

## TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
ABBREVIATIONS, ACRONYMS, AND INITIALISMS .....	v
1.0 INTRODUCTION.....	1
2.0 REVISED PAC NARRATIVES .....	10
PAC REFERENCE NUMBER: NW-1505 .....	11
(North Firing Range)	
PAC REFERENCE NUMBER(s): SW-133.1, 133.2, 133.3, 133.4, 1701 .....	14
and 1702 (Ash Pits, Operable Unit 5)	
PAC REFERENCE NUMBER: SW-133.5 .....	38
(Incinerator Facility)	
PAC REFERENCE NUMBER: SW-133.6 .....	44
(Concrete Wash Pad)	
PAC REFERENCE NUMBER: 100-603 .....	49
(Building 123 Bioassay Waste Spill)	
PAC REFERENCE NUMBER: 100-607 .....	54
(Building 111 Transformer PCB Leak)	
PAC REFERENCE NUMBER: 300-206 .....	59
(Inactive D-836 Hazardous Waste Tank)	
PAC REFERENCE NUMBER: 400-812 .....	63
(Tank T-2 Spill North of Building 460)	
PAC REFERENCE NUMBER: 600-189 .....	67
(Nitric Acid Tanks)	
PAC REFERENCE NUMBER: 700-1102 .....	71
(Transformer Leak-776-4)	

	PAC REFERENCE NUMBER: 800-179 .....	76
	(Building 865 Drum Storage Area)	
	PAC REFERENCE NUMBER: 800-180 .....	78
	(Building 883 Drum Storage Area)	
	PAC REFERENCE NUMBER: 900-1308 .....	80
	(Gasoline Spill Outside of Building 980)	
<b>3.0</b>	<b>SIGNIFICANT EVENTS (to date).....</b>	<b>83</b>
	(Significant Events Occurring within Reporting Period)	
	<b>Section 3.1 - CDPHE Buffer Zone Contamination Review.....</b>	<b>84</b>
	(Agreements, Status, & General Schedule for Disposition of 36 Locations)	
	<b>Section 3.2 - Operable Unit 1 CAD/ROD Amendment .....</b>	<b>114</b>
	(Agreements, Status, & Schedule for Remaining Actions Associated with IHSS 119.1 and the Collection Sump)	
	<b>Section 3.3 - Soil Relocation Tracking.....</b>	<b>115</b>
	<b>Section 3.4 - B440 TRUPACT II Shipping Facility .....</b>	<b>115</b>
	<b>Section 3.5 - PU&amp;D Yard Groundwater Plume, HRC Injection.....</b>	<b>116</b>
	<b>Section 3.6 - UBC Characterization Studies .....</b>	<b>116</b>
	(Horizontal Drilling, Buildings 123 and 886)	
	<b>Section 3.7 - UBC Characterization Studies .....</b>	<b>117</b>
	(Building 771 Sub-slab Pre-characterization)	

## FIGURES

Figure 1.1 PAC Area Boundaries .....	5
Figure 2.1 Location Map for PAC NW-1505 .....	12
Figure 2.2 Sample Location Map for the Ash Pits, Incinerator Facility & Concrete Wash Pad ...	15
Figure 2.3 HPGe Location Map (Am-241) for Operable Unit 5, Ash Pits .....	31
Figure 2.4 HPGe Location Map (U-235) for Operable Unit 5, Ash Pits .....	32
Figure 2.5 HPGe Location Map (U-238) for Operable Unit 5, Ash Pits .....	33
Figure 2.6 Location Map and Sample Locations for PAC 100-603 .....	50
Figure 2.7 Sample Location Map and Results for PAC 100-607 .....	53
Figure 2.8 Sample Location Map for IHSS 206 .....	60
Figure 2.9 Sample Location Map and Results for PAC 400-812 .....	64
Figure 2.10 Sample Location Map and Results for PAC 600-189 .....	68
Figure 2.11 Sample Location Map for PAC 700-1102 .....	72
Figure 2.12 Location Map for PAC 900-1308 .....	81

## TABLES

Table 1.1 - RFCA Consolidation of Former Operable Units .....	3
Table 1.2 - Status Table for IHSSs and PACs Updated this Reporting Period .....	7
Table 1.3 - HRR Site Tracking and Status through September 25, 2001 .....	9
Table 2.1 - Subsurface Soil Sampling Locations for Ash Pits .....	17
Table 2.2 - Summary of Analytical Results for Subsurface Soils at IHSS 133.1 .....	18
Table 2.3 - Summary of Analytical Results for Subsurface Soils at IHSS 133.2 .....	19
Table 2.4 - Summary of Analytical Results for Subsurface Soils at IHSS 133.3 .....	20
Table 2.5 - Summary of Analytical Results for Subsurface Soils at IHSS 133.4 .....	21
Table 2.6 - Summary of Analytical Results for Subsurface Soils at PAC SW-1701 .....	22
Table 2.7 - Summary of Analytical Results for Subsurface Soils at PAC SW-1702 .....	24
Table 2.8 - Summary of Analytical Results for Surface Soils and Sediments from the Ash Pits .....	25
Table 2.9 - Summary of Analytical Results for Groundwater at Ash Pit Sites .....	25
Table 2.10 - August 2001, Uranium Results for the Ash Pits .....	29
Table 2.11 - August 2001, Metal Results for the Ash Pits .....	29
Table 2.12 - Summary of Analytical Results for Surface Water Locations Near the Ash Pits .....	34
Table 2.13 - Concentration Levels for Contaminant Migratory Pathways .....	30
Table 2.14 - Summary of Analytical Results for Subsurface Soils at IHSS 133.5 .....	40
Table 2.15 - Summary of Analytical Results for Subsurface Soils at IHSS 133.6 .....	46

**TABLES (Continued)**

Table 2.16 - Analytes Exceeding Background Mean plus 2 Standard Deviations.....51  
Table 2.17 - PCB Results for Concrete Cores, Sludge & Water Samples at PAC 100-607.....56  
Table 2.18 - Summary of Surface Soil Sampling Results for IHSS 206 .....61  
Table 2.19 - November 11, 1993, Sampling Results, Building 460, Tank T-2 Transfer.....63  
Table 2.20 - Analytes Exceeding Background, PAC 100-812 .....65  
Table 2.21 - Summary of Surface Soil Sampling Results for IHSS 189 .....69  
Table 2.22 - Summary of Groundwater Sample Results near PAC 700-1102 .....74

**APPENDIX(S)**

Appendix 1 IHSSs, PACs, and UBCs

Appendix 2 Correspondence Letters

Appendix 3 Location Map for Soil Put-back and/or Relocation

- Figure A-3.1 –Non-RFCA Generated Soils Returned to Place of Origin
- Figure A-3.2 –RFCA/RSOP, B123 Soils Returned to Place of Origin
- Figure A-3.3 –RFCA/RSOP, B886 Soils Returned to Place of Origin

Appendix 4 Plates

5

## ABBREVIATIONS, ACRONYMS, AND INITIALISMS

AL	Action Level
ALF	Action Level and Standards Framework for Surface Water, Groundwater & Soils
AME	Actinide Migration Evaluation
AOC	Area of Concern
AR	Administrative Record
ARA	Accelerated Response Action
bgs	below ground surface
BTEX	benzene, toluene, ethyl-benzene, xylene
BZ	Buffer Zone
CAD/ROD	Corrective Action Decision/Record of Decision
CDPHE	Colorado Department of Public Health and Environment
CEARP	Comprehensive Environmental Assessment & Response Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHWA	Colorado Hazardous Waste Act
Ci	curies
cm <sup>2</sup>	square centimeters
CPIR	Contingency Plan Implementation Report
cpm	counts per minute
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DNAPL	dense non-aqueous phase liquid
DOE	U.S. Department of Energy
D/P/G	disintegrations per minute per gram
dpm	disintegrations per minute
DQO	Data Quality Objectives
EG&G	EG&G Rocky Flats, Inc.
EMWD	environmental measurement while drilling
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERA	Ecological Risk Assessment
FIDLER	Field Instrument for the Detection of Low-Energy Radiation
ft	foot/feet
ft <sup>2</sup>	square feet
FY	Fiscal Year
g	grams
GPR	Ground Penetrating Radar
GPS	Global Positioning System
HDPE	high density polyethylene
HEPA	high-efficiency particulate air
HHRA	Human Health Risk Assessment
HI	hazard index
HPGe	High Purity Germanium

6

**ABBREVIATIONS, ACRONYMS, AND INITIALISMS**  
(continued)

HRR	Historical Release Report
IA	Industrial Area
IAG	Interagency Agreement
IDM	investigative derived materials
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
IMP	Integrated Monitoring Program
IRIS	Integrated Risk Information System
ITS	Interceptor Trench System
ITPH	Interceptor Trench Pump House
IWCP	Integrated Work Control Package
$\mu\text{Ci/g}$	microcuries per gram
$\mu\text{g/kg}$	micrograms per kilogram (ppb)
$\mu\text{g/L}$	micrograms per liter (ppb)
mg/kg	milligrams per kilogram (ppm)
mg/L	milligrams per liter (ppm)
MDL	Method Detection Limit
MILES	Multiple Integrated Laser Engagement System
MST	Modular Storage Tank
nCi/g	nanocuries per gram
NFA	No Further Action
NPWL	New Process Waste Lines
NRC	National Response Center
NTS	Nevada Test Site
OPWL	Original Process Waste Lines
OU	Operable Unit
PA	Protected Area
PAC	Potential Area of Concern
PAM	Proposed Action Memorandum
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	Polychlorinated Biphenyl
PCE	tetrachloroethene
pCi/g	picocuries per gram
PCOC	Potential Contaminant of Concern
POC	Point of Compliance
POE	Point of Evaluation
ppb	part per billion ( $\mu\text{g/Kg}$ or $\mu\text{g/L}$ )
ppm	part per million ( $\text{mg/Kg}$ or $\text{mg/L}$ )
PPRG	Programmatic Preliminary Remediation Goal
PSZ	Perimeter Security Zone
PU&D	Property Utilization and Disposal
QC	quality control

**ABBREVIATIONS, ACRONYMS, AND INITIALISMS**  
(continued)

RCRA	Resource Conservation and Recovery Act
RCRA 3004(u)	Appendix 1, Waste Management Units RCRA Part B Permit Application
RFCA	Rocky Flats Cleanup Agreement
RFFO	Rocky Flats Field Office
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RFP	Rocky Flats Plant
RI	Remedial Investigation
RLCP	Reconnaissance Level Characterization Plan
RMRS	Rocky Mountain Remediation Services, L.L.C.
RQ	Reportable Quantity
RSALs	Radionuclide Soil Action Levels
SAP	Sampling and Analysis Plan
SCFA	Subsurface Contaminant Focus Area
SEP	Solar Evaporation Pond
SID	South Interceptor Ditch
SITE	Superfund Innovative Technology Evaluation
SNM	Special Nuclear Material
STP	Sewage Treatment Plant
SVOC	Semivolatile Organic Compound
SWD	Soil Water Database
SWMU	Solid Waste Management Unit
TCA	1,1,1-trichloroethane
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substances Control Act
UBC	Under Building Contamination
VOC	Volatile Organic Compound
yd <sup>3</sup>	cubic yards

# SECTION 1.0 INTRODUCTION

## 1.0 INTRODUCTION

### Background

The Rocky Flats Environmental Technology Site (RFETS) began operation in 1951. Since 1951, materials defined as hazardous substances, pollutants, and contaminants by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and materials defined as hazardous waste and hazardous constituents by the Resource Conservation and Recovery Act (RCRA) and/or the Colorado Hazardous Waste Act (CHWA), have been produced, purchased, stored, consumed, disposed, and released at various locations at RFETS. Contaminants remain within some facility tank and pipe systems and filter plenums. Certain contaminants have been detected and remain in groundwater, sediments, surface water, and soil at the Site and thus pose potential human health and environmental risks.

RCRA regulations require that all Solid Waste Management Units (SWMUs) be identified. This became applicable to RFETS with the signing of a Compliance Agreement on July 31, 1986. At that time, the exact definition of a SWMU had not been formalized, therefore, guidance from the State of Colorado and the regional office of the U.S. Environmental Protection Agency (EPA) was used. The State of Colorado and EPA required the identification of all areas where environmental releases may have occurred, including hazardous waste and nonhazardous waste-related releases. Also included were single-release areas and long-term waste management areas where waste storage may (or is known to) have occurred.

SWMUs were initially identified in 1985 by the DOE Los Alamos Operations Office and are presented in the Draft Comprehensive Environmental Assessment and Response Program (CEARP) Phase I: Installation Assessment. The study consisted of a records search, an open literature survey, and interviews with RFETS employees. The SWMU terminology is a RCRA designation consisting of inactive waste disposal sites, accidentally contaminated sites, and sites found to pose environmental concern due to past or current waste management practices. Inspections were conducted on each site. The first identification of RFETS SWMUs, consistent with the guidance provided by the State of Colorado and the regional EPA, was presented as an appendix to the November 1986 RCRA Part B Permit Application.

Formal efforts to document the extent of Site contamination were established with the signing of the Interagency Agreement (IAG) in 1991. At that time, SWMUs at RFETS were renamed Individual Hazardous Substance Sites (IHSSs). IHSS is a term defined under CERCLA and the IAG as "locations associated with a release or threat of release of hazardous substances that may cause harm to human health/or the environment." The term IHSS is used today at RFETS. The IAG grouped IHSSs by similar contaminant or geographic location into 16 larger Operable Units (OUs), and schedules were set for further characterization. In accordance with the IAG, a Historical Release Report (HRR) was developed. The original intent of the HRR was to capture existing information on historical incidents and plant practices involving hazardous substances at RFETS. Additionally, the IAG prescribed that the HRR reporting process continue quarterly for reporting of new or newly identified releases of hazardous substances to the environment (now identified as Potential Areas of Concern [PACs]).

In 1996, the Rocky Flats Cleanup Agreement (RFCA) was signed superceding the IAG. RFCA incorporated the earlier IAG requirements for updating the HRR; however, it was agreed that reporting would be required on an annual basis instead of quarterly. The first Annual Update was submitted in September 1996.

The 16 OUs designated in the IAG were consolidated into 10 OUs during the RFCA negotiation process to reduce field and administrative requirements. The consolidation of former OUs is presented in Table 1.1.

**Table 1.1 RFCA Consolidation of Former OUs**

<b>IAG Operable Unit Designation</b>	<b>RFCA Operable Unit Designation</b>
<del>Operable Unit 1</del>	<del>Closed under CAD/ROD</del>
Operable Unit 2	Incorporated into <b>Buffer Zone Operable Unit</b>
<del>Operable Unit 3</del>	<del>Closed under CAD/ROD</del>
Operable Unit 4	Incorporated into <b>Industrial Area Operable Unit</b>
Operable Unit 5	Unchanged Under RFCA
Operable Unit 6	Unchanged Under RFCA
Operable Unit 7	Unchanged Under RFCA
Operable Unit 8	Incorporated into Industrial Area Operable Unit
Operable Unit 9	Incorporated into Industrial Area Operable Unit
Operable Unit 10 <sup>2</sup>	Incorporated into Industrial Area Operable Unit <sup>2</sup>
<del>Operable Unit 11</del>	<del>Closed Under CAD/ROD</del>
Operable Unit 12	Incorporated into Industrial Area Operable Unit
Operable Unit 13	Incorporated into Industrial Area Operable Unit
Operable Unit 14	Incorporated into Industrial Area Operable Unit
<del>Operable Unit 15<sup>3</sup></del>	<del>Closed Under CAD/ROD<sup>3</sup></del>
<del>Operable Unit 16</del>	<del>Closed Under CAD/ROD</del>

Note: Shading indicates official closure of Operable Unit (i.e., CAD/ROD).  
Bold text indicates remaining Operable Units with an action

<sup>1</sup>Extraction and Treatment of Groundwater from the IHSS 119.1 Collection Well will be discontinued in February 2002 if trichloroethene concentrations remain below ALF Tier 1 ALs for the previous four quarters.

<sup>2</sup>IHSSs 170, 174A, 174B, and 177 within former Operable Unit 10 are in the Buffer Zone Operable Unit.

<sup>3</sup>Several IHSSs were deferred until D&D is initiated (refer to Operable Unit 15 CAD/ROD or Appendix 1).

At that time, Corrective Action Decisions/Record of Decisions (CAD/RODs) for OUs 11, 15, and 16 were already complete and OUs 1, 3, 5, 6, and 7 were in process or expected. For this reason these OUs retained their IAG designations. The Buffer Zone (BZ) OU incorporates all IHSSs from OU 2; IHSSs 170, 174A, and 174B from the former OU 10; and all PACs within those IHSSs and the BZ. The Industrial Area (IA) OU incorporates all IHSSs from OUs 4, 8, 9, 12, 13, and 14; IHSSs 115 and 196 from OU 6; all IHSSs from OU 10 with the exception of 170, 174A, and 174B; and all PACs and Under Building Contamination sites (UBC) Sites; located within the IA.

A large portion of the text contained within this Annual Update pertains to new information gathered to update previous IHSS, PAC, or UBC descriptions. Many of the PAC narrative

updates reflect regulatory agency comments to earlier annual updates. For this reporting period from August 1, 2000, through August 1, 2001, no new spills, releases, or findings of contaminants were identified at RFETS, however; one new PAC narrative has been added for the North Firing Range (PAC NW-1505). This Annual Update is prepared in accordance with Part 9, Subpart B, paragraph 119 (I) of RFCA (DOE 1996) Notification of Spills, Releases, or Findings and is presented in the format presented below.

For purposes of the HRR process and mapping clarity, original IHSS locations were designated a unique "PAC area" prefix number based upon geographic location. For example, IHSS 123.1 is designated as PAC 700-123.1. An area where there has been a recent release or finding of a hazardous substance in the environment (post-1992) is also assigned a PAC area prefix number, followed by the next numerically highest PAC reference number for that area. These areas are referred to as PACs and are equivalent to IHSSs in that they are CERCLA sites requiring disposition through the HRR and CERCLA reporting process. PAC prefixes are selected according to 14 geographic subdivisions, as illustrated on Figure 1.1. Large PAC areas (i.e., PACs that cross geographic PAC boundaries), such as the Original Process Waste Lines (OPWL); (PAC #000-121) and the Central Avenue Ditch (PAC #000-172), have been assigned a 000 prefix due to their boundary extent. To date, there are 12 IHSSs and/or PACs with the 000 prefix.

In addition to the 14 geographic areas, potential UBC Sites were also discussed in the original HRR (DOE 1992). UBC areas were necessary because of the potential contamination of soil under specific buildings from broken process waste lines or other potential sources related to the building histories. Appendix 4, Plate #4, Potential Areas of Concern, presents the UBC locations identified at RFETS.

PAC narratives include U.S. Department of Energy (DOE) Rocky Flats Field Office (RFFO) recommendations for further action or no further action (NFA). These recommendations are based on process knowledge, analytical data, conservative risk-based screens, or formally conducted personal interviews.

RFCA defines NFA as the determination that remedial actions are not currently warranted; however, such decisions are subject to revisitation at the time of the Final CAD/ROD. The Agency Acceptance Form included in past Quarterly and Annual Updates to the HRR was discontinued in the FY2000 Annual Update. As such, the current IHSS, PAC, and UBC regulatory status will be determined as part of an ongoing process between RFETS personnel and regulatory agencies.

This Annual Update is divided into three sections and four appendices. They are described as follows:

**Section 1.0** is a historical summary of the HRR process and identifies the contents of this document.

- **Table 1.1**, located in the introductory background section provides an overview of the OUs that result from regulatory agreements (i.e., the IAG and RFCA).
- **Table 1.2** is provided as a summary of the IHSS, PAC and UBC status contained within this Annual Update to the HRR.
- **Table 1.3** is an up-to-date account of: (1) the number of geographic areas (i.e., IHSSs, PACs, and UBC Sites) accepted as proposed NFA, either by written concurrence from the regulatory agencies or through the CAD/ROD process, (2) the number of geographic areas "proposed" for NFA since the 1992 HRR, for which concurrence has not been received from the regulatory agencies, and (3) the number of total geographical areas warranting further research, investigation, or action.

**Section 2.0** provides revised PAC narratives and incorporates new information regarding previously designated IHSSs and/or PACs. The revised narratives include the following types of information:

- Additional information or findings related to previously designated CERCLA sites, such as new data, boundary changes, corrections identified, etc.;
- Proposed NFA status based upon process knowledge, analytical data, conservative risk-based screening, source removal (or approved treatment) of contaminants in accordance with agency-approved Proposed Action Memorandums (PAMs), Interim Measure/Interim Remedial Actions (IM/IRAs), or other authorizing decision documents;
- Additional information requested by the regulatory agencies during the comment and response period to meet the proposed NFA criteria;
- Approved NFA status based upon final CAD/ROD or other authorizing documentation such as letters from the regulatory agencies; and
- Accelerated actions taken within the ER framework of field activities.

**Table 1.2 HRR PAC Narrative Updates Contained in this Annual Report**

<b>IHSS</b>	<b>OU</b>	<b>PAC</b>	<b>Site Description/Status</b>	<b>Updated</b>	<b>Proposed NFA</b>
NA	BZ	NW-1505	North Firing Range <i>Describes Future Actions</i>	2001 Annual Update	NA
133.1	BZ OU 5	SW-133.1	Ash Pit 1 <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
133.2	BZ OU 5	SW-133.2	Ash Pit 2 <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
133.3	BZ OU 5	SW-133.3	Ash Pit 3 <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
133.4	BZ OU 5	SW-133.4	Ash Pit 4 <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
133.5	BZ OU 5	SW-133.5	Incinerator Facility <i>NFA Proposed</i>	1997 Annual Update 2001 Annual Update	1997 Annual Update 2001 Annual Update
133.6	BZ OU 5	SW-133.6	Concrete Wash Pad <i>NFA Proposed</i>	1997 Annual Update 2001 Annual Update	1997 Annual Update 2001 Annual Update
NA	BZ OU 5	SW-1701	Recently Identified Ash Pit TDEM 1 <i>NFA Proposed</i>	1997 Annual Update 2001 Annual Update	1997 Annual Update 2001 Annual Update)
NA	BZ OU 5	SW-1702	Recently Identified Ash Pit TDEM 2 <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
NA	IA	100-603	Building 123 Bioassay Waste Spill <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
NA	IA	100-607	Building 111 Transformer <i>NFA Accepted (Interim)</i>	2000 Annual Update 2001 Annual Update	2001 Annual Update NFA Accepted
206	IA	300-206	Inactive D-836 Hazardous Waste Tank <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
NA	IA	400-812	Tank T-2 Spill North of B460 <i>NFA Proposed</i>	Eighth Quarterly 2001 Annual Update	Eighth Quarterly 2001 Annual Update
189	IA	600-189	Nitric Acid Tanks <i>NFA Proposed</i>	1997 Annual Update 2000 Annual Update 2001 Annual Update	1997 Annual Update 2001 Annual Update
NA	IA	700-1102	Transformer Leak 776-4 <i>NFA Proposed</i>	1996 Annual Update 1997 Annual Update 2000 Annual Update 2001 Annual Update	1997 Annual Update 2001 Annual Update

IHSS	OU	PAC	Site Description/Status	Updated	Proposed NFA
179	IA	800-179	Building 865 Drum Storage Area <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
180	IA	800-180	Building 883 Drum Storage Area <i>NFA Proposed</i>	2001 Annual Update	2001 Annual Update
NA	IA	900-1308	Gasoline Spill Outside Building 980 <i>NFA Proposed</i>	Sixth Quarterly 2001 Annual Update	2001 Annual Update

Note: Refer to Appendix 1 for Current Status of all HRR sites.  
Refer to Appendix 2 for regulatory agency correspondence letters.

**Section 3.0** briefly describes events or environmental projects occurring at Rocky Flats during the reporting period that are considered significant and should be documented. Recent project information regarding OU 1-IHSS 119.1, Property Utilization and Disposal (PU&D) Yard Plume, Horizontal Drilling at Buildings 123 and 886, Building 771 UBC pre-characterization studies, and final agreements for the Buffer Zone Contamination Review issued by the Colorado Department of Health and Environment (CDPHE) on August 23, 1999 are included.

**Appendix 1** provides a list of all sites identified in the original HRR, quarterly updates, and annual updates. A cross-reference with IHSS number (if applicable), IHSS numbers for PACs occurring within an IHSS boundary, and OU designation is provided in accordance with RFCA. Additionally, Appendix 1 provides a reference to quarterly or annual reports updating the information provided in the original PAC identification. Recommendation for a PAC as Proposed NFA or Approved for NFA is also provided, along with a reference to the quarterly or annual report the designation was assigned. HRR Sites, which have been approved NFA as proposed are presented with the approval date and applicable footnote. New PACs and PAC or IHSS revisions inclusive to this Annual Report are shaded in Appendix 1.

**Appendix 2** provides specific HRR correspondence letters from the regulatory agencies. To date, the Site has received four letters (with attachments) from the regulatory agencies providing important information specific to the HRR. The letters pertain to reviews of the 1997, 1998, and 1999 HRR Annual Reports as well as approval of NFA as proposed for PAC 100-607 (Building 111). Resolution of issues and disposition of the subject PACs and IHSSs will be addressed through ongoing discussions with the agencies. In brief, the letters conditionally document acceptance of proposed NFA status, request additional information or data for some PACs or IHSSs that were proposed NFA, or specify non-concurrence with PACs or IHSSs proposed for NFA in the HRR reporting process.

**Appendix 3** provides notification and documentation for replacement/movement of asphalt and or soil that has undergone a hazardous and radiological constituent analysis with RFCA ALs greater than Tier II. This reporting is consistent with the approval agreement for the RFCA Standard Operating Protocol (RSOP) for Asphalt and Soil Management. The reporting and documentation will include a summary of the movement activity, volumes, origination and

16

receiving sites, and contamination type(s). This appendix is identified as a "place-keeper" to describe and map such locations.

**Appendix 4** contains four plates. Each plate included in this update has been reviewed for accuracy and compared to information compiled and documented during the investigation processes. These maps are distributed plant-wide (and to all interested parties) and present the most current and accurate IHSS, PAC, and UBC Site boundaries. The RFCA Consolidated Operable Unit Map presented in RFCA and the original HRR PAC Area format are combined and illustrated as Plate #1. Plate #1 only illustrates IHSSs for which further investigation or action is warranted (as proposed in the HRR reporting process). NFA and proposed NFA IHSSs and PACs are illustrated on a separate coverage (Plate #2), thereby easily delineating between the IHSSs which require further action and progress made toward Site remediation. In addition, due to the complex nature of the process waste line system (IHSS 121) and associated IHSSs, an additional map (Plate #3) illustrates these waste transfer systems on a separate coverage. All areas shown on Plate #3 require further investigation. Plate #3 was revised in FY2000 to show areas of known or suspected leaks within the waste transfer system piping, and specific line section numbers. This plate also identifies what type of material was used for piping, results of pressure tests, and whether the pipe has been abandoned or in current use. Several upgrades were made relevant to the process waste line coverage during this reporting period. The PAC and UBC map (Plate #4) is consistent with past HRR Update Reports and shows PAC and UBC Sites that require further investigation.

### Summary

This report is intended to provide a comprehensive compilation of historical information updated to reflect present conditions and response actions at RFETS with regard to environmental releases or significant events. It is not the intention of this Annual Update or past updates to change or amend researched information in the original HRR, but rather to provide additional facts for specific areas as they become available. Prior to initiating work within any designated area, all available documents should be reviewed, including, but not limited to, Environmental Technical Memorandums, Data Summary Reports, project specific-decision documents, and Accelerated Action Completion Reports.

**Table 1.3 HRR Site Tracking and Status Through September 2001<sup>1</sup>**

Proposed NFA Accepted (CAD/ROD Process or other approval)	106
Proposed NFA (Pending Agency Review)	83
Potential Further Action Warranted	169
<b>Total</b>	<b>358</b>

<sup>1</sup> Tracking includes IHSSs, PACs, and UBC Sites at RFETS.

# SECTION 2.0

## REVISED PAC NARRATIVES

**PAC REFERENCE NUMBER: NW-1505**

IHSS Reference Number: Not Applicable  
Unit Name: North Firing Range  
Approximate Location: N751,250; E2,0813,390

Date(s) of Operation or Occurrence

1983 – Present  
(Currently in use)

Description of Operation or Occurrence

A firing range (Buildings 303 and 308) located in the northwest BZ has been and remains in use for target practice and security officer qualification. The range consists of a concrete pad covered by a roof. Until 1993, the target area consisted of a bermed area (approximately 300 feet by 200 feet). In December 1993, construction began to enhance the range with an improved backstop (bullet trap), walls, and roof.

Physical/Chemical Description of Constituents Released

Potential lead contamination may have resulted from bullets fired into the north berm within the firing range, as shown on the original pre-1993 construction footprint (Figure 2.1).

Responses to Operation or Occurrence

Brass bullet casings have been collected, containerized, and sent to PU&D for recycling since the range began operation in 1983 (Richmond 2001). Several times a year, bullets and lead fragments (collected in the bullet trap) are containerized in 3-gallon plastic buckets and transferred to PU&D for recycling.

Fate of Constituents Released to Environment

Use of solvents for cleaning firearms has not occurred at this location, nor have any explosives been detonated or armor piercing ammunition been used. No solvent spills or releases are known to have occurred at this location. The concrete pad is washed with approximately 200 to 300 gallons of water several times a year. The rinse water flows into a culvert on the eastern side of the pad and has been blocked with sediment and vegetation for an undetermined length of time.

Action/No Further Action Recommendation

Collection of the rinse water from the pad washing has been scheduled for the next washing operation. Further characterization of soil associated with this PAC will be completed after final D&D of the facility.

Comments

The North Firing Range is also described as Site #11 in the Buffer Zone Contamination Review (CDPHE 1999). Refer to Section 3 of this document for additional information.

This PAC has been added to Plate #4 (see Appendix 4).

References

CDPHE, 1999, *Buffer Zone Contamination Review*, Hazardous Materials and Waste Management Division, August.

Personnel communication: L. C. Richmond, WSLLC, August, 22, 2001.

