DRAFT ENVIRONMENTAL RESTORATION RFCA STANDARD OPERATING PROTOCOL FOR ROUTINE SOIL REMEDIATION FY03 NOTIFICATION #03-01 IHSS 111.4, TRENCH T-7

November 2002

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IHSS 111.4, TRENCH T-7

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ACRONYMS

AL	action level
AOC	area of concern
BZ	Buffer Zone
BZ SAP	Buffer Zone Sampling and Analysis Plan
DOE	Department of Energy
ER	Environmental Restoration
ER RSOP	Environmental Restoration RSOP for Routine Soil Remediation
FY	Fiscal Year
IA	Industrial Area
IHSS	Individual Hazardous Substance Site
IMP	Integrated Monitoring Program
PAC	Potential Area of Concern
PCOC	potential contaminant of concern
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RSOP	RFCA Standard Operating Protocol
VOC	volatile organic compound

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1.0 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002a) Fiscal Year (FY) 03 Notification includes the notification to remediate an Individual Hazardous Substance Site (IHSS) in the Rocky Flats Environmental Technology Site (RFETS) Buffer Zone (BZ) during FY03. The purpose of this Notification is to invoke the ER RSOP for IHSS Group NE-2, IHSS 111.4 (Trench T-7). Activities specified in the ER RSOP are not reiterated here; however deviations from the ER RSOP are noted where appropriate. The location of IHSS Group NE-2, IHSS 111.4 (Trench T-7) is shown Figure 1.

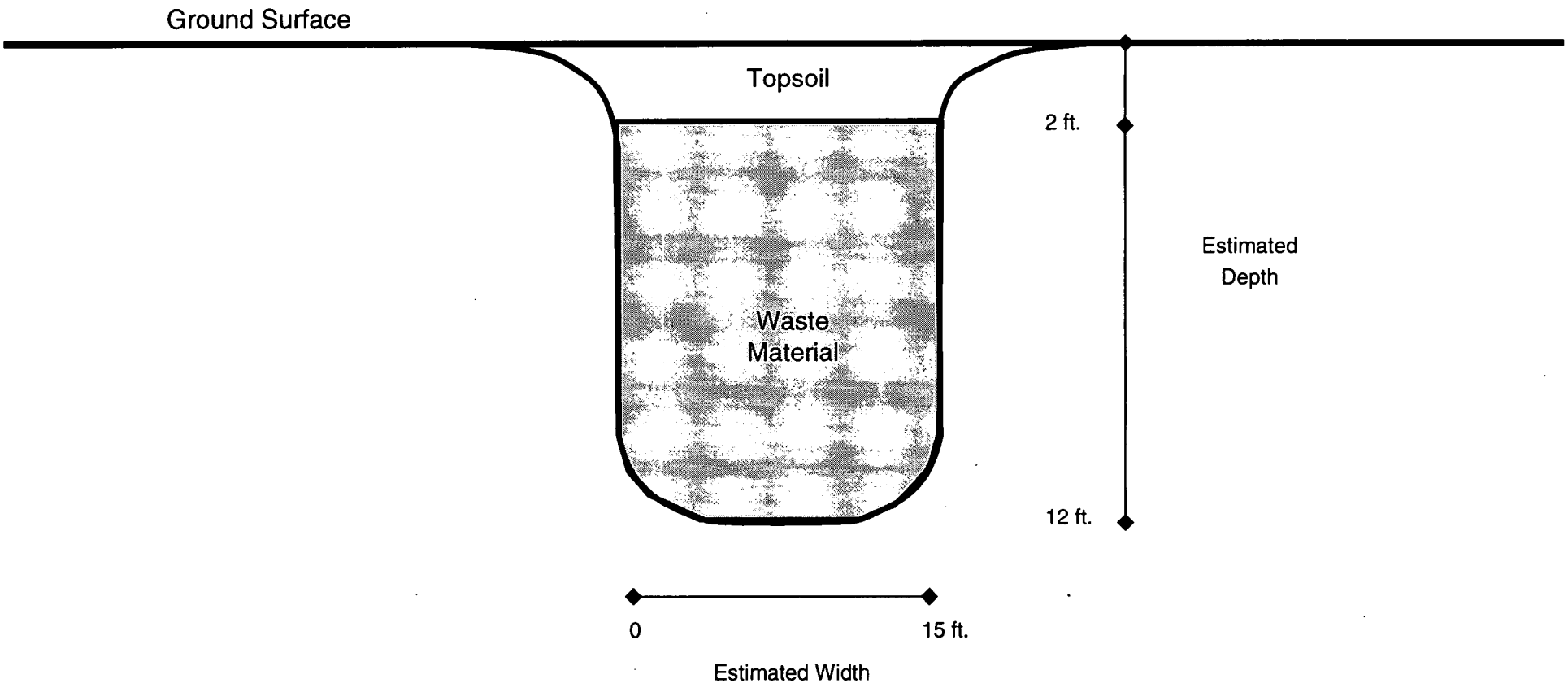
2.0 IHSS 111.4, TRENCH T-7

Trench T-7 is located approximately 1,400 feet east of the inner east guard gate and 290 feet south of the East Access Road. It is part of several trenches referred to as the East Trenches (DOE 1992). The trench was used primarily for the disposal of sanitary wastewater treatment plant sludge. Flattened empty drums and asphalt planking from the Solar Evaporation Ponds, both of which may be potentially contaminated with uranium and plutonium, also may have been disposed in the trench. In addition, it is believed that water and lathe coolant generated in Building 444 was disposed in one of the East Trenches. T-7 is approximately 115 feet long, 14 to 16 feet wide and 10 feet in depth, and is covered with two feet of soil cover. The volume of waste material in the trench is estimated to be 798 cubic yards. A cross-section of Trench T-7 is shown on Figure 2.

