. Foss, K-H RISS  
C. Freiboth, K-H RISS  
H. Marschall, K-H RISS  
N. Castaneda, RFFO  
S. Surovchak, RFFO

**Appendix C**  
**Data Comparison with Proposed RCFA Action Levels**

107

**SEP AOC Accelerated Action Characterization Data Greater Than Background Means Plus Two Standard Deviations or Method Detection Limit Compared To Proposed RFCA Action Levels**

CH48-000	4 5 - 6 0	Barium	841	150 00	289 38	26400	—	mg/kg
CH48-000	4 5 - 6 0	Cadmium	2 40	85 00	1 70	962	—	mg/kg
CH48-000	4 5 - 6 0	Copper	65 0	300 00	38 21	40900	—	mg/kg
CH48-016	4 5 - 6 0	Barium	1060	150 00	289 38	26400	—	mg/kg
CH48-016	4 5 - 6 0	Copper	73 0	300 00	38 21	40900	—	mg/kg
CI48-001	4 5 - 6 0	Barium	590	150 00	289 38	26400	—	mg/kg
CI48-001	4 5 - 6 0	Copper	49 0	300 00	38 21	40900	—	mg/kg
CI48-002	4 5 - 6 0	Barium	500	150 00	289 38	26400	—	mg/kg
CI48-002	4 5 - 6 0	Copper	41 0	300 00	38 21	40900	—	mg/kg
CI48-002	4 5 - 6 0	Vanadium	89 0	100 00	88 49	7150	292	mg/kg
CJ46-000	11	Americium-241	26 0	4 00	0 02	76	—	pCi/g
CJ46-000	11	Arsenic	15 0	25 00	13 14	22 2	—	mg/kg
CJ46-000	11	Barium	739	150 00	289 38	26400	—	mg/kg
CJ46-000	11	Cadmium	7 30	85 00	1 70	962	—	mg/kg
CJ46-000	11	Chromium	79 0	90 00	68 27	268	—	mg/kg
CJ46-000	11	Copper	81 0	300 00	38 21	40900	—	mg/kg
CJ46-000	11	Lead	44 7	20 00	24 97	1000	97 7	mg/kg
CJ46-000	11	Nickel	65 3	60 00	62 21	20400	—	mg/kg
CJ46-000	11	Strontium	261	250 00	211 38	613000	—	mg/kg
CJ46-000	11	Vanadium	205	100 00	88 49	7150	292	mg/kg
CJ46-000	11	Zinc	270	300 00	139 10	307000	—	mg/kg
CJ46-001	11	Americium-241	5 00	4 00	0 02	76	—	pCi/g
CJ46-001	11	Barium	631	150 00	289 38	26400	—	mg/kg
CJ46-001	11	Cadmium	9 30	85 00	1 70	962	—	mg/kg
CJ46-001	11	Copper	64 0	300 00	38 21	40900	—	mg/kg
CJ46-001	11	Lead	25 5	20 00	24 97	1000	97 7	mg/kg
CJ46-001	11	Strontium	268	250 00	211 38	613000	—	mg/kg
CJ46-001	11	Vanadium	183	100 00	88 49	7150	292	mg/kg
CJ46-002	11	Americium-241	32 0	4 00	0 02	76	—	pCi/g
CJ46-002	11	Barium	809	150 00	289 38	26400	—	mg/kg
CJ46-002	11	Copper	61 0	300 00	38 21	40900	—	mg/kg
CJ46-002	11	Lead	47 2	20 00	24 97	1000	97 7	mg/kg
CJ46-002	11	Strontium	230	250 00	211 38	613000	—	mg/kg
CJ46-002	11	Vanadium	145	100 00	88 49	7150	292	mg/kg
CJ46-002	11	Zinc	260	300 00	139 10	307000	—	mg/kg
CJ46-003	11	Arsenic	18 0	25 00	13 14	22 2	—	mg/kg
CJ46-003	11	Barium	842	150 00	289 38	26400	—	mg/kg
CJ46-003	11	Copper	79 0	300 00	38 21	40900	—	mg/kg
CJ46-003	11	Lead	29 4	20 00	24 97	1000	97 7	mg/kg
CJ46-003	11	Strontium	240	250 00	211 38	613000	—	mg/kg
CJ46-003	11	Vanadium	155	100 00	88 49	7150	292	mg/kg

108

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Sample ID	Depth	Element	Result	Result	Result	Result	Result	Unit
CJ46-003	11	Zinc	140	300 00	139 10	307000	—	mg/kg
CJ46-004	11	Americium-241	5 50	4 00	0 02	76	—	pCi/g
CJ46-004	11	Barium	664	150 00	289 38	26400	—	mg/kg
CJ46-004	11	Copper	65 0	300 00	38 21	40900	—	mg/kg
CJ46-004	11	Lead	29 8	20 00	24 97	1000	97 7	mg/kg
CJ46-004	11	Vanadium	221	100 00	88 49	7150	292	mg/kg
CJ46-004	11	Zinc	170	300 00	139 10	307000	—	mg/kg
CJ46-DR01	7 0 - 7 5	Arsenic	30 9	25 00	13 14	22 2	—	mg/kg
CJ46-DR01	7 0 - 7 5	Barium	893	150 00	289 38	26400	—	mg/kg
CJ46-DR01	7 0 - 7 5	Cadmium	4 67	85 00	1 70	962	—	mg/kg
CJ46-DR01	7 0 - 7 5	Chromium	69 8	90 00	68 27	268	—	mg/kg
CJ46-DR01	7 0 - 7 5	Copper	54 4	300 00	38 21	40900	—	mg/kg
CJ46-DR01	7 0 - 7 5	Iron	58000	2500 00	41046 52	307000	—	mg/kg
CJ46-DR01	7 0 - 7 5	Nickel	105	60 00	62 21	20400	—	mg/kg
CJ46-DR01	7 0 - 7 5	Vanadium	267	100 00	88 49	7150	292	mg/kg
CJ46-DR01	7 0 - 7 5	Zinc	188	300 00	139 10	307000	—	mg/kg
CJ47-000	0 0 - 0 5	Arsenic	34 2	25	10 09	22 2	—	mg/kg
CJ47-000	0 0 - 0 5	Barium	669	150	141 26	26400	—	mg/kg
CJ47-000	0 0 - 0 5	Chromium	26 0	90	16 99	268	—	mg/kg
CJ47-000	0 0 - 0 5	Copper	47 0	300	18 06	40900	—	mg/kg
CJ47-000	0 0 - 0 5	Strontium	467	250	48 94	613000	—	mg/kg
CJ47-000	0 0 - 0 5	Vanadium	112	100	45 59	7150	292	mg/kg
CJ47-001	0 0 - 0 5	Arsenic	33 5	25	10 09	22 2	—	mg/kg
CJ47-001	0 0 - 0 5	Barium	669	150	141 26	26400	—	mg/kg
CJ47-001	0 0 - 0 5	Copper	91 0	300	18 06	40900	—	mg/kg
CJ47-001	0 0 - 0 5	Strontium	429	250	48 94	613000	—	mg/kg
CJ47-001	0 0 - 0 5	Vanadium	80 0	100	45 59	7150	292	mg/kg
CJ47-002	0 0 - 0 5	Arsenic	30 5	25	10 09	22 2	—	mg/kg
CJ47-002	0 0 - 0 5	Barium	657	150	141 26	26400	—	mg/kg
CJ47-002	0 0 - 0 5	Chromium	23 0	90	16 99	268	—	mg/kg
CJ47-002	0 0 - 0 5	Copper	35 0	300	18 06	40900	—	mg/kg
CJ47-002	0 0 - 0 5	Strontium	430	250	48 94	613000	—	mg/kg
CJ47-002	0 0 - 0 5	Vanadium	88 0	100	45 59	7150	292	mg/kg
CJ47-003	0 0 - 0 5	Aluminum	17000	11	16902	228000	—	mg/kg
CJ47-003	0 0 - 0 5	Chromium	17 0	0 54	16 99	268	—	mg/kg
CJ47-003	0 0 - 0 5	Lithium	15 0	5 4	11 55	20400	—	mg/kg
CJ47-005	0 0 - 0 5	Aluminum	20000	10	16902	228000	—	mg/kg
CJ47-005	0 0 - 0 5	Beryllium	1 10	0 52	0 966	921	8 71	mg/kg
CJ47-005	0 0 - 0 5	Chromium	19 0	0 52	16 99	268	—	mg/kg
CJ47-005	0 0 - 0 5	Lithium	17 0	5 2	11 55	20400	—	mg/kg
CJ47-005	0 0 - 0 5	Nickel	15 0	4 2	14 91	20400	—	mg/kg
CJ47-006	0 0 - 0 5	Cadmium	4 80	0 52	1 612	962	—	mg/kg
CJ47-006	0 0 - 0 5	Chromium	20 0	0 52	16 99	268	—	mg/kg
CJ47-006	0 0 - 0 5	Lithium	12 0	5 2	11 55	20400	—	mg/kg
CJ47-006	0 0 - 0 5	Strontium	54 0	1	48 94	613000	—	mg/kg

109

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

CJ47-007	00-05	Barium	250	1	141 26	26400	—	mg/kg
CJ47-007	00-05	Lithium	14 0	5 2	11 55	20400	—	mg/kg
CJ47-007	00-05	Zinc	80 0	2 1	73 76	307000	—	mg/kg
CJ47-009	00-05	Americium-241	13 0	4	0 0227	76	—	pCi/g
CJ47-010	00-05	Americium-241	10 0	4	0 0227	76	—	pCi/g
CJ47-011	00-05	Americium-241	16 0	4	0 0227	76	—	pCi/g
CJ47-014	00-05	Barium	640	150	141 26	26400	—	mg/kg
CJ47-014	00-05	Cadmium	5 70	85	1 612	962	—	mg/kg
CJ47-014	00-05	Chromium	158	90	16 99	268	—	mg/kg
CJ47-014	00-05	Lead	56 9	20	54 62	1000	97 7	mg/kg
CJ47-014	00-05	Manganese	574	200	365 08	3480	—	mg/kg
CJ47-014	00-05	Strontium	255	250	48 94	613000	—	mg/kg
CJ47-014	00-05	Vanadium	141	100	45 59	7150	292	mg/kg
CJ47-DR01	4-4	Arsenic	24 2	25 00	13 14	22 2	—	mg/kg
CJ47-DR01	4-4	Copper	44 2	300 00	38 21	40900	—	mg/kg
CJ47-DR01	4-4	Iron	41900	2500 00	41046 52	307000	—	mg/kg
CJ47-DR01	4-4	Vanadium	204	100 00	88 49	7150	292	mg/kg
CJ47-DR01	4-4	Barium	666	150 00	289 38	26400	—	mg/kg
CJ47-DR02	00-05	Arsenic	20 4	25	10 09	22 2	—	mg/kg
CJ47-DR02	00-05	Barium	686	150	141 26	26400	—	mg/kg
CJ47-DR02	00-05	Chromium	36 0	90	16 99	268	—	mg/kg
CJ47-DR02	00-05	Copper	42 0	300	18 06	40900	—	mg/kg
CJ47-DR02	00-05	Nickel	18 4	60	14 91	20400	—	mg/kg
CJ47-DR02	00-05	Strontium	347	250	48 94	613000	—	mg/kg
CJ47-DR02	00-05	Vanadium	100	100	45 59	7150	292	mg/kg
CJ48-000	00-05	Arsenic	36.3	25	10 09	22 2	—	mg/kg
CJ48-000	00-05	Barium	624	150	141 26	26400	—	mg/kg
CJ48-000	00-05	Chromium	17 0	90	16 99	268	—	mg/kg
CJ48-000	00-05	Copper	45 0	300	18 06	40900	—	mg/kg
CJ48-000	00-05	Strontium	428	250	48 94	613000	—	mg/kg
CJ48-000	00-05	Vanadium	83 0	100	45 59	7150	292	mg/kg
CJ48-001	00-05	Arsenic	31 1	25	10 09	22 2	—	mg/kg
CJ48-001	00-05	Barium	669	150	141 26	26400	—	mg/kg
CJ48-001	00-05	Chromium	23 0	90	16 99	268	—	mg/kg
CJ48-001	00-05	Copper	55 0	300	18 06	40900	—	mg/kg
CJ48-001	00-05	Strontium	430	250	48 94	613000	—	mg/kg
CJ48-001	00-05	Vanadium	98 0	100	45 59	7150	292	mg/kg
CJ48-002	45-65	Barium	611	150 00	289 38	26400	—	mg/kg
CJ48-003	45-65	Barium	639	150 00	289 38	26400	—	mg/kg
CJ48-003	45-65	Copper	67 0	300 00	38 21	40900	—	mg/kg
CJ48-003	45-65	Strontium	343	250 00	211 38	613000	—	mg/kg
CJ49-DR01	4-4	Barium	1100	150 00	289 38	26400	—	mg/kg
CJ49-DR01	4-4	Vanadium	128	100 00	88 49	7150	292	mg/kg
CK47-000	6	Cadmium	89 0	0 05	1 70	962	—	mg/kg
47-000	6	Copper	41 0	0 16	38 21	40900	—	mg/kg

*Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern*

Sample		Result						
CK47-000	6	Lead	48 0	0 20	24 97	1000	97 7	mg/kg
CK47-000	6	Zinc	150	0 22	139 10	307000	—	mg/kg
CK47-001	6	Aluminum	40000	1 50	35373 17	228000	—	mg/kg
CK47-001	6	Barium	290	0 05	289 38	26400	—	mg/kg
CK47-002	6	Cadmium	30 0	0 05	1 70	962	—	mg/kg
CK47-002	6	Lithium	38 0	0 18	34 66	20400	—	mg/kg
CK47-DR01	1 - 1	Barium	475	150 00	289 38	26400	—	mg/kg
CK47-DR01	1 - 1	Strontium	219	250 00	211 38	613000	—	mg/kg
CK48-000	6	Cadmium	20 0	0 05	1 70	962	—	mg/kg
CK48-001		Cadmium	530	0 06	1 70	962	—	mg/kg
CK48-001		Lithium	41 0	0 22	34 66	20400	—	mg/kg
CK48-002	4 5 - 6 5	Barium	537	150 00	289 38	26400	—	mg/kg
CK48-002	4 5 - 6 5	Copper	48 0	300 00	38 21	40900	—	mg/kg
CK48-002	4 5 - 6 5	Vanadium	95 0	100 00	88 49	7150	292	mg/kg
CK48-003	3	Arsenic	15 1	25 00	13 14	22 2	—	mg/kg
CK48-003	3	Barium	909	150 00	289 38	26400	—	mg/kg
CK48-003	3	Cadmium	267	85 00	1 70	962	—	mg/kg
CK48-003	3	Chromium	86 2	90 00	68 27	268	—	mg/kg
CK48-003	3	Copper	120	300 00	38 21	40900	—	mg/kg
CK48-003	3	Iron	49100	2500 00	41046 52	307000	—	mg/kg
CK48-003	3	Lead	35 4	20 00	24 97	1000	97 7	mg/kg
CK48-003	3	Manganese	5900	200 00	901 62	3480	—	mg/kg
CK48-003	3	Nickel	253	60 00	62 21	20400	—	mg/kg
CK48-003	3	Strontium	248	250 00	211 38	613000	—	mg/kg
CK48-003	3	Vanadium	223	100 00	88 49	7150	292	mg/kg
CK48-003	3	Zinc	223	300 00	139 10	307000	—	mg/kg
CK48-004	3	Arsenic	22 4	25 00	13.14	22 2	—	mg/kg
CK48-004	3	Barium	969	150 00	289 38	26400	—	mg/kg
CK48-004	3	Cadmium	75 9	85 00	1 70	962	—	mg/kg
CK48-004	3	Copper	104	300 00	38 21	40900	—	mg/kg
CK48-004	3	Iron	181000	2500 00	41046 52	307000	—	mg/kg
CK48-004	3	Manganese	1070	200 00	901 62	3480	—	mg/kg
CK48-004	3	Nickel	215	60 00	62 21	20400	—	mg/kg
CK48-004	3	Strontium	222	250 00	211 38	613000	—	mg/kg
CK48-004	3	Vanadium	240	100 00	88 49	7150	292	mg/kg
CK48-004	3	Zinc	149	300 00	139 10	307000	—	mg/kg
CK48-005	3	Barium	853	150 00	289 38	26400	—	mg/kg
CK48-005	3	Cadmium	97 3	85 00	1 70	962	—	mg/kg
CK48-005	3	Copper	77 9	300 00	38 21	40900	—	mg/kg
CK48-005	3	Iron	44900	2500 00	41046 52	307000	—	mg/kg
CK48-005	3	Lead	36 8	20 00	24 97	1000	97 7	mg/kg
CK48-005	3	Manganese	1510	200 00	901 62	3480	—	mg/kg
CK48-005	3	Nickel	114	60 00	62 21	20400	—	mg/kg
CK48-005	3	Strontium	219	250 00	211 38	613000	—	mg/kg
CK48-005	3	Vanadium	233	100 00	88 49	7150	292	mg/kg

11

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Location Code	Depth Int. (ft)	Analysis	Result	Reg. Limit (mg/kg)						
CK48-005	3	Zinc	141	300	00	139	10	307000	—	mg/kg
CM47-000	0 0 - 0 5	Arsenic	17 0	25		10	09	22 2	—	mg/kg
CM47-000	0 0 - 0 5	Barium	665	150		141	26	26400	—	mg/kg
CM47-000	0 0 - 0 5	Cadmium	12 0	85		1	612	962	—	mg/kg
CM47-000	0 0 - 0 5	Chromium	83 0	90		16	99	268	—	mg/kg
CM47-000	0 0 - 0 5	Copper	47 0	300		18	06	40900	—	mg/kg
CM47-000	0 0 - 0 5	Iron	41900	2500		18037		307000	—	mg/kg
CM47-000	0 0 - 0 5	Manganese	460	200		365	08	3480	—	mg/kg
CM47-000	0 0 - 0 5	Nickel	64 9	60		14	91	20400	—	mg/kg
CM47-000	0 0 - 0 5	Strontium	240	250		48	94	613000	—	mg/kg
CM47-000	0 0 - 0 5	Vanadium	115	100		45	59	7150	292	mg/kg
CM47-000	0 0 - 0 5	Zinc	120	300		73	76	307000	—	mg/kg
CM47-001	0 0 - 0 5	Barium	567	150		141	26	26400	—	mg/kg
CM47-001	0 0 - 0 5	Cadmium	5 30	85		1	612	962	—	mg/kg
CM47-001	0 0 - 0 5	Chromium	51 0	90		16	99	268	—	mg/kg
CM47-001	0 0 - 0 5	Copper	42 0	300		18	06	40900	—	mg/kg
CM47-001	0 0 - 0 5	Iron	31400	2500		18037		307000	—	mg/kg
CM47-001	0 0 - 0 5	Nickel	46 0	60		14	91	20400	—	mg/kg
CM47-001	0 0 - 0 5	Strontium	481	250		48	94	613000	—	mg/kg
CM47-001	0 0 - 0 5	Vanadium	54 0	100		45	59	7150	292	mg/kg
CM47-002	0 0 - 0 5	Arsenic	15 0	25		10	09	22 2	—	mg/kg
CM47-002	0 0 - 0 5	Barium	733	150		141	26	26400	—	mg/kg
CM47-002	0 0 - 0 5	Cadmium	5 00	85		1	612	962	—	mg/kg
CM47-002	0 0 - 0 5	Chromium	59 0	90		16	99	268	—	mg/kg
CM47-002	0 0 - 0 5	Copper	87 0	300		18	06	40900	—	mg/kg
CM47-002	0 0 - 0 5	Iron	35600	2500		18037		307000	—	mg/kg
CM47-002	0 0 - 0 5	Manganese	392	200		365	08	3480	—	mg/kg
CM47-002	0 0 - 0 5	Nickel	51 0	60		14	91	20400	—	mg/kg
CM47-002	0 0 - 0 5	Strontium	350	250		48	94	613000	—	mg/kg
CM47-002	0 0 - 0 5	Vanadium	102	100		45	59	7150	292	mg/kg
CM47-002	0 0 - 0 5	Zinc	110	300		73	76	307000	—	mg/kg
CM48-000	0 0 - 0 5	Barium	613	150		141	26	26400	—	mg/kg
CM48-000	0 0 - 0 5	Cadmium	4 90	85		1	612	962	—	mg/kg
CM48-000	0 0 - 0 5	Chromium	56 0	90		16	99	268	—	mg/kg
CM48-000	0 0 - 0 5	Copper	35 0	300		18	06	40900	—	mg/kg
CM48-000	0 0 - 0 5	Iron	37500	2500		18037		307000	—	mg/kg
CM48-000	0 0 - 0 5	Manganese	368	200		365	08	3480	—	mg/kg
CM48-000	0 0 - 0 5	Nickel	46 0	60		14	91	20400	—	mg/kg
CM48-000	0 0 - 0 5	Strontium	288	250		48	94	613000	—	mg/kg
CM48-000	0 0 - 0 5	Vanadium	75 0	100		45	59	7150	292	mg/kg
CM48-001	0 0 - 0 5	Arsenic	13 0	25		10	09	22 2	—	mg/kg
CM48-001	0 0 - 0 5	Barium	611	150		141	26	26400	—	mg/kg
CM48-001	0 0 - 0 5	Cadmium	23 0	85		1	612	962	—	mg/kg
CM48-001	0 0 - 0 5	Chromium	51 0	90		16	99	268	—	mg/kg
CM48-001	0 0 - 0 5	Copper	52 0	300		18	06	40900	—	mg/kg

12

Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern

Location	Depth (inches)	Analyte	Result	Reporting Limit	Background Value	WRW Action	Remarks	Unit
CM48-001	0 0 - 0 5	Iron	37500	2500	18037	307000	—	mg/kg
CM48-001	0 0 - 0 5	Manganese	502	200	365 08	3480	—	mg/kg
CM48-001	0 0 - 0 5	Nickel	55 0	60	14 91	20400	—	mg/kg
CM48-001	0 0 - 0 5	Strontium	220	250	48 94	613000	—	mg/kg
CM48-001	0 0 - 0 5	Vanadium	115	100	45 59	7150	292	mg/kg
CM48-001	0 0 - 0 5	Zinc	110	300	73 76	307000	—	mg/kg
Valve Pit #1	8	Arsenic	16 0	25 00	13 14	22 2	—	mg/kg
Valve Pit #1	8	Barium	798	150 00	289 38	26400	—	mg/kg
Valve Pit #1	8	Chromium	104	90 00	68 27	268	—	mg/kg
Valve Pit #1	8	Copper	71 0	300 00	38 21	40900	—	mg/kg
Valve Pit #1	8	Iron	58100	2500 00	41046 52	307000	—	mg/kg
Valve Pit #1	8	Manganese	1410	200 00	901 62	3480	—	mg/kg
Valve Pit #1	8	Nickel	72 9	60 00	62 21	20400	—	mg/kg
Valve Pit #1	8	Strontium	230	250 00	211 38	613000	—	mg/kg
Valve Pit #1	8	Vanadium	121	100 00	88 49	7150	292	mg/kg