**PAC REFERENCE NUMBER(s): SW-133.1, 133.2, 133.3, 133.4, 1701, and 1702**

IHSS Reference Numbers: SW-133.1, SW-133.2, SW-133.3, and SW-133.4, and  
PACs SW-1701 and SW-1702

Unit Name: Ash Pits (Operable Unit 5)

Approximate Location: N748,000; E2,080,000

Date(s) of Operation or Occurrence

1950s - 1968

Description of Operation or Occurrence

In 1970, four burial sites (trenches [SW-133.1, SW-133.2, SW-133.3, and SW-133.4]) were located south of the incinerator area (IHSS 133.5). These trenches were used for disposal of ash (and noncombustible trash from various sources) from the incinerator that operated from approximately 1952 until 1968. Noncombustible trash, such as counting discs, broken glassware, and metal, was collected in a nearby dumpster and later disposed of in the trenches. The trenches are approximately 150 to 200 feet long, 12 feet wide, and 10 feet deep, and have been staked with steel fence posts and mapped. Approximately 3 feet of soil covers each trench location. Two additional burial trenches (PAC SW-1701 and SW-1702) were identified in 1994 (DOE 1996a) based on anomalies found during a time-domain electromagnetic (TDEM) conductivity survey. These two additional areas were confirmed through review of aerial photographs and samples collected from boreholes in the immediate area (Figure 2.2).

Ash from the incinerator and "dump area" was monitored in 1959 (DOE 1992). Activities of 4,000 counts per minute (cpm) alpha and 30 millirems per hour (mr/hr) beta were observed. Subsequently, the ash was buried in a trench. It is unclear whether the ash dump refers to the area immediately around the incinerator or the Original Landfill (IHSS SW-115). Special air sampling of the Plant incinerator was conducted in 1958 to address concerns of burning potentially contaminated waste from Buildings 444 and 447.

Physical/Chemical Description of Constituents Released

In September 1954, five ash samples from the burning of Building 991 wastes were collected. The average activity of the ash was  $4.5 \times 10^7$  disintegrations per milligram per kilogram (dpm/kg) of dry ash. The alpha activity of the ash was approximately 100 times higher than the usual ash samples from the incinerator. In 1956, special monitoring was performed during and after contaminated waste was burned in the Plant incinerator. Ash samples indicated 1.9 grams of radioactive material (depleted uranium) per kilogram of ash. Smear surveys of the incinerator before and after burning showed no increase in contamination. It was estimated that approximately 30,000 cubic feet of soil and ash were buried in the trenches.

Small quantities of depleted uranium-contaminated combustibles were burned along with the general combustible Plant refuse. One estimate indicates that less than 100 grams of depleted uranium were in the combustibles. A monthly ash sampling program was initiated in January 1962 and indicated there was 1 to 8 kilograms of depleted uranium per ton of ash (DOE 1992).

#### Responses to Operation or Occurrence

Sampling events were conducted from November 24, 1953, through December 9, 1954. In 1970, the locations of Ash Pits 1-1 through 1-4 were marked in the field. The ash in these trenches was evaluated and considered to present no problems unless disturbed and inhaled.

#### Fate of Constituents Released to Environment

In accordance with RFCA (DOE 1996b), the basis for an NFA determination is establishing that there is no actual or potential risk to human health or the environment. As part of this determination, the information presented in the Final OU 5 RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report (DOE 1996a) has been augmented with additional evaluation of potential contaminant migration pathways and the nature of the source material to provide a more complete picture of these IHSSs. Specifically, consideration has been given to the following:

- Soil concentrations in source area;
- Historical information;
- Potential for groundwater migration; and
- Potential for surface water impacts through runoff and groundwater migration.

The ash pit sites and surrounding area were extensively sampled as part of the Final OU 5 RFI/RI (DOE 1996a) and through groundwater and surface water monitoring. The locations of boreholes, wells, surface soil samples, sediment samples, and surface water samples used in this evaluation are shown on Figure 2.2. Data presented in this narrative are comprehensive, up-to-date information, retrievable from RFETS database archives. RFCA Tier I and Tier II Action levels (ALs) and stream standards are from RFCA Attachment 5, dated March 21, 2000 (DOE, 2000). Background levels for subsurface soil are from the Background Geochemical Characterization Report (DOE 1993). Background values for surface soils and sediments are from Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995). All background values used for comparison are the mean background value plus two standard deviations. Table 2.1 lists the trenches and associated boreholes and/or wells.

**Table 2.1.-Subsurface Soil Sampling Locations for Ash Pits**

IHSS/PAC Number	Borehole/Well Locations
133.1	56293, 56393, 56493, 58893
133.2	56993, 57093, 57193, 57293, 57294, 57393, 57493, 59894,
133.3	56593, 56693, 56793, 61193, 61393
133.4	55593, 55693, 55694, 55793, 55893, 55993, 56093, 58093, 58993, 59693, 63093,
SW-1701	55294, 59994, 60094
SW-1702	55894, 55994, 56095

**IHSS SW-133.1** – Uranium-238 is the only contaminant in subsurface soil at this IHSS that is above the RFCA Tier I AL. It was detected above its AL at only 1 location out of 12. Uranium-238 was detected above the RFCA Tier II AL at 2 out of 10 sampling locations. In general, metal concentrations were above Site background but below their Tier II ALs. Subsurface soil sampling results are summarized in Table 2.2.

**IHSS SW-133.2** – None of the contaminants in subsurface soil at this IHSS exceeded RFCA Tier I ALs. Arsenic exceeded its RFCA Tier II AL at one location. Beryllium was detected at 23 milligrams per kilogram (mg/kg) (above the RFCA Tier II AL) at one location (Borehole 57294) but was present at concentrations less than or equal to 1 mg/kg at all other locations. Barium, cadmium, copper, iron, lead, manganese, molybdenum, silver, sodium, zinc, plutonium 239, 240, and the uranium isotopes were above background at one location (Borehole BH57294) but below Tier II ALs. Subsurface soil sampling results are summarized in Table 2.3.

**IHSS SW-133.3** – No contaminants in subsurface soil were detected above RFCA Tier I ALs. Beryllium and arsenic were detected above RFCA Tier II ALs; however, they were below background concentrations. Cadmium, cobalt, copper, plutonium-239/240, uranium-234, uranium-238, gross beta, and zinc were above background concentrations. Subsurface soil sampling results are summarized in Table 2.4.

**IHSS 133.4** – Uranium-238, detected at a concentration of 848 picocuries per gram (pCi/g), in one subsurface soil sample, was above the RFCA Tier I AL. No other samples exceeded the Tier I AL. The average uranium-238 concentration for 38 samples was 67 pCi/g. Twenty-one constituents exceeded background but were below Tier II Als. Both arsenic and beryllium concentrations were below background concentrations. Subsurface soil sampling results are summarized in Table 2.5.

**PAC SW-1701** – No contaminants were detected above RFCA Tier I ALs in subsurface soil at this PAC. Only arsenic exceeded RFCA Tier II Als, and it was below background concentrations. Subsurface soil sampling results are summarized in Table 2.6.

25

**Table 2.2 - Summary of Analytical Results for Subsurface Soil at IHSS 133.1**

Analyte	Samples Above Detection Limit	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	11	24300	mg/kg	9820.9	1000000	1000000	35373.2
Americium-241	9	1	pCi/g	0.1	215	38	0.02
Antimony	2	33	mg/kg	26.5	768	768	17.0
Arsenic	11	14	mg/kg	3.5	299	2.99	13.1
Barium	11	374	mg/kg	159.7	133000	133000	289.4
Beryllium	7	4	mg/kg	1.4	104	1.04	14.2
Cadmium	3	57	mg/kg	20.7	1920	1920	1.7
Calcium	11	24600	mg/kg	7166.4			39382.3
Cesium	1	13	mg/kg	13.0			
Chromium	11	41	mg/kg	11.5	44300	4410	68.3
Cobalt	11	37	mg/kg	11.0	115000	115000	29.0
Copper	11	2920	mg/kg	298.6	71100	71100	38.2
Gross Alpha	12	742	pCi/g	78.9			43.5
Gross Beta	12	1580	pCi/g	171.0			36.8
Iron	11	31100	mg/kg	13932.7	576000	576000	41046.5
Lead	11	260	mg/kg	52.2	1000	1000	25.0
Lithium	11	8	mg/kg	5.0	38400	38400	34.7
Magnesium	11	4670	mg/kg	2595.5			9315.4
Manganese	11	696	mg/kg	228.5	83600	83600	901.6
Mercury	3	0	mg/kg	0.0	576	576	1.5
Molybdenum	1	24	mg/kg	24.0	9610	9610	25.6
Nickel	10	66	mg/kg	21.3	38400	38400	62.2
Plutonium-239/240	10	1	pCi/g	0.1	1429	252	0.02
Potassium	11	1680	mg/kg	986.5			6196.8
Selenium	2	0	mg/kg	0.0	9610	9610	4.8
Silver	3	158	mg/kg	57.3	9610	9610	24.5
Sodium	11	741	mg/kg	394.7			1251.2
Strontium	11	96	mg/kg	52.7	1000000	1000000	211.4
Thallium	2	1	mg/kg	0.5			1.8
Tin	1	16	mg/kg	16.0	1000000	1000000	286.3
Uranium-234	12	117	pCi/g	12.0	1738	307	2.6
Uranium-235	11	20	pCi/g	2.0	135	24	0.12
Uranium-238	12	1130	pCi/g	107.5	586	103	1.5
Vanadium	11	58	mg/kg	24.4	13400	13400	88.49
Zinc	11	891	mg/kg	136.4	576000	576000	139.1

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

26

**Table 2.3 - Summary of Analytical Results for Subsurface Soils at IHSS 133.2**

Analyte	Number of Samples Above Detection Limit	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	39	23200	mg/kg	12650.0	1000000	1000000	35373.2
Americium-241	26	5	pCi/g	0.2	215	38	0.02
Antimony	2	14	mg/kg	8.5	768	768	17.0
Arsenic	39	17	mg/kg	4.3	299	2.99	13.1
Barium	39	364	mg/kg	150.2	133000	133000	289.4
Benzo(a)pyrene	2	270	ug/kg	164.0	701000	7010	
Beryllium	31	23	mg/kg	1.7	104	1.04	14.2
Cadmium	5	25	mg/kg	8.8	1920	1920	1.7
Calcium	39	9970	mg/kg	4502.6			39382.3
Cesium	2	17	mg/kg	13.0			
Chloroform	2	6	ug/kg	5.0	21400.0	214	
Chromium	39	47	mg/kg	15.7	44300	4410	68.3
Cobalt	39	24	mg/kg	9.3	115000.0	115000	29.0
Copper	39	365	mg/kg	27.5	71100.0	71100	38.2
Cyclohexane	1	6	ug/kg	6.0			
Gross Alpha	40	74	pCi/g	21.4			43.5
Gross Beta	40	125	pCi/g	33.6			36.8
Iron	39	41900	mg/kg	17595.1	576000.0	576000	41046.5
Lead	39	378	mg/kg	26.6	1000.0	1000	25.0
Lithium	34	19	mg/kg	9.8	38400.0	38400	34.7
Magnesium	39	6900	mg/kg	3272.8			9315.4
Manganese	39	1070	mg/kg	292.5	83600	83600	901.6
Mercury	5	0	mg/kg	0.0	576.0	576	1.5
Molybdenum	6	470	mg/kg	80.7	9610.0	9610	25.6
Nickel	38	58	mg/kg	17.3	38400.0	38400	62.2
Octadecanoic Acid	1	290	ug/kg	290.0			
Plutonium-238	5	0	pCi/g	0.0			
Plutonium-239/240	13	8	pCi/g	0.6	1429.0	252	0.02
Potassium	38	4190	mg/kg	1692.1			6196.8
Selenium	6	2	mg/kg	0.8	9610.0	9610	4.8
Silicon	6	237	mg/kg	97.8			
Silver	3	41	mg/kg	23.0	9610.0	9610	24.5
Sodium	38	1590	mg/kg	277.4			1251.2
Strontium	39	111	mg/kg	39.5	1000000.0	1000000	211.4
Thallium	16	0	mg/kg	0.0			1.8
Tin	2	36	mg/kg	30.0	1000000	1000000	286.3
Toluene	1	2	mg/kg	2.0	707000	7070	
Uranium-234	39	15	pCi/g	1.7	1738	307	2.6
Uranium-235	38	1	pCi/g	0.1	135	24	0.12
Uranium-238	40	38	pCi/g	3.5	586	103	1.5
Vanadium	39	57	mg/kg	31.2	13400	13400	88.5
Zinc	39	1010	mg/kg	80.8	576000	576000	139.1

Above Background
Above Tier II Values and Below Background
Above Background and Tier II Values
Above Tier I Values

27

**Table 2.4 - Summary of Analytical Results for Subsurface Soils at IHSS 133.3**

Analyte	Number of Samples above Detection Limit	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	18	23300	mg/kg	11605.0	1000000.0	1000000.0	35373.2
Americium-241	15	1	pCi/g	0.1	215.0	38.0	0.02
Antimony	1	7	mg/kg	7.0	768.0	768.0	17.0
Arsenic	18	8	mg/kg	3.2	299.0	3.0	13.1
Barium	18	233	mg/kg	136.4	133000.0	133000.0	289.5
Beryllium	13	2	mg/kg	1.2	104.0	1.0	14.2
Cadmium	3	2	mg/kg	1.3	1920.0	1920.0	1.7
Calcium	18	8540	mg/kg	5689.4			39382.3
Chromium	17	76	mg/kg	17.6	44300	4410	
Cobalt	17	32	mg/kg	10.4	115000.0	115000.0	29.0
Copper	18	42	mg/kg	18.8	71100.0	71100.0	38.2
Gross Alpha	20	34	pCi/g	20.4			43.5
Gross Beta	20	44	pCi/g	30.0			36.8
Iron	18	39300	mg/kg	15188.9	576000.0	576000.0	41046.5
Lead	18	20	mg/kg	14.3	1000.0	1000.0	25.0
Lithium	18	18	mg/kg	9.2	38400.0	38400.0	34.7
Magnesium	18	5980	mg/kg	2975.6			9315.4
Manganese	18	828	mg/kg	326.6	83600.0	83600.0	901.6
Molybdenum	2	12	mg/kg	7.0	9610.0	9610.0	25.6
Nickel	18	49	mg/kg	18.4	38400.0	38400.0	62.2
Plutonium-239/240	18	1	pCi/g	0.1	1429	252	0.02
Potassium	18	3020	mg/kg	1391.7			6196.8
Selenium	2	0	mg/kg	0.0	9610.0	9610.0	4.8
Silver	2	16	mg/kg	8.5	9610.0	9610.0	24.5
Sodium	18	1140	mg/kg	360.1			1251.2
Strontium	18	76	mg/kg	42.9	1000000.0	1000000.0	211.4
Thallium	8	0	mg/kg	0.0			1.84
Tin	2	12	mg/kg	9.0	1000000.0	1000000.0	286.3
Uranium-234	21	3	pCi/g	1.2	1738.0	307.0	2.6
Uranium-235	19	0	pCi/g	0.0	135.0	24.0	0.12
Uranium-238	22	9	pCi/g	1.9	586.0	103.0	1.5
Vanadium	18	53	mg/kg	29.8	13400.0	13400.0	88.5
Zinc	18	298	mg/kg	57.5	576000.0	576000.0	139.1

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

28

**Table 2.5 - Summary of Analytical Results for Subsurface Soils at IHSS 133.4**

Analyte	Number of Samples above Detection Limit	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	35	32800	mg/kg	14227.4	1000000.0	1000000.0	35373.2
Americium-241	29	0	pCi/g	0.0	215.0	38.0	0.02
Antimony	9	50	mg/kg	21.0	768.0	768.0	17.0
Arsenic	35	9	mg/kg	4.1	299.0	3.0	13.1
Barium	35	637	mg/kg	176.9	133000.0	133000.0	289.4
Beryllium	22	12	mg/kg	2.0	104.0	1.0	14.2
Cadmium	13	42	mg/kg	11.2	1920.0	1920.0	1.7
Calcium	35	31700	mg/kg	6774.3			39382.3
Cesium	1	17	mg/kg	17.0			
Chromium	38	80	mg/kg	19.9	44300	4410	68.3
Cobalt	33	34	mg/kg	11.1	115000.0	115000.0	29.0
Copper	35	2520	mg/kg	230.0	71100.0	71100.0	38.2
Gross Alpha	43	759	pCi/g	72.3			43.5
Gross Beta	37	606	pCi/g	75.7			36.8
Iron	35	107000	mg/kg	23158.3	576000.0	576000.0	41046.5
Lead	35	935	mg/kg	75.0	1000.0	1000.0	25.0
Lithium	29	29	mg/kg	11.2	38400.0	38400.0	34.7
Magnesium	35	6000	mg/kg	3354.2			9315.4
Manganese	35	1480	mg/kg	317.2	83600.0	83600.0	901.6
Mercury	11	1	mg/kg	0.2	576.0	576.0	1.5
Molybdenum	7	20	mg/kg	11.1	9610.0	9610.0	25.6
Nickel	35	115	mg/kg	24.5	38400	38400	62.2
Plutonium-239/240	36	1	pCi/g	0.1	1429.0	252.0	0.02
Potassium	30	7040	mg/kg	1729.4			6196.8
Selenium	4	0	mg/kg	0.0	9610.0	9610.0	4.8
Silicon	3	368	mg/kg	316.0			
Silver	9	311	mg/g	66.4	9610.0	9610.0	24.5
Sodium	34	1370	mg/kg	461.4			1251.2
Strontium	35	91	mg/kg	49.7	1000000.0	1000000.0	211.4
Thallium	11	0	mg/kg	0.0			1.8
Tin	11	579	mg/kg	76.5	1000000.0	1000000.0	286.3
Uranium-234	38	241	pCi/g	20.8	1738.0	307.0	2.6
Uranium-235	37	17	pCi/g	1.7	135.0	24.0	0.12
Uranium-238	38	848	pCi/g	67.0	586.0	103.0	1.5
Vanadium	35	94	mg/kg	34.9	13400.0	13400	88.5
Zinc	35	2390	mg/kg	241.9	576000.0	576000	139.1

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

**Table 2.6 - Summary of Analytical Results for Subsurface Soils at PAC SW-1701**

Analyte	Number of Samples above Detection Limit	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	6	15400	mg/kg	12091.7	1000000.0	1000000.0	35373.17
Americium-241	4	0	pCi/g	0.0	215.0	38.0	0.02
Antimony	2	5	mg/kg	5.0	768.0	768.0	16.97
Arsenic	6	6	mg/kg	4.7	299.0	3.0	13.14
Barium	6	150	mg/kg	103.2	133000.0	133000.0	289.38
Benzoic Acid	1	140	ug/kg	140.0	10900000.0	109000.0	
Beryllium	6	1	mg/kg	0.8	104.0	1.0	14.2
Bis (2-Ethylhexyl) phthalate	1	100	ug/kg	100.0	311000000.0	3110000.0	
Calcium	6	7810	mg/kg	2986.7			39382.27
Cesium	1	4	mg/kg	4.0			
Chromium	6	19	mg/kg	14.8	44300	4410	68.3
Cobalt	6	12	mg/kg	8.2	115000.0	115000.0	29.0
Copper	6	38	mg/kg	18.8	71100.0	71100.0	38.2
Di-n-butylphthalate	1	190	ug/kg	190.0	426000000.0	4260000.0	
Gross Alpha	5	23	pCi/g	15.6			43.5
Gross Beta	5	35	pCi/g	26.6			36.8
Iron	6	18100	mg/kg	14883.3	576000.0	576000.0	41046.5
Lead	6	15	mg/kg	11.5	1000.0	1000.0	25.00
Lithium	6	12	mg/kg	9.0	38400.0	38400.0	34.7
Magnesium	6	3600	mg/kg	2946.7			9315.4
Manganese	6	726	mg/kg	316.7	83600.0	83600.0	901.6
Nickel	6	355	mg/kg	115.0	38400.0	38400.0	62.2
Phenanthrene	1	41	ug/kg	41.0			
Plutonium-238	4	0	pCi/g	0.0			
Plutonium-239/240	4	0	pCi/g	0.0	1429.0	252.0	0.02
Potassium	6	1660	mg/kg	1244.3			6196.8
Silver	1	1	mg/kg	1.0	9610.0	9610.0	24.5
Sodium	6	296	mg/kg	157.7			1251.2
Strontium	6	28	mg/kg	22.0	1000000.0	1000000.0	211.4
Tetrachloroethene	1	18	ug/kg	18.0	3150.0	31.5	
Tin	1	10	mg/kg	10.0	1000000.0	1000000.0	286.3
Uranium-234	4	1	pCi/g	1.0	1738.0	307.0	2.6
Uranium-235	4	0	pCi/g	0.0	135.0	24.0	0.12
Uranium-238	4	1	pCi/g	1.0	586.0	103.0	1.5
Vanadium	6	50	mg/kg	32.5	13400.0	13400	88.5
Zinc	6	85	mg/kg	44.7	576000.0	576000	139.1

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

**PAC SW-1702** - Lead, beryllium, and uranium-238 were detected above Tier I ALs, and arsenic, uranium-233/234, and uranium-235 were detected above RFCA Tier II ALs at this PAC. Subsurface soil analytical results are presented in Table 2.7.

Analysis of 18 surface soil samples from across the ash pit area did not indicate metals were present above RFCA Tier I or Tier II ALs with the exception of arsenic and beryllium, which were above Tier II ALs but below background. Table 2.8 presents these results.

Metals that were not incinerated were also disposed of in this trench. This is evidenced by the following:

- Reports indicating that an ash storage dumpster at this site often contained noncombustible materials (DOE 1992).
- Soil concentrations of iron are greater than 10 percent in places. Copper and zinc are near 1 percent.
- "Ironstone" has been reported at the site (most likely pieces of metal that have cemented the soil around them).

Soil contamination at this PAC appears to be limited to isolated hot spots with slightly elevated uranium-238. A portion of PAC SW-1702 has both elevated uranium and metal concentrations.

**Potential for Groundwater Migration** - Sixteen well locations were evaluated to determine whether the ash pits impacted groundwater. Groundwater sampling and analysis results are summarized in Table 2.9.

**IHSSs 133.1 and 133.3** - One well, 56294, is immediately downgradient of these IHSSs. No contaminants were detected above RFCA Tier I ALs and only thallium was found above Tier II. Thallium is not a contaminant found in significant levels in soil at IHSS 133.1 or 133.3.

**IHSS 133.2** - Aluminum, thallium, uranium-234/234, and uranium-238 concentrations in groundwater were greater than RFCA Tier II ALs in well 58795 downgradient of this IHSS. Thallium was not found in subsurface soil in IHSS 133.2 and aluminum concentrations were below background. Uranium-233/234 and uranium-238 in soil were detected at activities slightly above the Tier II ALs.

**IHSS 133.4 and SW-1702** - Although these areas had the highest level of soil contamination, little was detected in groundwater samples. The nearest downgradient well (63093) contained methylene chloride concentrations above detection limit and uranium-233/234 and uranium-238 concentrations above background concentrations. This well was sampled numerous times; however, methylene chloride was only detected once. Additionally, methylene chloride is not in soil at IHSS 133.4 or SW-1702. Uranium-234 and uranium-235 were detected in subsurface soil samples above background concentrations in IHSS 133.4 and above Tier II ALs in PAC SW-1702.

**Table 2.7 - Summary of Analytical Results for Subsurface Soils at PAC SW-1702**

Analyte	Number of Samples above Detection Limit	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	9	28600	mg/kg	17514.4	1000000.0	1000000.0	35373.1
Americium-241	10	3	pCi/g	0.3	215.0	38.0	0.02
Antimony	2	16	mg/kg	11.5	768.0	768.0	17.0
Arsenic	9	21	mg/kg	10.0	299.0	3.0	13.1
Barium	9	1680	mg/kg	509.7	133000.0	133000.0	289.4
Beryllium	9	446	mg/kg	91.4	104.0	1.0	14.2
Cadmium	7	71	mg/kg	27.0	1920.0	1920.0	1.7
Calcium	9	24700	mg/kg	8977.8			39382.3
Cesium	6	9	mg/kg	6.2			
Chromium	9	434	mg/kg	99.6	44300	4410	68.3
Cobalt	9	701	mg/kg	148.6	115000.0	115000.0	29.0
Copper	9	8850	mg/kg	2081.4	71100.0	71100.0	38.2
Gross Alpha	11	418	pCi/g	116.4			43.5
Gross Beta	11	899	pCi/g	276.5			36.8
Iron	9	106000	mg/kg	40500.0	576000.0	576000.0	41046.5
Lead	9	5200	mg/kg	1223.4	1000.0	1000.0	25.0
Lithium	9	14	mg/kg	10.6	38400.0	38400.0	34.7
Magnesium	9	11700	mg/kg	4656.7			9315.4
Manganese	9	2150	mg/kg	588.6	83600.0	83600.0	901.6
Mercury	3	0	mg/kg	0.0	576.0	576.0	1.5
Molybdenum	5	68	mg/kg	34.4	9610.0	9610.0	25.6
Nickel	9	325	mg/kg	94.1	38400	38400	62.2
Plutonium-238	7	0	pCi/g	0.0			
Plutonium-239/240	9	7	pCi/g	1.6	1429.0	252.0	0.02
Potassium	9	3950	mg/kg	1734.0			6196.8
Selenium	3	7	mg/kg	5.3	9610.0	9610.0	4.8
Silicon	3	704	mg/kg	503.0			
Silver	8	209	mg/kg	74.5	9610.0	9610.0	24.5
Sodium	9	3360	mg/kg	1254.1			1251.2
Strontium	9	102	mg/kg	54.1	1000000.0	1000000.0	211.4
Thallium	5	7	mg/kg	3.4			1.8
Tin	7	102	mg/kg	49.6	1000000.0	1000000.0	286.3
Uranium-234	11	350	pCi/g	63.8	1738.0	307.0	2.6
Uranium-235	11	68	pCi/g	9.7	135.0	24.0	0.12
Uranium-238	11	940	pCi/g	177.0	586.0	103.0	1.5
Vanadium	9	60	mg/kg	36.2	13400.0	13400	88.5
Zinc	9	7220	mg/kg	1802.6	576000.0	576000	139.1

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

32

**Table 2.8 - Summary of Analytical Results for Surface Soils and Sediments from the Ash Pits**

Analyte	Number of Samples above Detection Limits	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
<b>Surface Soil Samples</b>							
Arsenic	20	7.7	mg/kg	5.3	299.0	3.0	13.1
Beryllium	8	1.6	mg/kg	1.2	104.0	1.0	14.2
<b>Sediment Samples</b>							
Arsenic	17	17.3	mg/kg	3.7	299.0	3.0	13.1
Beryllium	10	6.8	mg/kg	1.6	104.0	1.0	14.2

**Table 2.9 - Summary of Analytical Results for Groundwater at Ash Pit Sites  
(Different Location identified by Color Change)**

Location	Collection Date	Description	Result	Units	Above Tier I	Above Tier II	Tier I	Tier II
<b>IHSSs 133.1 and 133.3</b>								
56294	4/27/95	Thallium	5.9	ug/L	No	Yes	200	2
<b>IHSS 133.2</b>								
58793	3/7/95	Aluminum	44900.0	ug/L	No	Yes	3.65E+06	3.65E+04
58793	8/12/93	Aluminum	64200.0	ug/L	No	Yes	3.65E+06	3.65E+04
63793	5/1/95	Thallium	4.3	ug/L	No	Yes	200	2
63693	1/18/95	Uranium-233,-234	1.3	pCi/L	No	Yes	106	1.06
63793	1/4/95	Uranium-233,-234	1.4	pCi/L	No	Yes	106	1.06
63793	5/1/95	Uranium-233,-234	4.1	pCi/L	No	Yes	106	1.06
58793	8/12/93	Uranium-238	0.8	pCi/L	No	Yes	76.8	0.768
58793	6/18/93	Uranium-238	1.1	pCi/L	No	Yes	76.8	0.768
58793	1/6/95	Uranium-238	3.6	pCi/L	No	Yes	76.8	0.768
63693	1/18/95	Uranium-238	1.3	pCi/L	No	Yes	76.8	0.768
63793	1/4/95	Uranium-238	1.1	pCi/L	No	Yes	76.8	0.768
63793	5/1/95	Uranium-238	2.9	pCi/L	No	Yes	76.8	0.768
<b>IHSSs 133.4 and SW-1702</b>								
63093	3/30/94	Methylene Chloride	13.0	ug/L	No	Yes	500	5
63093	5/24/95	Uranium-233,-234	3.3	pCi/L	No	Yes	106	1.06
63093	5/24/95	Uranium-238	2.4	pCi/L	No	Yes	76.8	0.768
<b>IHSSs 133.5, 133.6, and SW-1701</b>								
59093	-	1,1-Dichloroethene	46.0	ug/L	No	Yes	700	7
59093	2/17/95	1,1-Dichloroethene	48.0	ug/L	No	Yes	700	7
59093	2/17/95	Benzene	46.0	ug/L	No	Yes	500	5
59093	2/17/95	Benzene	46.0	ug/L	No	Yes	500	5
55394	4/24/95	Thallium	5.0	ug/L	No	Yes	200	2
59093	2/17/95	Toluene	46.0	ug/L	No	Yes	100	1
59093	2/17/95	Toluene	46.0	ug/L	No	Yes	100	1
59093	2/17/95	Trichloroethene	43.0	ug/L	No	Yes	500	5
59093	2/17/95	Trichloroethene	44.0	ug/L	No	Yes	500	5
55394	4/24/95	Uranium-233,-234	1.1	pCi/L	No	Yes	106	1.06
55394	4/24/95	Uranium-238	0.8	pCi/L	No	Yes	76.8	0.768

**Table 2.9 - Summary of Analytical Results for Groundwater at Ash Pit Sites (continued)**

Location	Collection Date	Description	Result	Units	Above Tier I	Above Tier II	Tier I	Tier II
<b>Downgradient</b>								
5686	5/24/93	1,1-Dichloroethene	51.0	ug/L	No	Yes	700	7
5686	5/24/93	1,1-Dichloroethene	52.0	ug/L	No	Yes	700	7
5686	5/21/91	Antimony	9.3	ug/L	No	Yes	600	6
5686	11/8/90	Antimony	13.4	ug/L	No	Yes	600	6
5686	10/20/88	Antimony	34.0	ug/L	No	Yes	600	6
5686	1/16/89	Antimony	57.7	ug/L	No	Yes	600	6
5686	1/16/89	Arsenic	14.1	ug/L	No	Yes	500	5
5686	1/16/89	Arsenic	25.6	ug/L	No	Yes	500	5
5686	5/24/93	Benzene	55.0	ug/L	No	Yes	500	5
5686	5/24/93	Benzene	57.0	ug/L	No	Yes	500	5
5686	10/2/86	Chromium VI	160000.0	ug/L	Yes	Yes	10000	100
5686	5/27/87	Lead	18.0	ug/L	No	Yes	1.50E+03	1.50E+01
5686	10/2/86	Methylene Chloride	5.0	ug/L	No	Yes	500	5
5686	4/7/88	Methylene Chloride	23.0	ug/L	No	Yes	500	5
5686	7/13/88	Nickel	426.0	ug/L	No	Yes	1.40E+04	1.40E+02
5686	5/19/87	Plutonium-239/240	0.3	pCi/L	No	Yes	15.1	0.151
5686	5/24/93	Strontium-89,90	0.9	pCi/L	No	Yes	85.2	0.852
5686	11/8/90	Strontium-89,90	0.9	pCi/L	No	Yes	85.2	0.852
5686	9/30/87	Strontium-89,90	1.0	pCi/L	No	Yes	85.2	0.852
5686	7/15/87	Strontium-89,90	1.3	pCi/L	No	Yes	85.2	0.852
5686	5/24/93	Strontium-89,90	0.9	pCi/L	No	Yes	85.2	0.852
5686	11/28/89	Tetrachloroethene	5.0	ug/L	No	Yes	500	5
56594	4/25/95	Thallium	4.4	ug/L	No	Yes	200	2
5686	10/28/96	Thallium	4.7	ug/L	No	Yes	200	2
5686	10/28/96	Thallium	5.6	ug/L	No	Yes	200	2
5686	5/24/93	Toluene	56.0	ug/L	No	Yes	100	1
5686	5/24/93	Toluene	57.0	ug/L	No	Yes	100	1
5686	5/24/93	Trichloroethene	55.0	ug/L	No	Yes	500	5
5686	5/24/93	Trichloroethene	56.0	ug/L	No	Yes	500	5
1374	2/13/92	Uranium-233,-234	3.4	pCi/L	No	Yes	106	1.06
5686	10/25/94	Uranium-233,-234	1.5	pCi/L	No	Yes	106	1.06
1374	2/13/92	Uranium-238	2.6	pCi/L	No	Yes	76.8	0.768
56594	12/22/94	Uranium-238	0.9	pCi/L	No	Yes	76.8	0.768
56594	12/22/94	Uranium-238	1.3	pCi/L	No	Yes	76.8	0.768
59894	5/16/95	Arsenic	5.8	ug/L	No	Yes	500	5

34

Uranium-238 was found in subsurface soil samples above the Tier I AL in both IHSS 133.4 and PAC SW-1702.