2.1 Potential Contaminants of Concern

Contaminants of concern (COCs) at IHSS 111.4 were determined based on process knowledge and data collected during previous studies (DOE 1992, DOE 1996). COCs include plutonium, americium, uranium, metals, and volatile organic compounds (VOCs). Results from previous sampling activities are presented in Figure 3, which presents results greater than background mean plus two standard deviations or the detection limit. Results indicate that some contaminant concentrations exceed RFCA action levels (ALs) (e.g., plutonium-239/240, americium-241, and arsenic). Two out of 10 boreholes exceeded plutonium and americium ALs (Locations 11895 and 12095 between 3 and 5 feet), and one location barely exceeded the arsenic AL (Location BH4887 between 6 and 7 feet).

Figure 2 - Cross-Section of Trench T-7



2.2 Project Conditions

The following conditions are present at this site:

- Trench 7 (IHSS 111.4) is surrounded by other trenches, including Trench 5 (IHSS 111.2), Trench 6 (IHSS 111.3), Trench 8 (IHSS 111.5), and Trench 9 (IHSS 111.6);
- The eastern end of IHSS 111.6 abuts the western end of IHSS 111.4;
- The East Spray Field South Area is located to the east of IHSS 111.4;
- The area is relatively flat and covered by grass; and
- The area to the south slopes down towards Women Creek.

2.3 Remediation Plan

This RSOP Notification remediation plan for IHSS 111.4, Trench T-7 includes the following objectives:

- Remove all waste material from the trench (estimated at 798 cubic yards) and dispose of offsite;
- Collect confirmation samples from the excavation in accordance with the Buffer Zone Sampling and Analysis Plan (BZSAP) (DOE 2002b);
- Remove soils at the trench boundary (i.e., trench side walls and bottom) with concentrations equal to or exceeding RFCA ALs; and
- Backfill the excavation with clean fill, grade and seed the area.

It is anticipated that after remediation there will be areas at the site with concentrations of radionuclides, organics and metals greater than background mean plus two standard deviations or method detection limits, but below RFCA ALs. The potential remediation area is shown on Figure 4.

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2.4 Stewardship Evaluation

Based on the COCs (Section 2.1) and the ER RSOP (DOE 2002a), it is anticipated that all contamination above RFCA ALs will be remediated. Because the full extent of excavation and remediation is not known at this time, an additional stewardship evaluation will be conducted during remediation using the consultative process. A map of residual contamination will be generated after remediation. The following sections present the stewardship evaluation.

2.4.1 Proximity to Other Contaminant Sources

IHSS 111.4, Trench T-7 is part of the East Trenches, which are located in the RFETS BZ on both sides of the East Access Road and east of the inner east guard gate. The trench is surrounded by other trenches, including Trench 5 (IHSS 111.2), Trench 6 (IHSS 111.3), Trench 8 (IHSS 111.5), and Trench 9 (IHSS 111.6). The eastern end of Trench 9 abuts the western end of Trench 7. These trenches have similar histories and the same COCs (DOE 1992). The East Spray Field South Area (PAC NE-216.3) is located to the east of Trench 7. COCs include beryllium in surface soil samples and methylene chloride in subsurface soil samples.

2.4.2 Surface Water Protection

Surface water protection includes the following considerations:

Is there a pathway to surface water from potential erosion to streams or drainages?

Trench T-7 is in a flat-lying area not prone to erosion. Waste material is covered by approximately two feet of soil. Runoff from the area flows into the South Interceptor Ditch, via the East Spray Field Interceptor Channel, and then into Pond C-2. Water from Pond C-2 is monitored prior to discharge.

Do characterization data indicate there are contaminants in surface soil?

Data on surface soil contaminants are not available. Waste material is covered by approximately two feet of soil.

Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?

The POEs and POCs downstream of T-7 also monitor contaminants from the South Interceptor Ditch, which receives runoff from the southern part of the Industrial Area (IA). Therefore, it is not possible to determine if contaminants detected are from the T-7 area or from the IA.

Is the IHSS Group in an area with high erosion potential, based on the 100-Year Average Erosion Map?

IHSS 111.4 is not located in an area with a high-erosion potential. The 100-Year Average Erosion Map (Figure 11, DOE 2002a) indicates that IHSS 111.4 is located in an area designated as "No Disposition or Detachment".

2.4.3 Monitoring

Monitoring includes the following considerations:

Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?

Groundwater samples taken from the trench area in 1992 contained VOCs at concentrations greater than RFCA ALs (see Table 1). Recent groundwater data from two Plume Extent Wells near Trench T-7 (i.e., Wells 04591 and 10194) indicate no reportable RFCA AL exceedances (DOE 2002c). The two wells had non-reportable uranium-233/234 and uranium-238 concentrations that were above ALs. Results for all uranium isotopes were below their respective background mean plus two standard deviations.

Based on water level data, the wells in Trench T-7 are routinely dry, so contaminant migration is expected to be limited. It does not appear that contaminants from Trench T-7 would impact downgradient groundwater quality and surface water quality at POEs and POCs.

Table 1
Groundwater Concentrations Exceeding Action Levels

Well	Sample Number	Collection Date	Analyte	Results (mg/L)	Detection Limit (mg/L)	Action Level (mg/L)
8391	GW034781T	9/3/92	Carbon tetrachloride	0.009	0.0001	0.005
8391	GW034781T	9/3/92	Tetrachloroethene	0.32	0.00014	0.005
8391	GW034781T	9/3/92	Trichloroethene	0.022	0.00028	0.005

Source: DOE 1996.

Can the impact be traced to a specific IHSS Group?

Impacts on groundwater quality could be from multiple sources.

Are additional monitoring stations needed?

No; there are sufficient wells in the area.

Can existing monitoring locations be deleted if additional remediation is conducted?

No. Monitoring will still be required to evaluate groundwater quality in the area.