WRW - Wildlife Refuge Worker

113

Hot Spot Removal Confirmation Sampling Data, by Surface and Subsurface Locations, Compared to the Proposed RFCA Action Levels

Sample ID	Location	Depth	Element	Value	RFCA Action Level	Unit
CJ45-005	2084610	0 0 - 0 50	Beryllium	1 10	0 04	mg/kg
			Cadmium	7 70	0 04	mg/kg
CJ45-006	2084610	0 0 - 0 50	Cadmium	7 30	0 04	mg/kg
			Copper	19 00	0 21	mg/kg
			Mercury	0 58	0 00	mg/kg
			Zinc	74 00	0 59	mg/kg
CJ45-007	2084610	0 0 - 0 50	Beryllium	1 00	0 04	mg/kg
			Copper	62 00	0 20	mg/kg
			Iron	26000 00	1 70	mg/kg
			Manganese	640 00	0 04	mg/kg
CJ45-008	2084610	0 0 - 0 50	Beryllium	1 00	0 04	mg/kg
			Copper	30 00	0 20	mg/kg
			Iron	24000 00	1 70	mg/kg
			Manganese	550 00	0 04	mg/kg
			Nickel	16 00	0 19	mg/kg
			Vanadium	49 00	0 15	mg/kg
CJ45-009	2084610	0 0 - 0 50	Aluminum	18000 00	2 20	mg/kg
			Cadmium	1 80	0 04	mg/kg
			Chromium	17 00	0 08	mg/kg
			Copper	20 00	0 20	mg/kg
			Lithium	14 00	0 12	mg/kg
			Strontium	57 00	0 05	mg/kg
CJ46-DR03	2084610	0 0 - 0 50	Copper	56 00	0 21	mg/kg
			Iron	22000 00	1 70	mg/kg
			Manganese	490 00	0 04	mg/kg
			PU-239/240	0 58	0 29	pci/g
			Selenium	1 40	0 55	mg/kg

Output Report for IHSS Group 000-1, Solar Evaporation Ponds Area

75

Sample ID	Sample No.	Depth	Element	Concentration	Unit	Max	Min	Range	Unit
C146-DR04	2084610	750678	Zinc	170.00	0.58	73.76	307000	—	mg/kg
			Copper	29.00	0.20	18.06	40900	—	mg/kg
C146-DR05	2084610	750678	AM-241	0.29	0.22	0.02	76	—	pci/g
			Copper	19.00	0.20	18.06	40900	—	mg/kg
			U-235	0.16	0.11	0.09	8	—	pci/g
C146-DR06	2084610	750678	Copper	77.00	0.20	18.06	40900	—	mg/kg
			Iron	26000.00	1.70	18037.00	307000	—	mg/kg
			Lithium	12.00	0.12	11.55	20400	—	mg/kg
			Manganese	610.00	0.04	365.08	3480	—	mg/kg
			U-235	0.15	0.13	0.09	8	—	pci/g
			Zinc	74.00	0.57	73.76	307000	—	mg/kg
C146-DR07	2084610	750678	U-233/234	5.63	0.24	2.25	300	—	pci/g
			U-235	0.34	0.25	0.09	8	—	pci/g
CK46-DR01	2084890	750671	AM-241	1.66	0.36	0.02	76	—	pci/g
			Cadmium	23.00	0.04	1.61	962	—	mg/kg
			Chromium	20.00	0.08	16.99	268	—	mg/kg
			Copper	41.00	0.21	18.06	40900	—	mg/kg
			Lithium	19.00	0.12	11.55	20400	—	mg/kg
			Mercury	0.31	0.00	0.13	25200	—	mg/kg
			Nickel	20.00	0.20	14.91	20400	—	mg/kg
			PU-239/240	10.40	0.17	0.07	116/50	—	pci/g
			U-233/234	11.00	0.18	2.25	300	—	pci/g
			U-235	1.28	0.21	0.09	8	—	pci/g
			U-238	2.70	0.19	2.00	351	—	pci/g
CK46-DR02	2084890	750671	AM-241	1.16	0.47	0.02	76	—	pci/g
			Cadmium	25.00	0.04	1.61	962	—	mg/kg
			Chromium	21.00	0.08	16.99	268	—	mg/kg
			Copper	38.00	0.21	18.06	40900	—	mg/kg
			Lithium	16.00	0.12	11.55	20400	—	mg/kg

Output Report for IHSS Group 000-1, Solar Evaporation Ponds Are of Concern

Sample ID	Element	Concentration	Unit	Limit	Unit	Concentration	Unit	Limit	Unit
CK46-DR03	Nickel	19.00	0.19	14.91	20400	mg/kg			
	PU-239/240	3.87	0.13	0.07	116/50	pci/g			
	U-233/234	4.26	0.06	2.25	300	pci/g			
	U-235	0.65	0.07	0.09	8	pci/g			
	AM-241	0.88	0.16	0.02	76	pci/g			
	Cadmium	26.00	0.04	1.61	962	mg/kg			
	Chromium	27.00	0.08	16.99	268	mg/kg			
	Copper	60.00	0.21	18.06	40900	mg/kg			
	Lithium	18.00	0.12	11.55	20400	mg/kg			
	Mercury	0.36	0.00	0.13	25200	mg/kg			
	Nickel	19.00	0.20	14.91	20400	mg/kg			
	PU-239/240	14.30	0.29	0.07	116/50	pci/g			
	CK46-DR04	U-233/234	8.47	0.13	2.25	300	pci/g		
U-235		0.35	0.12	0.09	8	pci/g			
U-238		3.77	0.11	2.00	351	pci/g			
Aluminum		21000.00	2.40	16902.00	228000	mg/kg			
AM-241		1.93	0.29	0.02	76	pci/g			
Cadmium		20.00	0.04	1.61	962	mg/kg			
Chromium		26.00	0.08	16.99	268	mg/kg			
Copper		47.00	0.22	18.06	40900	mg/kg			
Lithium		28.00	0.12	11.55	20400	mg/kg			
Mercury		0.22	0.00	0.13	25200	mg/kg			
Nickel		22.00	0.20	14.91	20400	mg/kg			
PU-239/240		11.00	0.28	0.07	116/50	pci/g			
CK46-DR05		U-233/234	7.11	0.20	2.25	300	pci/g		
	U-235	0.29	0.24	0.09	8	pci/g			
	U-238	2.46	0.21	2.00	351	pci/g			
	Cadmium	23.00	0.04	1.61	962	mg/kg			
	Chromium	22.00	0.08	16.99	268	mg/kg			





IS

out Report for IHSS Group 000-1, Solar Evaporation Ponds Area Concern

Sample ID	Sample No.	Depth	Location	Depth	Sample No.	Depth	Location	Depth	Sample No.	Depth	Location	Unit
CK46-019	2084908	750688	2 00 - 2 00	AM-241	2 36	0 40	0 02	76				pCi/g
				PU-239/240	0 94	0 06	0 02	116/50				pCi/g
CK48-DR06	2084919 923	751074 863	1 00 - 1 00	AM-241	0 51	0 24	0 02	76				pCi/g
				Cadmium	2 10	0 04	1 70	962				mg/kg
				PU-239/240	0 61	0 14	0 02	116/50				pCi/g
CK48-DR07	2084919 923	751074 863	1 00 - 1 00	AM-241	0 45	0 19	0 02	76				pCi/g
				PU-239/240	0 36	0 20	0 02	116/50				pCi/g
CK48-DR08	2084919 923	751074 863	1 00 - 1 00	AM-241	0 42	0 26	0 02	76				pCi/g
				PU-239/240	0 61	0 14	0 02	116/50				pCi/g
CK48-DR09	2084919 923	751074 863	1 00 - 1 00	AM-241	0 53	0 27	0 02	76				pCi/g
				Cadmium	4 00	0 04	1 70	962				mg/kg
				PU-239/240	0 54	0 15	0 02	116/50				pCi/g
CK48-DR10	2084919 923	751074 863	1 00 - 1 00	PU-239/240	0 36	0 14	0 02	116/50				pCi/g
				U-233/234	34 80	0 11	2 64	300				pCi/g
				U-235	3 94	0 11	0 12	8				pCi/g
				U-238	19 40	0 10	1 49	351				pCi/g

**ENCLOSURE**

**Compact Disk, Data Set for IHSS Group 000-1 AOC**

120  
120



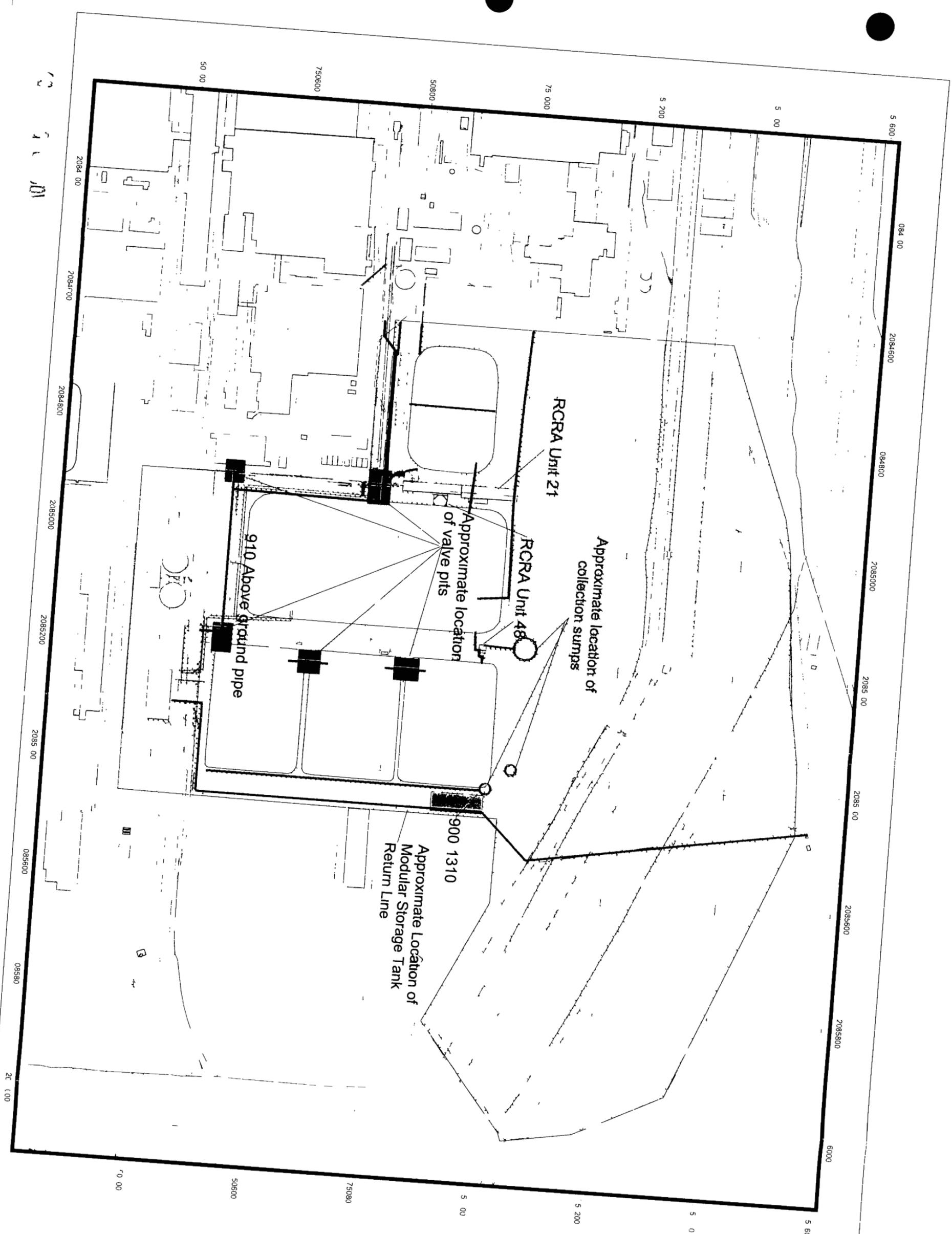


Figure 2  
Solar Evaporation Ponds  
Area of Concern

**KEY**

- OU4 AOC
- SEP
- IHSS
- PAC
- Building or other structure
- OPWL
- NPWL
- Storm drain
- Leak Detection Drain
- MST Return Line
- Stream ditch or other drainage
- Paved area
- Fence
- Dirt Road