**SW-1701** - A number of volatile organic compounds (VOCs) were detected sporadically in groundwater samples near or downgradient of this PAC. Toluene, benzene, 1,1-dichloroethene, and tetrachloroethene were detected at concentrations greater than Tier II ALs at various times in well 59093 and each only once. The thallium concentration in groundwater was also above RFCA Tier II ALs. Uranium-233/234 and uranium-238 in groundwater were slightly above RFCA Tier II ALs.

The chromium concentration of 160,000 micrograms per liter (ug/ L) might be anomalous because of the following:

- This well was sampled for metals, including chromium, on eight occasions after the 160,000 ug/L result was reported. These results ranged between 4.2 and 270 ug/L.
- Chromium was not found in significant quantities in the soil.

VOCs detected in this well may be anomalous because of the following:

- VOCs would be driven off or destroyed in an incinerator and would not be found in residual ash.
- This location was sampled numerous times for these compounds and they were not detected in any subsequent samples.
- Many of the analytes are common laboratory contaminants that are used for cleaning gas chromatographs and other lab equipment.
- Different compounds were detected each time.
- The levels at which these compounds detected are very close to the detection limits where there is a greater likelihood for error.

### **Downgradient Wells**

VOCs were detected sporadically in downgradient wells. Although there are several groundwater samples with VOC concentrations greater than Tier II ALs, it is not likely the ash pits are the source of these compounds. Furthermore, these data may be anomalous.

The chromium concentration (160,000 µg/L) in a groundwater sample from downgradient well 5686 was significantly greater than the Tier I AL. Groundwater samples collected in 1987 from well 5686 indicated lead, nickel, thallium, arsenic, and antimony concentrations were greater than Tier II ALs. Seventeen subsequent samples from the same well indicated lead and nickel concentrations were less than Tier II ALs. Only arsenic was detected in significant quantities in ash pit soil.

Strontium-89/90, plutonium-239/240, and uranium isotopes were detected in downgradient wells. Strontium was detected above the Tier II AL in groundwater at well 5686 but not in wells between Well 5686 and the ash pits. Additional samples from this well indicate that strontium concentrations are below Tier II ALs. Plutonium-239/240 was detected above Tier II ALs in groundwater from well 5686. This was the only sample out of 60 that had concentrations exceeding Tier II levels. As with strontium, plutonium concentrations were below Tier II levels in wells between well 5686 and the ash pits.

Uranium isotopes were detected at activities slightly above the Tier II AL in wells 1374, 5686, and 56594. Only five samples out of 116 contained uranium isotope concentrations above the Tier II ALs. Uranium isotopes did not exceed Tier II ALs in the most recent samples collected in 1996. Both process knowledge and analytical data indicate that uranium is present in ash pit soil. It could be concluded that uranium is not consistently above Tier II levels. The most recent samples taken in 1996 did not exceed Tier II ALs.

#### **Recent Groundwater Results:**

In order to bridge the gap between historical results and the present, additional groundwater samples were taken in the early part of August 2001. Tables 2.10 and 2.11 show the results for uranium and metals, respectively. Two of the wells selected for sampling, 52193 and 56294, were to dry to sample. All of the results were below Tier I ALs. Uranium-233, -234 was above Tier II ALs in three of the locations. None of these wells are downgradient. Only two wells had metals above Tier II ALs, 5686 and 55194. The levels in 55194 were at or just above Tier II ALs. Well 5686 had levels of chromium, molybdenum, nickel and thallium above Tier II ALs. The well is downgradient and is not associated with any particular ash pit. Chromium is above the Tier II ALs however, is only 11 percent of the Tier I AL.

In conclusion, there does not appear to be a problem with the volatile organic compounds or metals in the groundwater even though elevated levels of metals are present in the ash pits. There are low uranium concentrations that extend across the ash pit sites and possibly extends farther downgradient. Based on the available data, it appears that this is not a downgradient threat and at times, portions of it might actually dry up or subside.

**Table 2.10 - August 2001, Uranium Results for the Ash Pits**

Analyte	Result	Unit	Minimum Detection Activity	Tier I Action Level	Tier II Action Level
<b>Well 5686</b>					
Uranium-233,-234	0.65	pCi/L	0.046	106	1.06
Uranium- 235	U	pCi/L	0.060	135	24
Uranium-238	0.53	pCi/L	0.046	586	103
<b>Well 58793</b>					
Uranium-233,-234	0.84	pCi/L	0.15	106	1.06
Uranium- 235	U	pCi/L	0.037	135	24
Uranium-238	0.66	pCi/L	0.13	586	103
<b>Well 59093</b>					
Uranium-233,-234	16.4	pCi/L	0.096	106	1.06
Uranium- 235	0.46	pCi/L	0.017	135	24
Uranium-238	11.5	pCi/L	0.017	586	103
<b>Well 55194</b>					
Uranium-233,-234	1.47	pCi/L	0.11	106	1.06
Uranium- 235	0.066	pCi/L	0.044	135	24
Uranium-238	1.79	pCi/L	0.016	586	103
<b>Well 63093</b>					
Uranium-233,-234	2.58	pCi/L	0.068	106	1.06
Uranium- 235	0.093	pCi/L	0.048	135	24
Uranium-238	1.92	pCi/L	0.014	586	103

 Above Tier II Values

**Table 2.11 - August 2001, Metal Results for the Ash Pits**

Description	Location					Units	Tier I	Tier II
	5686	58793	59093	55194	63093			
Chromium	1100	18	2.1	25	U	ug/L	10,000	100
Lead	6.7	9	6.8	15	1.2	ug/L	1,500	15
Molybdenum	370	5.3B	U	4.5B	U	ug/L	18,300	183
Nickel	140	12B	U	180	U	ug/L	14,000	140
Thallium	2	0.51B	0.39B	0.47B	0.21B	ug/L	200	2

B =Below method detection limit but above instrument detection limit  
U =Undetected

 Above Tier II ALs

In summary, groundwater data from downgradient wells indicate that some VOC, metal, and radionuclide concentrations are above Tier II ALs. However, most of the exceedances are from 1987 and were not confirmed by additional sampling and analysis. Additionally, only arsenic and uranium were found in elevated concentrations in ash pit soil.

**Surface Water:**

As shown in Table 2.12 (see page 33), aluminum, antimony, cadmium, copper, iron, lead, manganese, mercury, silver, americium-241, gross alpha, gross beta, and plutonium- 239/240 concentrations in nearby surface water locations were greater than RFCA surface water standards.

37

While the ash pits may be the source of some or all of the copper, iron, lead, silver, and possibly mercury and cadmium, none of these constituents have been detected above Tier II ALs in ash pit soil.

Further downgradient at SW027 (surface water point of evaluation [POE]) and at Pond C-2, the ash pit potential contaminants of concern (PCOCs) have never been detected above RFCA surface water standards.

Sediments in the south interceptor ditch and Woman Creek were also sampled at five locations. Only arsenic and beryllium concentrations exceeded Tier II ALs, but they were below background concentrations. Table 2.8 summarizes these concentrations.

There are two potential pathways to surface water from the ash pits: groundwater migration and runoff. Based on groundwater and surface water analytical data, uranium and most metals associated with ash pit soil are not reaching surface water through the groundwater migration pathway. These data are summarized in Table 2.13 below:

**Table 2.13 - Concentration Levels for Contaminant Migratory Pathways**

Analyte	Maximum Ash Pit Subsurface Soil Concentrations	Maximum Groundwater Concentrations	Maximum Surface Water Concentrations
Arsenic	21 mg/kg	25.6 ug/L	ND
Beryllium	446 mg/kg	ND	ND
Lead	5200 mg/kg	18 ug/L	8 ug/L
Uranium-234/235	350 pCi/g	4.1 pCi/L	ND
Uranium-238	848 pCi/g	3.6 pCi/L	ND

ND = Not Detected

The runoff pathway is not complete because the vegetative cover over the ash pits eliminates runoff of contaminants.

#### **Airborne Pathways:**

The Final OU 5 RFI/RI Report (DOE 1996a) evaluated airborne pathways as part of the baseline risk assessment and concluded that there was no substantial risk. Additionally, there is a vegetative cover over the ash pits eliminating resuspension of contaminants.

#### **Radiological Surveys**

In addition to laboratory analysis for radionuclides, a High Purity Germanium (HPGe) survey of the entire area was conducted in 1993. Figures 2.3, 2.4 and 2.5 show the survey results for americium-241, uranium-235, and uranium-238. Americium was not detected at statistically significant levels. This result suggests that plutonium is not present either. The highest uranium measurement averaged 18.8 pCi/g in soil, well below the Tier II level of 103 pCi/g. These results indicate that no major areas of radioactive contamination were missed by soil sampling activities. It also provides additional process knowledge that the ash pits are not significant source areas of radionuclides.

Table 2.12 - Analytical Results for Surface Water Near the Ash Pit Sites

Location	Collection Date	Description	Result	Units	Standard
<b>Metals</b>					
SW041	8/6/90	Aluminum	90.6	ug/L	8.70E+01
SW041	8/6/90	Aluminum	99.1	ug/L	8.70E+01
SW039	4/12/90	Aluminum	238	ug/L	8.70E+01
SW041	4/5/90	Aluminum	631	ug/L	8.70E+01
SW040	7/30/87	Aluminum	2500	ug/L	8.70E+01
SW041	9/5/90	Antimony	11.4	ug/L	6
SW039	11/8/90	Antimony	14.7	ug/L	6
SW039	9/13/90	Antimony	22.4	ug/L	6
SW041	7/8/91	Antimony	29	ug/L	6
SW039	9/13/90	Antimony	14.4	ug/L	6
SW039	11/8/90	Antimony	15.6	ug/L	6
SW041	6/4/91	Cadmium	1.9	ug/L	1.5
SW041	7/8/91	Cadmium	2	ug/L	1.5
SW039	6/4/91	Copper	16	ug/L	16
SW041	6/4/91	Copper	28	ug/L	16
SW041	8/5/91	Iron	1010	ug/L	1000
SW041	9/5/91	Iron	1100	ug/L	1000
SW041	4/5/90	Iron	1320	ug/L	1000
SW041	12/4/90	Iron	13900	ug/L	1000
SW041	12/4/90	Iron	13900	ug/L	1000
SW041	11/20/89	Iron	15900	ug/L	1000
SW041	2/6/90	Iron	1970	ug/L	1000
SW041	6/16/89	Iron	2090	ug/L	1000
SW041	5/3/91	Iron	2670	ug/L	1000
SW041	5/3/91	Iron	2670	ug/L	1000
SW041	2/6/90	Iron	3550	ug/L	1000
SW039	12/4/90	Iron	5390	ug/L	1000
SW039	12/4/90	Iron	5390	ug/L	1000
SW041	5/26/89	Iron	5480	ug/L	1000
SW041	6/4/90	Iron	6800	ug/L	1000
SW041	12/5/89	Iron	8180	ug/L	1000
SW039	11/18/91	Lead	8	ug/L	6.5
SW039	12/20/89	Lead	7.3	ug/L	6.5
SW041	12/5/89	Lead	6.6	ug/L	6.5
SW041	12/4/90	Manganese	1100	ug/L	1000
SW041	12/4/90	Manganese	1100	ug/L	1000

42

**Table 2.12 - Analytical Results for Surface Water Near the Ash Pit Sites (cont.)**

Location	Collection Date	Description	Result	Units	Standard
SW039	11/17/89	Mercury	0.33	ug/L	0.01
SW041	5/26/89	Mercury	0.44	ug/L	0.01
SW039	4/6/89	Mercury	0.3	ug/L	0.01
SW041	3/1/89	Mercury	1.1	ug/L	0.01
SW039	3/21/90	Mercury	0.25	ug/L	0.01
SW039	4/12/90	Mercury	0.3	ug/L	0.01
SW039	11/17/89	Mercury	0.33	ug/L	0.01
SW039	4/15/92	Silver	2.7	ug/L	0.6
SW041	12/4/90	Silver	3.4	ug/L	0.6
SW041	12/4/90	Silver	3.4	ug/L	0.6
SW041	9/5/90	Silver	3.5	ug/L	0.6
SW041	11/5/90	Silver	9.8	ug/L	0.6
SW041	7/8/91	Silver	3	ug/L	0.6
SW041	11/5/90	Silver	9.8	ug/L	0.6
<b>Radionuclides</b>					
SW039	1/17/90	Americium-241	0.162	pCi/L	0.15
SW039	1/17/90	Americium-241	0.162	pCi/L	0.15
SW041	6/4/90	Gross Alpha	40.1	pCi/L	7
SW041	6/16/89	Gross Alpha	57	pCi/L	7
SW041	1/4/90	Gross Alpha	8.3	pCi/L	7
SW041	1/4/90	Gross Alpha	8.3	pCi/L	7
SW039	7/16/90	Gross Beta	23.69	pCi/L	8
SW041	1/4/90	Gross Beta	14.9	pCi/L	8
SW041	6/4/90	Gross Beta	36	pCi/L	8
SW041	6/16/89	Gross Beta	41	pCi/L	8
SW039	6/27/88	Plutonium-239/240	0.219	pCi/L	0.15

Action/No Further Action Recommendation

The Final OU 5 RFI/RI Report summarized all data that have been collected and recommended that NFA was warranted at OU 5 based on the human health risk assessment. Upon review of the original data and additional groundwater data collected during this season (summer 2001), justification for NFA is based on the following:

- All surface soil PCOCs are below RFCA Tier I ALs.
- All subsurface PCOCs except uranium-238, lead, and beryllium are below RFCA Tier I ALs.
- Arsenic in subsurface soil is above the RFCA Tier II AL but below background.
- A risk assessment of the area concluded that the ash pits do not pose a significant human health risk. The health assessment evaluated five different worker and recreational scenarios.

- The cumulative hazard index was below 1. All the cancer risks were at the low end of EPA's target range.
- The volume of source material is small and isolated. Although there were 3 soil concentrations that exceeded RFCA Tier I levels, the number of samples exceeding Tier II levels was disproportionately small. This would suggest that most of the ash is from general site waste and only small amounts actually had elevated metals and radionuclides.
- The source media is ash. Ash typically has low permeabilities because of particle size. Furthermore, natural pozzolanic reactions could be binding the inorganic contaminants. Many of the pH measurements of stream sediments indicated that the area might be in an alkaline environment which would further enhance this effect
- The source material is buried. All of the areas with high soil concentrations were beneath approximately 2 feet of cover. This cover has protected the ash pits from erosion and migration of contaminants to surface water. The cover also prevents airborne suspension of contaminated soil.
- The site has a vegetative cover. The area has remained undisturbed long enough for the natural means of erosion control to become established. Vegetation could also reduce the percolation of water down through the ash.
- Groundwater concentrations are below RFCA Tier II ALs. Furthermore, downgradient wells that initially exceeded Tier II levels often do not exceed those levels when sampled at a later date.
- The ash pits do not appear to be impacting downstream surface water locations. Although there may be metals impacting upstream locations, the ash pits do not appear to have significant downstream impacts.
- The ash pits are not close to the stream bed. The ash pits are far enough from Woman Creek and the South Interceptor Ditch (SID) to not be impacted by flooding and bank erosion. Further, the ash pits are outside of the 100-year flood plain.
- Local sediments and surface soil are clean. Contaminants in the ash pits do not appear in the surface soil and sediments. It does not appear that there has been any transport of contaminated media through suspension in surface water run-off.
- There is very little groundwater. Often times the area is too dry to collect a sample. Water level data indicates that significant portions are dry areas. As more sources of groundwater are eliminated through the D&D process, it is anticipated that there will be even less water in the future.
- The area might be Preble's Meadow Jumping Mouse habitat. A site biologist has indicated that Preble's meadow jumping mice might use the portion of the recovered native grassland over the ash pits closest to the stream as foraging and day-nesting areas. This area is probably also used by nesting birds.

## Comments

No information was found that specified operation, initiation and completion dates for each of the Ash Pits. References were made to the incinerator ash being dumped in trenches adjacent to the incinerator. Low-angle oblique photographs clearly show the location of four trenches in the area. One reference documents that an unknown quantity of depleted uranium-contaminated incinerator ash was dumped within an area several hundred feet southeast and southwest of the incinerator. PAC SW-133.4 is a few hundred feet southeast of where the incinerator was believed to be; yet, PAC SW-133.6, the Concrete Wash Pad, is a few hundred feet southwest. It is not known whether the contaminated ash was dumped in a pit or on the ground surface. A pit was located southwest of the incinerator.

## References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE 1993, *Background Geochemical Characterization Report*, Golden, CO, September.

DOE 1995, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program*, Golden, CO, May.

DOE, 1996a, *Final Phase I RFI/RI Report, Woman Creek Drainage, Operable Unit 5, Vol. 1*, Rocky Flats Environmental Technology Site, Golden, CO, April.

DOE, 1996b, *Final Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, Golden, CO, July.

DOE, 2000, *Final Rocky Flats Cleanup Agreement Attachment 5, Rocky Flats Environmental Technology Site Action Levels and Standards Framework for Surface Water, Ground Water, and Soils*, Rocky Flats Environmental Technology Site, Golden, CO, March.

**PAC REFERENCE NUMBER: SW-133.5**

IHSS Reference Number: SW-133.5 (OU 5)  
Unit Name: Incinerator Facility  
Approximate Location: N747,500; E2,079,500

Date(s) of Operation or Occurrence

1952 - 1968

Description of Operation or Occurrence

An incinerator (Facility 219 or Building 219) was located south of the West Access Road near the original RFETS west boundary (Figure 2.2; IHSS 133.5). The incinerator was used to burn general site wastes during the 1950s until 1968. Design and as-built drawings of the incinerator indicate that it was a significant structure with an emission stack approximately 32 feet high (DOE 1992).

In 1960, it was necessary to reline the firebox and stack with a plastic refractory. Between 1960 and 1968, the incinerator continued to deteriorate until it was necessary to cease its use and dispose of trash in some other manner. The Present Landfill (PAC NW-114) was constructed as a substitute for the incinerator, and waste disposal to the Present Landfill began on August 14, 1968 (DOE 1992).

A review of aerial photographs shows that the incinerator was present August 7, 1969 and removed by August 6, 1971. No documentation was found that described the dismantling and removal of the incinerator (DOE 1992).

Physical/Chemical Description of Constituents Released

Until 1959, the ashes and noncombustible material were placed around the incinerator and to the south near the concrete wash pad area (IHSS 133.6). After 1959, the ash was placed in trenches to the south, southeast, and east of the incinerator (see IHSSs SW-133.1-133.4 and PACs SW-1701 and 1702). An unknown quantity of depleted uranium-contaminated material was burned in the incinerator and estimated to contain at least 100 grams of depleted uranium (DOE, 1992). Residual ash has been sampled and found to be radioactive. A monthly ash sampling program was initiated in January 1962 and data are available in the monthly History Reports by the Waste Disposal Coordination Group (DOE 1992).

### Responses to Operation or Occurrence

Air emission samples were collected during burning operations in September 1956. Smear surveys of the incinerator before and after burning of contaminated waste showed no increase in contamination. Air sampling of the incinerator continued in 1958 during combustion of radioactively contaminated trash from Buildings 444 and 447; however, no sample results could be located (DOE 1992). An "ash dump" south of the plant was monitored in May 1959 and found to contain up to 4,000 cpm alpha activity and 20 mr/hr beta activity. Low-angle oblique photographs of the incinerator show fill material almost to the height of the incinerator roof. The unvegetated fill material is clearly non-native soil, but it is unclear whether the fill material is ash (DOE 1992).

### Fate of Constituents Released to Environment

Per RFCA (DOE 1996a), the basis for a NFA determination is established by determining that there is no actual or potential risk to human health or the environment. The information presented in the Final OU 5 RFI/RI (DOE 1996b) is augmented with additional evaluation of potential contaminant migration pathways and the nature of the source material to provide a more detailed picture of this IHSS. Specifically, consideration has been given to the following parameters:

- Soil concentrations in source area
- Historical information
- Potential for groundwater migration
- Potential for surface water migration through runoff and groundwater impacts

The data set presented in this narrative is comprehensive, up-to-date information (all analytical data is retrievable from RFETS database archives). Tier I and Tier II ALs, and stream standards were taken from RFCA Attachment 5, dated March 21, 2000 (DOE 2000). Background levels for subsurface soil were taken from the Background Geochemical Characterization Report (DOE 1993). Background values for surface soil and sediments were taken from the Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995). All of the background values are based on the mean background value plus two standard deviations.

**Soil Contamination** Four boreholes (55193, 55293, 55393, and 55493) have been placed within, or adjacent to, IHSS 133.5 (Figure 2.2). None of the analytes exceeded current RFCA Tier I ALs for soils. Tier II ALs were exceeded for beryllium and arsenic; however, these samples were below background. The highest concentrations of arsenic and beryllium were 6 mg/kg and 2 mg/kg, respectively. RFCA Tier II ALs for these metals are 2.99 mg/kg and 1.04 mg/kg, respectively. Background concentrations were exceeded for barium, copper, manganese, and uranium-238; however, the concentrations of these analytes were significantly below Tier II ALs. Table 2.14 presents the maximum and average values for sub-surface soil above the detection limits and the corresponding RFCA Tier I and Tier II ALs and background levels.

**Table 2.14 - Summary of Analytical Results for Subsurface Soils at IHSS 133.5**

Analyte	Samples Above Detection Limits	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	15	27700	mg/kg	10370.7	1000000	1000000	35373
Americium-241	16	0	pCi/g	0.0	215	38	0.02
Arsenic	15	6	mg/kg	3.5	299	3	13
Barium	15	388	mg/kg	98.2	133000	133000	289
Beryllium	11	2	mg/kg	1.0	104	1	14
Cadmium	1	1	mg/kg	1.0	1920	1920	2
Calcium	15	8510	mg/kg	3866.0			39382
Cesium	1	9	mg/kg	9.0			
Chromium	15	28	mg/kg	11.1	44300	4410	68
Cobalt	15	26	mg/kg	7.9	115000	115000	29
Copper	15	390	mg/kg	38.3	71100	71100	38
Gross Alpha	15	22	pCi/g	15.7			43
Gross Beta	16	35	pCi/g	28.1			37
Iron	15	28300	mg/kg	12211.3	576000	576000	41047
Lead	15	20	mg/kg	9.1	1000	1000	25
Lithium	9	19	mg/kg	7.4	38400	38400	35
Magnesium	15	4730	mg/kg	2162.7			9315
Manganese	15	1180	mg/kg	279.7	83600	83600	902
Mercury	4	0	mg/kg	0.0	576	576	2
Nickel	15	22	mg/kg	10.6	38400	38400	62
Plutonium-239/240	12	0	pCi/g	0.0	1429	252	0.02
Potassium	12	2370	mg/kg	1216.1			6197
Silver	1	3	mg/kg	3.0	9610	9610	25
Sodium	9	331	mg/kg	167.9			1251
Strontium	15	63	mg/kg	28.5	1000000	1000000	211
Thallium	5	1	mg/kg	0.2			2
Tin	1	62	mg/kg	62.0	1000000	1000000	286
Uranium-234	16	2	pCi/g	0.9	1738	307	2.6
Uranium-235	16	0	pCi/g	0.0	135	24	0.12
Uranium-238	16	2	pCi/g	1.1	586	103	1.5
Vanadium	15	55	mg/kg	28.5	13400	13400	88
Zinc	15	50	mg/kg	27.9	576000	576000	139

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

48

Eighteen surface soil sampling locations across the ash pit area were also sampled and nothing was detected above RFCA Tier I or Tier II ALs except for arsenic and beryllium, which were above Tier II levels but below background (Table 2.8).

### **Potential for Groundwater Migration**

Downgradient wells from IHSS 133.5 include wells 55194, 59093, 55394, and 62593. Table 2.9 shows all of the groundwater results in comparison to RFCA Tier I and Tier II ALs.

Based on analytical data, there are a number of VOCs that appear sporadically in the groundwater data. Specifically, toluene, benzene, 1,1-dichloroethene, and tetrachloroethene have been detected at various times in the same well 59093. For each sampling event, these compounds were detected only once and never detected again. Based on the historical use of the ash pits, it is unlikely that the ash pits are the source for these compounds. Furthermore, it is unlikely that these compounds are actually present at these locations and probably represent anomalous data for the following reasons:

- VOCs would be transported in an incinerator or destroyed and, therefore, would not be found in the residual ash.
- The location where the samples were collected has been sampled numerous times for these compounds and not detected in samples at different times.
- Many of these analytes are common laboratory contaminants that are used for cleaning gas chromatographs and other lab equipment.
- Different compounds are being detected for each sampling events.
- The levels at which these compounds are being detected are very close to the detection limits where there is a greater likelihood for error.

The single metal found in groundwater – thallium - was detected below the method detection limits (MDL) and has not been detected above background levels in any of the boreholes associated with IHSS 133.5.

Uranium-233/234 and uranium-238 were detected at levels slightly above RFCA Tier II ALs. These isotopes have been found at elevated levels in nearby ash pits, but were not identified at levels above background from the IHSS 133.5 subsurface soil samples. Based on the data, it is unlikely that IHSS 133.5 is the source for these radionuclides.

### **Surface Water**

As shown in Table 2.12 nearby surface water locations have had contaminant concentrations above RFCA standards and action levels for aluminum, antimony, cadmium, copper, iron, lead, manganese, mercury, silver, americium-241, gross alpha, gross beta, and plutonium-239/240. Many of these may be from natural sources (aluminum, antimony, iron, manganese, and silver) or from other sources in the area. These metals were not identified above Tier II ALs in any of the boreholes installed within or adjacent to IHSS 133.5. Further downgradient, at SW-027 (surface

water POE) and at Pond C-2, the IHSS 133.5, potential contaminants of concern have never been detected above RFCA surface water standards.

### **Airborne Pathways**

The OU 5 RFI/RI report for IHSSs SW-133.1 through SW-133.6, evaluated airborne pathways as part of an investigation for wind resuspension and erosion potential of contaminated soil. The report also evaluated airborne pathways as part of the risk assessment concluding there was no substantial risk as there are minimal levels of contaminants in the soil.

### **Radiological Surveys**

In addition to sampling, an HPGe Survey was conducted of the entire area. Figures 2.3, 2.4 and 2.5 present the results of this survey for americium-241, uranium-235, and uranium-238, respectively. HPGe surveys are considered a useful screening tool and offer a general representation of the radiological characteristics of the soil, including areas where soil samples were not collected. The survey results show that there was no americium contamination, which supports the conclusion that plutonium is not a PCOC in the area. Uranium concentrations are consistent with the uranium detected in the groundwater. Although one measurement for uranium-238 produced an average soil concentration of 18.8 pCi/g, this activity is well below the Tier II AL of 103 pCi/g.

### **Action/No Further Action Recommendation**

The Final Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report OU 5 (DOE 1996) summarized all data that had been collected and recommended that NFA was warranted for OU 5, based upon the human health risk assessment. The report grouped IHSS 133.5 with the other surrounding IHSSs and PACs (IHSS 133.1, IHSS 133.2, IHSS 133.3, IHSS 133.4, IHSS 133.6, PAC 1701 and PAC 1702) into a single Area of Concern (AOC). As part of this reevaluation, IHSS 133.5 was not grouped with other IHSSs but instead evaluated as a single IHSS.

Upon review of the original data and additional groundwater data collected during this field season (summer 2001), the data show that no surface soils were identified above RFCA Tier I ALs. Groundwater contamination is limited to trace concentrations of uranium isotopes that are slightly above RFCA Tier II ALs. There is no indication that surface water contamination exists from IHSS 133.5.

Therefore, in accordance with RFCA (DOE 1996a), it is again proposed that IHSS 133.5 be approved for NFA, based upon the lack of a contaminant source found at this site.

### **Comments**

Based upon the OU 5 RFI/RI Report, the location of IHSS 133.5, as originally reported in the HRR is inaccurate. The revised location for IHSS 133.5 is shown on Figure 2.2.

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE 1993, *Background Geochemical Characterization Report*, Golden, CO, September.

DOE 1995, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program*, Golden, CO, May.

DOE, 1996a, *Final Phase I Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, Golden, CO, July.

DOE, 1996b, *Final Rocky Flats Cleanup Agreement RFI/RI Report, Woman Creek Drainage, Operable Unit 5, Vol. 1*, Rocky Flats Environmental Technology Site, Golden, CO, April.

DOE, 2000, *Final Rocky Flats Cleanup Agreement Attachment 5, Rocky Flats Environmental Technology Site Action levels and Standards Framework For Surface Water, Ground Water, and Soils*, Rocky Flats Environmental Technology Site, Golden, CO, March.