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2.4.4 Stewardship Actions and Recommendations

The current stewardship actions and recommendations for IHSS Group NE-2 are as follows:

- Use Best Management Practices to reduce erosion into surface water drainage (Section 7.2 of the ER RSOP).
- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following:
  - Signs and barriers;
  - Restrictions on soil excavation; and
  - Soil excavations controlled through the Site Soil Disturbance Permit process.
- Implement long-term stewardship actions, including the following:
  - Continuing Federal ownership and control over the Site; and
  - Land use restrictions in accordance with the Site's Long-Term Stewardship Plan.

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions.

2.5 Accelerated Action Remediation Goals

ER RSOP remedial action objectives include 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 IHSS 111.4, Trench 7 include the following:

- Remove all waste material from the trench (approximately 798 cubic yards) and dispose of offsite;
- Conduct confirmation sampling and remove soils at the trench boundary (i.e., trench side walls and bottom) with concentrations equal to or exceeding RFCA ALs; and
- Reclaim the site to enable use as a wildlife refuge.

2.6 Treatment

Not applicable.

2.7 Project-Specific Monitoring

Environmental monitoring, including downstream surface water and downgradient groundwater monitoring, will be conducted as part of the Integrated Monitoring Program (IMP) to ensure that contaminant concentrations are not increasing and that water quality standards are being met (DOE 2001).

Project-specific surface water, groundwater, and air monitoring during remediation will be planned through the IMP process. Additional air monitoring will be conducted in accordance with Work Controls in order to document the absence of airborne activity. Potential locations of air samplers are shown on Figure 4.

2.8 Intended Waste Disposition

It is anticipated that most of the waste from Trench T-7 will be classified and disposed of as low level or low level mixed waste.

2.9 Administrative Record Documents

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

DOE, 1995, Phase II RFI/RI, 903 Pad, Mound and East Trenches Area, OU 2, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1996, Trenches and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Rocky Flats Environmental Technology Site, Integrated Monitoring Plan, Golden, Colorado.

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

DOE, 2002, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE 2002, Third Quarter RFCA Groundwater Monitoring Report for Calendar Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

2.10 Projected Schedule

Remediation of IHSS 111.4, Trench T-7 will begin in the third or fourth quarter of FY03. This project is scheduled to be completed at the same time as the Trench T-4 project. The projected schedule to complete both projects is five months.

3.0 PUBLIC PARTICIPATION

ER RSOP Notification #03-01 activities will probably be discussed at the November 2002 ER/Decontamination and Decommissioning Status meeting. This Notification is available at the Rocky Flats Reading Rooms.

4.0 REFERENCES

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

DOE, 1996, Trenches and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Rocky Flats Environmental Technology Site, Integrated Monitoring Plan, Golden, Colorado.

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

DOE, 2002b, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE 2002c, Third Quarter RFCA Groundwater Monitoring Report for Calendar Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

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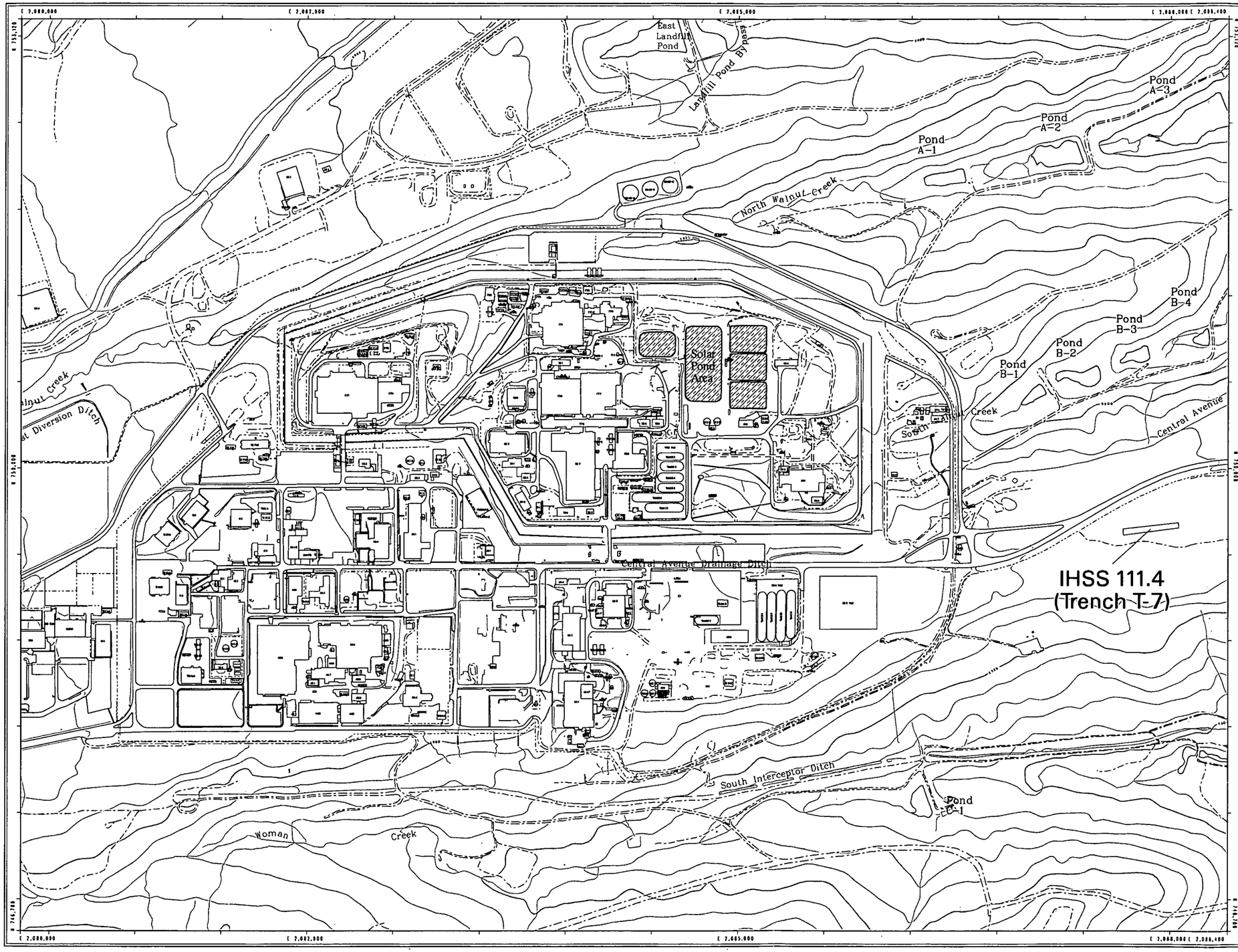
Figure 1
IHSS Location Map