Scale 1:1700

40 0 40 80 120 160 Feet

Start Point Coordinate  
 Easting: 208400  
 Northing: 50000  
 Datum: NAD 27

US D partm t f e g y  
 Rocky Fl E onm tal Technology Sit

Prepared by



Figure 3  
Solar Evaporation Ponds  
Area of Concern  
Hot Spots

- KEY**
- SEP
  - AOC
  - Building
  - IHSS
  - Streams
  - Fence
  - Paved Road
  - Dirt Road
  - Hot Spot
- Rejected data due to MDA exceeded the RDL and / recovery was outside acceptable range



50 0 50 100 Feet

Scale = 1:1750

State Plane Coordinate Projection  
Colorado Central Zone  
Datum NAD 27

USDP from 1981 to 1997  
Revised by Environmental Technology Systems

Prepared by

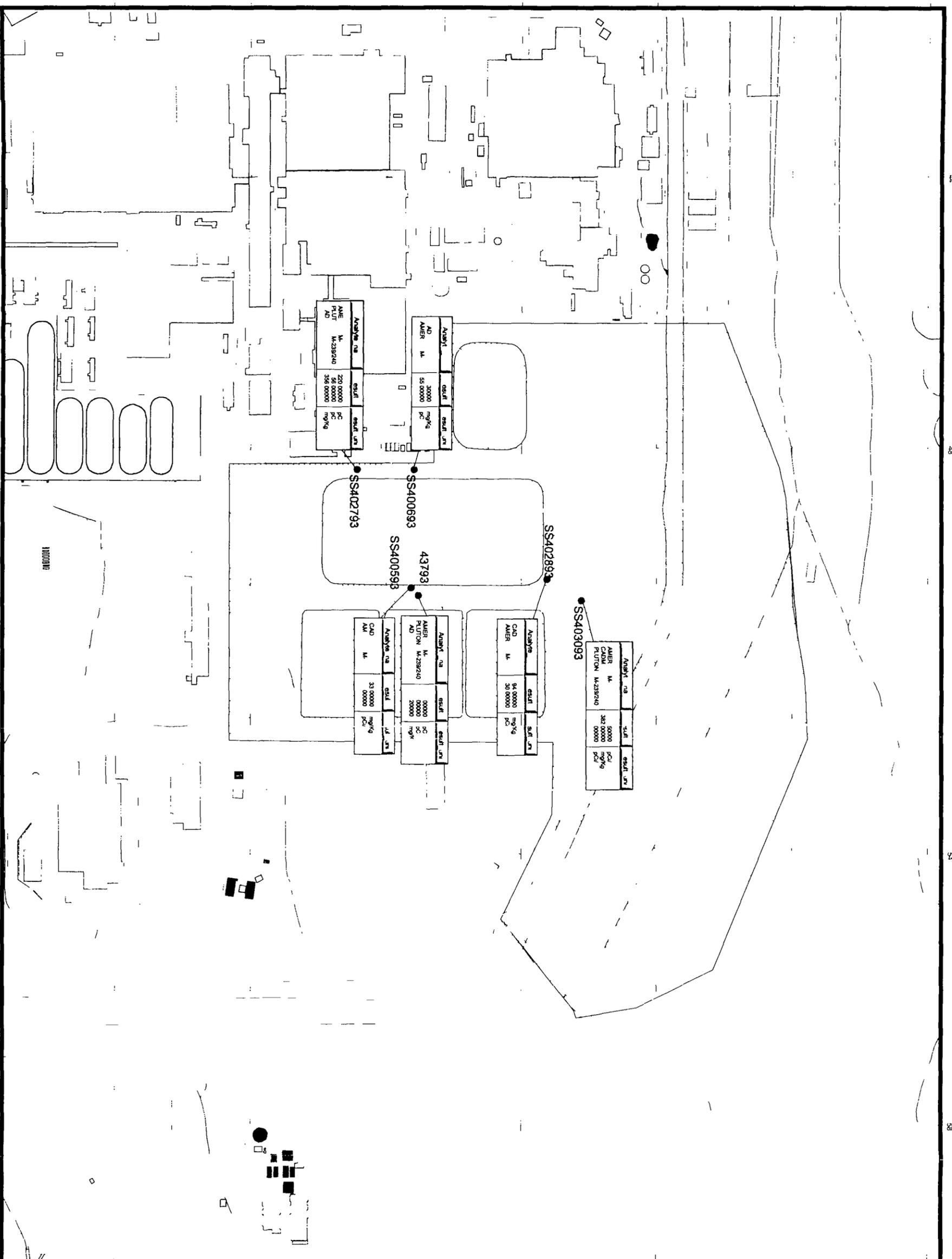


Project

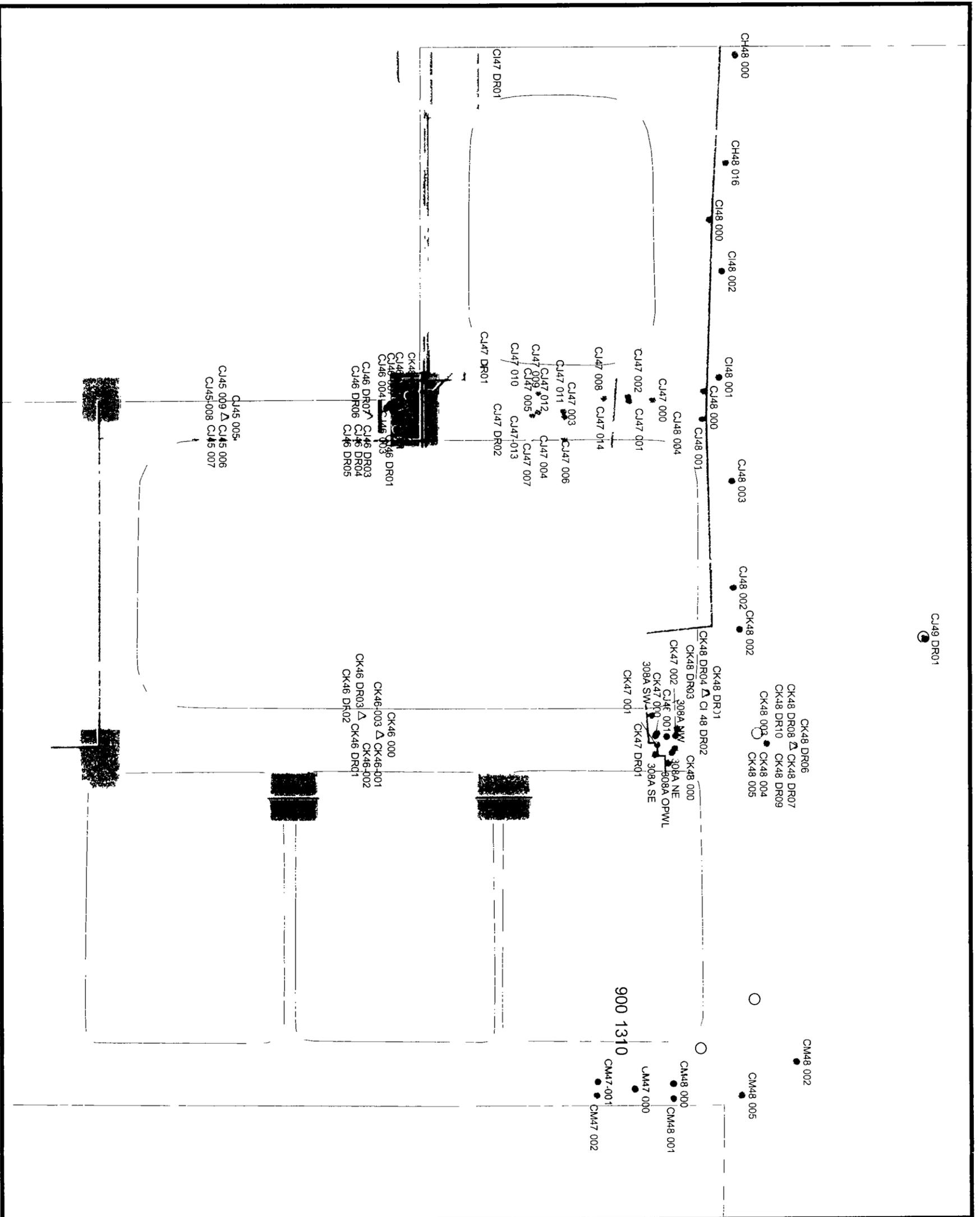


Project ID: p0823022

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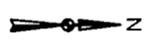


**Figure 4**  
**Accelerated Action Sampling**  
**Locations at SEP AOC**



**KEY**

- IP S m pl
- Ch i t S m pl
- C i l l t S m p
- P L
- VI P t
- P p
- S I P d
- S i m
- P d A
- F
- D r r d
- B l d g
- A O C
- I H S S