**PAC REFERENCE NUMBER: SW-133.6**

IHSS Reference Number: 133.6, (OU 5)  
Unit Name: Concrete Wash Pad  
Approximate Location: N747,500; E2,079,000

Date(s) of Operation or Occurrence

1953 - Present

Description of Operation or Occurrence

Excess concrete from construction activities at RFETS was routinely washed from concrete trucks southwest of the plant. In March 1979, Plant Services was requested to clean up debris from past cement truck washouts and all cement truck washouts be conducted at the present landfill (IHSS 114). This area is adjacent to the former Plant incinerator location (IHSS 133.5). Reference was made to ash being disposed southwest of the incinerator, which may have been close to this area (DOE 1992).

Physical/Chemical Description of Constituents Released

The concrete wash pad was a waste concrete disposal site. However, concrete is not a hazardous waste. Potentially contaminated ash generated from the incinerator may have been deposited southwest of the incinerator in the area of the concrete wash pad. Ground disturbance in the area is apparent in aerial photographs taken beginning in 1953 and other Plant photos afterward (DOE 1992).

Responses to Operation or Occurrence

No documentation was found that detailed responses to any activity related to this practice.

Fate of Constituents Released to Environment

Per RFCA (DOE 1996a), the basis for a NFA determination is based in that there is not an actual (or potential) risk to human health or the environment. The information presented in the Final OU 5 RFI/RI (DOE 1996b) is augmented with additional evaluation of potential contaminant migration pathways and the nature of the source material to provide a more detailed picture of this Individual Hazardous Substance Site. Specifically, consideration has been given to the following parameters:

- Soil concentrations in the potential source area
- Historical information
- Potential for groundwater migration

- Potential for surface water migration through runoff and groundwater impacts

The data set presented in this narrative is comprehensive, up-to-date information (all analytical data are retrievable from RFETS database archives). Tier I and Tier II ALs and stream standards were taken from RFCA Attachment 5, dated March 21, 2000 (DOE, 2000). Background levels for subsurface soils were taken from the Background Geochemical Characterization Report (DOE 1993). Background values for surface soil and sediments were taken from the Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995). All of the background values are based on the mean background value plus two standard deviations.

### **Soil Contamination**

Four boreholes (54893, 54993, 55093, and 58894) have been placed within or adjacent to IHSS 133.6 (Figure 2.2). Table 2.15 summarizes the results of soil samples taken from these boreholes. The analytical results indicate that there are no significant levels of contaminants in the soil. Arsenic and beryllium were above Tier II values, but the maximum values were below background levels (mean background level plus two standard deviations).

Eighteen surface soil sample locations across the ash pit area were also sampled with no detections above RFCA Tier I or Tier II levels, except for arsenic and beryllium which were above Tier II levels but, below background (see Table 2.8).

### **Potential for Groundwater Migration**

Downgradient wells from IHSS 133.6 include wells 55194, 59093, 55394, and 62593. Table 2.9 presents all of the groundwater results in comparison to RFCA Tier I and Tier II ALs.

Similar to IHSS 133.5, there are volatile organic compounds that appear sporadically in the groundwater data for this area. Specifically, toluene, benzene, 1,1-dichloroethene, and tetrachloroethene have been detected at various times in the same well, 59093. At each sampling event, these compounds were detected only once and then never detected again. Based upon the historical use of the ash pits, it is unlikely that the ash pits are the source for these compounds. Furthermore, it is unlikely that the noted compounds are actually present at these locations. They more likely represent anomalous data for the following reasons:

- VOCs would be transported in an incinerator or destroyed and therefore, would not be found in the residual ash.
- The location where the samples were collected has been sampled numerous times for these compounds and not detected in any of those samples.
- Many of these analytes are common laboratory contaminants used for cleaning gas chromatographs and other lab equipment.
- Different compounds are detected each time.
- The levels at which these compounds are being detected at are very close to the detection limits where there is a greater likelihood for error.

53

The single metal found in groundwater - thallium - was detected below the MDL and has not been detected above background levels in any of the boreholes associated with IHSS 133.5.

Uranium-233/234 and uranium-238 were detected at levels slightly above Tier II levels. Because these isotopes have been found at elevated levels in nearby ash pits and have not been found at levels above background in IHSS 133.6 subsurface soil samples, it is unlikely that IHSS 133.6 is the source for these radionuclides, based on the levels of uranium isotopes detected in soil samples.

**Table 2.15 - Summary of Analytical Results for Subsurface Soils at IHSS 133.6**

Analyte	Number of Samples Above Detection Limits	Maximum Concentration	Unit	Average Concentration	Tier I Action Level	Tier II Action Level	Background Concentration
Aluminum	7	21300	mg/kg	11305.7	1000000	1000000	35373
Americium-241	4	0	pCi/g	0.0	215	38	0.02
Arsenic	7	6	mg/kg	3.7	299	3	13
Barium	7	683	mg/kg	178.7	133000	133000	289
Beryllium	7	2	mg/kg	0.9	104	1	14
Calcium	7	5010	mg/kg	4365.7			39382
Chromium	7	21	mg/kg	11.9	44300	4410	68
Cobalt	7	10	mg/kg	6.0	115000	115000	29
Copper	7	24	mg/kg	17.0	71100	71100	38
Gross Alpha	7	36	pCi/g	24.9			43
Gross Beta	7	37	pCi/g	30.6			37
Iron	7	24100	mg/kg	11295.7	576000	576000	41047
Lead	7	22	mg/kg	16.3	1000	1000	25
Lithium	7	16	mg/kg	7.0	38400	38400	35
Magnesium	7	5720	mg/kg	2774.3			9315
Manganese	7	134	mg/kg	74.3	83600	83600	902
Mercury	1	0	mg/kg	0.0	576	576	2
Molybdenum	1	1	mg/kg	1.0	9610	9610	26
Nickel	7	20	mg/kg	11.3	38400	38400	62
Plutonium-239/240	5	0	pCi/g	0.0	1429	252	0.02
Potassium	7	1990	mg/kg	1077.6			6197
Sodium	6	1180	mg/kg	629.0			1251
Strontium	7	70	mg/kg	53.6	1000000	1000000	211
Thallium	2	0	mg/kg	0.0			2
Tin	1	4	mg/kg	4.0	1000000	1000000	286
Uranium-234	8	2	pCi/g	1.1	1738	307	2.6
Uranium-235	8	0	pCi/g	0.0	135	24	0.12
Uranium-238	8	2	pCi/g	1.3	586	103	1.5
Vanadium	7	58	mg/kg	28.4	13400	13400	88
Zinc	7	57	mg/kg	36.9	576000	576000	139

	Above Background
	Above Tier II Values and Below Background
	Above Background and Tier II Values
	Above Tier I Values

54

## Surface Water

As shown in Table 2.12, nearby surface water locations have had contaminant concentrations above RFCA standards and action levels for aluminum, antimony, cadmium, copper, iron, lead, manganese, mercury, silver, americium-241, gross alpha, gross beta, and plutonium-239/240. Some of these compounds might be from natural sources (aluminum, antimony, iron, manganese, and silver) or from other potential sources in the area. None of the compounds have been found above Tier II levels in any of the boreholes installed in and around IHSS 133.6. Further downgradient, at POE-SW027 (surface water POE) and at C-2 pond, the IHSS 133.6 potential contaminants of concern have never been detected above RFCA surface water standards.

### Action/No Further Action Recommendation

No Further Action is recommended for IHSS 133.6, as justified by the lack of significant levels of contamination at the site. IHSS 133.6 differs from the other IHSSs and PACs in the area in that there might never have been a historical basis for contamination. IHSS 133.6 was defined as an IHSS because there was a possibility that ash from the incinerator at IHSS 133.5 was pushed down the slope into this area, not because of its past use as a concrete wash pad. Based on the currently-defined PAC and IHSS, it appears that PAC SW-1701 had materials that were pushed down from the slope. Therefore, it is probable that there is no source of contaminants associated with the IHSS itself. This would not have been confirmed until the IHSS was sampled. However, the sample results support this conclusion.

In addition to evidence that there may never have been any releases at IHSS 133.6, the following provide additional justification:

- There were no surface soils sampled above RFCA Tier I ALs. Arsenic and beryllium were above Tier II levels but were below background levels.
- Groundwater contamination appears to be limited to traces of uranium isotopes that are slightly above RFCA Tier II levels and are more likely to be from one of the other nearby IHSSs to the northeast.
- There has been no identified surface-water contamination from IHSS 133.6.

### Comments

The location of IHSS 133.6, as originally reported in the HRR, is inaccurate. The revised location, based on the OU 5 RFI/RI Report, is based on aerial surveys and historical information. Figure 2.2 shows the revised location of IHSS 133.6.

References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE 1993, *Background Geochemical Characterization Report*, Golden, CO, September.

DOE 1995, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program*, Golden, CO, May.

DOE, 1996a, *Final Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, Golden, CO, July.

DOE, 1996b, *Final Phase I RFI/RI Report, Woman Creek Drainage, Operable Unit 5, Vol. 1*, Rocky Flats Environmental Technology Site, Golden, CO, April.

DOE, 2000, *Final Rocky Flats Cleanup Agreement Attachment 5, Rocky Flats Environmental Technology Site Action Levels and Standards Framework For Surface Water, Ground Water, and Soils*, Rocky Flats Environmental Technology Site, Golden, CO, March.

**PAC REFERENCE NUMBER: 100-603**

IHSS Reference Number: Not Applicable

Unit Name: Building 123 Bioassay Waste Spill

Location: N749,000; E2,082,000 (Southwest of Building 123)

Date(s) of Operation or Occurrence

June 9, 1989

Description of Operation or Occurrence

An underground process waste line from Building 123 was being excavated and replaced due to a break in the line (PAC 100-602). The excavated end of the broken line was temporarily capped with a plastic bag, and Building 123 process waste was rerouted to bypass the broken line. A pump used to reroute the waste failed and allowed some of the waste to overflow into the broken line. Part of this waste leaked around the plastic bag and into the excavation. The release was confined to the excavation. Rainwater that was being pumped out of the trench at the time of the spill was not contaminated, as confirmed by sampling (DOE 1992).

Physical/Chemical Description Constituents Released

The release consisted of bioassay waste containing hydrochloric acid and nitric acid. The waste had a pH of approximately 1. The waste also may have contained urine, and up to a combined total of 1.5 gallons of ammonium thiocyanate, ammonium iodide, and ammonium hydroxide. The calculated maximum volume of the spill was 30 gallons. The released material mixed with rainwater in the excavation.

Responses to Operation or Occurrence

Potential flow from the excavation was contained with earthen berms. Approximately 100 gallons of rainwater contaminated by the spill were neutralized, pumped from the excavation, and transferred to the process waste system for treatment in Building 374. Samples were collected to evaluate the spread of contamination. The release was documented in RCRA Contingency Plan Implementation Report No. 89-006 (DOE 1989).

In late 2000, four subsurface soil samples were collected in and around PAC 100-603 as part of the UBC 123 characterization project (Figure 2.6). Each sample was analyzed for VOCs, semivolatile organic compounds (SVOCs), total metals, and isotopic radionuclides.

Analytical data produced from the chemical and radiological soil samples collected at locations HDD-3-01 and HDD-3-02 were verified and validated consistent with the Data Quality Objective (DQO) decision rules for

the UBC 123 Characterization Project. Upon completion of data analysis for that project, it was determined that no environmental remediation action was necessary relative to radiological or hazardous constituents at UBC 123. A more detailed explanation of the data analysis is presented in the Final Data Summary Report for the Characterization of UBCs 123 and 886 (KH 2001a).

Samples from locations HDD-3-Trench-A and HDD-3-Trench-B were collected within the PAC boundaries at approximately 20 inches below the top of existing asphalt. VOC and SVOC concentrations were reported at below MDLs (U-qualified by the labs) or well below RFCA Tier II ALs. Radionuclide and metals results were reported to be at non-detectable concentrations (U-qualified by the labs) or at levels below site mean background plus two standard deviations (with the exception of those analytes in Table 2.16 below). All of the reported concentrations were significantly below the RFCA Tier II ALs.

**Table 2.16 - Analytes Exceeding Background Mean Plus Two Standard Deviations**

Sampling Location	Analytical Concentration mg/kg or pCi/g	Tier I Action Level	Tier II Action Level	Mean Background Concentration <sup>1</sup>	Background Mean + 2 Stand. Deviations <sup>1</sup>
HDD-3-Trench-A	Cadmium - 3.5	2040 mg/kg	2040 mg/kg	0.82 mg/kg	1.70 mg/kg
HDD-3-Trench-A	Lead - 36.8	1000 mg/kg	1000 mg/kg	10.87 mg/kg	24.97 mg/kg
HDD-3-Trench-B	Am-241 - 0.100 (J-Qualified)	209 pCi/g	38 pCi/g	0.00 pCi/g	0.02 pCi/g
HDD-3-Trench-B	Cadmium - 5.3	2040 mg/kg	2040 mg/kg	0.82 mg/kg	1.70 mg/kg
HDD-3-Trench-B	Lead - 66.9	1000 mg/kg	1000 mg/kg	10.87 mg/kg	24.97 mg/kg

<sup>1</sup>Source: K-H, 2001b, Industrial Area Sampling and Analysis Plan, Tables F-4 & F-5, RFETS, June.

Fate of Constituents Released to Environment

Results from 11 samples collected shortly after the incident to evaluate the spread of contamination indicated that contamination was restricted to the excavation within 8 feet of Building 123. Approximately 100 gallons of rainwater contaminated by the spill were neutralized, pumped from the excavation, and transferred to the process waste system for treatment in Building 374.

Action/No Further Action Recommendation

Results of the analyses are summarized in Table 2.16 along with the appropriate RFCA ALs. All of the analytical results were below RFCA ALs.

Based upon the results of the soil samples collected, no current or potential contaminant source was identified for this PAC location. The release occurred in 1989, was not a continuing release and contaminated water was neutralized and pumped from the excavation. PCOCs for this PAC were not detected and therefore PAC 100-603 is proposed for NFA consistent with criteria set forth in RFCA (DOE 1996).

59

Comments:

Analytical results for HDD-3-01 and HDD-3-02 are included in the Final Data Summary Report for the Characterization of UBCs 123 and 886 (KH, 2001a).

It should be noted that the original HRR (DOE 1992) mentions that the waste stream for Building 123, a bioassay laboratory, may have had small concentrations of ammonium thiocyanate, ammonium iodide and ammonium hydroxide. While these compounds were not specifically sampled for in FY2000, it is very unlikely that RFCA Tier II ALs could have been exceeded. The RFCA Tier II ALs for ammonium and cyanide are >1 million and > 40,900 parts per million (ppm), respectively.

References

DOE, 1989, *RCRA Contingency Plan Implementation Report No. 89-006*, Rocky Flats Plant, Golden, CO, June.

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, Golden, CO, July.

KH, 2001a, *Final Data Summary Report for the Characterization of UBCs 123 and 886*, Rocky Flats Environmental Technology Site, Golden, CO, August.

K-H, 2001b, *Industrial Area Sampling and Analysis Plan, Tables F-4 & F-5*, Rocky Flats Environmental Technology Site, Golden, CO, June.

**PAC REFERENCE NUMBER: 100-607**

IHSS Reference Number: Not Applicable  
Unit Name: Building 111 Transformer PCB Leak  
Approximate Location: N749,500; E2,081,500

Date(s) of Operation or Occurrence

In Service Date - September 22, 1954  
February 1984 (first documentation) through early mid-1986 (transformer repaired)

Description of Operation or Occurrence

A large electrical transformer is located inside the Building 111 basement (Figure 2.7). The transformer held approximately 500 gallons of dielectric cooling oil, which at one time, contained polychlorinated biphenyls (PCBs) (DOE 1992). In February 1984, the transformer (111-1) was first documented to be leaking into the secondary containment, which at that time was filled with gravel (DOE 1992). The secondary containment basin for Transformer 111-1 was designated PAC 100-607 in the HRR in June 1992.

On January 30, 1986, EPA conducted a survey of the Rocky Flats Plant to determine compliance with federal PCB regulations. The inspection identified a number of leaking transformers, including the Building 111-1 transformer (DOE 1992). Follow-up inspection and repair by Plant personnel indicated that leaks originated at the transformers' tap changer and oil sample valve.

Physical/Chemical Description of Constituents Released

An unknown amount of PCB-bearing dielectric oil leaked from the transformer between February 1984 (possibly earlier) and early to mid-1986. It is not known whether the leaks during this period were continuous or intermittent. Samples of the oil collected in early 1984 indicated 17 ppm PCBs (Aroclor 1260), a commercial PCB formulation, in a paraffin-based mineral oil. Service records maintained by the RFETS Plant Power organization indicate that samples were collected of the oil on July 12, 1985 (251 ppm PCBs), and on January 7, 1987 (7.3 ppm PCBs). Engineering design drawings show that an isolated footing drain system was installed within the secondary containment structure and routed approximately 30 feet east of the building to a manhole sump. A waterproofing compound was used during installation of the manhole to prevent seepage into and out of the structure. The system was installed during the original construction of the building due to groundwater infiltration into the building basement.

## Responses to Operation or Occurrence

The sampling event conducted in early 1984 (17 ppm Aroclor 1260) indicated that PCB levels in the cooling oil were below the EPA regulatory limit of 50 ppm and therefore, no corrective actions were taken at that time (DOE, 1992). The gravel lining in the secondary containment was removed and the footing drain structure grouted closed prior to January 8, 1986. Service records document that the transformer was cleaned and repaired in August 1986 and retrofilled on September 20, 1986, with non-PCB-containing oil. Residual staining on the transformer concrete pad was noted in January 1987, and it was suggested that the pad be coated with a sealant. No documentation could be found to confirm whether the sealant had been applied. Three water samples were collected and analyzed for PCBs from the associated manhole east of Building 111 on September 4, 1986 (Rockwell 1986). Results from the sampling indicated that PCB concentrations in all three samples were less than 1 part per billion (ppb).

During a 1991 Plant-wide investigation of PCB contamination resulting from transformers and other potential areas where PCBs were handled or stored, the Industrial Hygiene organization collected 14 wipe samples from the 111-1 transformer. An EPA-approved method (EPA Method 8080) was used and the samples were analyzed by an offsite laboratory. PCB contamination was not identified (i.e., all samples were nondetect) on the exterior of the transformer and surrounding area (EG&G 1991).

Beginning in September 2000, reconnaissance-level characterization plan (RLCP) sampling for the Building 111 Cluster was conducted. Nine samples were collected in and around the 111-1 Transformer and the extended footing drain area. Analytical results for PCBs (including four Laboratory QC samples) are shown in Table 2.17. Characterization sampling included analysis for PCBs and other parameters at the following locations (K-H 2000a):

- One water sample and two sludge samples from the parking lot manhole 30 feet east of Building 111 (outfall of footing drain);
- One sludge sample from the footing drain sump in the mechanical room;
- One sludge sample from the drain next to the elevator lift at the southeast corner of the building; and
- Four (2-inch-deep) concrete cores from the floor of the secondary containment surrounding the transformer.

The maximum concentration of PCBs identified from concrete cores in the secondary containment area (PAC 100-607) was 0.283 ppm Aroclor 1260. The maximum concentrations of PCBs identified in sludge from the associated sanitary drain manhole located 30 feet to the east of the building was 2.3 ppm Aroclor 1254 and 0.9 ppm Aroclor 1260, respectively (Figure 2.7 and Table 2.17).

Maximum sludge sample concentrations of 2.5 ppm Aroclor 1016 and 4.1 ppm Aroclor 1254 were identified in a sample collected from the sump located in the mechanical room adjacent to the electrical room. A sludge sample collected from the storm drain located in the outer dock lift area had a maximum concentration of 3.3 ppm Aroclor 1254.

**Table 2.17 - PCB Results for Concrete Cores, Sludge & Water Samples at PAC 100-607 (ppm)**

Sample ID	Sample Loc./type	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
111-M-1D-1	Conc. Core Transformer	U	U	U	U	U	U	0.176
111-M-1D-2	Conc. Core Transformer	U	U	U	U	U	U	U
111-M-1D-3	Conc. Core Transformer	U	U	U	U	U	U	0.005
111-M-1D-4	Conc. Core Transformer	U	U	U	U	U	U	0.283
PBLK01 <sup>1</sup>	Conc. Core Lab QC	U	U	U	U	U	U	U
PBLK01LCS <sup>1</sup>	Conc. Core Lab QC	U	U	U	U	U	U	0.025
MS <sup>1</sup>	Conc. Core Lab QC	U	U	U	U	U	U	0.145
MSD <sup>1</sup>	Conc. Core Lab QC	U	U	U	U	U	U	0.207
BS-111-2-SL	Footing Drain Sludge from Mechanical Rm	2.500	U	U	U	U	U	4.100
SDB111-E	Storm Drain Sludge Lift Station	U	U	U	U	U	3.300	U
B111MH-E-1	Manhole Sludge	U	U	U	U	U	2.300	0.900
B111MH-E-2	Manhole Sludge	U	U	U	U	U	2.200	U
B111MH-E-WR	Manhole Water	U	U	U	U	U	U	U

Note: All analytical data by EPA Method S- 846 8082 for PCBs.

U - nondetect

<sup>1</sup> PBLK01 (method blank), PBLK01LCS (laboratory control sample) MS (matrix spike) and MSD (matrix spike duplicate) are laboratory QC designations.

Fate of Constituents Released to Environment

The PCOCs for PAC 100-607 are PCBs. The sequence of sampling events leading up to and including the RLCP for the Building 111 Cluster show that PCB dielectric oil was contained within the containment system as originally designed.

The RLCP process enables characterization of potentially contaminated building materials for final waste disposition. The DQO process for D&D activities is consistent with the DQO process used for sampling and characterization of environmental media.

### Action/No Further Action Recommendation

PAC 100-607 was accepted for NFA as proposed in an interim update to this HRR Annual Update submitted in April 2001, (K-H 2001). Refer to Comments (below) and Appendix 2 (Regulatory Correspondence) for NFA approval letter.

### Comments

In accordance with an approved PAM (DOE 1995), and Toxic Substances Control Act (TSCA) Guidance documents, the PCB characterization data for PAC 100-607 and other areas in the Building 111 basement are below the established cleanup criteria and approved AL of 25 ppm for PCBs and also met the D&D material disposition concentration level of 50 ppm. PAC 100-607 was accepted as proposed on April 12, 2001, for NFA in accordance with RFCA (EPA, CDPHE 2001).

Building 111 is currently undergoing D&D. As prescribed in the FY2000 Annual Update to the HRR (K-H 2000b), sampling was conducted within and adjacent to PAC 100-607 in accordance with the RLCP contained in the Decontamination and Decommissioning Characterization Protocol (DDCP) (MAN-077-DDCP). A detailed sampling package and report for the Building 111 Cluster was completed and approved by the regulatory agencies.

### References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1995, *Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, RF/ER-95-0066.UN*, Rocky Flats Environmental Technology Site, Golden CO, July.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

EG&G, 1991, *Assessment of Known, Suspect, and Potential Environmental Releases of Polychlorinated Biphenyls, Preliminary Assessment/Site Description*, Rocky Flats Plant, Golden, CO, October.

EPA and CDPHE, 2001, *Joint Approval Letter of NFA for PAC 100-607*, April 12.

K-H, 2000a, *Reconnaissance Level Characterization Plan (RLCP) for the Building 111 Cluster*, Rocky Flats Environmental Technology Site, Golden CO, September.

K-H, 2000b, *Annual Update to the Historical Release Report for the Rocky Flats Plant*, Rocky Flats Environmental Technology Site, Golden, CO, September.

K-H, 2001, *Interim Update to the Historical Release Report for PAC 100-607*, Rocky Flats Environmental Technology Site, Golden, CO, April.

Rockwell, 1986, *Analytical Data for PCB Samples Collected from the Building 111 Manhole Sump, Lab #E86-3934*, Rocky Flats Plant, Golden, CO, September.

**PAC REFERENCE NUMBER: 300-206**

IHSS Reference Number: 206  
Unit Name: Inactive Hazardous Waste Tank D-836  
Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

1975 - 1987

Description of Operation or Occurrence

Tank D-836 was a 19,000-gallon, carbon steel tank used for hazardous waste storage. The tank had no secondary containment and was located on compacted soil (DOE 1992a). It was identified as a portion of RCRA Unit #42 in the RCRA Part B Permit Application (DOE 1992b). Specifically, Tank D-836 was identified as Unit #42.14. The tank can be seen in a 1980 Rocky Flats Plant (RFP) photograph, situated along the north side of Building 374. A spill of condensate water occurred on February 18, 1980, when a line from the Building 374 evaporator to the tank was disconnected.

Physical/Chemical Description of Constituents Released

The portable tanker was used to hold off-specification product water elevated in conductivity. Water collected from the tanker pursuant to the spill in 1980 was found to contain low concentrations of tritium, however data could not be located.

Responses to Operation or Occurrence

It is believed that the tank was removed in 1987; however, no documentation could be found to support this assumption.

Based upon historical information regarding the waste stream released to the soil in 1980, sampling was performed for tritium and total metals in 1994, in accordance with the OU 10 Work Plan (DOE, 1992c). Ten surface soil samples and one duplicate were collected from the IHSS as shown on Figure 2.8 (DOE 1995a). Table 2.18 presents the analytes detected above background concentrations (DOE 1995b) in relation to RFCA Tier I and Tier II ALs.

67

**Table 2.18 - Summary of Surface Soil Sampling Results for IHSS 206**

Potential Contaminants of Concern <sup>1</sup>	Number of Surface Soil Samples	Number of Detects > RFCA Tier II <sup>2</sup>	Comparison Values (mg/kg or pCi/g) Open Space		Range of Values Detected (mg/kg or pCi/g)	
			RFCA Tier II <sup>3,4</sup>	RFCA Tier I <sup>5,6</sup>	Minimum	Maximum
<b>Total Metals</b>						
Calcium	11	0	NA	NA	2300	5940
Copper	11	0	71100	71100	11.5	35.9
Magnesium	11	0	NA	NA	1850	3690
Sodium	11	0	NA	NA	143	423
Zinc	11	0	576000	576000	41.3	258
<b>Radionuclides</b>						
Tritium	11	0	NA	NA	-630	950

<sup>1</sup> Contaminants of concern are those chemicals detected above background concentrations presented in the Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995b).

<sup>2</sup> PAC 300-206 is within the IA OU; Industrial Use RFCA Action Levels Apply

<sup>3</sup> Tier II values for nonradionuclides represent either 1E+06 carcinogenic risk or a hazard index of 1 for noncarcinogenic toxicity.

<sup>4</sup> Tier II values for radionuclides are based on an annual dose limit of 15 mrem to a hypothetical future resident.

<sup>5</sup> Tier I values for nonradionuclides represent either 1E+04 carcinogenic risk or a hazard index of 1 for noncarcinogenic toxicity.

<sup>6</sup> Tier I values for radionuclides are based on an annual dose limit of 85 mrem to a hypothetical future resident.

### Fate of Constituents Released to Environment

No documentation could be found pertaining to soil removal or cleanup activities for the release in 1980.

### Action/No Further Action Recommendation

Based upon the results of the soil samples collected, no current or potential contaminant source was identified. The incident occurred in 1980 and was not a continuing release. PCOCs for this IHSS were not detected and therefore PAC 300-206 is proposed for NFA consistent with criteria set forth in RFCA (DOE 1996).

### Comments

Ten of 11 antimony results were rejected because predigestion matrix spike (MS) criteria were not met at the laboratory; however, the one acceptable result of 3.2 mg/kg was well below background levels (DOE 1995b)

### References

DOE, 1992a, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1992b, *RCRA Part B Permit Application Unit #42, (Unit #42.14)*, Rocky Flats Plant, Golden, CO.

69

DOE, 1992c, *Final Phase 1 RFI/RI Work Plan, Outside Closure (Operable Unit 10)*, Rocky Flats Plant, Golden, CO, May.

DOE, 1995a, *Technical Memorandum 1, Operable Unit 10 (Other Outside Closures)*, Rocky Flats Plant, Golden, CO. January.

DOE 1995b, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program*, Golden, CO, May.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

**PAC REFERENCE NUMBER: 400-812**

IHSS Reference Number: Not Applicable

Unit Name: Release of Process Water from Building 460 (Tank T-2)

Approximate Location: N748,720; E2,081,958

Date(s) of Operation or Occurrence

November 10, 1993

Description of Operation or Occurrence

A release of process water occurred on November 10, 1993, when Plant personnel were transferring 3,500 gallons of process waste water from Tank T-2 located inside Building 460 to a tanker truck (Figure 2.9). Approximately 90 minutes into the transfer operation, a plant employee observed liquid escaping from an air vent on top of the tanker. Approximately 25 gallons of liquid were released onto the soil and concrete pavement dock area (northwest corner of Building 460). The dock area consists of approximately 3 inches of soil covering a concrete subslab (DOE 1994).

Physical/Chemical Description of Constituents Released

The 25 gallons of material released to the soil and underlying concrete was characterized as potentially containing a characteristic hazardous waste for chromium (D007). A field pH test was performed and the released liquid was determined to have a pH of between 6.0 and 6.5. Analytical data (Toxicity Characteristic Leaching Procedure [TCLP]) for samples collected on November 10, 1993, are shown on Table 2.19. The results indicate that RCRA waste characteristics for toxicity were not exceeded.

**Table 2.19 - November 11, 1993, Sampling Results (TCLP) for Process Waste Released from Building 460, Tank T-2 Transfer**

Analyte	Liquid Concentration (mg/L)	Asphalt/Soil Concentration (mg/L)	Regulatory Limit (mg/L)
Barium	0.036	0.031	100.0
Cadmium	0.190	0.002	1.0
Chromium	2.08	0.018	5.0
Lead	<0.060	<0.004	5.0
Silver	<0.007	<0.004	5.0

Responses to Operation or Occurrence

The RCRA Contingency Plan was implemented (CPIR 93-009), and CDPHE and EPA were notified of the event. Employees involved in the transfer operation immediately shut down the pumps from Building 460 and secured the discharge valves from Tank T-2 to prevent additional waste from entering the tanker truck. Samples were collected of the liquid spilled and wetted soil from under the tanker. Absorbent socks and a wet vacuum were used to remove standing liquids (which were returned to Tank T-2). The used absorbent socks and personal protective equipment (PPE) were placed in the Building 460 RCRA 90-day accumulation area. On November 11, 1993, the soil overlying the concrete subslab was removed (eight 55-gallon drums) and transferred to a RCRA permitted storage area.