EXPLANATION

- IHSS

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats boundary
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1995

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

Scale = 1 : 8180
1 inch represents approximately 682 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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

GIS Dept. 303-966-7707

DRAFT

October 09, 2002

NT_Svr w:/projects/fy2003/03-0018/t7_fig1.aml

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Figure 3
Existing Analytical Results
IHSS 111.4
Trench 7

2086800 2087000 2087200 2087400 2087600 2087800 2088000 2088200 2088400 2088600 2088800

750200 750000 749800 749600 749400 749200 749000 748800

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
12295	3.00	8.00	ACENAPHTHENE	160	ug/Kg	NA	330	40827468.7
12295	3.00	8.00	ACETONE	18	ug/Kg	NA	100	102200000
12295	3.00	8.00	ANTHRACENE	190	ug/Kg	NA	330	204137343
12295	3.00	8.00	BIS(2-ETHYLHEXYL)PHTHALATE	71000	ug/Kg	NA	330	1963057.16
12295	3.00	8.00	CHRYSENE	370	ug/Kg	NA	330	3483438.18
12295	3.00	8.00	FLUORANTHENE	430	ug/Kg	NA	330	27218312.4
12295	3.00	8.00	FLUORENE	120	ug/Kg	NA	330	40827468.7
12295	3.00	8.00	NAPHTHALENE	110	ug/Kg	NA	330	1930854.57
12295	3.00	8.00	PHENOL	460	ug/Kg	NA	330	613200000
12295	3.00	8.00	PLUTONIUM-239/240	0.0856	pCi/g	0.02	0.0036	116
12295	3.00	8.00	PYRENE	1200	ug/Kg	NA	330	22119616.2
12295	3.00	8.00	URANIUM-235	0.3418	pCi/g	0.12	0.0111	8
12295	3.00	8.00	URANIUM-238	10.26	pCi/g	1.49	0.0124	351
12295	8.00	10.00	1,1,1-TRICHLOROETHANE	2	ug/Kg	NA	5	52983257.3
12295	8.00	10.00	ACETONE	16	ug/Kg	NA	100	102200000
12295	8.00	10.00	BIS(2-ETHYLHEXYL)PHTHALATE	1100	ug/Kg	NA	330	1963057.16
12295	8.00	10.00	CHLOROFORM	2	ug/Kg	NA	5	11304.28
12295	8.00	10.00	CHRYSENE	40	ug/Kg	NA	330	3483438.18
12295	8.00	10.00	METHYLENE CHLORIDE	3	ug/Kg	NA	5	1869949.58
12295	8.00	10.00	PHENOL	1300	ug/Kg	NA	330	613200000
12295	8.00	10.00	PYRENE	90	ug/Kg	NA	330	22119616.2
12295	8.00	10.00	TETRACHLOROETHENE	50	ug/Kg	NA	5	551263.77
12295	8.00	10.00	TRICHLOROETHENE	130	ug/Kg	NA	5	12587.40

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
08291	2.00	8.00	PLUTONIUM-239/240	0.033	pCi/g	0.02	0.008	116
08291	2.70	2.90	ACETONE	280	ug/Kg	NA	10	102200000
08291	2.70	2.90	TOLUENE	480	ug/Kg	NA	5	19655817.7
08291	2.70	2.90	TOTAL XYLENES	7	ug/Kg	NA	5	2044000000
08291	7.50	7.70	1,1,2,2-TETRACHLOROETHANE	5	ug/Kg	NA	5	75170.54
08291	7.50	7.70	ACETONE	21	ug/Kg	NA	10	102200000
08291	8.00	14.00	PLUTONIUM-239/240	0.032	pCi/g	0.02	0.003	116
08291	10.70	10.90	TOLUENE	8	ug/Kg	NA	5	19655817.7
08291	14.00	20.00	PLUTONIUM-239/240	0.031	pCi/g	0.02	0.007	116
08291	15.80	16.00	TOLUENE	20	ug/Kg	NA	5	19655817.7
08291	19.80	20.00	ACETONE	32	ug/Kg	NA	10	102200000
08291	19.80	20.00	TOLUENE	130	ug/Kg	NA	5	19655817.7

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
12395	3.00	8.00	1,1,1-TRICHLOROETHANE	300	ug/Kg	NA	5	52983257.3
12395	3.00	8.00	ACETONE	1100	ug/Kg	NA	100	102200000
12395	3.00	8.00	BUTYL BENZYL PHTHALATE	4900	ug/Kg	NA	330	147464108
12395	3.00	8.00	PHENOL	410	ug/Kg	NA	330	613200000
12395	3.00	8.00	TETRACHLOROETHENE	16000	ug/Kg	NA	5	551263.77
12395	3.00	8.00	TRICHLOROETHENE	190	ug/Kg	NA	5	12587.40
12396	8.00	10.00	AMERICIUM-241	0.0219	pCi/g	0.02	0.0085	76
12395	8.00	10.00	PHENOL	700	ug/Kg	NA	330	613200000
12395	8.00	10.00	PLUTONIUM-239/240	0.0998	pCi/g	0.02	0.0095	116