S I 1 500



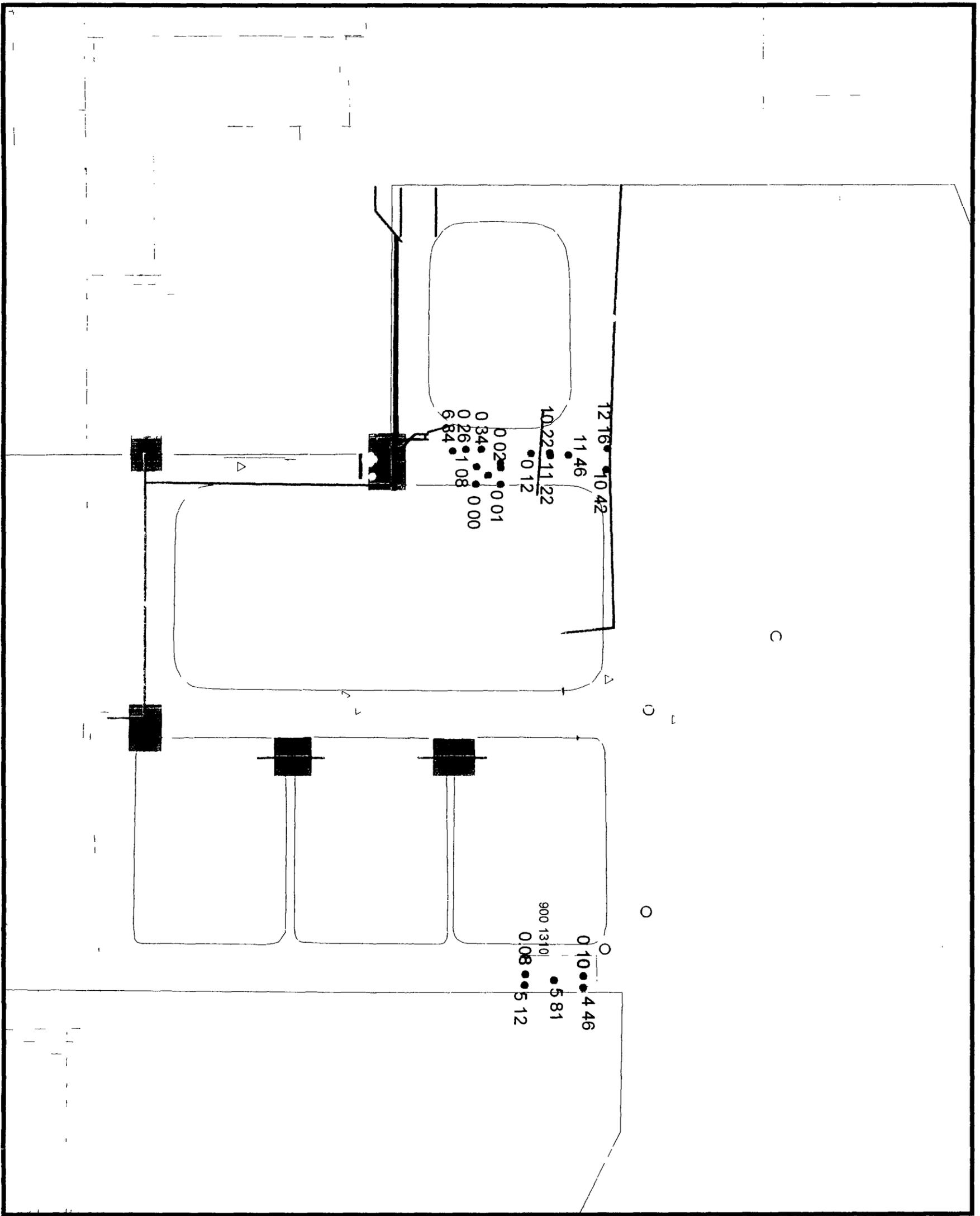
State Plane Coordinate System  
 Colorado Central Zone  
 Datum NAD 27

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**Figure 6**  
**Tier II Sum of Ratios**  
**for Non Radionuclides in**  
**Surface Soil Based on**  
**Accelerated Action**  
**Characterization**



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**Figure 7**  
**Tier II Sum of Ratios**  
**for Radionuclides**  
**in Surface Soil**  
**Based on Accelerated**  
**Action Characterization**

**KEY**

- Ch t zatl S mpI
- N D I t B kg d
- I P ce S mpI
- C I I t S mp
- P ce L
- V I P t
- S I P d
- P d Ar
- F c
- D t R d
- B I d g
- A O C
- I H S S



Scale 1:1500  
 30 0 30 60 90 120 Feet

State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum NAD 27

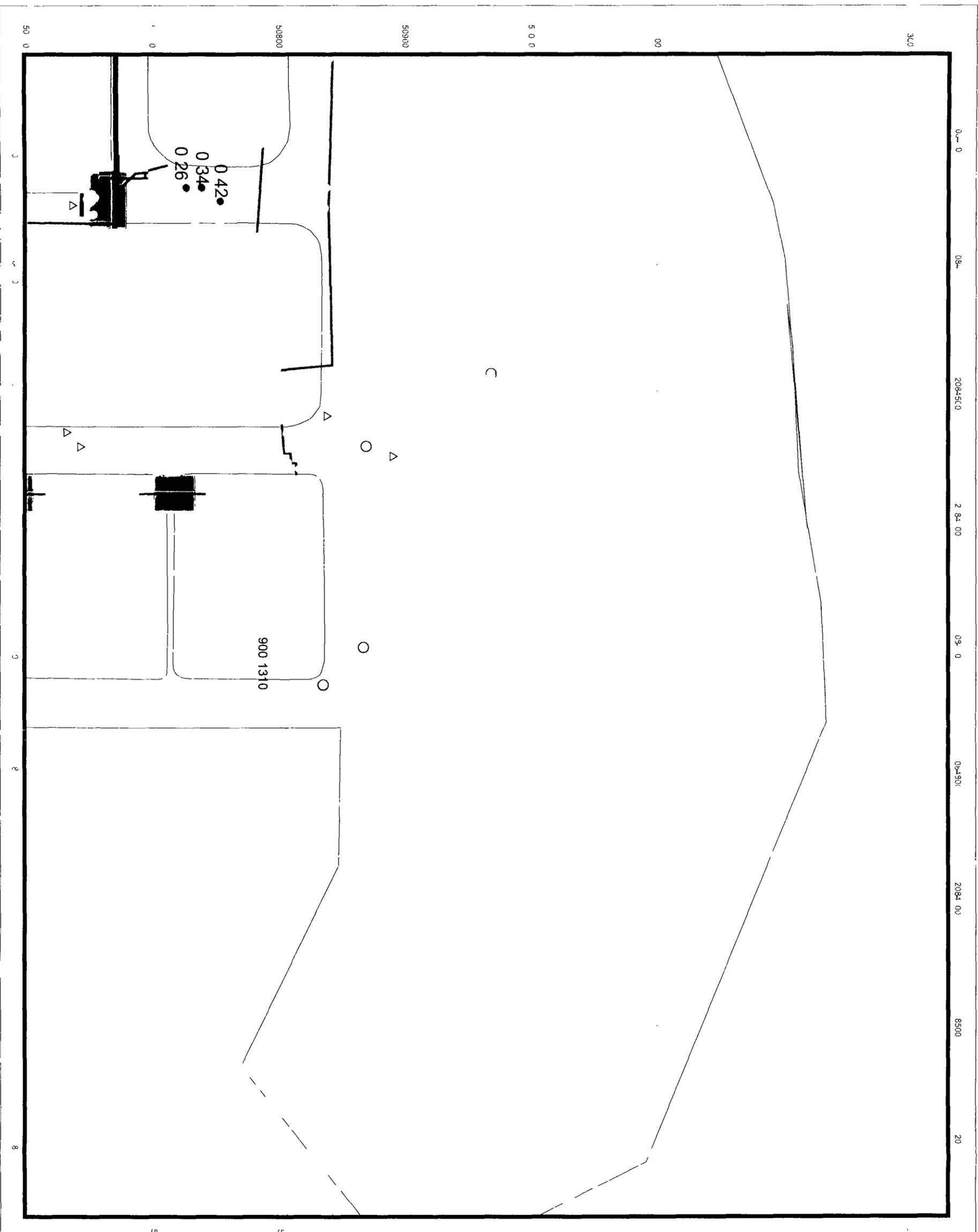
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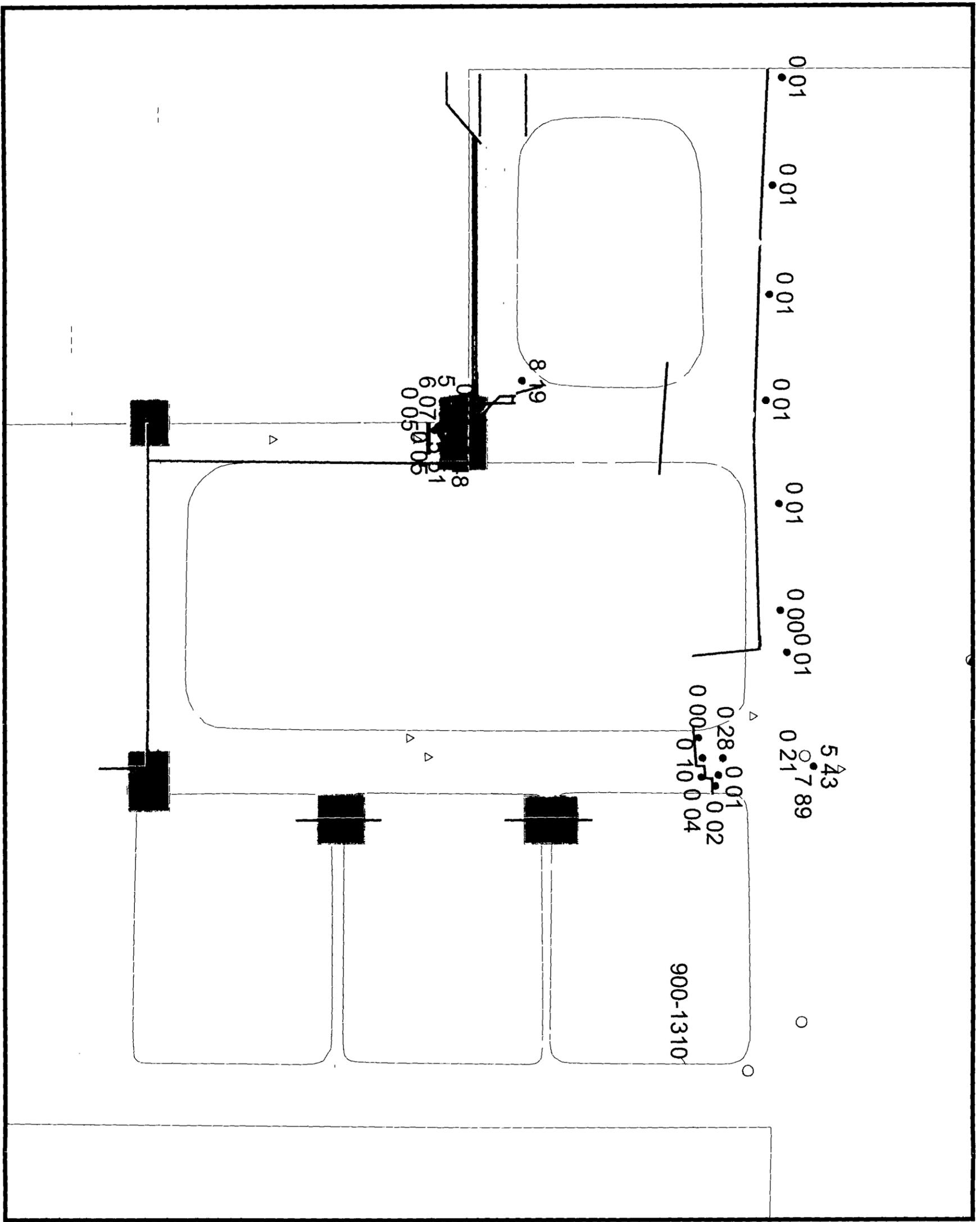
0001 cseout/srp-c-0580



**Figure 8**  
**Tier II Sum of Ratios**  
**for Non Radionuclides**  
**in Subsurface Soil**  
**Based on Accelerated**  
**Action Characterization**