On November 3, 2000, eight 1-foot composite samples were collected at the PAC 400-812 location to perform a hazardous waste determination in accordance with requirements of the Soil Disturbance Permitting process (Environmental Assessment #FAC01P5M; submitted October 30, 2000) (RMRS 2000). Samples were collected for SW-846 VOCs, total metals, pH, and gross alpha-beta. VOCs were collected by grab methods (i.e., not composited) and all locations were surveyed. Analytical data passed validation and are archived in the plant database systems. Table 2.20 presents the analytes detected above background concentrations (DOE, 1995) in relation to RFCA Tier 1 and Tier II ALs.

**Table 2.20 - Summary of Surface Soil Sampling Results for PAC 400-812**

Potential Contaminants of Concern <sup>1</sup>	Number of Surface Soil Samples	Number of Detects > RFCA Tier II <sup>2</sup>	Comparison Values (mg/Kg or pCi/g) Industrial Area		Range of Values Detected (mg/Kg or pCi/g)	
			RFCA Tier II <sup>3,4</sup>	RFCA Tier I <sup>5,6</sup>	Minimum	Maximum
<b>Total Metals</b>						
Copper	8	0	75,600	75,600	18.1	53
Iron	8	0	613000	613000	9,800	20,300
Manganese	8	0	66,800	66,800	201	517
Nickel	8	0	40,900	40,900	5	20.6
Strontium	8	0	1,000,000	1,000,000	24.7	69.3

<sup>1</sup> Contaminants of concern are those chemicals detected above background concentrations presented in the Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE, 1995).

<sup>2</sup> PAC 400-812 is within the Industrial Area OU; Industrial Use RFCA Action Levels Apply

Fate of Constituents Released to Environment

Approximately 12 gallons of the spilled liquid were recovered and returned to Tank T-2. Eight drums of soil were removed the following day and managed in a RCRA 90-day accumulation area. Potentially hazardous constituents released to the environment are unlikely due to the response action and concrete subslab design.

73

### Action/No Further Action Recommendation

Based upon the analytical results and knowledge of the prior spill cleanup, no current or potential contaminant source could be identified at this location. PCOCs for PAC 400-812 were not detected and therefore this PAC is proposed for NFA consistent with criteria set forth in RFCA (DOE 1996).

### Comments:

All of the analytical results are maintained in the Soil Water Database (SWD) and are attached to the Soil Disturbance Permit (Environmental Assessment #FAC01P5M; submitted October 30, 2000) (RMRS 2000).

Sampling was conducted in this area to provide waste determination information for excavated soil. Sampling methodologies used were consistent with current environmental sampling methodologies and DQOs.

### References:

DOE, 1994, *Historical Release Report, Seventh Quarterly Update, January 1, 1994 to March 31, 1994*, Rocky Flats Environmental Technology Site, Golden, CO.

DOE 1995, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program*, Golden, CO, May.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

EG&G, 1993, *RCRA Contingency Plan Implementation Report (CPIR 93-009)*, Rocky Flats Environmental Technology Site, Golden, CO, November.

RMRS, 2000, *Soil Disturbance Permit, Environmental Assessment #FAC01P5M*, submitted October 30.

**PAC REFERENCE NUMBER: 600-189**

IHSS Reference Number: 189, IA OU

Unit Name: Nitric Acid Tanks (IAG Name: Multiple Acid Spills)

Approximate Location: N748,899; E2,082,711

Date(s) of Operation or Occurrence

1952 - 1996

Description of Operation or Occurrence

IHSS 600-189 is the former location of the 218 Acid Tanks, also referenced as the Building 218 Acid Farm. Prior to removal of the tanks in 1996, the tanks were located adjacent to the railroad tracks east of Building 444 and south of Cottonwood Avenue (Figure 2.10). The tanks were used for the storage of nitric acid from 1952 to 1996 for Buildings 771 and 883 (DOE 1992). The tanks were designed with secondary containment in the form of 4-inch-thick concrete walls approximately 4 feet in depth.

On October 27, 1982, a brown cloud of gas was observed coming from the Acid Tank Farm. No documentation was found explaining the incident (DOE 1992).

An overflow occurred on September 25, 1985, during a filling operation. No documentation could be found pertaining to the quantity of acid released (DOE 1992).

On June 28, 1986, the level probe in a dumpster tank failed, causing a release of nitric acid to the safety overflow and onto the ground. Approximately 1 gallon of acid was released to the ground surface (DOE 1992).

Physical/Chemical Description of Constituents Released

Nitric acid was released to the environment in each of the occurrences.

Responses to Operation or Occurrence

Two containers of sodium bicarbonate were used to neutralize the September 1985 spill. The volume of the containers is unknown (DOE 1992).

Following the June 1986 overflow incident, the Fire Department washed down, diluted, and neutralized the acid with sodium bicarbonate (DOE 1992).

IHSS 189 was investigated in accordance with the OU 12 RFI/RI field investigation. On March 3, 1994, surficial sampling was conducted at five locations surrounding the former tank area. Samples were collected for radionuclides, total metals, pesticides, PCBs and pH. Analytes with concentrations exceeding background are presented in Table 2.20 with corresponding RFCA Tier I and Tier II Als. All sampling locations are shown on Figure 2.10. The acid tanks were removed on September 29, 1996, as part of a Plant-wide D&D schedule.

**Table 2.21 - Summary of Surface Soil Sampling Results for IHSS 189**

Potential Contaminants of Concern <sup>1</sup>	Number of Surface Soil Samples	Number of Detects > RFCA Tier II <sup>2</sup>	Comparison Values (mg/kg or pCi/g) Industrial Use		Range of Values Detected (mg/kg or pCi/g)	
			RFCA Tier II <sup>3,4</sup>	RFCA Tier I <sup>5,6</sup>	Minimum	Maximum
<b>Total Metals</b>						
Beryllium	5	0	1.33	133	.24	1.1
Calcium	5	0	NA	NA	2090	6220
Copper	5	0	75600	75600	13.6	26.8
Lead	5	0	1000	1000	18.1	60.0
Mercury	5	0	613	613	0.085	0.27
Sodium	5	0	NA	NA	314	846
PH	5	NA	NA	NA	7.16	8.33
<b>Radionuclides</b>						
Am-241	1	0	38	209	0.07	0.07
Pu-239, 240	5	0	252	1088	0.05	0.55
Ra-226	1	0	NA	NA	1.51	1.51
U-235	5	0	24	113	0.03	0.14
U-233,234	5	0	307	1627	1.32	2.32
U-238	5	0	103	506	1.65	6.24

<sup>1</sup> Contaminants of concern are those chemicals detected above background concentrations presented in the Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program (DOE 1995a).

<sup>2</sup> IHSS 189 is within the 1A OU; Industrial use RFCA Als apply.

<sup>3</sup> Tier II values for nonradionuclides represent either 1E+06 carcinogenic risk or a hazard index of 1 for non-carcinogenic toxicity.

<sup>4</sup> Tier II values for radionuclides are based on an annual dose limit of 15 mrem to a hypothetical future resident.

<sup>5</sup> Tier I values for nonradionuclides represent either 1E+04 carcinogenic risk or a hazard index of 1 for non-carcinogenic toxicity.

<sup>6</sup> Tier I values for radionuclides are based on an annual dose limit of 85 mrem to a hypothetical future resident.

### Fate of Constituents Released to Environment

No documentation was found that detailed the removal of soil affected by the nitric acid; however, it is documented that the acid spills were neutralized with sodium bicarbonate. This is supported by the results of the soil pH analysis that were between 7.16 and 8.33.

### Action/No Further Action Recommendation

IHSS 189 was proposed for NFA in the 1997 Annual Update to the HRR based upon the health effects and exposure scenario. At that time, analytical data from the RFI/RI investigation for OU 12 was not available for IHSS 186. Based upon comments received from the regulatory agencies on July 19, 1999, soil pH data would be required to obtain NFA status at this location. This PAC narrative provides soil pH data and all other available data documented in the OU 12, Technical Memorandum No. 2 (DOE 1995).

Based upon the results of the soil samples collected, no current or potential contaminant source was identified. PCOCs for IHSS 189 were not identified and therefore IHSS 189 is proposed for NFA consistent with criteria set forth in RFCA (DOE 1996).

#### Comments

Due to the relatively small amount of acid spilled and the neutralization effect over time, the cumulative hazard indices for noncarcinogenic health effects are expected to be 0.01 or less and therefore, no adverse noncancer health effects are expected under the exposure conditions evaluated for this IHSS.

#### References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1995a, *Geochemical Characterization of Background Surface Soils: Background Soils Characterization Program*, Rocky Flats Environmental Technology Site, Golden, CO.

DOE, 1995b, *Technical Memorandum No. 2, Operable Unit 12, 400/800 Areas, Draft*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, February.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

**PAC REFERENCE NUMBER: 700-1102**

IHSS Reference Number: Not Applicable  
Unit Name: Transformer Leak - 776-4  
Approximate Location: N750,500; E2,083,500

Date(s) of Operation or Occurrence:

Prior to January 1986

Description of Operation or Occurrence

Prior to January 1986, Transformer 776-4 was located approximately 100 feet west of the northwest corner of Building 776 (Figure 2.11). The transformer pad at this location was positioned on an incline with drainage toward an access road 15 feet to the east. In January 1986, a plant employee reported that a leak was observed from Transformer 776-4. In February 1986, the transformer was again reported to be leaking on the radiator, around the gauges, valves, and bushing compartment. There was an oily film on most of the surfaces of the transformer and on the transformer pad. In an August 1986 photograph, staining was visible on the concrete pad beneath the transformer. Further leaking was reported in August and September 1986. Samples collected in November 1986 of the concrete under the transformer drain valve and of soil at the south edge of the transformer pad were found to be contaminated with PCBs (DOE 1992). The transformer was moved to a new pad several feet to the north in 1987 (DOE 1996b).

Physical/Chemical Description of Constituents Released

In September 1976, the oil in Transformer 776-4 had a PCB concentration of approximately 5 percent (using a PCB test kit). Samples of the oil collected in November 1977 indicate the fluid in the transformer had a PCB concentration of approximately 3 percent. In October 1985, the oil was reported to have a PCB concentration greater 500 ppm (test method unknown). In November 1986, wipe samples collected from a valve, sidewall, and the concrete pad were found to contain 29.8, 5.0, and 417.5 ppm PCBs, respectively. Also in November 1986, a wipe sample collected from the concrete pad beneath the drain valve was found to contain 498 micrograms per square centimeter ( $\mu\text{g}/\text{cm}^2$ ) PCBs. Soil samples collected in November 1986 from the south edge of the original transformer pad indicated 14,900 ppm PCB contamination (DOE 1992).

Response to Operation or Occurrence

In September 1976, Transformer 776-4 was documented as being drained and refilled with a non-PCB silicone oil. The transformer was scheduled for replacement under the PCB Fire Hazard Elimination Project in FY1988.

The transformer was removed for retrofilling and relocated several feet to the north in 1987. The original transformer pad surface was partially removed (scabbled) to a depth of 4 inches and left in place.

In March 1989, it was reported that transformer 776-4 was replaced under the Environmental Hazards Elimination Project. Further remediation of the site was scheduled on August 10, 1989 (DOE 1992).

During a sitewide sampling program in August 1991, soil samples were collected in accordance with agency-approved EPA sampling protocol and analyzed for PCBs using EPA Method 8080. The highest PCB concentration detected in soil collected adjacent to the old concrete transformer pad was 480 ppm (DOE 1996a).

Working under an agency-approved Final PAM for Remediation of Polychlorinated Biphenyls (DOE 1995), additional samples were collected in 1995 and 1996 to verify the lateral and vertical extent of PCB migration. Soil samples were analyzed using EPA Draft Method 4020, and concrete samples were analyzed using EPA Method 8080. Based upon analytical results for the concrete samples, the highest PCB contamination level on the concrete pad was 56 ppm. In accordance with the PAM (DOE, 1995), approximately 177 cubic yards (yd<sup>3</sup>) of PCB-contaminated soil and 10.7 yd<sup>3</sup> of PCB-contaminated concrete were excavated to a depth of 17 feet, containerized, and shipped to an EPA licensed TSCA landfill in Kettleman, California, for disposal (DOE 1997). An area of soil approximately 20 square feet (ft<sup>2</sup>), at a depth of 17 feet is PCB-contaminated at levels around 70 ppm using EPA Method 8080 as documented in the Closeout Report for the Source Removal of Polychlorinated Biphenyls (DOE 1997). The RFCA Tier I subsurface soil ALs for Aroclor-1260 is 3,820 ppm. Excavation was stopped due to health and safety concerns and equipment limitations.

This site was recommended for NFA in 1997; however, comments received from the regulatory agencies on July 19, 1999, conclude that additional groundwater samples should be collected to ensure that PCB contamination is not mobilized in the subsurface. Groundwater samples were collected for PCBs at two down-gradient locations during FY2001 from well 22696 and from the Building 771/776 tunnel (Figure 2.11). The underground tunnel connecting Buildings 776 and 771 is immediately east of PAC 700-1102 and approximately 23 feet in depth. Groundwater samples did not contain detectable concentrations of PCBs. Analytical results are presented in Table 2.21.

#### Fate of Constituents Released to Environment

No historical documentation was found that detailed the disposition of the scabbled concrete removed from the transformer pad (DOE 1992).

PAC 700-1102 was remediated from an initial PCB contaminant level of 480 ppm Aroclor-1260 in the soil to 70 ppm. Because the residual contamination is 17 feet below ground surface (bgs), the source removal significantly reduced risk to human health and the environment (DOE 1997).

**Table 2.22 - Summary of Groundwater Sample Results near PAC 700-1102**

Potential Constituent of Concern	Number of Samples	Number of Detects (MDA 0.53 ug/L)	RFCA Regulatory Action Level Exceedances Groundwater (5 ug/L)
<b>PCBs 771/776 Tunnel<sup>1</sup></b>			
Aroclor 1216	2	0 (<0.5 ug/L)	0
Aroclor 1221	2	0 (<0.5 ug/L)	0
Aroclor 1232	2	0 (<0.5 ug/L)	0
Aroclor 1242	2	0 (<0.5 ug/L)	0
Aroclor 1248	2	0 (<0.5 ug/L)	0
Aroclor 1254	2	0 (<0.5 ug/L)	0
Aroclor 1260	2	0 (<0.5 ug/L)	0
<b>PCBs (Well 22696)</b>			
Aroclor 1216	1	0 (<0.5 ug/L)	0
Aroclor 1221	1	0 (<0.5 ug/L)	0
Aroclor 1232	1	0 (<0.5 ug/L)	0
Aroclor 1242	1	0 (<0.5 ug/L)	0
Aroclor 1248	1	0 (<0.5 ug/L)	0
Aroclor 1254	1	0 (<0.5 ug/L)	0
Aroclor 1260	1	0 (<0.5 ug/L)	0

PCOC are chemicals/compounds detected above background concentrations presented in the Geochemical Characterization of Background Surface Soils, Background Soils Characterization Program (DOE 1995b).

EPA Method SW-846 8082 used for all groundwater samples, MDA = minimum detectable activity

Action/No Further Action Recommendation

PAC 700-1102 was recommended for NFA in 1997 based upon removal of the contaminant source. Comments received from the regulatory agencies on July 19, 1999 concluded that NFA of this PAC would be granted if downgradient groundwater samples were collected verifying that PCB contamination is not mobilized in the subsurface which could affect surface water.

During FY2001, groundwater sampling for PCBs was conducted at two downgradient locations. These locations are shown on Figure 2.11 as well 22696 and the Building 771/776 tunnel. Analytical data presented in Table 2.21 verify that PCB contamination is not mobilized in the subsurface. Based upon the additional data presented in this narrative, PAC 700-1102 is again proposed for NFA.

Comments

The excavation was filled with clean structural backfill in 1996.

References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1995a, *Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls*, RF/ER-95-0066.UN, Rocky Flats Environmental Technology Site, Golden, CO, July.

82

DOE, 1995b, *Geochemical Characterization of Background Surface Soils, Background Soils Characterization Program*, Rocky Flats Environmental Technology Site, Golden, CO.

DOE, 1996a, *Annual Update for the Historical Release Report, August 1, 1995 through August 1, 1996*, RF/ER-96-0046, September.

DOE, 1996b, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO., July.

DOE, 1997, *Closeout Report for the Source Removal of PCBs*, RF/RMRS-97-044, Revision 0, July.

RMRS, 1997, *Annual Update to the Historical Release Report*, Rocky Flats Environmental Technology Site, Golden, CO, September.

**PAC REFERENCE NUMBER: 800-179**

IHSS Reference Number: 179, OU 15

Unit Name: Building 865 Drum Storage Area

Approximate Location: N749,000; E2,084,000

Date(s) of Operation or Occurrence

1970 – 1998

Description of Operation or Occurrence

The Building 865 Drum Storage Area was first used in 1970 and was used as a RCRA 90-day accumulation area until late 1998 (exact date unknown). The storage area was in Room 145 and measured 12 feet by 8 feet. The maximum number of 55-gallon drums stored in the unit was 10. The drums were stored directly on a concrete floor with no berms or floor drains (DOE 1992).

Physical/Chemical Description of Constituents Released

The drums contained VOCs, beryllium, and radioactive waste. In the past, chlorinated solvents were also stored at this location. There have been no documented releases and, based on a visual inspection in November 1986, there was no visual evidence of spills (DOE 1992).

Responses to Operation or Occurrence

A review of the inspection records and Room 145 (IHSS 179) was completed on July 11, 2001. No documentation could be found regarding a release or spill from this accumulation area. Further, there was no evidence of staining on the concrete floor.

Fate of Constituents Released to Environment

This IHSS was studied in accordance with the IAG schedule for OU 15 (DOE 1995). No releases were identified; however, upon signing of the CAD/ROD for OU 15, IHSS 179 is called out as "deferred" until D&D operations begin (DOE 1995).

Action/No Further Action Recommendation

Based upon the review of inspection records, walkdown of the area, and interpretation of the regulations as stated in Comments below, no current or potential contaminant source can be identified in Room 145; therefore, consistent with criteria set forth in RFCA (DOE 1996), IHSS 179 is proposed for NFA.

84

## Comments

Requirements for 90-day accumulation areas under 6 Colorado Code of Regulations (CCR) 1007-3, Part 262.34 (a) state "In addition, such a generator is exempt from all the requirements in Subpart G of Part 265, except for 265.111 and 265.114, and from Part 266 of these regulations."

Under 265.111 it states that "The owner or operator must close the facility in a manner that: (a) minimizes the need for further maintenance, and (b) Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere, and (c) complies with the closure requirements of this subpart including, but not limited to, the requirements of sections..." These additional sections deal with the closure of tank systems, containment systems, incinerators, landfills, thermal treatment processes, or containment buildings.

IHSS 179 is above grade within Building 865 and considered part of the building "structure" to be removed under D&D programs. UBC 865 (potential contaminants under the building) remains scheduled for characterization sampling under the IA Sampling and Analysis Plan.

## References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1995, *Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures*, Rocky Flats Environmental Technology Site, Golden, CO, August.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

6 CCR 1007-3, Part 262.34 (a), Subpart G of Part 265, Part 265.111, Part 265.114, and from Part 266.

**PAC REFERENCE NUMBER: 800-180**

IHSS Reference Number: 180, OU 15

Unit Name: Building 883 Drum Storage Area

Approximate Location: N748,500; E2,084,000

Date(s) of Operation or Occurrence

1981 - 1998

Description of Operation or Occurrence

The Building 883 Drum Storage Area was first used in 1981 and continued its use as a RCRA 90-day accumulation area until late 1998 (exact date unknown). The storage area was in Room 104 and measured 16 feet by 10 feet. The maximum number of 55-gallon drums stored in the unit was 30. The drums were stored directly on a concrete floor with no berms or floor drains (DOE 1992).

Physical/Chemical Description of Constituents Released

The drums contained waste oils that were usually contaminated with solvents and uranium. Analytical results have indicated the presence of VOCs, beryllium, and radioactivity. There have been no documented releases and, based on a visual inspection in November 1986, there was no evidence of spills or leakage (DOE 1992).

Responses to Operation or Occurrence

A review of the inspection records and Room 104 (IHSS 180) was completed on July 11, 2001. No documentation could be found regarding a release or spill from this accumulation area. Further, there was no evidence of staining on the concrete floor.

Fate of Constituents Released to Environment

This IHSS was studied in accordance with the IAG schedule for OU 15. No releases were identified; however, upon signing of the CAD/ROD for OU 15, IHSS 180 is called out as "deferred" until D&D operations begin (DOE 1995).

Action/No Further Action Recommendation

Based upon the review of inspection records, walkdown of the area and interpretation of the regulations as stated in Comments below, no current or potential contaminant source can be identified in Room 104; therefore, consistent with criteria set forth in RFCA (DOE 1996), IHSS 180 is proposed for NFA.

## Comments

Requirements for 90-day accumulation areas under 6 CCR 1007-3, Part 262.34 (a) state "In addition, such a generator is exempt from all the requirements in Subpart G of Part 265, except for 265.111 and 265.114, and from Part 266 of these regulations."

Under 265.111 it states that "The owner or operator must close the facility in a manner that: (a) minimizes the need for further maintenance, and (b) Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere, and (c) complies with the closure requirements of this subpart including, but not limited to, the requirements of sections..." These additional sections deal with the closure of tank systems, containment systems, incinerators, landfills, thermal treatment processes, or containment buildings.

IHSS 180 is above grade within Building 883 and considered part of the building "structure" to be removed under D&D programs. UBC 883 (potential contaminants under the building) remains scheduled for characterization sampling under the IA Sampling and Analysis Plan.

## References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June.

DOE, 1995, *Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures*, Rocky Flats Environmental Technology Site, Golden, CO, August.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

6 CCR 1007-3, Part 262.34 (a), Subpart G of Part 265, Part 265.111, Part 265.114, and from Part 266.

**PAC REFERENCE NUMBER: 900-1308**

IHSS Reference Number: NA

Unit Name: Gasoline Spill Near Southeast Corner of B980

Approximate Location: N750,000; E2,087,000

Date(s) of Operation or Occurrence

November 22, 1993

Description of Operation or Occurrence  
(HRR Sixth Quarterly Update, January 1994)

At approximately 6:00 p.m., a garage employee was refueling a security vehicle near the southeastern corner of Building 980 when a gasoline spill occurred (Figure 2.12). Approximately 0.7 gallons of gasoline was released to the bed of the portable fuel truck and the underlying soil (DOE 1994).

Physical/Chemical Description of Constituents Released

Approximately ½ gallon of gasoline was released to the environment (i.e., soil).

Responses to Operation or Occurrence

A spill response was conducted on the same day of the occurrence and all of the wetted soil was excavated and placed into a black and white drum. Documentation regarding the amount of material removed from the site was not identified.

Several meetings were immediately held regarding fueling operations and it was determined that all portable fueling would be conducted within predetermined non-IHSS locations and specifically on concrete or asphalted surfaces. This plant practice remains in effect today at RFETS.

Fate of Constituents Released to Environment

The soil contents within the black and white drum were determined to be non-radioactive by on-site screening methods and transported to the plant garage (Building 331) for storage in a satellite collection area (DOE 1994).

### Action/No Further Action Recommendation

PAC 900-1308 was not proposed for NFA in the 1994 Quarterly Update to the HRR because the HRR reporting process for proposing NFA(s) was not in place. However, the information regarding this small spill has been reviewed and appropriately falls into the current guidance for a NFA-required site.

Based upon review of the original PAC narrative, walk-down of the area, and documentation that the ½ gallon of gasoline was physically remediated during spill cleanup, no current or potential contaminant source can be identified for this site. Therefore, PAC 900-1308 is proposed for NFA, consistent with criteria set forth in RFCA (DOE 1996).

### Comments

The area where this spill occurred is not within another IHSS, PAC, or UBC location.

### References

DOE, 1994, *Quarterly Update for the Historical Release Report, October 1, 1993 through January 1, 1994, January.*

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July.

**SECTION 3.0**

**OTHER SIGNIFICANT EVENTS  
(TO DATE)**

**Section 3.0** - This Section describes specific events, occurrences and projects that have taken place during the reporting period for this annual update. The event descriptions are brief summaries and may be useful for future projects and in support of the Sites closure.

### 3.1 - CDPHE Buffer Zone Contamination Report

#### Rocky Flats Response to Concerns:

This section was prepared by the Site to document agreements regarding all areas identified by the CDPHE Buffer Zone Report as being of possible environmental concern. This section provides background information regarding Site/CDPHE correspondence, a summary of the process for identification of historical release sites, and a proposed resolution for each "area" or "site" identified by CDPHE as potentially being of environmental concern.

Concerns for many of the sites were resolved at the January 10, 2001 meeting and agreements were reached to resolve concerns for all of the areas identified by CDPHE.

#### BACKGROUND

CDPHE released a report on their website entitled, Buffer Zone Contamination Review Technical Report, dated August 23, 1999 (BZ Report). The study was intended to be a review of information contained in various documents to ascertain whether additional potentially contaminated areas might exist in the BZ, beyond those areas that have currently been identified as Potential Areas of Concern (PACs) or Individual Hazardous Substance Sites (IHSSs). In the report, CDPHE identified 30 additional areas that may have possible environmental concerns and 6 currently identified areas that may have additional concerns. The report stated that identification of additional areas of possible concern does not necessarily mean that these newly identified areas contain contamination or that they are necessarily the result of unreported activities performed at Rocky Flats. Rather, these areas may be the result of natural events, or they may have been identified but the activities associated with these sites are not adequately documented at this time.

The Rocky Flats Site (Site) responded in a December 21, 1999 letter from Joe Legare of the U.S. Department of Energy (DOE) to Steve Gunderson and Steve Tarleton of CDPHE. An Assessment and Response to the CDPHE report was provided as an attachment to the letter. In the letter, DOE stated that the 36 areas were reviewed internally by comparing the information presented against other aerial photographs, Site knowledge, and documented sampling where available. Based on this review, the Site determined that 8 of the 36 areas identified by CDPHE either have work currently associated with them or will be followed up on in the future. The remaining 28 areas do not require further action.

On March 15, 2000, David Kruchek of CDPHE (CDPHE Representative) sent an email memorandum (March 15, 2000 memo) to Tom Greengard of the Site. The memorandum contained draft comments in response to the previous correspondence and was provided to help guide discussions at a meeting planned to discuss areas in the BZ that CDPHE and EPA still have questions about. The State and EPA had met previously to discuss the CDPHE report. The meeting was held January 10, 2001 as a technical meeting and included the review of aerial photographs. The purpose of the Site/CDPHE/EPA meeting was to reach agreement on all areas of potential concern. The agencies would like to be able to declare some areas of the BZ "clean" for all uses as a result of the review of the areas in the BZ.

### IDENTIFICATION OF HISTORICAL RELEASE SITES

The following discussion of the programs dedicated to identifying potential historical release sites at Rocky Flats is presented to summarize the comprehensive and in-depth effort that has gone into identifying potential releases at Rocky Flats over the last 15 to 30 years.

In responses to several of the findings, the Comprehensive Environmental Assessment and Response Program (CEARP) is referenced. The CEARP was the precursor to the Environmental Restoration Program within DOE, and was based on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. The CEARP comprehensively identified and evaluated actual and potential waste sites and contamination incidents including leaks and spills. The CEARP Phase I: Installation Assessment Report was released in April 1986. The Phase I Report focused on whether waste disposal practices or other operations resulted in environmental problems that require remedial action. The CEARP Phase I Report was based on a records search, open literature survey, employee interviews, preliminary assessments, and site inspections. The Phase I Report provided documentation for CERCLA pre-remedial activities including Federal Facility Site Discovery and Identification Findings, Preliminary Assessments, Site Inspections, and Hazard Ranking System evaluation. The Phase I investigations were performed by personnel of the Los Alamos National Laboratory (LANL) for DOE Albuquerque Operations. At the time, DOE-HQ and Albuquerque Operations were conducting environmental contamination assessments for all the weapons sites under their jurisdiction, which included Rocky Flats. DOE and Contractor personnel at Rocky Flats provided assistance, but not direction, to the LANL investigation.

As part of the records search, documents were reviewed and evaluated in the categories of environmental reports, management plans, monitoring reports, permits, operational records, standard operating procedures, appraisals, audits, inspections, special reports, historical documents, accident/incident investigation reports, and internal files. Key historical documents that were reviewed included "A Summary of Onsite Radioactive Waste Disposal" (Putzier 1970) and "Environmental Inventory: A Historical Summation

of Environmental Incidents Affecting Soils at or Near the USAEC Rocky Flats Plant” (Owen and Steward 1973).

Former and current Site employees with knowledge of Site operations were identified and screened to determine who should be interviewed. Eighty-four employees familiar with production, facilities, site services, research, waste management, and environmental operations were interviewed. These individuals were interviewed to identify waste disposal operations, past leaks or spills, and undocumented incidents or practices that could have resulted in environmental concerns. Information from the interviews covers the complete history of operations at the Site from 1951 through 1984 and is included in the CEARP Phase I Report.

In addition to the CEARP Installation Assessment Report, a Historical Release Report (HRR) was prepared in June 1992. The HRR was updated quarterly under the Interagency Agreement (IAG) until 1996. Since then, the HRR has been updated annually under the Rocky Flats Cleanup Agreement (RFCA). The purpose of the HRR is to report, summarize, and update existing and/or new information on incidents involving hazardous substances at Rocky Flats. The information in the HRR is used by EPA and CDPHE to determine whether sites potentially affected by incidents, known as PACs, IHSSs, and Under Building Contamination (UBC) Sites require or warrant further investigation and/or remediation. IHSSs are defined as individual locations where hazardous substances have come to be located at a discrete area within the Site.

Identification and characterization of hazardous material releases are determined by background research, comprehensive review of DOE and contractor files, interviews with current and former Site employees, review of photographs, and site inspections. Thousands of documents have been reviewed and several hundred employees have been interviewed as part of the HRR process. The HRR process has verified and augmented previous IHSS documentation, and identified potential new sites that may present an impact to human health and the environment.

The photographs and preliminary photographic interpretations of disturbed areas at Rocky Flats contained in the EPA Photo Report of 1988 were reviewed during the initial HRR investigations. The EPA Photo Report is cited extensively in, and is the basis of, the CDPHE BZ Report.

## RESOLUTION OF CONCERNS

In the following sections, CDPHE concerns and responses to those concerns have been summarized to facilitate final resolution of the concerns raised in the BZ Report.

Concerns for many of the sites were resolved at the January 10, 2001 meeting, and agreements were reached to resolve concerns for all of the areas identified by CDPHE. This document has been revised to resolve concerns for all of the sites as agreed at the January

10, 2001 meeting. Refer to the meeting minutes for the resolution of concerns and agreements for each site.

**SITE #1** - Disturbed ground immediately southeast of the Industrial Area (IA) identified as the former small arms range (see CDPHE Buffer Zone Report, Appendix 2, #1 and 64)

**Resolution:** This site is the Old Firing Range. It has been designated as a new PAC, number SE-1602. It is addressed in the 1999 Annual Update to the HRR.