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
12095	3.00	5.00	2-BUTANONE	32	ug/Kg	NA	NA	129997594
12095	3.00	5.00	ACETONE	26	ug/Kg	NA	NA	102200000
12095	3.00	5.00	AMERICIUM-241	343	pCi/g	0.02	1	76
12095	3.00	5.00	AMERICIUM-241	410	pCi/g	0.02	0.4	76
12095	3.00	5.00	ANTIMONY	29.448	mg/Kg	16.97	NA	408.8
12095	3.00	5.00	ARSENIC	20.003	mg/Kg	13.14	NA	21.7
12095	3.00	5.00	CADMIUM	1.9632	mg/Kg	1.7	1.95	954.77
12095	3.00	5.00	PLUTONIUM-239/240	2100	pCi/g	0.02	0.4	116
12095	3.00	5.00	PLUTONIUM-239/240	3450	pCi/g	0.02	0.4	116
12095	3.00	5.00	SELENIUM	49.06	mg/Kg	4.8	49.06	5110
12095	3.00	5.00	URANIUM-235	0.95	pCi/g	0.12	0.51	8
12095	3.00	5.00	URANIUM-235	1.7	pCi/g	0.12	0.4	8
12095	3.00	5.00	URANIUM-238	2	pCi/g	1.49	0.5	351
12095	3.00	5.00	URANIUM-238	17	pCi/g	1.49	1.5	351
12095	8.00	10.00	ACETONE	17	ug/Kg	NA	100	102200000
12095	8.00	10.00	AMERICIUM-241	0.0543	pCi/g	0.02	0.0051	76
12095	8.00	10.00	BIS(2-ETHYLHEXYL)PHTHALATE	130	ug/Kg	NA	330	1963057.16
12095	8.00	10.00	METHYLENE CHLORIDE	3	ug/Kg	NA	5	1869949.58
12095	8.00	10.00	NICKEL	145	mg/Kg	62.21	8	20440
12095	8.00	10.00	PHENOL	290	ug/Kg	NA	330	613200000
12095	8.00	10.00	PLUTONIUM-239/240	0.4501	pCi/g	0.02	0.0079	116
12095	8.00	10.00	URANIUM-235	0.3112	pCi/g	0.12	0.0196	8
12095	8.00	10.00	URANIUM-238	2.225	pCi/g	1.49	0.0229	351

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
08391	4.30	4.50	ACETONE	10	ug/Kg	NA	10	102200000
08391	4.30	4.50	METHYLENE CHLORIDE	4	ug/Kg	NA	5	1869949.58
08391	4.30	4.50	TOLUENE	5	ug/Kg	NA	5	19655817.7
08391	9.20	9.40	ACETONE	17	ug/Kg	NA	10	102200000
08391	9.20	9.40	METHYLENE CHLORIDE	7	ug/Kg	NA	5	1869949.58
08391	9.20	9.40	TOLUENE	54	ug/Kg	NA	5	19655817.7
08391	12.20	12.40	ACETONE	25	ug/Kg	NA	10	102200000
08391	12.20	12.40	METHYLENE CHLORIDE	5	ug/Kg	NA	5	1869949.58
08391	12.20	12.40	TOLUENE	61	ug/Kg	NA	5	19655817.7
08391	16.10	16.30	ACETONE	18	ug/Kg	NA	10	102200000
08391	16.10	16.30	METHYLENE CHLORIDE	8	ug/Kg	NA	5	1869949.58
08391	16.10	16.30	TOLUENE	64	ug/Kg	NA	5	19655817.7
08391	21.60	21.80	ACETONE	12	ug/Kg	NA	10	102200000
08391	21.60	21.80	METHYLENE CHLORIDE	4	ug/Kg	NA	5	1869949.58
08391	21.60	21.80	TOLUENE	67	ug/Kg	NA	5	19655817.7
08391	24.30	24.50	ACETONE	15	ug/Kg	NA	10	102200000
08391	24.30	24.50	METHYLENE CHLORIDE	5	ug/Kg	NA	5	1869949.58
08391	24.30	24.50	TOLUENE	42	ug/Kg	NA	5	19655817.7
08391	29.70	29.90	ACETONE	18	ug/Kg	NA	10	102200000
08391	29.70	29.90	METHYLENE CHLORIDE	11	ug/Kg	NA	5	1869949.58
08391	29.70	29.90	TETRACHLOROETHENE	5	ug/Kg	NA	5	551263.77
08391	29.70	29.90	TOLUENE	10	ug/Kg	NA	5	19655817.7
08391	32.90	33.10	ACETONE	17	ug/Kg	NA	10	102200000
08391	32.90	33.10	METHYLENE CHLORIDE	11	ug/Kg	NA	5	1869949.58
08391	37.70	37.90	ACETONE	29	ug/Kg	NA	10	102200000
08391	37.70	37.90	TETRACHLOROETHENE	2	ug/Kg	NA	5	551263.77
08391	40.00	44.00	BIS(2-ETHYLHEXYL)PHTHALATE	47	ug/Kg	NA	330	1963057.16
08391	41.70	41.90	ACETONE	84	ug/Kg	NA	10	102200000