**KEY**

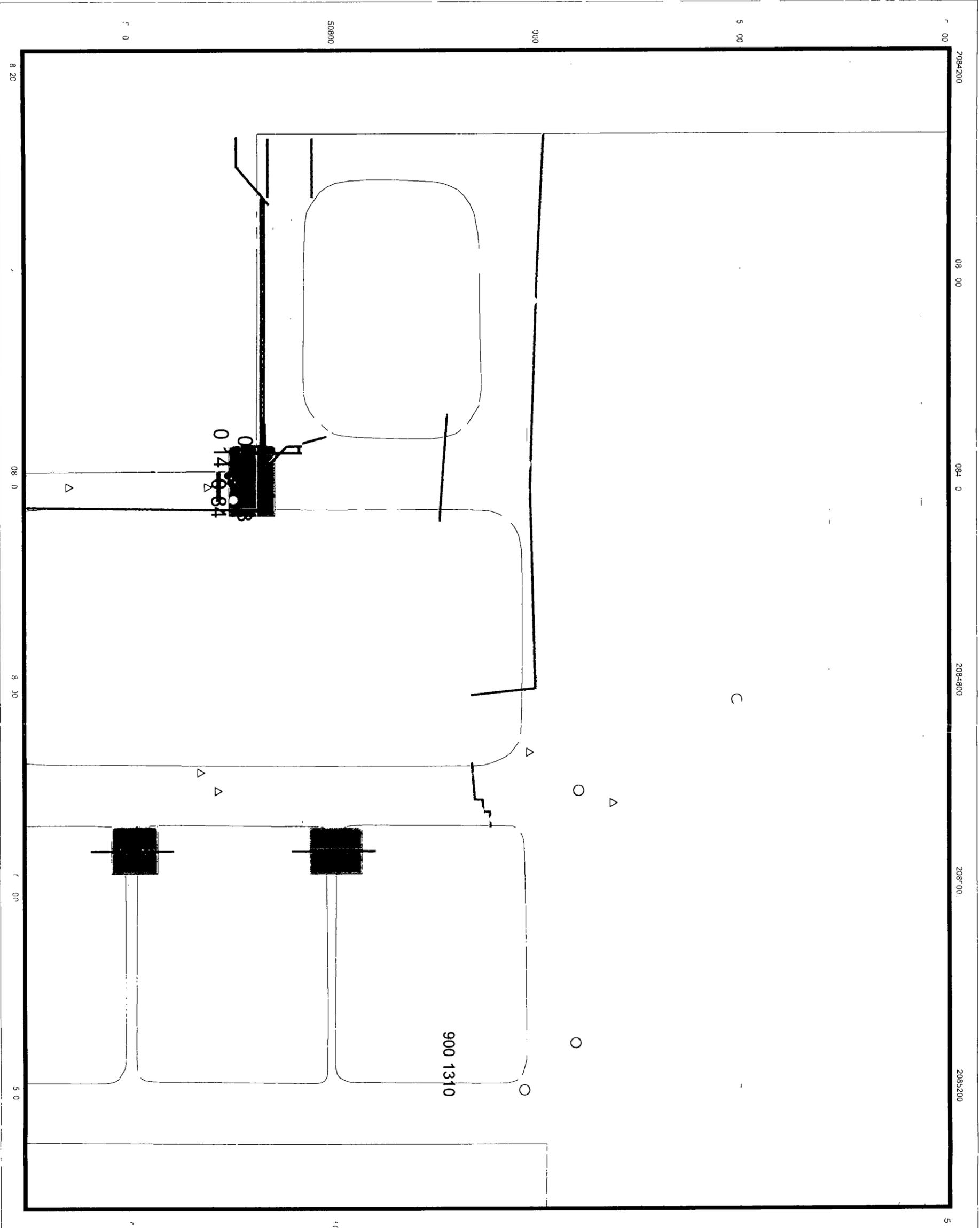
- Ch t zat S mpl
- △ N D I B kg d
- I P oce S mpl
- C I l t S mp
- ~ P oe L
- ~ V I P l s
- ~ S I P d
- ~ P d Ar
- ~ F oe
- ~ D r R d
- ~ B l d g
- ~ AOC
- ~ IHSS



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum NAD 27

USDP Form 1 February 1975  
 Revised March 1975

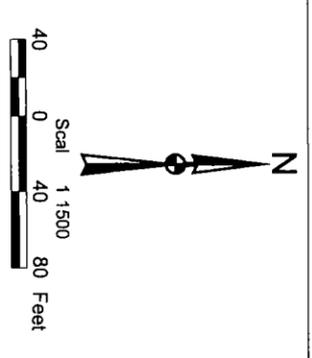




**Figure 9**  
 Tier II Sum of Ratios  
 for Radionuclides  
 in Subsurface Soil  
 Based on Accelerated  
 Action Characterization

**Key**

- Ch i t z t S m p l
- N D t B k g d
- I P c e S m p l
- C l l t S m p
- P c e s L
- V I P t s
- S I P d
- P d A r
- F o e s
- D t R d
- B l d g
- A O C
- I H S S



State Plane Coordinate System  
 Colorado Central Zone  
 Datum NAD 27

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 000- caseou/sep-c-oseo

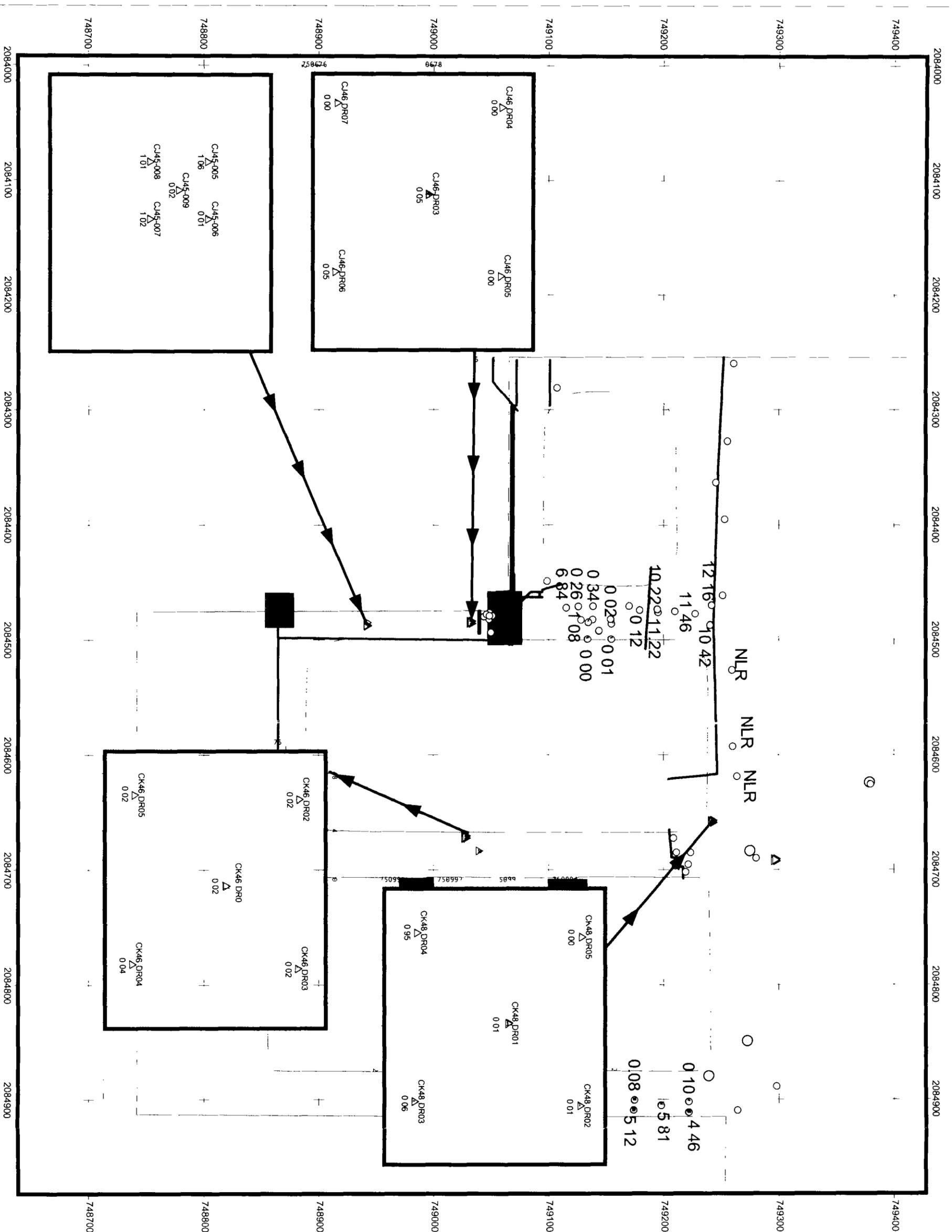
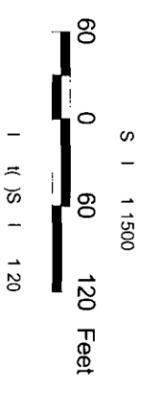


Figure 12  
Tier II Sum of Ratios for  
Non Radionuclides in Surface Soil  
Based on Residual Contamination

Key

- Ch t t S mpl
- Ch t zai S mpl B kg d
- C f m t S mpl
- C f m t S mpl B kg d
- C l e c t S m p
- P L
- V i P t
- S i P d
- P d A
- F
- D r R d
- B i d g
- A O C
- I H S S
- N L R N L g R P l l



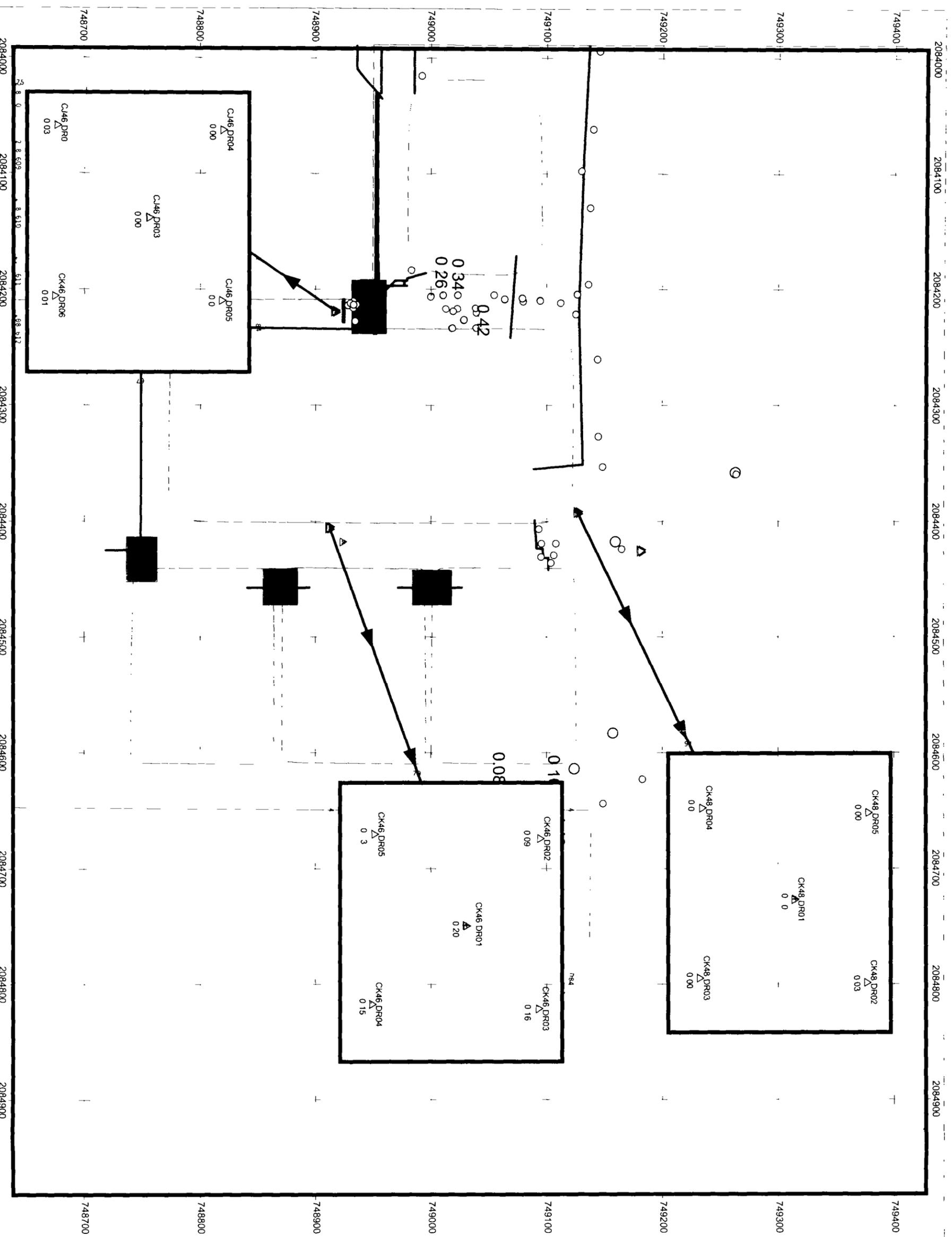
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Datum NAD 27