**SITE #2** - Disturbed ground northwest of the IA, an apparent ranch site, possible trenches and an area along the hillside near the creek to the southwest of the ranch (see BZ Report, Appendix 2, #4,41 and 49). This area is reported to have been utilized as a practice site for various activities including small arms target practice and possibly for disposal activities.

**December 1999 Site Response:** These disturbed areas are located on the Lindsay Ranch. The ranch site was inspected by Nick Demos and Tom Greengard on November 17, 1999. All areas appear to be associated with Ranch operations, scouring and slumping features, or different vegetation. These features are observable on the air photos. No information of a spill or environmental release exists. No additional study of this area is planned.

After reviewing the Site response of December 1999, CDPHE (March 15, 2000 memo) has requested documentation of exercises and training activities that have been conducted at the Ranch. The CDPHE Representative is concerned with undue risks to visitors and the environment from past small arms target practice. He has requested sufficient information to determine its environmental condition, whether the site should be identified as a PAC, and whether sampling for metals and possibly explosives is necessary. The documentation should include information regarding all of the specific areas identified at the site, specifically the disturbed area along the stream bank to the southwest of the barn (see 1971 photo, Figure 6 of the EPA 1988 Photo Report (Photo Report), referenced in Appendix 2, #49 of the CDPHE Buffer Zone Report).

**Additional Discussion:** Interviews were conducted with Wackenhut security personnel to obtain information on security training at the Ranch site. Occurrence's of live fire were reported once in approximately 1974 and once in 1983 or 1984. No indications of previous firing events were reported or had been heard of by one of the security officers who has been at Rocky Flats since 1970. He indicated he had substantial contact with officers who had been at the Site since 1951. Before 1970, shooting was reported to have been mostly on the East Firing Range. Several weapons were fired in the 1970s training exercise. Shooting was conducted from the south hillside overlooking the Ranch buildings toward the farmhouse and barn. One of the officers interviewed was in charge of exercises for the "special response team." They conducted a live fire exercise once at the Ranch house in 1983 or 1984. This exercise included the use of small arms, tear gas,

and concussion grenades. Many training exercises to test security were conducted in the vicinity of Lindsay Ranch. Most exercises did not use live fire or explosives. All cleaning of weapons was conducted at the Security building on Plantsite. Several exercises have been conducted using the Multiple Integrated Laser Engagement System (MILES). These exercises used lasers and blanks, not live fire. Many vehicles have been used for Plant security, including tracked and wheeled vehicles. Restrictions on travel in the Buffer Zone have been in place since the early 1990s. There have been no known leaks or spills from security exercises in the vicinity of the Ranch or surrounding property. No fueling operations were conducted at the Ranch.

No information of a spill or environmental release exists, including interviews and information provided in CEARP, the HRR, and other historical reports. Inspection of the Ranch indicates that all disturbed areas referenced by CDPHE appear to be associated with Ranch operations, scouring and slumping features, or different vegetation (predominantly cattails).

**Resolution:** An Integrated Work Control Package (IWCP) work package has been prepared to perform general housekeeping in the BZ. Cleanup tasks are scheduled for FY 2002. The Lindsay Ranch area will include general "non-ranch" related housekeeping, which will include collection of spent rifle and shotgun casings associated with the above-mentioned Plant security exercises.

**SITE #3** - Disturbed areas southwest of B881 (see BZ Report, Appendix 2, #10 and 30), west of OU 1 between OU 1 and IHSS 115, and north of the South Interceptor Ditch (SID). Possible outfalls from B881 or other sources and a possible retention pond are indicated in Figure 2 of the Photo Report.

**December 1999 Site Response:** The disturbed areas appear to be erosion and slump features from three runoff areas from the B850 area, a large slump associated with construction of the SID, and drilling and sampling for OU 1 investigations. No evidence for a pond structure was observed. Extensive sampling and analysis data exist from OU 1 studies conducted from 1986 to 1999. A Corrective Action Decision/Record of Decision (CAD/ROD) for OU 1 was signed in 1997 and amended in 2000. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) does not believe the area was adequately investigated as part of OU 1 and he thinks a determination of possible contamination needs to be performed, possibly including sample collection and analysis. Documentation needs to be provided if sampling has previously been conducted.

**Additional Discussion:** The outfalls referenced in the EPA Photo Report can be seen on the 1955 photo. The areas are engineered drainage structures for runoff control from the parking lot and steep hillslope. The structures were located on Site Utility Plans, Drawing No. 1550D-53-M. They were designed as 12-inch corrugated metal pipe (CMP)

with concrete shutes. No information of a spill or environmental release exists, including interviews and information provided in the CEARP, HRR, and other historical reports. There was no reason to sample these areas as part of OU 1 remedial investigations and they were not investigated.

Two maps were presented at the January 10, 2001 meeting: (1) Surface Soil and Sediment Sampling Locations dated 9/17/97, RMRS Map ID 97-0111-88, and (2) Aerial Distribution of Pu-239, 240 Activity in Surface Soils dated 3/18/99, Map ID 98-0215. The maps showed that soil and sediment concentrations for radionuclides are below Tier II levels in this area. CDPHE indicated they had no surface water concerns based on the information presented. As agreed in the meeting, the data were reviewed and concentrations were at background levels.

**Resolution:** No further investigation of this site.

**SITE #4** - Disturbed ground in the southeast area of the IA and north of IHSS 119.1 and OU 1 (see BZ Report, Appendix 2, #16). May have been filled in by 1964 (see Photo Report, Figures 2 and 3).

**December 1999 Site Response:** The disturbed area is believed to result from extensive drilling activities during the 1980s. Extensive sampling and analysis data exist from OU 1 studies conducted from 1986 to 1999. A CAD/ROD for OU 1 was signed in 1997 and amended in 2000. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) thinks the area may have been a disposal site and was not investigated as part of OU 1 and needs a determination of possible contamination, possibly including sampling and analysis. Documentation needs to be provided if sampling has previously been conducted.

**Additional Discussion:** A disturbed area is visible in 1953 and 1955 photos. It does not appear to be a disposal site. The reason for the disturbance is not clear; it may have been used for vehicle parking or equipment storage. No use could be determined from the photos. It could not be determined whether the area existed prior to construction of Rocky Flats based on a review of a 1937 photo. The area was inspected and is currently under the Contractor Yard. It appears to be directly under or just south of T891C. No information of a spill or environmental release exists including interviews and information provided in the CEARP, HRR, and other historical reports. There was no reason to sample this area as part of OU 1 remedial investigations and it was not sampled. A CAD/ROD for OU 1 was signed in 1997 and amended in 2000.

As discussed in the January 10, 2001, meeting, existing historical analytical data (56 sampling locations total) exist in the area of concern (AOC). The data have been assessed and no contamination was identified in the "contractors yard" for organics,

inorganics, or radionuclides. Sampling events were conducted in support of the following projects:

- Installation of the 891 Trailers Waterline, February 1994;
- Construction of the 891 Decontamination Water Annex, October 1994;
- Equipment Removal, August 1996; and
- Characterization of the Contractors Yard (44 Sampling Locations), March 1994.

**Resolution:** No further investigation of this site.

**SITE #5** - Disturbed area southeast of the IA and just north of the small arms range (see BZ Report, Appendix 2, #19 and 47, and Photo Report, Figure 3 and later photos).

**December 1999 Site Response:** This site is known as the concrete wash area and was used by cement trucks during construction of Buildings 130 and 460 in the 1980s.

**Additional Discussion:** The site is within IHSS 155. The area is surrounded by surface soils exceeding Tier II ALs (Als) as presented in the Characterization Report for the 903 Drum Storage Area, Lip Area and Americium Zone (DOE 2000). Therefore, surface soil underlying the concrete is assumed to also exceed Tier II ALs.

**Resolution:** The site is within IHSS 155 and will be addressed as part of the 903 Lip Area action.

**SITE #6** - Disturbed area east of IHSS 111.3 in the area of the East Spray Field (IHSS 216.3) south of the East Access Road and just east of the small arms range (see BZ Report, Appendix 2, #8, 9, 20, 48, and Figures 3 and 5 of the Photo Report). Disturbances appear between 1964 and 1978.

**December 1999 Site Response:** The disturbed area is believed to result from construction activities. There are no reports of spills, releases, or waste disposal activities in this area other than the East Trenches and East Spray Field operations. The area was sampled during OU 2 remedial investigations. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) feels that sampling in the area was insufficient to characterize the area and materials, and that the area was not specifically sampled as part of OU 2 investigations. A determination of possible contamination is needed, which may include sampling and analysis.

98

**Additional Discussion:** Boreholes 10691, 10791, 10891, and 11191A and wells were drilled in the area during remedial investigations (Final OU 2 RI Report, 1995, Figure 2.1-1).

**Resolution:** The area will be investigated as part of Buffer Zone IHSS Group NE/NW as stated in the draft BZ SAP, FY02, Addendum.

**SITE #7** - Disturbed area northwest of the IA, south of the Present Landfill (IHSS 114) and west of IHSS 166.2 (see BZ Report, Appendix 2, #42 and Photo Report, Figures 5 and 6).

**December 1999 Site Response:** The area has been identified as resulting from heavy construction traffic associated with the Landfill, PU&D Yard and general equipment storage area. There are no records of any spills, releases, or disposal activities in this area. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) has requested documentation such as old work documents, worker interviews, photographs and any data collected from previous investigations. An investigation to determine possible contamination may be necessary if no documentation is available.

**Additional Discussion:** This area is not present on the 1964 photo, but it is present on 1969 and 1971 photos (Figures 5 and 6). Landfill operations started in August, 1968. It could be a storage area or fill from landfill excavation. It appears to be present before the storage area visible on later (1978) photos. The storage area appeared between 1971 and 1978. There is no indication the area was ever sampled. The PU&D Yard and associated IHSSs (170 and 174a) were in operation from 1974 to 1994, after the period of interest. No information of a spill or environmental release exists including interviews and information provided in the CEARP, HRR, and other historical reports.

**Resolution:** Site #7 will be investigated using methodology presented in the BZ Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

**SITE #8** - Disturbed area, possibly trenches, south of the Present Landfill (IHSS 114) and east of IHSS 170 (see BZ Report, Appendix 2, #54 and Photo Report, Figure 6).

**December 1999 Site Response:** There is no record of a spill, release, or disposal activity at this location. The disturbed area is most likely a result of landfill operations. If determined to be part of IHSS 114, the area will be addressed as part of the CAD/ROD and final closure of the Landfill. Otherwise, no additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responds that the area may be within the IHSS 114 boundary although the trenches identified on Figure 6 do not appear to be located within the boundary. An investigation to determine possible contamination may be necessary if no analytical data specific to these "trenches" is available.

**Additional Discussion:** The site is alongside Site #7 to the west. The site appears to be outside the IHSS 114 boundary in an area of open storage (see May 1986 photo, Figure 10). It appears to be present before the storage area visible on later photos. Although the site is in the middle of the PU&D Yard VOC plume, it does not appear to be contributing to that plume. No information of a spill or environmental release exists including interviews and information provided in CEARP, HRR and other historical reports.

**Resolution:** Site #8 will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

**SITE #9** - Disturbed ground southwest of the Present Landfill (IHSS 114) and east of IHSS 170 (see BZ Report, Appendix 2, #54 and Photo Report, Figures 7-10, 13). Identified by the Photo Report as "open storage" with an area of "standing liquid." The site was in use as of July 17, 1978 (see Photo Report, Figure 7). The BZ Report states that contamination may have been released.

**December 1999 Site Response:** The site is part of the new PU&D Yard storage area. There are no records of any spills, releases or waste disposal activities at this site. There are no records of storage of hazardous wastes or any wastes at this site. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) requests documentation indicating site use plus sampling data if available. Otherwise, an investigation to determine possible contamination may be necessary.

**Additional Discussion:** This site (storage area) is in the same area as Sites #7 (disturbed ground) and #8 (possible trenches). See discussions under "Resolution" of Sites #7 and 8. There is no Figure 13 in the Site's copy of the EPA Photo Report. The new PU&D Yard was used to store excess equipment. No information of a spill or environmental release exists, including interviews and information provided in CEARP, HRR, and other historical reports.

**Resolution:** Site #9 will be investigated using methodology presented in the BZ SAP. Results will be reported in the HRR.

**SITE #10** - Disturbed area west of the IA and IHSS 170 (see BZ Report, Appendix 2, #53 and Photo Report, Figures 7-10, 12, 13). The Photo Report identified the area as a "probable oil burn facility." Site inspection indicated a possible cement batch plant rather than an oil burn area. There may be disposal concerns.

**December 1999 Site Response:** The area is the former concrete batching plant. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) feels that the "vent" (see Photo Report, Figure 8) needs to be explained and documentation of the operations at this site provided with results of sampling, if any was performed. Otherwise, an investigation to determine possible contamination may be necessary.

**Additional Discussion:** The area is known to be a former concrete batching plant. The "vent" was only one photo-interpreter's opinion. All air photo interpretations are verified by "on the ground" evaluation whenever possible. The "vent" interpretation should be disregarded based on actual knowledge of the site's use. Inspection of the site by the CDPHE Representative (see BZ Report, Site #10) indicated a possible cement batch plant rather than an oil burn area. No information of a burn, spill, disposal activity, or environmental release exists, including interviews and information provided in the CEARP, HRR, and other historical reports. There is no Figure 13 in the Site's copy of the EPA Photo Report.

As discussed in the January 10, 2001 meeting, the area of concern has been identified as the Concrete Batching Plant by Kaiser-Hill Construction Management (Excavation Specialist). Reference to the "vent" on the aerial photograph is the approximate location of large diesel motors associated with the concrete mixers.

**Resolution:** No further investigation of this site.

**SITE #11** - Small arms range northeast of IA, south of IHSS 142.1 (see BZ Report, Appendix 2, #69). The site should be identified as an IHSS or PAC and may need to be investigated when out of service. Potential contaminants include metals and possibly explosives and solvents.

**December 1999 Site Response:** The site is the existing Firing Range. It will be decommissioned in accordance with RFCA and the Decommissioning Program Plan (DPP). The facility will go through the Reconnaissance Level Characterization process and be identified as a Type 1 or Type 2 building, based on the presence or absence of contamination. Lead contamination in the berm will be removed as part of the deactivation or Decontamination and Decommissioning (D&D) of the facility. The D&D process will address the potential for facility contamination and Environmental

Restoration (ER) will evaluate the potential for environmental contamination. The site will not be designated as a PAC because the berm is considered a facility and will be decontaminated and decommissioned through the D&D process.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) understands that any buildings will be decommissioned according to D&D protocols and any environmental contamination will be addressed by ER. He concludes that environmental concerns may exist at this site and it needs to be designated as a PAC for appropriate investigation.

**Additional Discussion:** The new firing range will be reported as a new PAC (NW-1505) in the 2001 Annual Update to the HRR. The building and berm will be decontaminated and decommissioned through the D&D process. As part of the D&D process, samples will be collected to verify that lead concentrations do not exceed the appropriate standards.

**Resolution:** The site has been designated as PAC NW-1505. Additional characterization will be conducted under the BZ SAP and BZ SAP Addendum, which includes PAC NW-1505.

**SITE #12** - A small retention pond northeast of the IA and south of IHSS 142.1 (see BZ Report, Appendix 2, #74 and Photo Report, Figure 3). The source of the water for the pond may be the northeastern part of the IA, east of the Solar Ponds. Contaminants may have accumulated in the pond and need to be evaluated.

**December 1999 Site Response:** Inspection of the site on November 17, 1999 and a 1969 air photo confirm that a pond may have existed at this location in a depression likely caused by the nearby roads. The depression collects water seasonally during large storm events. Sampling of influent and effluent water has been conducted at SW092 and SW091. Soil/sediment data have not been located. No VOC detections have been reported in surface water samples. Soil/sediment within the depression will be sampled "ad hoc" under the Integrated Monitoring Plan (IMP).

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like to participate in defining when, where, number of samples, depths, and analytes. He would like to see documentation describing the sampling actions to be implemented including the site's inclusion in the IMP.

**Resolution:** Soil/sediment within the depression will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

102

**SITE #13** - Disturbed areas south-southeast of the IA, south of Woman Creek and west of IHSS 209 (see BZ Report, Appendix 2, #6 and Photo Report, Figure 2). A possible location for a tower, not necessarily an environmental concern but needs to be documented.

**December 1999 Site Response:** An interview on November 9, 1999 substantiated that an air monitoring tower was planned at this location, but the site was rejected for unknown reasons. A grass fire also altered vegetation.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like to see documentation, including interview notes.

**Additional Discussion:** The site is not identified on Figure 2. The site was identified by CDPHE at the January 10, 2001 meeting. The site was planned to be the location of a radio tower installation. The radio tower was never installed. The disturbance was investigated as part of the OU 5 Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remediation Investigation (RFI/RI) and discussed in the RFI/RI Report (April 1996). The area has been revegetated.

**Resolution:** No further investigation of this site.

**SITE #14** - Disturbed area west of the IA, north of IHSS 133.5 and the West Access Road (see BZ Report, Appendix 2, #7 and #39, and Photo Report, Figures 1 and 2). May not be an environmental concern but needs to be evaluated or documented.

**December 1999 Site Response:** Uneven ground where the 130 Trailer Complex now exists, soil appears to have been brought to the area at one time. Possibly, it was an early construction area for the trailers. Site personnel walked down the area on November 17, 1999. No information was found as to where the soil came from. One interviewee suggested it was from construction of B130 or B131. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) indicates that the ground was disturbed prior to 1955 (see Figures 1 and 2). Therefore, it predated any construction activities associated with the 130 buildings or trailers, which are northeast of this site. The site appears to be related to activity immediately south of the west entrance road, which is the Ash Pit area. The CDPHE Representative wants the site added to the Ash Pit investigation.

**Additional Discussion:** The site can be observed on 1953 and 1955 air photos. The T130 Trailer Complex was constructed in 1989-1990. The site appears to be the location of the concrete wash pad, which may have been used as early as 1953, based on ground disturbance observed on air photos and the discussion in the HRR (1992). The

103

incinerator was in operation starting in 1952 and the ash pits are reported to have been in use starting around 1959. The dates of operation for the incinerator and ash pits are provided so that air photos can be reviewed with that knowledge. The site was inspected and concrete work appears to have been conducted on both sides of the current road. The cement dump area is readily observed across the road to the south and spills over the hillside. No information of a burn, spill, disposal activity or environmental release exists, including interviews and information provided in the CEARP, HRR, and other historical reports.

**Resolution:** No further investigation will be performed on the north side of the main road. The area south of the road will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

**SITE #15** - Disturbed area west of the IA, north of Walnut Creek and IHSS 168 (see BZ Report, Appendix 2, #14, and Photo Report, Figures 1 and 2). It may be related to ditch construction or operation and may not be an environmental concern, but needs to be evaluated or documented.

**December 1999 Site Response:** The area is believed to result from ditch cleaning by the City of Broomfield. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like to see documentation.

**Additional Discussion:** This site could not be definitively located in the Photo Report and was not indicated as a possible site on the EPA photographs. The site believed to be referenced is thought to be the Church Ditch or possibly the McKay Ditch. Soil disturbance reports are written frequently for the City of Broomfield for the Church Ditch. The site is one of the ditches that do not belong to the U.S. Government.

**Resolution:** No further investigation of this site.

**SITE #16** - Elongated disturbed area, east of the IA, possibly a ditch or pipeline running east-northeast from approximately IHSS 113 (Mound Site), between IHSS 110/111 and IHSS 111.8/111.7 to the northeast along the top of the hillside south of Walnut Creek (see BZ Report, Appendix 2, #15). It appears to be an extension of older activity from the west. It may not be an environmental concern but needs to be evaluated or documented.

**December 1999 Site Response:** There is a ditch in the area and a scar from utility installation to the East Guard Gate (B920). There is also an old narrow gauge railroad grade in that area. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responds that the state, given previous activities along the railroad grade (see Photo Report, Figure 2 dated 1955), would like to see documentation of what caused the disturbances. Otherwise, the site may need to be identified as a PAC and investigated to determine possible contamination.

**Additional Discussion:** It is not known what previous activities along the railroad grade are referred to. The Denver Utah & Pacific Railroad was constructed across what eventually became the Rocky Flats Plant site in the 1880s (see articles, photos and map in Endvision, September 11 and September 25, 2000 editions). The site referenced in the 1955 photo (Photo Report, Figure 2) is not visible in the 1964 photo. This linear site could be a road. It looks like a road in the 1953 photo. The East Access Road was constructed in 1964. It could have been a security road. It appears to be along the current security road on the diagonal north of Trench T-1. The site was inspected and the elongated area referenced in the concern appears to be the old railroad grade. There are a number of possibilities as to what is in the 1955 photo. However, no information of a burn, spill, disposal activity or environmental release exists, including interviews and information provided in the CEARP, HRR, and other historical reports.

As discussed at the January 10, 2001, meeting, the State's concern is that the area bisects the East Trenches, specifically Trenches T-3 (IHSS 110) and T-4 (IHSS 111.1) to the north of the linear feature and Trenches T-11 (IHSS 111.8) and T-10 (IHSS 111.7) to the south. No samples were collected between the trenches according to the OU 2 RI Report dated April 1995.

**Resolution:** Samples will be collected in the AOC as part of the investigations for IHSS Group NE/NW.

**SITE #17** - A structure, possibly a home site, southeast of the IA and immediately northeast of IHSS 142.11 (see BZ Report, Appendix 2, #21 and Photo Report, Figures 3, 5, and 6). The structures appear to have been removed and the area modified during construction of the dam on Woman Creek. This site is unlikely to be a concern but it should be evaluated or documented.

**December 1999 Site Response:** No evidence of a homesite was observed on historical photos. The property was procured by the U.S. Government in 1976. There were three previous owners and historical records indicate the property was used for ranching.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responded that because no site activities occurred at this location and the Government acquired the property in 1976, the State will accept the "letter" (Legare to Gunderson and Tarleton, December 21, 1999) as documentation of the site condition.

**Resolution:** No further investigation of this site.

**SITE #18** - A possible home site, southeast of the IA and south of IHSS 142.11 (see BZ Report, Appendix 2, #22). The structures appear to have been cleared and the area modified during construction of the dam on Woman Creek. This site is unlikely to be a concern but it should be evaluated or documented.

**December 1999 Site Response:** There is evidence of a structure, possibly a home site, on photos from 1969. The railroad owned the land in 1897. It was bought by K. Church in 1915 and sold to the U.S. Government in 1974. Historical records indicate the property was used for ranching.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responded that because no site activities occurred at this location and the Government acquired the property in 1974, the State will accept the "letter" (Legare to Gunderson and Tarleton, December 21, 1999) as documentation of the site condition.

**Resolution:** No further investigation of this site.

**SITE #19** - Possible ash disposal pile or waste cement disposal area southwest of IA and west of IHSS 133.5 (see BZ Report, Appendix 2, #36).

**December 1999 Site Response:** This area is known to have been used as a concrete wash area and cement trucks routinely used it during construction of B460 in the early 1980s. Soil conditions underlying the concrete pour areas and the potential removal of all concrete debris will be addressed during the remedial action for the ash pits.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like documentation in the form of an addition or modification to the HRR that this area will be addressed with the Ash Pits.

**Additional Discussion:** The site is within the Ash Pit area. The concern identifies possible ash disposal or waste cement disposal areas west of IHSS 133.5. The boundaries of IHSSs 133.5 and 133.6 were extended based on information developed as part of the HRR (June 1992) subsequent to publication of the EPA Photo Report (July 1988). This area is within the Ash Pits and was investigated with results reported in the Final Phase I RFI/RI Report for Woman Creek Priority Drainage, OU 5 (April 1996). The EPA Photo Report was reviewed as part of the investigation. Nothing was found at the location west of IHSS 133.5 noted by the EPA Photo Report (Figure 4). The other locations noted on figure 4 are within the extended boundaries of IHSSs 133.5 and 133.6 or adjacent to, and in between, these IHSSs. The area was identified by field inspection as rubble piles in the RI Report.

**Resolution:** The site will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

**SITE #20** - Numerous disturbed spots west and northwest of the IA, and north and east of IHSS 168, possibly prairie dog mounds (see BZ Report, Appendix 2, #31 and 40). An evaluation should be performed.

**December 1999 Site Response:** These mounds can be seen in 1937 air photos prior to construction of Rocky Flats. Conjecture concerning the spots includes teepee rings from migrating Indian tribes, giant ant hills, prairie dog communities, and mima mounds. Mima mounds result from geomorphic processes such as solational weathering and freeze-thaw actions. They have been observed in Mira Mesa, California, and in Washington State. No further investigation is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) agrees that these surface scars appear to be caused by natural processes but that physical aspects of these features do not seem to fit the definition of mima mounds. He would like an interpretation by a "qualified expert," as well as an explanation of the apparent paths into these areas.

**Additional Discussion:** Photos from 1937 to 1987 were analyzed (July 1937 Photo, EPA Photo Report Figures 1, 2, 3, 4, 6, 7, 8, 9, and 10 and Plant Photo 37358, October 1987). The spots appear dark on photos from spring and early summer and light-colored on photos taken in late summer and fall. The EPA Photo Report indicated that these spots "may be natural rather than man-made, prairie dog homes." The spots can be seen in photos prior to construction of Rocky Flats. There is no reason to believe that these spots, and the pattern of spots, are other than natural. Marcia Murdock, the Site's Senior Ecologist, was consulted and prepared the discussion below.

"Once I was able to inspect the photos in question, it was quite obvious that the disturbances referred to at "Site #20" were part of a black-tailed prairie dog (*Cynomys ludovicianus*) colony. Prairie dog mounds are very distinctive in aerial photographs; they show up virtually white compared to surrounding ground because they are kept devoid of any vegetation by the prairie dogs (removal of visual barriers), and are randomly spaced, large roundish structures. The mounds typically cluster sporadically, a manifestation of the extended-family social structure of the species.

Interestingly, the "Site #20" colony started in the vicinity of the gravel mine near the present West Gate of the Site in the early part of the 1960s, and gradually moved to the northwest. By 1969, some of the early burrow mounds had been abandoned, and were reclaimed by vegetation. The abandoned mounds showed visual characteristics very similar to the curious roundish patches of vegetation/surficial anomalies that I described as "burrow mounds" in my first email. While inspecting photos covering a period of about 50 years, I have found that these same anomalies are present throughout the entire extent of the Rocky Flats Alluvium deposit - on and off the Site - and they are even evident in surrounding hillside areas as well, albeit very much less distinct. I'll discuss

107

that in greater detail later. The time series of photos I was eventually able to find clearly showed the migration of the "Site #20" colony to the northwest, along the alluvial pediment. Out of curiosity, I inspected older and younger photos to see where prairie dog colonies had existed over time. The last photographic record that shows evidence of the colony in question was in 1972, when the outer Buffer Zone was acquired. This photo shows active prairie dog mounds just northwest of the 130 Trailers, and northeast of the New Landfill. By 1980 the most recently built prairie dog mounds around "Site #20" were still identifiable, but revegetated. The town was not active.

All these older photos that were of good quality and sufficient photographic resolution showed the same vegetation/surficial anomalies that I have ascribed to the burrow mounds. As I compared photos from different times, I was able to identify some of these burrow mounds in very close proximity to where prairie dog mounds appeared on other photos of different ages. To my eye, many of these appeared to be nearly identical in position and shape to the original prairie dog mound disturbance. On the 1960s photos in question, I was able to locate some prairie dog mounds that were close to some specific topographical features just northeast of the New Landfill on the Site. After marking these down, I was able to find corresponding present-day burrow mounds in the field. Some of these mounds appeared to have current small mammal use, others did not. I plan to visit these again soon, now that I have recently observed "housekeeping" activities within similar mounds along my normal survey transects. The housekeeping activity I have observed over the past month appears to be mostly the responsibility of thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*) that would be emerging from hibernation about now. Some of the burrow activity is also the distinctive runways of voles (probably prairie voles). In one location I have observed activity that might actually be from northern pocket gophers (*Thomomys talpoides*). This question has continued to pique the interest of Site ecologists, and this field season we will be investigating which small mammals are currently present in the vicinity of selected burrow mounds. By fall, we hope to have a better defined species list of the present occupants of the burrow mound areas.

Other photos over time, showing a wide area surrounding the Site, provide evidence of prairie dog colonies appearing and disappearing over the whole area - inside the Site boundaries and out in surrounding areas. Some of the photos taken early in the last decade show prairie dog colonies where the Site ecologists monitored colonies in the early 1990s, which presently stand empty. During the early 1990s, in conjunction with studies conducted on the Standley Lake eagles as they established their nesting territory, the Colorado Division of Wildlife, U.S. Fish and Wildlife Service, and Rocky Flats collaborated on a prairie dog mapping effort. During that effort we used aerial photos to identify active prairie dog colonies and to plan our monitoring strategy. At that time the colonies spread over a large area to the east and north of Rocky Flats, and several areas on the Site as well. When the plague swept through, many of the colonies were wiped out. At about the same time, a large portion of the Rock Creek super-colony was eliminated through poisoning, in preparation for the large scale expansion of the Rock Creek Subdivision and Interlochen site expansion. More recently, recovering colonies

adjacent to the Site's south boundary (north of Hwy 72) were poisoned, and few individuals survive there. The Site's "Hwy. 128 Prairie Dog Town" has started to reestablish, but is not yet recovered to its pre-1994 population.

In the interest of establishing any historical memory of prairie dog colonies on the Site in the early years, I started an interview effort. It has taken some time to find a few of the "old-timers", but I was eventually able to find a few who remembered things about prairie dogs. One of the oldest men I spoke with had run cattle on the old Church holdings, along with the Churches and several of the other original landowners. He mentioned one incident when a man and his son had come out to the grazing area to shoot prairie dogs, and had apparently had some success. He saw the man several days later, and the man said his son was in the hospital very ill with an unknown ailment. The rancher told him to rush back to the hospital and have his son and himself checked for plague! He did, and his son was saved. Apparently they had plague in the colonies in the late 40s when this occurred. It turned out that the son had handled a dead prairie dog, and had indeed contracted plague. He mentioned that the plague would sweep through about every decade to 15 years, and wipe out the colonies, then they would slowly build back up. We are presently experiencing a recovery period after the plague passed through our area in 1994. Apparently little has changed with that disease dynamic.