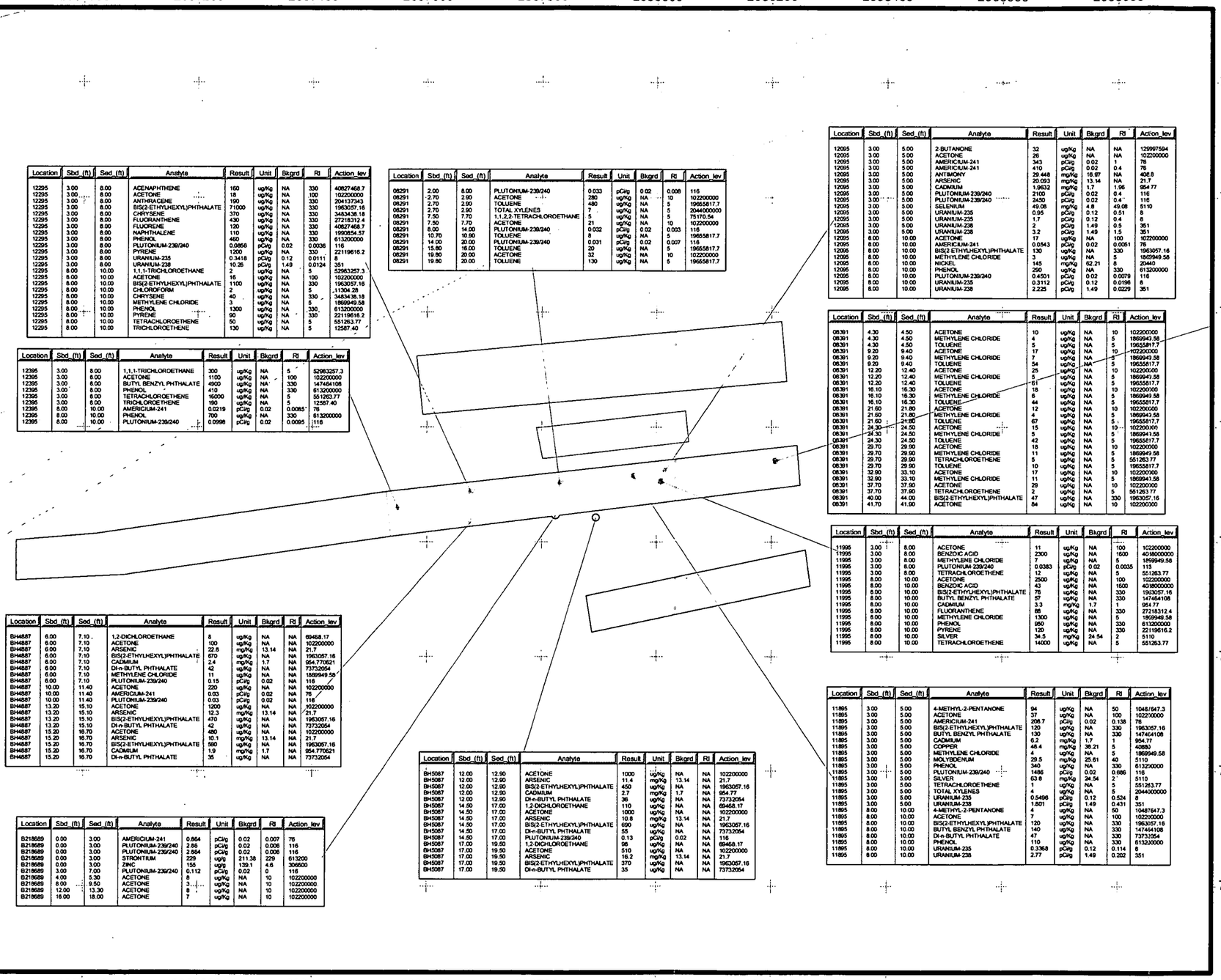
Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
11995	3.00	8.00	ACETONE	11	ug/Kg	NA	100	102200000
11995	3.00	8.00	BENZOIC ACID	2300	ug/Kg	NA	1600	4018000000
11995	3.00	8.00	METHYLENE CHLORIDE	7	ug/Kg	NA	5	1869949.58
11995	3.00	8.00	PLUTONIUM-239/240	0.0383	pCi/g	0.02	0.0035	116
11995	3.00	8.00	TETRACHLOROETHENE	12	ug/Kg	NA	5	551263.77
11995	8.00	10.00	ACETONE	2500	ug/Kg	NA	100	102200000
11995	8.00	10.00	BENZOIC ACID	43	ug/Kg	NA	1600	4018000000
11995	8.00	10.00	BIS(2-ETHYLHEXYL)PHTHALATE	76	ug/Kg	NA	330	1963057.16
11995	8.00	10.00	BUTYL BENZYL PHTHALATE	57	ug/Kg	NA	330	147464108
11995	8.00	10.00	CADMIUM	3.3	mg/Kg	1.7	1	954.77
11995	8.00	10.00	FLUORANTHENE	88	ug/Kg	NA	330	27218312.4
11995	8.00	10.00	METHYLENE CHLORIDE	1300	ug/Kg	NA	5	1869949.58
11995	8.00	10.00	PHENOL	950	ug/Kg	NA	330	613200000
11995	8.00	10.00	PYRENE	120	ug/Kg	NA	330	22119616.2
11995	8.00	10.00	SILVER	34.5	mg/Kg	24.54	2	5110
11995	8.00	10.00	TETRACHLOROETHENE	14000	ug/Kg	NA	5	551263.77