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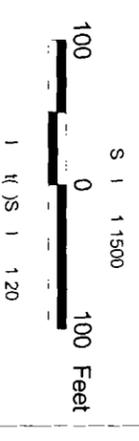
Figure 13  
Tier II Sum of Ratios for  
Radionuclides In Surface Soil  
Based on Residual Contamination



Key

- C l l t S m p
- C f m t S m p l B k g d
- C f m t S m p l
- C h t t S m p l B k g d
- C h t t S m p l
- P o c L
- V i P t
- S I P d
- P d A
- F
- D r R d
- B l d g
- A O C
- I H S S

NLRN L g R p t t



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Figure 14  
Tier II Sum of Ratios for  
Non Radionuclides In Subsurface Soil  
Based on Residual Contamination

Key

- Ch t t S mpl B kg d
- Ch t t S mpl B kg d
- C f m t S mpl B kg d
- C f m t S mpl B kg d
- C l l t S mp
- P L
- V I P t
- S I P d
- P d A
- F
- D t R d
- B l d g
- A O C
- I H S S

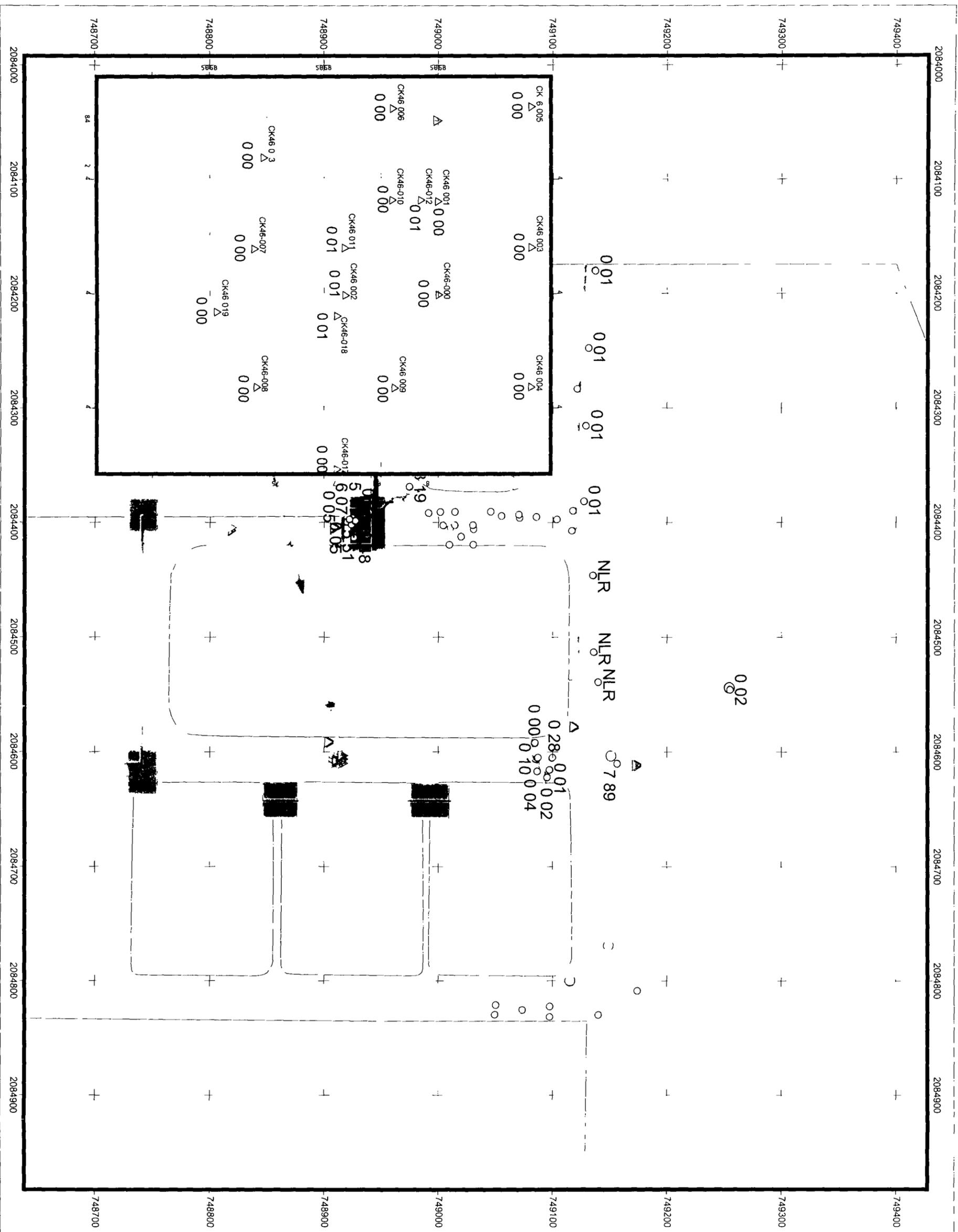
NLR NLR NLR NLR



State Plane Coordinate Projection  
Colorado Central Zone  
Datum NAD 27

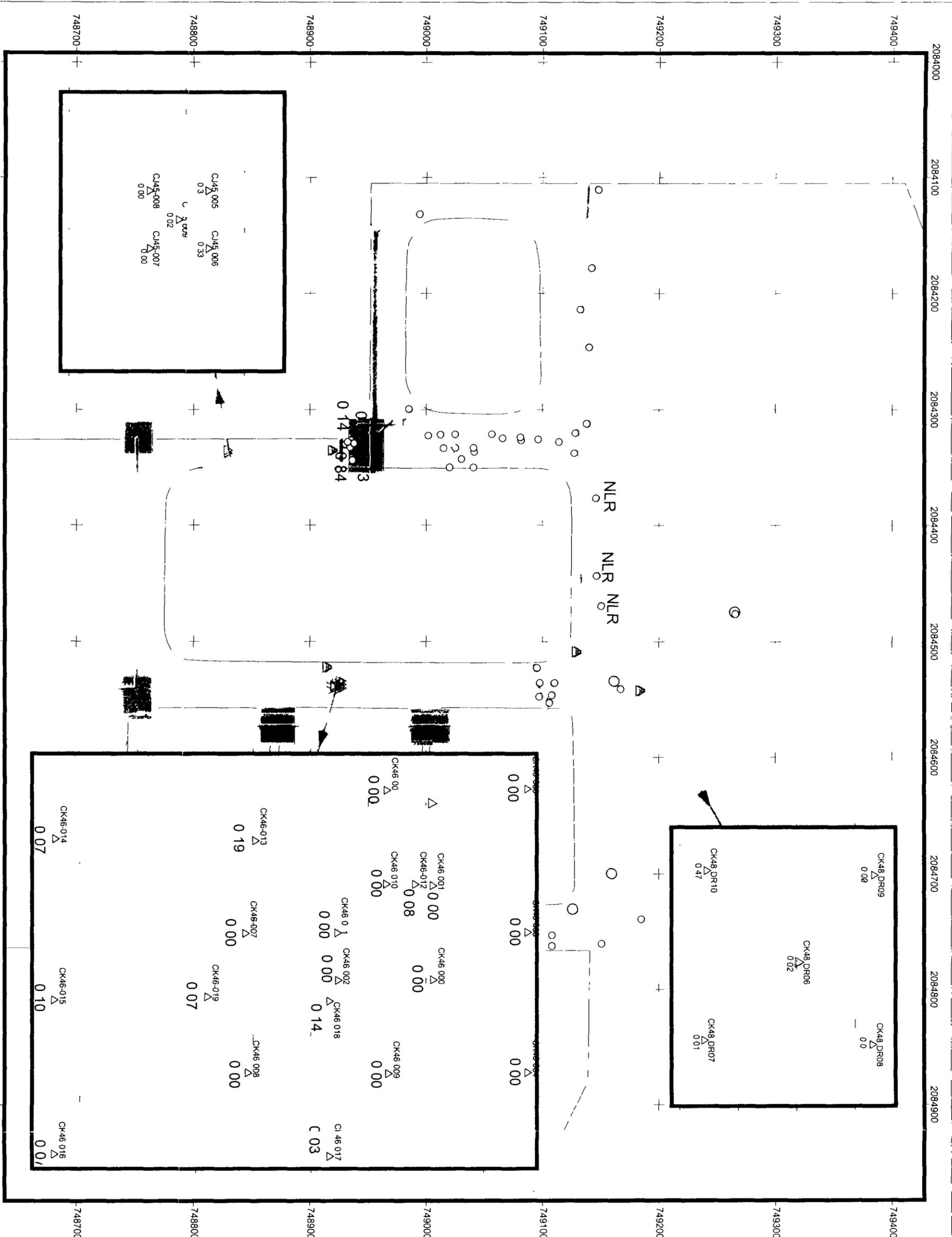
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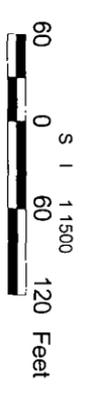
AS Walsh '01

Figure 15  
Tier II Sum of Ratios for  
Radionuclides In Subsurface Soil  
Based on Residual Contamination



Key

- Ch i t S mp l B kg d
- Ch i t S mp l B kg d
- C f m i S mp l B kg d
- C l l t S mp l
- P L
- VI P t
- S I P d
- P d A
- F
- D r R d
- B l d g
- A O C
- I H S S
- N L R N L g R p t t



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Figure 16  
No Longer Representative  
Sampling Locations

Key

- In Process Sample Locations
- Characterization/Legacy Sample Locations
- Solar Ponds
- Paved Area
- Fence
- Dirt Road
- AOC