Another old-timer who started work out here in the mid-1960s recalled that the buildings and grounds crews had been tasked with a prairie dog removal and relocation project not long after he started work here (probably about 1965-67). Because this prairie dog removal effort was going on during the same time frame that the photos in question were taken, the vehicle tracks that can be seen among the prairie dog burrows are not unexpected. It takes considerable time and effort to catch all the prairie dogs in a colony, and the effort, if they were live-trapping, could have gone on for some time. Some of the prairie dogs were relocated off the Site near the Church Ranch headquarters (the best I can determine is that may have been near the present Rocky Flats Lake), and they set up housekeeping in a place the ranchers didn't want them. Plant personnel were dispatched to capture them and move them yet again. Photos of the Site from 1964 through 1972 show colonies in the area to the west and northwest of the present day 130 trailer complex (including within the New Landfill), and in the northeast part of the outer Buffer Zone near Indiana Street (in the area of the McKay Bypass Pipeline). Later photos from the early 1980s show the "Hwy. 128 Prairie Dog Town" in place.

In a recent literature review, I have run across one 1960s research project that actually studied differences in vegetation between the burrow mounds of the Rocky Flats Alluvium, the surrounding undisturbed alluvial plain, and hillside soils of the terminal alluvial abutments where the soils have been re-sorted, and are less rocky. This research project identified these anomalous structures as "pebble mounds", and found that northern pocket gophers were closely associated with them at that time. The authors noted that the gophers appeared to be responsible for significant turnover of the soils in these mounds. The study identified significant differences between the pebble mound vegetation and the surrounding alluvial plain vegetation. One species they noted

specifically was cheatgrass (*Bromus sp.*), which still appears on the pebble mounds today. (Branson, F.A., Miller, R.F., and I.S. McQueen. Plant communities and soil moisture relationships near Denver, Colorado. 1965. Ecology. Vol 46 (3), pp 311-319.) At present, northern pocket gophers are uncommon at the Site, but other papers written regarding 1970s studies at Rocky Flats referred to apparently fairly high gopher populations at that time. (One paper described direct counts of gopher mounds: Terrol F. Winsor and F. Ward Whicker. Pocket gophers and redistribution of plutonium in soil. August, 1980. Health Physics, Pergamon Press. Vol. 39, pp. 257-262.) As with many small populations, pocket gophers exhibit cyclic population increases and crashes, so this species may presently be in recovery in the vicinity of the Site.

After considering all this information, it appears that the origination of these burrow mounds may have centered around abandoned prairie dog mounds. The soils of the prairie dog mounds would have been loose, and easy for smaller burrowing mammals to take advantage of. With the smaller rodents such as the thirteen-lined ground squirrels and northern pocket gophers able to keep the burrow mound soils loose, other species such as prairie voles (*Microtus ochrogaster*), deer mice (*Peromyscus maniculatus*), and silky pocket mice (*Perognathus flavus*) can also burrow and contribute to soil loosening and turnover by their smaller contributions. The origins and placement of the mounds may well indeed be due to historic prairie dog mounds, but the smaller residents keep these areas disturbed in the absence of the larger burrowers.

On May 30, 2001, a tour of the "circular features" in the BZ was conducted for CDPHE, EPA, and the U.S. Fish and Wildlife Service. Attendees included Carl Spreng and David Kruchek of CDPHE and Gary Kleeman, Jean Lillich, and Tim Rehder of EPA. Marcia Murdock identified several of the features in the field and described the processes involved in their formation. These features are small mounds 8 to 18 inches high and up to 20 feet across. They are found all over the general area, including numerous areas offsite. The features are most likely the result of prairie dog activity in the past and probably represent the excavated material caused during burrowing of the tunnels and living quarters. The prairie dogs have died off, potentially from plague, and other smaller rodents that are not able to move the amount of rocks and soil that prairie dogs are capable of removing have reoccupied the burrow areas. As a result of the discontinued maintenance (vegetation clipping) by prairie dogs, the mounds have become overgrown and are now covered with the types of vegetation indicative of disturbed ground.

The difference in these mounds between the Rocky Flats Alluvium and the softer, less rocky colluvium was noted. The mounds are more pronounced on the Rocky Flats Alluvium because the excavated rocky material protects the mounds from erosion.

Various active burrows were noted on some of the mounds. However, it was clear from the type of freshly excavated material that the animal inhabiting the newer (refurbished) burrows was not capable of removing a large quantity of rocky material.

Representatives of the agencies agreed in conversations at the end of the tour that no action is necessary for these natural features.

**Resolution:** No further investigation of this site.

**SITE #21** - Two areas of disturbed ground southwest of the IA, west of IHSS 133.5, south of the raw water detention pond and the West Access Road (see BZ Report, Appendix 2, #37). These areas may not be associated with disposal activities but need to be evaluated or documented.

**December 1999 Site Response:** Interviews conducted on November 8, 1999 identified the disturbances as soil and rubble "push-off" from the grading of the present dirt road in the area. The areas were inspected on November 17, 1999 and found to be piles of large cobble stones. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like to see copies of the interviews and the inspection report.

**Additional Discussion:** Agreement on this site was made in the January 10, 2001 meeting regarding details of the interviews with the Kaiser-Hill Construction Management (Excavation Specialist). There are no further details available. As reported in the December 1999 Site Response, interviews with the Kaiser-Hill Construction Management (Excavation Specialist) conducted on November 8, 1999 identified the disturbances as soil and rubble "push-off" from the grading of the present dirt road in the area. The areas were inspected on November 17, 1999 and found to be piles of large cobble stones.

**Resolution:** No further investigation of this site.

**SITE #22** - Large excavation west of the IA and north of IHSS 168 (see BZ Report, Appendix 2, #38). May be related to gravel excavation and not to Rocky Flats, but needs to be evaluated or documented.

**December 1999 Site Response:** The disturbance is a rock quarry managed by Western Aggregates and is not associated with Rocky Flats. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) reports that it is a surface mine called the Church Pit which has been operating since the 1940s. It is operated by Lakewood Brick and Tile under a 1979 Permit #M1979045 (per Carl Mount of the State Office of Minerals and Geology) and is

owned by the Church Ranch. The State agrees that the site does not have contamination concerns related to Rocky Flats.

**Resolution:** No further investigation of this site.

**SITE #23** - Possible waste disposal area west of the IA and north of IHSS 168 (see BZ Report, Appendix 2, #51). A visual inspection of the area indicates it was used as a borrow area rather than a disposal site. This needs to be properly documented and environmental concerns evaluated as necessary.

**December 1999 Site Response:** The site was inspected on November 17, 1999. There is some evidence that the area was used as a rock quarry and several interviewees thought it was used as a borrow area for landfill operations (IHSS 114). A review of OU 11 documents found no mention of operations at this site. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like copies of the interviews and site inspection report.

**Additional Discussion:** The site was inspected and appears to be fill. It is a large, poorly vegetated, mounded rocky area. A road leads to the Present Landfill.

Agreement regarding this Site was made in the January 10, 2001 meeting concerning details of the interviews with the Kaiser-Hill Construction Management (Excavation Specialist). There are no further details available. As reported in the December 1999 Site Response, interviews were conducted with Kaiser-Hill Construction Management (Excavation Specialists) and several interviewees thought it was used as a borrow area for landfill operations (IHSS 114). The site was inspected on November 17, 1999. There is evidence that the area was used as a rock quarry.

**Resolution:** No further investigation of this site.

**SITE #24** - Areas of possible fill north-northwest of the IA and north and west of IHSS 114 (see BZ Report, Appendix 2, #55 and Photo Report, Figures 7-10 and 13). These areas may be related to the landfill and/or ditch construction but need to be confirmed and documented or evaluated for environmental concerns.

**December 1999 Site Response:** The areas are known to be rip rap water breaks installed in the ditch during construction for erosion control. No additional study is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like documentation of the nature of the material.

**Additional Discussion:** The areas can be observed on photos from 1978 to 1986. There is no Figure 13 in the Site's copy of the EPA Photo Report. These areas appear to be associated with Landfill operations or construction of the dam. Based on the photos, both of the areas appear to have been used to stockpile soil. The time period, since the areas cannot be observed in 1971 but are visible in 1978, matches dam construction. Two Landfill ponds and a dam were constructed in 1974-1975. January 1975 Rocky Flats photos (19157-03 and 04) clearly show the elongated soil mound. The areas are identified as soil stockpiles in Sanitary Landfill Renovations, Landfill Trench, General Plan & Sections, Drawing No. 27317-1 (Zeff, Cogorno & Sealy, Inc., Tri-Consultants, Inc. and Hydro-Triad, Ltd., 1974) and in Figure 2 of the Present Landfill Closure Plan (1988). There is no information of a burn, spill, disposal activity, or environmental release exists, including interviews and information provided in the CEARP, HRR, and other historical reports.

**Resolution:** No further investigation of this site.

**SITE #25** - Disturbed area north of the IA and north of landfill retention pond, between IHSS 167.1 and the pond (see BZ Report, Appendix 2, #56 and Photo Report, Figure 7). This may be a borrow area for the landfill dam construction but it needs to be evaluated or documented.

**December 1999 Site Response:** The area is not clearly identified but appears to be a slump resulting from slope failure. The area may have been used as a borrow area but that has not been confirmed. There is no record of a burn, spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like documentation that identifies this area as a slump feature or borrow area during August 1978 (see Photo Report, Figure 7).

**Additional Discussion:** The site is not evident in the 1971 photo but is observable in 1978 and 1980 photos. The site was inspected and it appears to have been used as a borrow area. The slope has been cut down and the area appears to have been reseeded. The time frame and proximity to the Landfill make it reasonable to assume that use of the area is related to Landfill operations or dam construction. Two landfill ponds and a dam were constructed in 1974-1975. January 1975 Rocky Flats photos (19157-01 and 02) clearly show the area has been scraped. No information of a burn, spill, disposal activity, or environmental release exists, including interviews and information provided in the CEARP, HRR, and other historical reports.

**Resolution:** No further investigation of this site.

**SITE #26** - Disturbed ground northeast of the IA and north of Walnut Creek and IHSS 142.2 (see BZ Report, Appendix 2, #57 and Photo Report, Figure 7). This may be a borrow area for the landfill dam construction but it needs to be evaluated or documented. See Site #27. Sites #26 and #27 are adjacent to each other.

**December 1999 Site Response:** See response to Site #27.

**Additional Discussion:** See response to Site #27.

**Resolution:** No further investigation of this site.

**SITE #27** - Disturbed ground northeast of the IA and north of Walnut Creek and IHSS 142.3 (see BZ Report, Appendix 2, #58 and Photo Report, Figure 7). This may be a borrow area for the landfill dam construction but it needs to be evaluated or documented.

**December 1999 Site Response:** The disturbed areas along the road north of the A Ponds (Sites #26 and #27) were visually observed on November 17, 1999 and found to be areas of surficially exposed caliche common to the Rocky Flats Alluvium. Several specimens were collected from the area. The area of lighter color between the two sites is where a grass fire has occurred. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like an explanation of site activities that occurred at these two sites to disturb the ground during August 1978 (see Photo Report, Figure 7), as well as documentation such as copies of work documents that identify the activities.

**Additional Discussion:** Caliche is clearly evident on the surface today. Ground disturbance is not evident in the 1971 photo but is observable in 1978 and 1980 photos. Based on the photos, the area could have been used for borrow for dam construction, or for construction staging or storage. The site was inspected and shows evidence of surface scraping. The time frame and proximity to the Landfill and Pond A-3, and possibly even Pond A-2, make it reasonable to assume that use of the area is related to Landfill operations or dam construction. Pond A-2 was constructed in 1973, Pond A-3 was constructed in 1974, and two Landfill ponds and a dam were constructed in 1974-1975. No information of a burn, spill, disposal activity, or environmental release exists including interviews and information provided in the CEARP, HRR, and other historical reports.

**Resolution:** No further investigation of this site.

**SITE #28** - Change in surface features/outfall locations to bypass the South Walnut Creek ponds east of the IA (see BZ Report, Appendix 2, #62). The environmental concerns created by a change in flow from the diversion ditch, allowing flow farther to

the east, and the possible dissemination of contamination throughout the areas affected by the ditch, need to be evaluated or documented.

**December 1999 Site Response:** The area has been severely eroded over the years. It is not clear where the specific disturbance is located, but installation of power lines and a natural gas main may have contributed to scarring. Regarding a redirection of flow and a consequent bypass of water around the B ponds, there is a deep gully that flows directly to South Walnut Creek upstream of Pond B-5. The pond effluent is Point of Compliance (POC) GS08 and is sampled in accordance with RFCA. There is no evidence of a spill, release, or disposal activity at these locations. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responded that his concern is related to the surface water flow and sediment transport and disposal that would have occurred during storm events and runoff from the East Spray Field. The CDPHE Representative indicated that the ditch was constructed for East Spray Field runoff. Surface water samples from GS08 do not provide information regarding potential contamination that may exist in the sediment in the ditch and at the terminus of the various outfall locations over time. Changing the outfall location to the east is the activity of concern. The CDPHE Representative would like to review water and sediment data previously collected along the ditch and at each outfall, which may identify possible contamination, or the Site should provide a proposed sampling plan and documentation.

**Additional Discussion:** The disturbance referred to could not be definitively located based on a review of the photos. However, no data are available from the ditch or outfalls. The area was identified at the January 10, 2001, meeting by CDPHE.

**Resolution:** The area will be sampled as part of the IHSS Group NE/NW investigations.

**SITE #29** - Disturbance northwest of the IA (see BZ Report, Appendix 2, #66). This appears to be a tower unrelated to any disposal activities but needs to be confirmed and documented or evaluated.

**December 1999 Site Response:** The area was inspected on November 17, 1999. The light color circled on Figure 2 of the BZ Report is a large cattail wetland. No additional study of this area is planned. The locations identified on Figures 1 (#66) and 2 (#29) of the BZ Report are south of the dirt road.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like documentation of the disturbance seen on Figure 9 of the Photo Report, which may be an antenna site.

**Additional Discussion:** It is not clear where the disturbance is located, based on a review of Figures 1 and 2 of the BZ Report and Figures 9 and 10 of the EPA Photo Report. No

information of a burn, spill, disposal activity, or environmental release exists in that area, including interviews and information provided in the CEARP, HRR, and other historical reports. The site was identified by CDPHE at the January 10, 2001 meeting. The site is the location of the Meteorological Tower.

**Resolution:** No further investigation of this site.

**SITE #30** - Disturbed ground north of parking lot on the north side of the IA (see BZ Report, Appendix 2, #72). It may be a negligible environmental impact but needs to be evaluated or documented.

**December 1999 Site Response:** The area was visually inspected on November 17, 1999. Slumping of the hillside is apparent. The light areas circled are believed to be natural geologic processes common to that area. There is no evidence of a spill, release, or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) is not convinced that slumping describes the disturbed ground seen in Figure 13 of the Photo Report. He would like documentation of the activities that caused the disturbed ground, evident in 1988 photos.

**Additional Discussion:** There is no Figure 13 in the Site's copy of the EPA Photo Report. Slumping of the hillside is apparent today and in historical photos. It is possible that construction was occurring in the area in 1988. The parking lot was extended in 1988 or 1989. No activities were observed from a review of 1987 and 1989 photos although the appearance of a bare spot on the hillside can be observed in an October 1987 photo. Slumping and vegetation changes in different seasons can contribute to the appearance of disturbed ground. Slumping of the hillside occurs throughout the area and was clearly observed on photos and during a second site inspection. It is possible that physical stresses, such as rainfall or traffic at the base of the hill caused additional slumping at that location in 1987-1988. Strict controls on waste handling were in place by the mid-1980s. No wastes would have been buried on a slumping hillside adjacent to a security fence and just above the parking lot and only access road to that area. No information of a burn, spill, disposal activity, or environmental release exists in that area including, interviews and information provided in CEARP, HRR, and other historical reports.

**Resolution:** No further investigation of this site.

**The following six Sites were identified in the Buffer Zone Report as IHSSs or PACs that may have a larger aerial extent or possible additional concerns than currently identified.**

**SITE #31** - Disturbed ground immediately west-northwest of IA (see BZ Report, Appendix 2, #2 and #52) appears to have been identified as PAC 300-700, the Scrap Roofing Disposal Area. The HRR indicated that scrap roofing material, asphalt, styrofoam and plastic sheeting were removed and placed in the sanitary landfill, and that no radioactivity was detected in the trench or material. No other sampling or analysis was reported. It is not clear in the HRR if both of the two large excavated areas were investigated although both were filled and may have been used as disposal sites. A visual inspection did not identify any evidence of debris or waste. The area has been filled, leveled and gently sloped to the north into Walnut Creek. Paved and dirt/gravel roads and storage/parking areas have been placed over parts of this area. This is the area of soil mounds (See BZ Report, Appendix 2, #61) which may be construction soil that may have been spread on this area. Additional evaluation of this area may need to be performed.

**December 1999 Site Response:** The area is outside the PA, west of B371 and is referred to as Gate 5. It has been used to stockpile sand and gravel and equipment for many years. Originally it was used for workers parking during construction of B371. The HRR describes PAC 300-700 in this area. PAC 300-700 was approved for No Further Action (NFA) in 1992. PAC 300-702 is also in this area and has been assigned to IA Group 300-6.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responds that two large excavations can be seen in the Photo Report, Figures 1,2,3,5 and 6. The westernmost excavation is mostly filled by 8/6/71 (Figure 6) and completely filled and partly covered by a parking lot and a road by 8/17/78 (Figure 7), and the eastern excavation is mostly filled by 6/1/80 (Figure 8). The 1992 HRR indicates that Site #31 received waste since 1955 and that "due to the limited documentation regarding disposal in the 1960s, it is unclear if any release to the environment occurred". The location of PAC 300-700 in the 1992 HRR (Figure 300-1) appears to only include the eastern excavation and the HRR states that "other documents suggest a more westerly location". Therefore, the initial approval of PAC 300-700 as NFA may not include the whole area identified as Site #31 and the designation of NFA appears to have been premature without appropriate soil sampling at this apparent landfill. The CDPHE Representative wants the actual area that was included in remedial actions at PAC 300-700 to be identified along with the results of any sampling and analysis that were performed. He concludes that additional environmental investigations appear necessary at this site.

**Additional Discussion:** After further review, PAC 300-700 was approved by EPA as NFA in 1992. Two sites are observable on old photos, starting in 1953. The area appears

re-vegetated. The west-side may have been filled in. Comments in the HRR regarding PACs 300-700 (Scrap Roofing Disposal Unit) and 300-702 (Pesticide Shed, B367), and BZ Report, Appendix 2, page 4 were reviewed. PAC 300-700 was an old burial trench 500 yards northwest of B371 although other documents suggested a more westerly location (HRR 1992). Note that the distance of 500 yards to the trench reported in the June 1992 HRR was an error and the actual distance is approximately 500 feet. The trench was excavated and its contents placed in the "sanitary landfill" in 1981. No radioactivity detected on the material or in the trench. Based on HRR Figure 300-1 and photos (Photo Report Figures 1-3,5-8), only the eastern excavation was included in PAC 300-700.

**Resolution:** Site #31 will be investigated as part of the Industrial Area, 300 Group. Results will be reported in the HRR.

**SITE #32** - Possible waste disposal area west-southwest of IA south of the west access road and in the area of IHSSs 133.6, 133.4, 133.1, 133.3 and 133.5 (See BZ Report, Appendix 2, #3). The currently identified IHSSs appear to identify specific areas within this disturbed area. It may not be a new IHSS but it needs to be evaluated with the adjacent IHSSs.

**December 1999 Site Response:** The site is near the OU5 ash pits and incinerator. The area is IHSS 133.5.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) will accept the "letter" (Legare to Gunderson and Tarleton, 12/21/1999) as documentation for the identification of this site.

**Resolution:** The site will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

**SITE #33** - Possible waste disposal areas southwest of IA near the Ash Pits (See BZ Report, Appendix 2, #24, 25 and 26). Possible additional disposal/ash areas between IHSS 133.5 and 133.6, immediately north of IHSS 133.1 and south of 133.3. These areas may be currently identified as IHSSs but the exact locations are difficult to determine. An evaluation needs to be performed.

**December 1999 Site Response:** The site is near the OU5 ash pits. The area is believed to be IHSSs 133.2 and 133.3.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) will accept the "letter" (Legare to Gunderson and Tarleton, 12/21/1999) as documentation for the identification of this site.

**Resolution:** The site will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

**SITE #34** - Disturbed area southeast of IA and south of Woman Creek (See BZ Report, Appendix 2, #5). Identified as IHSS 209 in the HRR but covers a larger area. IHSS 209 appears to be only the northern half of this site. The area should be included in IHSS 209 and further evaluation may need to be performed.

**December 1999 Site Response:** The site is an area of disturbed soil west of IHSS 209, which is known to have been used as a gravel borrow area. It is not known where the gravel was used. There is no evidence of a spill, release or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) would like documentation that supports a determination of no releases or disposal activity at this site, including data that identifies the possible contamination of this site. The documentation should indicate why this area should not be included with IHSS 209, considering its apparent relationship to IHSS 209.

**Additional Discussion:** The site is visible in 1955 (Figure 2). The 1992 HRR indicated that IHSS 209 was being studied as part of OU5. The OU5 RFI/RI Report (1996) presents an extensive discussion of all the sites associated with IHSS 209. As part of the RI, air photos were reviewed, including the EPA Photo Report, the sites were visually inspected and samples were collected. There was no evidence that the sites were ever used for waste disposal. Analytical results from the RI samples collected indicate that contaminants of concern including volatiles, metals and radionuclides are not present within IHSS 209 and the associated surface disturbances. In addition, no information of a burn, spill, disposal activity or environmental release exists including interviews and information provided in CEARP, HRR and other historical reports. As documented in the OU5 RFI/RI Report, IHSS 209 and the source area west of the IHSS were removed from further evaluation in the human health risk assessment because concentrations did not exceed criteria established in the CDPHE screen. Additionally, results of the Ecological Risk Assessment for the Woman Creek Watershed did not indicate that IHSS 209 was a source area. IHSS 209 was proposed as No Further Action (NFA) in 1997 (HRR Annual Update, 1997) and accepted by EPA and CDPHE in 1999.

**Resolution:** No further investigation of this site.

**SITE #35** - Pipelines and East Spray areas east of the IA (See BZ Report, Appendix 2, #63). These activities and areas are identified as IHSSs 216.2 and 216.3. However, it does not appear that all of the East Spray areas are included in these IHSSs. There appears to be an area north of the East Access Road and east of 216.2 that is not

identified as part of IHSS 216 (see Photo Report, Figure 8). The area needs to be included with IHSS 216 and evaluated as necessary.

**December 1999 Site Response:** The large Gwyn or Air Force Tower was at this location. There were no spills to the environment during construction or dismantlement of the tower. There is no evidence of a spill, release or disposal activity at this location. No additional study of this area is planned. The BZ Report also requests expansion of IHSS 216.2. IHSSs 216.1 and 216.2 were sampled extensively during the OU2 Remedial Investigation. The IHSSs were subsequently proposed as NFA in 1996. Based on the sampling results, additional sampling is not warranted and no additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responds that the Air Force Tower can be seen in Figure 13 of the Photo Report dated 6/7/88. The area initially of concern can be observed in 1980 (see Photo Report, Figure 8 dated 6/1/80) as a disturbed and dark area. The area is identified as "revegetated fill with associated spray piping". Sampling at IHSSs 216.1 and 216.2 does not provide sufficient rationale for not having included this site as part of IHSS 216.2. Proposal of these IHSSs for NFA is also insufficient rationale for the area not being part of IHSS 216.2. The CDPHE Representative would like to review the rationale for not previously including this site as part of IHSS 216.2 along with any documentation and data available for this site, plus rationale for consideration of this site as a possible new PAC. An investigation to determine the possible contamination of this area may need to be performed.

**Additional Discussion:** The specific area of the Tower was not included with IHSS 216.2 because there is no evidence of a spill, release or disposal activity associated with the Tower. Boreholes 10691, 10791, 10891 and 11191A and wells were drilled in the area during remedial investigations (Draft Final OU2 RI Report, 1995, Figure 2.1-1). Analytical results indicate low levels of VOCs and radionuclides in subsurface soils.

The site was identified by CDPHE at the January 10, 2001 meeting. Activities in this area could not be determined. The rationale for the specific boundaries established for the East Spray Fields is not well documented. It is possible that runoff areas were not included. The EPA Photo Report indicates that pipelines and spray areas were put in with most of the runoff appearing to go to Woman Creek (BZ Report, Appendix 2, #63). Given the location of Site #35 on the plateau north of the East Access Road, it is more likely that runoff would go to Walnut Creek. The area of the Tower is outside the boundaries of the East Spray Field IHSSs.

On August 14, 2001, five surficial grab samples were collected in the immediate area of the former GWYN Tower prior to disturbing soil in that area. The sampling was required to perform a hazardous waste determination in accordance with requirements of the Soil Disturbance Permitting process (Environmental Assessment Rin. #01S0110). Samples were collected for SW-846, total metals, which is the potential contaminant of concern in

this area. All of the sampling locations were surveyed on August 16, 2001. Review of the analytical data has been completed and is consistent with normal background concentrations for metals. This data will be forwarded to the regulatory agencies upon receipt of the validation reports.

**Resolution:** No further investigation of this site.

**SITE #36** - Disturbed area west of IA (See BZ Report, Appendix 2, #67) which appears to be an area of fill within PAC 100-604. However, the area is not specifically identified in the HRR. The source and potential impact of this fill should be determined.

**December 1999 Site Response:** The area is where the 130 Trailer complex is currently located and is believed to be associated with the activities described for Site #14. There is no evidence of a spill, release or disposal activity at this location. No additional study of this area is planned.

After reviewing the Site response of December 1999, the CDPHE Representative (March 15, 2000 memo) responded that, as previously noted for Site #14, the construction activity that may have occurred at this site is not related to the concerns identified for Site #14. However, if the disturbance related to Site #36 is determined to be construction-related, then the Site is requested to provide documentation.

**Additional Discussion:** The site appears from Figure 2 (1955) in the BZ Report to be located north of the raw water pond near the road. However, the specific location referred to could not be located on the referenced 1983 photo (Figure 9). If it is the area noted as fill/possible disposal on Figures 7-9 (north of raw water pond near road), it seems well outside PAC 100-604. The HRR was reviewed regarding PAC 100-604 and Figure 100-1 for its boundaries. PAC 100-604 was designated as a result of sanitary sewer leaks in the T130 Trailer Complex. The T130 Complex was not constructed until 1989-1990. There was no indication of a disturbed area at the possible location on the EPA photos prior to 1978. The site may be north of OU11 (IHSS 168). Samples were not collected from this area. The disturbance cannot be explained on the basis of available information. However, no information of a burn, spill, disposal activity or environmental release exists in that area including interviews and information provided in CEARP, HRR and other historical reports.

CDPHE identified the area of concern at the January 10, 2001 meeting. It can be seen on Figure 12 of the EPA Photo Report. The site of actual interest is an area of disturbed ground where the T130 Trailer Complex is located. The site appears to be related to construction, according to both CDPHE and Site personnel. The Site will check for additional information.

**Resolution:** The site will be investigated using methodology presented in the Buffer Zone Sampling and Analysis Plan (SAP). Results will be reported in the HRR.

### 3.2 - Operable Unit 1-IHSS 119.1, July 31, 2001

A major Modification to the OU 1 CAD/ROD (DOE 2001) was submitted to EPA and CDPHE for approval in January 2001 for a modification to the selected remedy for IHSS 119.1 identified in the original OU 1 CAD/ROD (DOE 1997). The modification includes continuation of groundwater extraction and treatment from the OU 1 collection well for a period of one year after signing the CAD/ROD modification, and groundwater monitoring at IHSS 119.1 consistent with the RFETS IMP. The Major Modification was signed by the agencies in February 2001.

The OU 1 collection well is sampled quarterly and the sample results are reported in the RFETS Plume Treatment Monitoring Reports. Only trichloroethene has exceeded the RFCA Action Level and Standards Framework for Surface Water and Soils (ALF) Tier I AL for groundwater. Sample results from the March/April 2001 sampling event are presented below. Extraction and treatment of groundwater from the collection well will be discontinued in February 2002 if data from the previous four quarters show that the average concentration for trichloroethene in the well continues to be below the ALF Tier I AL. The collection well will then be utilized as a plume definition well in accordance with the RFETS IMP. If average trichloroethene concentrations in the newly designated Plume Definition Well are observed for four consecutive sampling events to be above the ALF Tier I AL, then impacts to surface water will be evaluated.

#### IHSS 119.1 Collection Well Sampling Results

Analyte	Concentration ( $\mu\text{g/L}$ )	RFCA Groundwater Tier I Action Level ( $\mu\text{g/L}$ )
Trichloroethene	300	500
Tetrachloroethene	30	500
1,1-Dichloroethene	18	700
Carbon Tetrachloride	14	500

\* Note: Results are for the March/April 2001 sampling events (detected concentrations only).

The OU 1 french drain was decommissioned in September 2000 in accordance with the original OU 1 CAD/ROD (DOE 1997). Water from the french drain is no longer collected or sampled. The French Drain system was breached at the lowest point and the collected groundwater now flows underground to the SID. Details of the decommissioning of the french drain system are presented in the OU 1 - 881 Hillside Area French Drain Decommissioning Closeout Report (DOE 2000).

#### References

DOE, 1997, *Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, February.

DOE, 2000, *Operable Unit 1 – 881 Hillside Area French Drain Decommissioning Closeout Report*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, December.

DOE, 2001, *Major Modification to the Operable Unit 1: 881 Hillside Area, Corrective Action Decision/Record of Decision*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, January.

### **3.3 - Soil Relocation Tracking, September 19, 2001**

#### **Buildings 123/886 UBC Characterization Project**

The Asphalt and Soil Management RSOP was implemented to return a small quantity (approximately 0.2 cubic yards) of soil was returned to its site of origination. The soil consisted of excess soil samples generated during the Buildings 123/886 UBC Characterizations. Per the RSOP, due to the fact that one sample exceeded RFCA Tier II values, the soil replacement volumes and locations are being summarized in the HRR reporting process.

#### **Building 123**

Upon review of analytical data, some metals were detected above background levels, and only arsenic was detected above RFCA Tier II ALs. The single Tier II exceedance was detected at 14.7 mg/kg. The replacement site was also the point of generation. The estimated volume of soil returned to this site is approximately 0.1 cubic meters and the coordinates are N 749210, E 2081783.

#### **Building 886**

Upon review of analytical data, none of the soil returned to the site was detected above RFCA Tier II ALs. The replacement site was also the point of generation. The estimated volume of soil returned to this site is approximately 0.1 cubic meters. Coordinates for this activity are N 749053, E 2084462. The B886 soil return is included in this HRR report only because the return was completed in association with the B123 soils.