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
11895	3.00	5.00	4-METHYL-2-PENTANONE	94	ug/Kg	NA	50	1048/647.3
11895	3.00	5.00	ACETONE	37	ug/Kg	NA	100	102200000
11895	3.00	5.00	AMERICIUM-241	208.7	pCi/g	0.02	0.138	76
11895	3.00	5.00	BIS(2-ETHYLHEXYL)PHTHALATE	120	ug/Kg	NA	330	1963057.16
11895	3.00	5.00	BUTYL BENZYL PHTHALATE	130	ug/Kg	NA	330	147464108
11895	3.00	5.00	CADMIUM	6.2	mg/Kg	1.7	1	954.77
11895	3.00	5.00	COPPER	48.4	mg/Kg	36.21	5	40880
11895	3.00	5.00	METHYLENE CHLORIDE	4	ug/Kg	NA	5	1869949.58
11895	3.00	5.00	MOLYBDENUM	29.5	mg/Kg	25.61	40	5110
11895	3.00	5.00	PHENOL	340	ug/Kg	NA	330	613200000
11895	3.00	5.00	PLUTONIUM-239/240	1486	pCi/g	0.02	0.686	116
11895	3.00	5.00	SILVER	63.8	mg/Kg	24.54	2	5110
11895	3.00	5.00	TETRACHLOROETHENE	1	ug/Kg	NA	5	551263.77
11895	3.00	5.00	TOTAL XYLENES	4	ug/Kg	NA	5	2044000000
11895	3.00	5.00	URANIUM-235	0.5496	pCi/g	0.12	0.524	8
11895	3.00	5.00	URANIUM-238	1.801	pCi/g	1.49	0.431	351
11895	8.00	10.00	4-METHYL-2-PENTANONE	4	ug/Kg	NA	50	1048/647.3
11895	8.00	10.00	ACETONE	7	ug/Kg	NA	100	102200000
11895	8.00	10.00	BIS(2-ETHYLHEXYL)PHTHALATE	120	ug/Kg	NA	330	1963057.16
11895	8.00	10.00	BUTYL BENZYL PHTHALATE	140	ug/Kg	NA	330	147464108
11895	8.00	10.00	DI-n-BUTYL PHTHALATE	47	ug/Kg	NA	330	73732054
11895	8.00	10.00	PHENOL	110	ug/Kg	NA	330	613200000
11895	8.00	10.00	URANIUM-235	0.3368	pCi/g	0.12	0.114	8
11895	8.00	10.00	URANIUM-238	2.77	pCi/g	1.49	0.202	351

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
BH4687	6.00	7.10	1,2-DICHLOROETHANE	8	ug/Kg	NA	NA	69468.17
BH4687	6.00	7.10	ACETONE	100	ug/Kg	NA	NA	102200000
BH4687	6.00	7.10	ARSENIC	22.8	mg/Kg	13.14	NA	21.7
BH4687	6.00	7.10	BIS(2-ETHYLHEXYL)PHTHALATE	670	ug/Kg	NA	NA	1963057.16
BH4687	6.00	7.10	CADMIUM	2.4	mg/Kg	1.7	NA	954.770621
BH4687	6.00	7.10	DI-n-BUTYL PHTHALATE	42	ug/Kg	NA	NA	73732054
BH4687	6.00	7.10	METHYLENE CHLORIDE	11	ug/Kg	NA	NA	1869949.58
BH4687	6.00	7.10	PLUTONIUM-239/240	0.15	pCi/g	0.02	NA	116
BH4687	10.00	11.40	ACETONE	220	ug/Kg	NA	NA	102200000
BH4687	10.00	11.40	AMERICIUM-241	0.03	pCi/g	0.02	NA	76
BH4687	10.00	11.40	PLUTONIUM-239/240	0.03	pCi/g	0.02	NA	116
BH4687	13.20	15.10	ACETONE	1200	ug/Kg	NA	NA	102200000
BH4687	13.20	15.10	ARSENIC	12.3	mg/Kg	13.14	NA	21.7
BH4687	13.20	15.10	BIS(2-ETHYLHEXYL)PHTHALATE	470	ug/Kg	NA	NA	1963057.16
BH4687	13.20	15.10	DI-n-BUTYL PHTHALATE	42	ug/Kg	NA	NA	73732054
BH4687	15.20	16.70	ACETONE	480	ug/Kg	NA	NA	102200000
BH4687	15.20	16.70	ARSENIC	10.1	mg/Kg	13.14	NA	21.7
BH4687	15.20	16.70	BIS(2-ETHYLHEXYL)PHTHALATE	580	ug/Kg	NA	NA	1963057.16
BH4687	15.20	16.70	CADMIUM	1.9	mg/Kg	1.7	NA	954.770621
BH4687	15.20	16.70	DI-n-BUTYL PHTHALATE	35	ug/Kg	NA	NA	73732054

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
BH5087	12.00	12.90	ACETONE	1000	ug/Kg	NA	NA	102200000
BH5087	12.00	12.90	ARSENIC	11.4	mg/Kg	13.14	NA	21.7
BH5087	12.00	12.90	BIS(2-ETHYLHEXYL)PHTHALATE	450	ug/Kg	NA	NA	1963057.16
BH5087	12.00	12.90	CADMIUM	2.7	mg/Kg	1.7	NA	954.77
BH5087	12.00	12.90	DI-n-BUTYL PHTHALATE	36	ug/Kg	NA	NA	73732054
BH5087	14.50	17.00	1,2-DICHLOROETHANE	110	ug/Kg	NA	NA	69468.17
BH5087	14.50	17.00	ACETONE	1000	ug/Kg	NA	NA	102200000
BH5087	14.50	17.00	ARSENIC	10.8	mg/Kg	13.14	NA	21.7
BH5087	14.50	17.00	BIS(2-ETHYLHEXYL)PHTHALATE	690	ug/Kg	NA	NA	1963057.16
BH5087	14.50	17.00	DI-n-BUTYL PHTHALATE	55	ug/Kg	NA	NA	73732054
BH5087	14.50	17.00	PLUTONIUM-239/240	0.13	pCi/g	0.02	NA	116
BH5087	17.00	19.50	1,2-DICHLOROETHANE	98	ug/Kg	NA	NA	69468.17
BH5087	17.00	19.50	ACETONE	510	ug/Kg	NA	NA	102200000
BH5087	17.00	19.50	ARSENIC	16.2	mg/Kg	13.14	NA	21.7
BH5087	17.00	19.50	BIS(2-ETHYLHEXYL)PHTHALATE	370	ug/Kg	NA	NA	1963057.16
BH5087	17.00	19.50	DI-n-BUTYL PHTHALATE	33	ug/Kg	NA	NA	73732054