S I 1 1500

I I S I 1 25



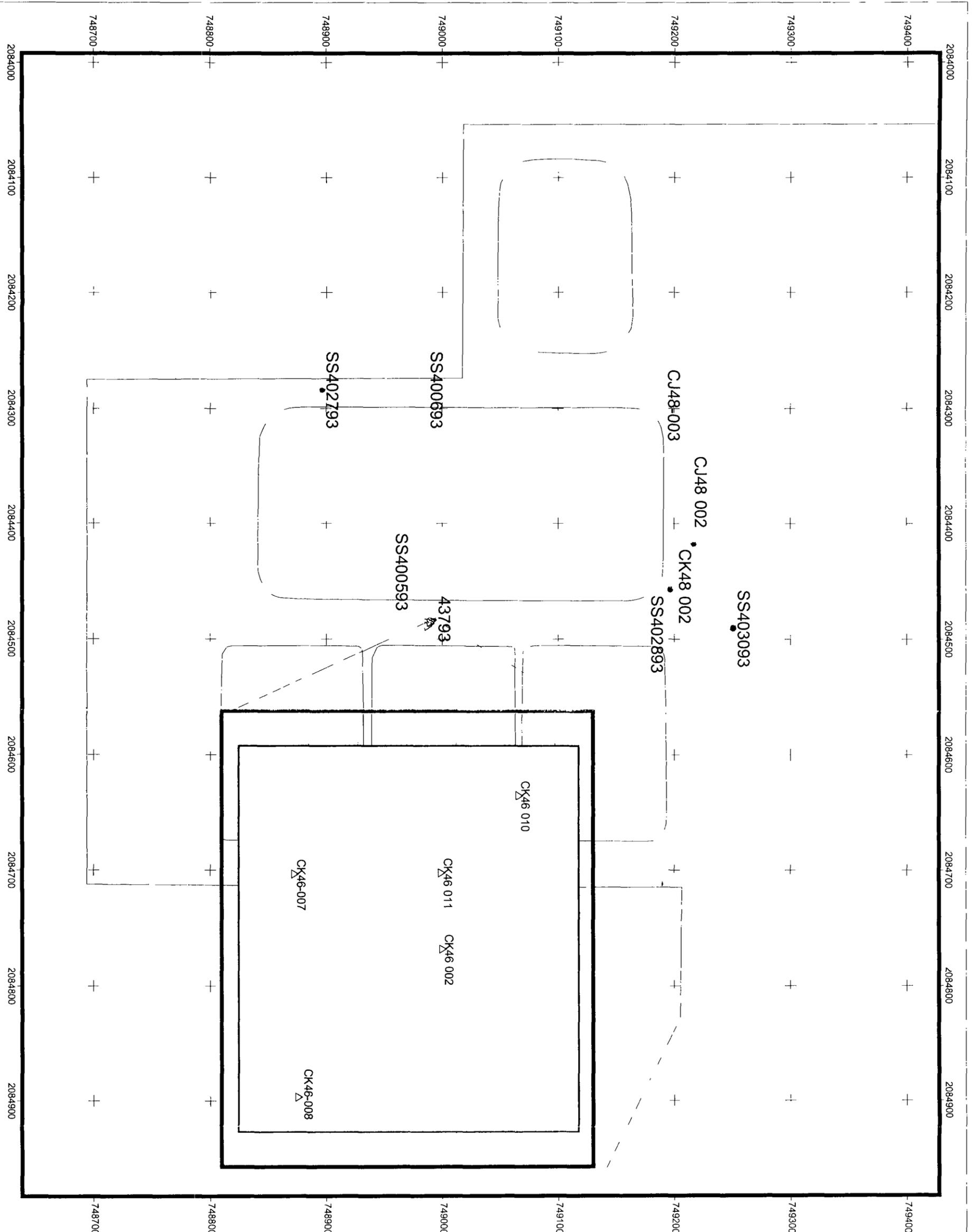
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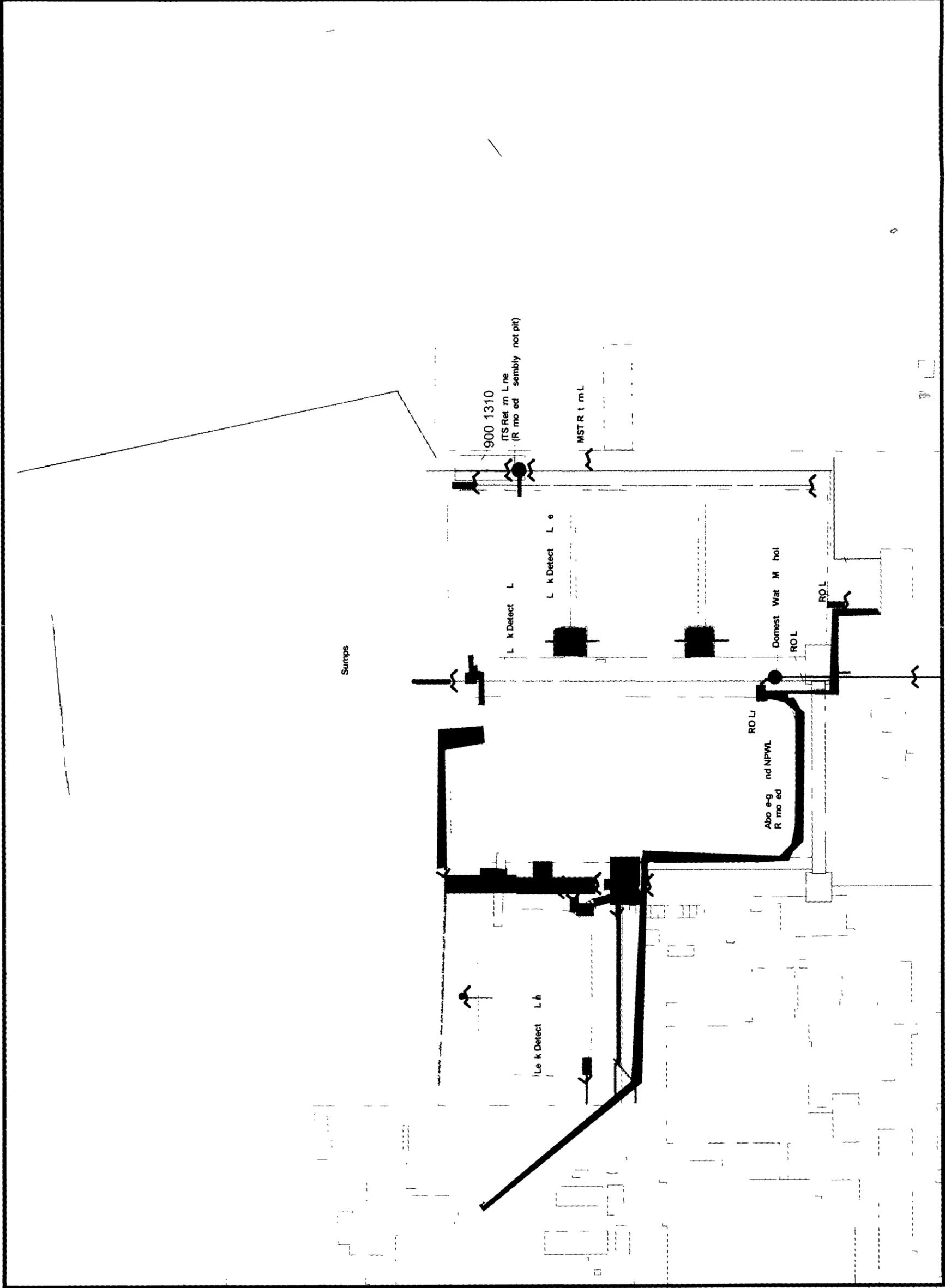
11/1/01

1/17/00

Figure 10  
SEP AOC  
Items Removed Remaining  
and Not Found

KEY

- OU4 AOC
- SEP
- IHSS
- PAC
- Building or other structure
- Removed
- Not Found
- OPWL
- Storm drain
- Leak Detection Drain
- MST and ITS Return Lines
- Stream ditch or other drainage
- Paved area
- Fence
- Dirt Road
- Pipeline disrupted



Scale 1:1800  
20 0 20 40 60 80 Feet

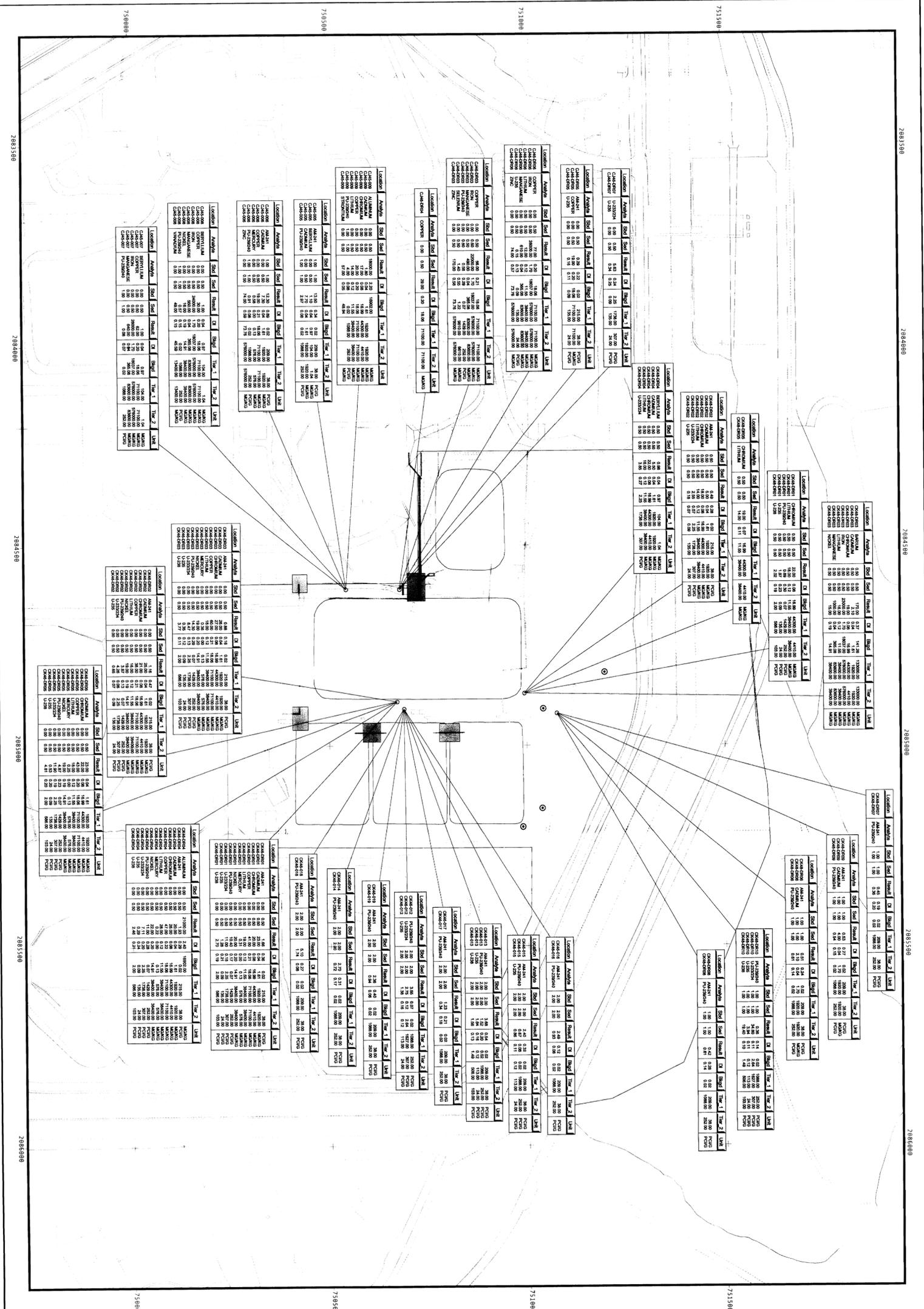
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1/17/00



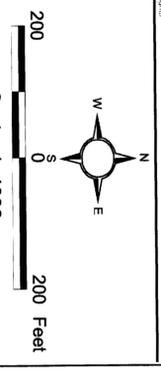


**Figure 11**  
Hot Spot Confirmation Sampling Locations and Results

**Key**

- Characterization Samples
- Collection Sumps
- ⊙ Process Lines
- ▭ Valve Pits
- ▭ Pipes
- ▭ Solar Ponds
- ▭ Streams
- ▭ Paved Area
- ▭ Fence
- ▭ Dirt Road
- ▭ Building
- ▭ AOC
- ▭ IHSS

Only sample results greater than background mean plus two standard deviations or reporting limit are shown.



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Prepared for: KAISER-HILL COMPANY  
Date: November 2002

File: sep-02-out.apr  
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