Location	Sbd_(ft)	Sed_(ft)	Analyte	Result	Unit	Bkgrd	RI	Action_lev
B218689	0.00	3.00	AMERICIUM-241	0.864	pCi/g	0.02	0.007	76
B218689	0.00	3.00	PLUTONIUM-239/240	2.86	pCi/g	0.02	0.008	116
B218689	0.00	3.00	PLUTONIUM-239/240	2.864	pCi/g	0.02	0.008	116
B218689	0.00	3.00	STRONTIUM	229	ug/g	211.38	229	613200
B218689	0.00	3.00	ZINC	155	ug/g	139.1	4.6	306500
B218689	3.00	7.00	PLUTONIUM-239/240	0.112	pCi/g	0.02	0	116
B218689	4.00	5.30	ACETONE	8	ug/Kg	NA	10	102200000
B218689	8.00	9.50	ACETONE	3	ug/Kg	NA	10	102200000
B218689	12.00	13.30	ACETONE	8	ug/Kg	NA	10	102200000
B218689	16.00	18.00	ACETONE	7	ug/Kg	NA	10	102200000



KEY

- Paved Road
- Dirt Road
- Streams
- Fence
- Subsurface Sample Location
- IHSS 111.2
- IHSS 111.3
- IHSS 111.4
- IHSS 111.5
- IHSS 111.6

N W E S

100 0 100 Feet

Scale = 1:1600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared by:

WESTON RADMS

Prepared for:

KAISER•HILL COMPANY

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Date: 23Oct02

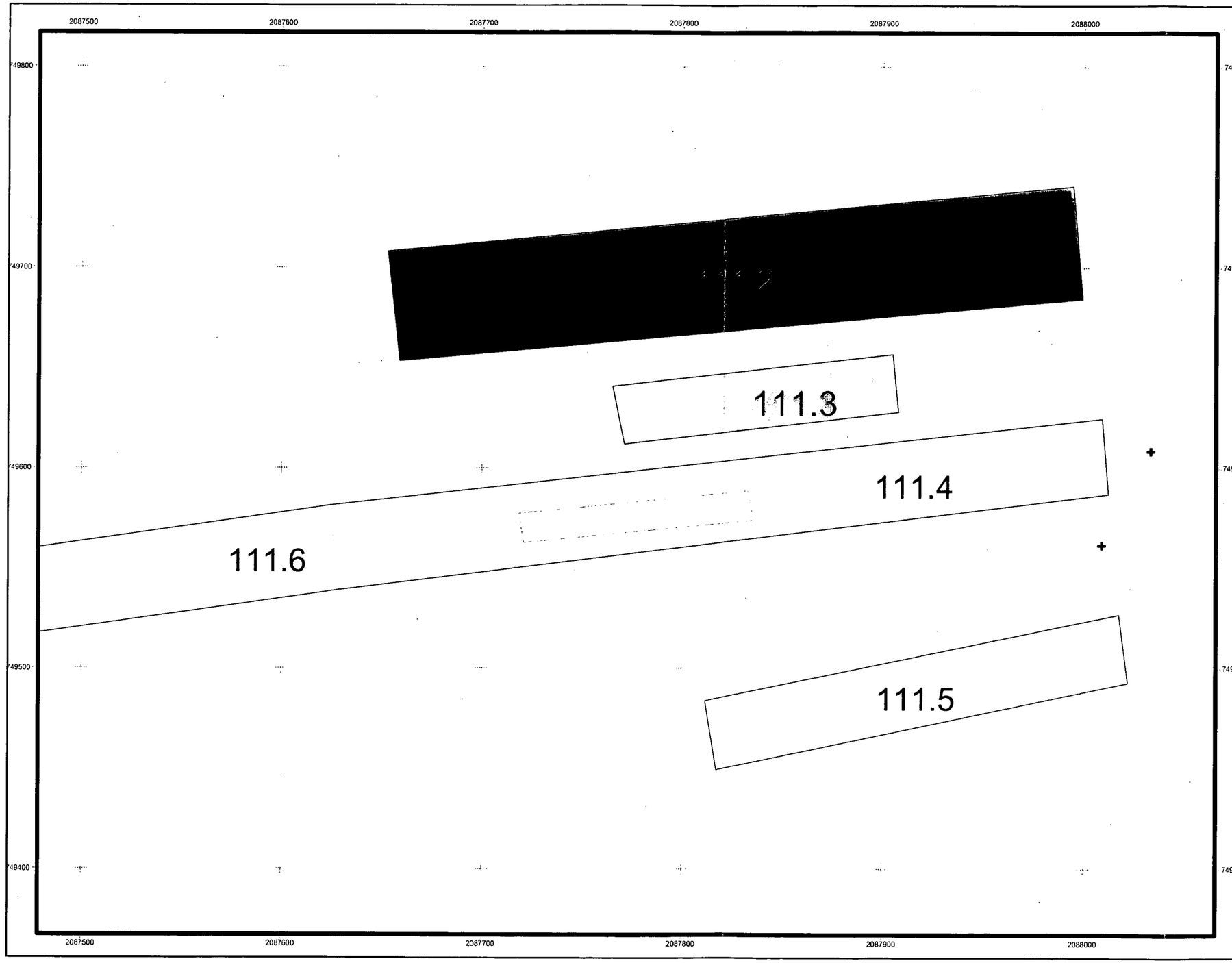

Figure 4
IHSS 111.4
Potential Remediation Area Map

KEY

- Trench 7 Boundary
- IHSS 111.2
- IHSS 111.3
- IHSS 111.4
- IHSS 111,5
- IHSS 111.6
- Potential Air Sampler Locations

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N
W E
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20 0 20 40 Feet

Scale = 1:600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Date: 23Oct02