### **3.4 - B440 TRUPACT II Shipping Facility Construction Project, April 5, 2001**

At approximately 2:30 pm on February 22, 2001, excavators at the B440 TRUPACT II Shipping Facility Construction Site uncovered soils that released a strong hydrocarbon-like odor when exposed to ambient air. The excavation was immediately halted for health, safety, and environmental assessment.

The area was barricaded and surveyed for radiological contamination. No radiological contamination was detected. Four composite soil samples were collected on the following day for total metals, volatile organics, PCBs, pH, and isotopic radionuclides. Results were received approximately 2 weeks later and reviewed. A hazardous waste

123

determination was performed by the projects waste generator and the soil determined to be non-hazardous. In addition, there were no exceedances above RFCA Tier II ALs. The soil was returned to a location very near to where it was excavated on August 9, 2001.

### 3.5 - PU&D Yard Plume, August 30, 2001

A plume of VOC-contaminated groundwater is derived from a small, localized contaminant source in the PU&D Yard. The DOE Subsurface Contaminant Focus Area (SCFA) provided funding for the Site to conduct a field-scale treatability study at this location to evaluate the effectiveness of Hydrogen Release Compound (HRC<sup>®</sup>) in remediating VOC-contaminated groundwater in the low-flow regimes common at the Site. HRC<sup>®</sup> is a proprietary, environmentally safe, food-quality polylactate ester formulated for slow release of lactic acid upon hydration. The product has been used at other sites to stimulate rapid degradation of chlorinated VOC contaminants in groundwater and soil. However, this is the first application at the Site.

The highest groundwater contaminant concentrations are found in the source area. Tetrachloroethene is the primary contaminant, with 1,700 µg/L the highest concentration observed in the groundwater. For the treatability study, a monitoring well was installed in the source area and another well immediately downgradient. Initial samples were collected and analyzed to establish baseline conditions. In February 2001, 800 pounds of HRC<sup>®</sup> were introduced into the source area and the subsurface conditions were allowed to stabilize for two months. Monthly sample collection to monitor the changed subsurface conditions began in April and will continue through September.

Initial results showed an increase in contaminant concentrations over baseline conditions. This may be due to several factors including desorption due to changes in subsurface conditions and the effects of heavy precipitation that occurred after material insertion. Later results confirmed that reducing conditions have been established and contaminant concentrations appear to be declining. If effective at this location, this method may be used to remediate other groundwater plumes at the Site.

### 3.6 – UBC Sites 123 and 886, August 30, 2001

The DOE SCFA provided funding to characterize potential under building contamination at Building 886 and the Building 123 slab at RFETS. The technology deployed was horizontal directional drilling combined with environmental measurement while drilling (EMWD) developed by Sandia National Laboratory. Geoprobe data were also collected to evaluate the feasibility and cost effectiveness of this methodology compared to conventional characterization. The characterization information will be used to make remedial action and waste disposal decisions.

124  
The preliminary results indicate that the two methods are comparable. As expected, the horizontal drilling method was slower and encountered more subsurface obstacles but collected samples specifically within the target area under the process waste lines. The

results indicate that this technique is effective, particularly where waste minimization and spread of contamination are major issues.

At Building 886, 1 horizontal borehole and 15 conventional sampling locations were completed. Data indicate that no radiological or chemical contamination exist above RFCA action levels at the sample locations.

At Building 123, four horizontal boreholes and 29 geoprobe holes were completed. There were three isolated sampling locations where arsenic and lead exceeded RFCA ALs. No other potential contaminants exceeded ALs.

### 3.7 - UBC 771, August 30, 2001

A preliminary characterization of Building 771 UBC was conducted by collecting approximately 32 samples at 16 locations. The numbers and types of samples, coupled with their specific locations, were collected to determine whether contamination existed that would warrant removal of the building's foundation for final D&D/site closure, or whether the foundation may be left in place. Results indicate no chemicals or radionuclides in excess of RFCA Tier I ALs. Arsenic occurs in soil at three locations in excess of both Tier II and background levels; nitrate and a variety of radionuclides, metals, and VOCs exceed Tier II ALs in groundwater at four (different) locations. These preliminary results do not suggest either a definitive point source of contamination or a potential source location. Based on these preliminary data, there does not appear to be contamination within the 771 UBC that would warrant removal of the concrete foundation; however, final decisions are reserved until the entire 771 UBC characterization is complete.

125

## **Appendix 1**

### **HRR SITES**

#### **IHSSs, PACs & UBCs (Comprehensive Status List)**

126

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
<b>NORTHEAST BUFFER ZONE</b>							
110	BZ	NE-110	Trench T-3	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	-
111.1	BZ	NE-111.1	Trench T-4	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
111.2	BZ	NE-111.2	Trench T-5	HRR <sup>1</sup>	-	-	-
111.3	BZ	NE-111.3	Trench T-6	HRR <sup>1</sup>	-	-	-
111.4	BZ	NE-111.4	Trench T-7	HRR <sup>1</sup>	-	-	-
111.5	BZ	NE-111.5	Trench T-8	HRR <sup>1</sup>	-	-	-
111.6	BZ	NE-111.6	Trench T-9	HRR <sup>1</sup>	-	-	-
111.7	BZ	NE-111.7	Trench T-10	HRR <sup>1</sup>	-	-	-
111.8	BZ	NE-111.8	Trench T-11	HRR <sup>1</sup>	-	-	-
142.1	6	NE-142.1	Pond A-1	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.2	6	NE-142.2	Pond A-2	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.3	6	NE-142.3	Pond A-3	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.4	6	NE-142.4	Pond A-4	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.5	6	NE-142.5	Pond B-1	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.6	6	NE-142.6	Pond B-2	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.7	6	NE-142.7	Pond B-3	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.8	6	NE-142.8	Pond B-4	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.9	6	NE-142.9	Pond B-5	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-

127

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
142.12	6	NE-142.12	Flume Pond (IAG Name: Newly Identified Pond A-5) (off-scale of Plate #2)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
156.2	6	NE-156.2	Soil Dump Area Between the A and B Series Drainages	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
166.1	6	NE-166.1	Trench A	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
166.2	6	NE-166.2	Trench B	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
166.3	6	NE-166.3	Trench C (two areas designated on Plate #2)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
167.1	6	NE-167.1	Landfill North Area Spray Field	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
167.2	7	NE-167.2	Pond Area Spray Field (Center Area)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
167.3	7	NE-167.3	South Area Spray Field	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
216.1	6	NE-216.1	East Spray Fields - North Area	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
216.2	BZ	NE-216.2	East Spray Field	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
216.3	BZ	NE-216.3	East Spray Field	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
NA	BZ	NE-1400	Tear Gas Powder Release	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	BZ	NE-1401	NE Buffer Zone Gas Line Break	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	BZ	NE-1402	East Inner Gate PCB Spill	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	BZ	NE-1403	Gasoline Spill - Building 920 Guard Post	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
142.6	BZ	NE-1404	Diesel Spill at Pond B-2 Spillway	Quarterly 2 <sup>5</sup>	Quarterly 3 <sup>6</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	-

128

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	BZ	NE-1405	Diesel Fuel Spill at Field Treatability Unit (identified as NE-1404; reassigned NE-1405 in Quarterly 7 <sup>9</sup> )	Quarterly 3 <sup>6</sup>	Quarterly 4 <sup>8</sup> Quarterly 7 <sup>9</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	BZ	NE-1406	771 Hillside Sludge Release	Quarterly 4 <sup>8</sup>	Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	BZ	NE-1407	OU 2 Treatment Facility	Quarterly 4 <sup>8</sup>	Quarterly 7 <sup>9</sup> (900-1312) Quarterly 8 <sup>15</sup> (900-1309)	-	-
NA	BZ	NE-1408	OU 2 Test Well (formerly NE-1406)	Quarterly 4 <sup>8</sup>	Quarterly 7 <sup>9</sup>	Annual 1999 <sup>23</sup>	2000 <sup>29</sup>
NA	BZ	NE-1409	Modular Tanks and 910 Treatment System Spill (formerly 000-503)	Quarterly 5 <sup>10</sup>	Quarterly 7 <sup>9</sup> Annual 2000 <sup>26</sup>	Annual 1999 <sup>23</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
NA	BZ	NE-1410	Diesel Fuel Spill at Field Treatability Unit	Quarterly 7 <sup>9</sup>	-	Quarterly 7 <sup>9</sup>	-
NA	BZ	NE-1411	Diesel Fuel Overflowed from Tanker at OU 2 Field Treatability Unit	Quarterly 7 <sup>9</sup>	-	Quarterly 7 <sup>9</sup>	-
NA	BZ	NE-1412	Trench T-12 Located in OU 2 East Trenches	Quarterly 10 <sup>11</sup>	-	-	-
NA	BZ	NE-1413	Trench T-13 Located in OU 2 East Trenches	Quarterly 10 <sup>11</sup>	-	-	-
<b>NORTHWEST BUFFER ZONE</b>							
114	7	NW-114	Present Landfill	HRR <sup>1</sup>	-	-	-
170	BZ	NW-170	PU&D Storage Yard - Waste Spills	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup> Annual 1999 <sup>23</sup>	-

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
174A	BZ	NW-174A	PU&D Yard Container Storage Area	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup>		-
174B	BZ	NW-174B	PU&D Container Storage Facilities	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup> Annual 1999 <sup>23</sup>	1999 <sup>28</sup>
195	16	NW-195	Nickel Carbonyl Disposal	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 16 CAD/ROD <sup>12</sup>
203	7	NW-203	Inactive Hazardous Waste Storage Area	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	BZ	NW-1500	Diesel Spill at PU&D Yard (formerly NW-175)	Quarterly 3 <sup>6</sup>	Quarterly 7 <sup>9</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	BZ	NW-1501	Asbestos Release at PU&D Yard (formerly NW-176)	Quarterly 3 <sup>6</sup>	Quarterly 7 <sup>9</sup>	Annual 1999 <sup>23</sup>	2000 <sup>29</sup>
114	7	NW-1502	Improper Disposal of Diesel-Contaminated Material at Landfill (formerly NW-177)	Quarterly 2 <sup>5</sup>	Quarterly 3 <sup>6</sup> Quarterly 7 <sup>9</sup>	Quarterly 7 <sup>9</sup>	-
114	7	NW-1503	Improper Disposal of Fuel-Contaminated Material at Landfill	Quarterly 1 <sup>24</sup>	Quarterly 7 <sup>9</sup>	Quarterly 7 <sup>9</sup>	-
114	7	NW-1504	Improper Disposal of Thorosilane-Contaminated Material at Landfill	Quarterly 7 <sup>9</sup>	-	Quarterly 7 <sup>9</sup>	-
NA	BZ	NW-1505	North Firing Range	Annual 2001	Annual 2001		
<b>SOUTHEAST BUFFER ZONE</b>							
142.10	5	SE-142.10	Pond C-1	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
142.11	5	SE-142.11	Pond C-2	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
209	5	SE-209	Surface Disturbance Southeast of Bldg. 881	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>

130

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	BZ	SE-1600	Pond 7-Steam Condensate Releases	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	BZ	SE-1601	Pond 8 - Cooling Tower Discharge Releases	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
155	BZ	SE-1602	East Firing Range	Annual 1999 <sup>23</sup>	-	-	-
<b>SOUTHWEST BUFFER ZONE</b>							
115	IA	SW-115	Original Landfill	HRR <sup>1</sup>	-	-	-
133.1	5	SW-133.1	Ash Pit 1	HRR <sup>1</sup>	Annual 2001	Annual 2001	
133.2	5	SW-133.2	Ash Pit 2	HRR <sup>1</sup>	Annual 2001	Annual 2001	
133.3	5	SW-133.3	Ash Pit 3	HRR <sup>1</sup>	Annual 2001	Annual 2001	
133.4	5	SW-133.4	Ash Pit 4	HRR <sup>1</sup>	Annual 2001	Annual 2001	
133.5	5	SW-133.5	Incinerator Facility	HRR <sup>1</sup>	Annual 1997 <sup>7</sup> Annual 2001	Annual 1997 <sup>7</sup> Annual 2001	
133.6	5	SW-133.6	Concrete Wash Pad	HRR <sup>1</sup>	Annual 1997 <sup>7</sup> Annual 2001	Annual 1997 <sup>7</sup> Annual 2001	
196	IA	SW-196	Water Treatment Plant Backwash Pond	HRR <sup>1</sup>	-	-	-
NA	BZ	SW-1700	Fuel Spill into Woman Creek Drainage	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	5	SW-1701	Recently Identified Ash Pit (also referred to as TDEM-1)	Quarterly 9 <sup>13</sup>	Annual 1997 <sup>7</sup> Annual 2001	Annual 1997 <sup>7</sup> Annual 2001	
NA	5	SW-1702	Recently Identified Ash Pit (also referred to as TDEM-2)	Quarterly 9 <sup>13</sup>	Annual 2001 <sup>7</sup>	Annual 2001 <sup>7</sup>	
<b>000 AREA</b>							
101	IA	000-101	207 Solar Evaporation Ponds	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	-	-

131

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
121	IA	000-121	Original Process Waste Lines (includes Tanks T-2, T-3, T-10, T-14, T-16, T-40)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1998 <sup>7</sup> (UBC 123)	-	-
162	IA	000-162	Radioactive Site - 700 Area Site # 2	HRR <sup>1</sup>	-	-	-
168	11	000-168	West Spray Field	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 11 CAD/ROD <sup>14</sup>
172	IA	000-172	Central Avenue Waste Spill	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
190	IA	000-190	Caustic Leak (also referred to as Central Avenue Ditch)	HRR <sup>1</sup>	-	-	-
192	16	000-192	Antifreeze Discharge	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 16 CAD/ROD <sup>12</sup>
NA	IA	000-500	Sanitary Sewer System (not shown on Plate 4)	HRR <sup>1</sup>	-	-	-
NA	BZ	000-501	Roadway Spraying	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	000-502 <i>(see 900-1310)</i>	<i>ITS Water Spill (identified in Quarterly 2 as 000-502; reassigned as 900-1310 in Quarterly 7; the number 000-502 is no longer in use.)</i>	Quarterly 2 <sup>5</sup>	NA	NA	NA
NA	IA	000-503	Solar Pond Water Spill Along Central Avenue	Quarterly 7 <sup>9</sup>	-	Quarterly 7 <sup>9</sup>	-
NA	IA	000-504	New Process Waste Lines	Annual 1999 <sup>23</sup>	-	-	-
NA	IA	000-505	Storm Drains	Annual 1999 <sup>23</sup>	-	-	-
<b>100 AREA</b>							
148	IA	100-148	Waste Spills	HRR <sup>1</sup>	Annual 1998 <sup>7</sup> (UBC 123)	-	-

132

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	IA	100-600	Mercury Spill-Valve Vault 124-B, Building 124	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-601	Building 123 Phosphoric Acid Spill	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-602	Building 123 Process Waste Line Break	HRR <sup>1</sup>	-	-	-
NA	IA	100-603	Building 123 Bioassay Waste Spill	HRR <sup>1</sup>	Annual 2001	Annual 2001	-
NA	IA	100-604	T130 Complex Sewer Line Leaks	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-605	Building 115 Hydraulic Oil Spill	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-606	Building 125 TCE Spill	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-607	Building 111 Transformer PCB Leak	HRR <sup>1</sup>	Annual 2000 <sup>6</sup> Annual 2001	Annual 2001	2001 <sup>10</sup>
NA	IA	100-608	Building 131 Transformer Leak	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	IA	100-609	Building 121 Security Incinerator	HRR <sup>1</sup>	-	-	-
NA	IA	100-610	Asbestos Release - Building 123	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-611	Building 123 Scrubber Solution Spill	HRR <sup>1</sup>	-	-	-
NA	IA	100-612	Battery Solution Spill - Building 119	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	100-613	Asphalt Surface in Lay-down Yard North of Building 130 (identified as 000-501 in Quarterly 4 <sup>8</sup> ; reassigned as 100-613 in Quarterly 7 <sup>9</sup> )	Quarterly 4 <sup>8</sup>	Quarterly 7 <sup>9</sup>	Quarterly 7 <sup>9</sup>	-
<b>300 AREA</b>							
128	IA	300-128	Oil Burn Pit No. 1	HRR <sup>1</sup>	-	-	-
134N	IA	300-134N	Lithium Metal Destruction Site	HRR <sup>1</sup>	-	-	-
134S	IA	300-134S	Lithium Metal Destruction Site	HRR <sup>1</sup>	-	-	-
135	IA	300-135	Cooling Tower Blowdown	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>

133

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
151	IA	300-151	Tank 262 Fuel Oil Spills	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
156.1	IA	300-156.1	Building 371 Parking Lot (two locations designated on Plate #2)	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
171	IA	300-171	Solvent Burning Ground	HRR <sup>1</sup>	-	-	-
181	IA	300-181	Building 334 Cargo Container Area	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
186	IA	300-186	Valve Vault 12	HRR <sup>1</sup>	-	-	-
188	IA	300-188	Acid Leak	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
206	IA	300-206	Inactive D-836 Hazardous Waste Tank	HRR <sup>1</sup>	Annual 2001	Annual 2001	-
212	IA	300-212	Building 371 Drum Storage Area, Unit 63 (deferred to Part VIII of the RFETS RCRA Mixed Residues Modification; see Annual 1997)	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-
NA	IA	300-700	Scrap Roofing Disposal	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-701	Sulfuric Acid Spill – Building 371	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-702	Pesticide Shed	HRR <sup>1</sup>	-	-	-
NA	IA	300-703	Building 331 North Area	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-704	Roof Fire, Building 381	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-705	Potassium Hydroxide Spill North of Building 374	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-706	Evaporator Tanks North of Building 374	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-707	Sanitizer Spill	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	300-708	Transformers North of Building 371	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	300-709	Transformer Leak 334-1	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	300-710	Gasoline Spill North of Building 331	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>

134

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	IA	300-711	Nickel-Cadmium Battery Acid Spill Outside of Building 373	Quarterly 1 <sup>24</sup>	Quarterly 7 <sup>9</sup>	Quarterly 7 <sup>9</sup>	-
NA	IA	300-712	0.5-Gallon Antifreeze Spilled by Street Sweeper Outside of Building 373	Quarterly 7 <sup>9</sup>	-	Quarterly 7 <sup>9</sup>	-
NA	IA	300-713	Caustic Spill North of Building 331	Quarterly 8 <sup>15</sup>	-	Quarterly 8 <sup>15</sup>	-
NA	IA	300-714	Laundry Waste Water Spill from Tank T-803, North of Building 374	Quarterly 10 <sup>11</sup>	-	Quarterly 10 <sup>11</sup>	-
NA	IA	300-715	Battery Acid Spill	Annual 1997 <sup>3</sup>	-	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
<b>400 AREA</b>							
116.1	IA	400-116.1	West Loading Dock, Building 447 (IAG Name: West Loading Dock Area)	HRR <sup>1</sup>	-	-	-
116.2	IA	400-116.2	South Loading Dock, Building 444 (IAG Name: South Loading Dock Area)	HRR <sup>1</sup>	-	-	-
122	IA	400-122	Underground Concrete Tank	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> (000-121)	-	-
129	IA	400-129	Building 443 Oil Leak (deferred to IA OU; see Annual 1997)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup>	-	-
136.1	IA	400-136.1	Cooling Tower Pond West of Building 444 (IAG Name: Cooling Tower Pond Northeast Corner of Building 460)	HRR <sup>1</sup>	-	-	-
136.2	IA	400-136.2	Cooling Tower Pond East of Building 444 (IAG Name: Cooling Tower Pond West of Building 460)	HRR <sup>1</sup>	-	-	-

135

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
157.1	IA	400-157.1	Radioactive Site North Area	HRR <sup>1</sup>	-	-	-
157.2	IA	400-157.2	Radioactive Site South Area	HRR <sup>1</sup>	-	-	-
182	IA	400-182	Building 444/453 Drum Storage Area	HRR <sup>1</sup>	-	-	-
187	IA	400-187	Sulfuric Acid Spill (IAG Name: Acid Leaks [2])	HRR <sup>1</sup>	-	-	-
191	IA	400-191	Hydrogen Peroxide Spill	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
193	16	400-193	Steam Condensate Leak	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 16 CAD/ROD <sup>12</sup>
204	15	400-204	Original Uranium Chip Roaster (deferred to D&D and UBC 447; see OU 15 CAD/ROD)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
205	IA	400-205	Building 460 Sump #3 Acid Side	HRR <sup>1</sup>	-	-	-
207	IA	400-207	Inactive 444 Acid Dumpster	HRR <sup>1</sup>	-	-	-
208	IA	400-208	Inactive 444/447 Waste Storage Area	HRR <sup>1</sup>	-	-	-
NA	IA	400-800	Transformer 443-1	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	IA	400-801	Transformer, Roof of Building 447	HRR <sup>1</sup>	-	-	-
NA	IA	400-802	Storage Area, South of Building 334	HRR <sup>1</sup>	-	-	-
NA	IA	400-803	Miscellaneous Dumping, Building 460 Storm Drain	HRR <sup>1</sup>	-	-	-
NA	IA	400-804	Road North of Building 460	HRR <sup>1</sup>	-	-	-
NA	IA	400-805	Building 443 Tank #9 Leak	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	400-806	Catalyst Spill, Building 440	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	400-807	Sandblasting Area	HRR <sup>1</sup>	-	-	-
NA	IA	400-808	Vacuum Pump Leak - Building 442	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>

136

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	IA	400-809	Oil Leak - 446 Guard Post	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	400-810	Beryllium Fire - Building 444	HRR <sup>1</sup>	-	-	-
NA	IA	400-811	Transformer 443-2, Building 443	Quarterly 2 <sup>5</sup>	Quarterly 3 <sup>6</sup> Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
NA	IA	400-812	Tank T-2 Spill in Building 460	Quarterly 6 <sup>16</sup>	Quarterly 7 <sup>9</sup> Quarterly 8 <sup>15</sup> Annual 2001	Quarterly 8 <sup>15</sup> Annual 2001	
NA	IA	400-813	RCRA Tank Leak in Building 460	Quarterly 7 <sup>9</sup>	-	-	-
NA	IA	400-814	Air Conditioner Compressor Release, Bldg. 444 Roof	Quarterly 8 <sup>15</sup>	-	Quarterly 8 <sup>15</sup>	-
NA	IA	400-815	RCRA Tank Leak in Building 460	Quarterly 8 <sup>15</sup>	-	-	-
NA	IA	400-820 (see 600-1004)	Central Avenue Ditch Soil Spreading (identified in Quarterly 6 as 400-820, reassigned as 600-1004 in Quarterly 7; the number 400-820 is no longer in use).	Quarterly 6 <sup>16</sup>	Quarterly 7 <sup>9</sup>	NA	NA
<b>500 AREA</b>							
117.1	IA	500-117.1	North Site Chemical Storage	HRR <sup>1</sup>	-	-	-
117.2	IA	500-117.2	Middle Site Chemical Storage	HRR <sup>1</sup>	-	-	-
158	IA	500-158	Radioactive Site - Building 551	HRR <sup>1</sup>	-	-	-
159	IA	500-159	Radioactive Site - Building 559	HRR <sup>1</sup>	-	-	-
169	IA	500-169	Waste Drum Peroxide Burial	HRR <sup>1</sup>	Annual 1998 <sup>7</sup> Annual 2000 <sup>26</sup>	Annual 1998 <sup>7</sup>	-

137

Appendix I. HRR Sites at RFETS.

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
197	IA	500-197	Scrap Metal Sites	HRR <sup>1</sup>	-	-	-
NA	IA	500-900	Transformer Leak - 515/516	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	500-901	Transformer Leak - 555	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	500-902	Transformer Leak - 559	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	500-903	RCRA Storage Unit #1	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	500-904	Transformer Leak - 223-1/223-2	HRR <sup>1</sup>	-	-	-
NA	IA	500-905	Transformer Leak - 558-1	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	500-906	Asphalt Surface Near Building 559	Quarterly <sup>48</sup>	-	-	-
172	IA	500-907	Tanker Truck Release of Hazardous Waste from Tank 231B	Quarterly <sup>911</sup>	-	-	-
156.1, 186	IA	500-908	Oil Released from Air Compressor	Quarterly <sup>1217</sup>	-	Quarterly <sup>1217</sup>	-
158	IA	500-909	Release of Spent Photographic Fixer Solution	Annual <sup>19962</sup>	-	Annual 1996 <sup>2</sup>	-
<b>600 AREA</b>							
117.3	IA	600-117.3	Chemical Storage - South Site	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
120.1	IA	600-120.1	Fiberglassing Area North of Building 664	HRR <sup>1</sup>	-	-	-
120.2	IA	600-120.2	Fiberglassing Area West of Building 664	HRR <sup>1</sup>	-	-	-
152	IA	600-152	Fuel Oil Tank 221 Spills	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
160	IA	600-160	Radioactive Site Building 444 Parking Lot	HRR <sup>1</sup>	-	-	-
161	IA	600-161	Radioactive Site - Building 664	HRR <sup>1</sup>	-	-	-
164.1	IA	600-164.1	Radioactive Slab from Bldg. 776	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	2001 <sup>31</sup>

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
189	IA	600-189	Nitric Acid Tank	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup> Annual 2001	Annual 1997 <sup>3</sup> Annual 2001	
NA	IA	600-1000	Transformer Storage Building 662	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	600-1001	Temporary Waste Storage Building 663	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	
NA	IA	600-1001(a)	Waste Oil Identified in PAC-1001	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
NA	IA	600-1002	Transformer Storage - West of Building 666	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	600-1003	Transformers North and South of 661-675 Substation	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
152, 157.1, 172	IA	600-1004	Central Avenue Ditch Cleaning Incident (formerly identified as 400-820)	Quarterly 6 <sup>16</sup>	Quarterly 7 <sup>9</sup>	-	-
NA	IA	600-1005	Former Pesticide Storage Area	Quarterly 7 <sup>9</sup>	-	-	-
<b>700 AREA</b>							
118.1	IA	700-118.1	Multiple Solvent Spills West of Building 730	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	-	-
118.2	IA	700-118.2	Multiple Solvent Spills South End of Building 776	HRR <sup>1</sup>	-	-	-
123.1	IA	700-123.1	Valve Vault 7	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
123.2	IA	700-123.2	Valve Vault West of Building 707	HRR <sup>1</sup>	-	-	-
124.1	IA	700-124.1	30,000 Gallon Tank (Tank #68)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> (000-121)	-	-

139

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
124.2	IA	700-124.2	14,000 Gallon Tank (Tank #66)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> (000-121)	-	-
124.3	IA	700-124.3	14,000 Gallon Tank (Tank #67)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> (000-121)	-	-
125	IA	700-125	Holding Tank (Tank #66)	HRR <sup>1</sup>	-	-	-
126.1	IA	700-126.1	Westernmost Out-of-Service Waste Tank	HRR <sup>1</sup>	-	-	-
126.2	IA	700-126.2	Easternmost Out-of-Service Waste Tank	HRR <sup>1</sup>	-	-	-
127	IA	700-127	Low-Level Radioactive Waste Leak	HRR <sup>1</sup>	-	-	-
131	IA	700-131	Radioactive Site - 700 Area Site #1	HRR <sup>1</sup>	-	-	-
132	IA	700-132	Radioactive Site - 700 Area Site #4	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> (000-121) Annual 1997 <sup>3</sup>	-	-
137	IA	700-137	Cooling Tower Blowdown Buildings 712 and 713 (IAG Name: Cooling Tower Blowdown Building 774)	HRR <sup>1</sup>	-	-	-
138	IA	700-138	Cooling Tower Blowdown Building 779	HRR <sup>1</sup>	-	-	-
139.1N(a)	IA	700-139.1N(a)	Caustic/Acid Spills Hydroxide Tank Area	HRR <sup>1</sup>	Annual 1999 <sup>23</sup>	-	-
139.1N(b)	IA	700-139.1N(b)	Caustic/Acid Spills Hydroxide Tank Area	HRR <sup>1</sup>			
139.1S	IA	700-139.1S	Caustic/Acid Spills Hydroxide Tank Area	HRR <sup>1</sup>			
139.2	IA	700-139.2	Caustic/Acid Spills Hydrofluoric Acid Tanks	HRR <sup>1</sup>	-	-	-
143	IA	700-143	Bldg. 771 Outfall	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	-
144	IA	700-144(N)	Sewer Line Overflow (IAG Name: Sewer Line Break)	HRR <sup>1</sup>	-	-	-

140

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
144	IA	700-144(S)	Sewer Line Overflow (IAG Name: Sewer Line Break)	HRR <sup>1</sup>	-	-	-
146.1	IA	700-146.1	Concrete Process Waste Tanks 7,500 Gallon Tank (31)	HRR <sup>1</sup>	-	-	-
146.2	IA	700-146.2	Concrete Process Waste Tanks 7,500 Gallon Tank (32)	HRR <sup>1</sup>	-	-	-
146.3	IA	700-146.3	Concrete Process Waste Tanks 7,500 Gallon Tank (34W)	HRR <sup>1</sup>	-	-	-
146.4	IA	700-146.4	Concrete Process Waste Tanks 7,500 Gallon Tank (34E)	HRR <sup>1</sup>	-	-	-
146.5	IA	700-146.5	Concrete Process Waste Tanks 3,750 Gallon Tank (30)	HRR <sup>1</sup>	-	-	-
146.6	IA	700-146.6	Concrete Process Waste Tanks 3,750 Gallon Tank (33)	HRR <sup>1</sup>	-	-	-
147.1	IA	700-147.1	Process Waste Line Leaks (IAG Name: Maas Area)	HRR <sup>1</sup>	-	-	-
149.1	IA	700-149.1	Effluent Pipe	HRR <sup>1</sup>	-	-	-
149.2	IA	700-149.2	Effluent Pipe	HRR <sup>1</sup>	-	-	-
150.1	IA	700-150.1	Radioactive Site North of Building 771 (IAG Name: Radioactive Leak North of Building 771)	HRR <sup>1</sup>	-	-	-
150.2	IA	700-150.2	Radioactive Site West of Buildings 771 and 776 (IAG Name: Radioactive Leak West of Building 771)	HRR <sup>1</sup>	-	-	-
150.3	IA	700-150.3	Radioactive Site Between Buildings 771 & 774 (IAG Name: Radioactive Leak Between Buildings 771 & 774)	HRR <sup>1</sup>	-	-	-

141

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
150.4	IA	700-150.4	Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)	HRR <sup>1</sup>	-	-	-
150.5	IA	700-150.5	Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	Annual 1998 <sup>7</sup>	1999 <sup>28</sup>
150.6	IA	700-150.6	Radioactive Site South of Building 779 (IAG Name: Radioactive Leak South of Building 779)	HRR <sup>1</sup>	-	-	-
150.7	IA	700-150.7	Radioactive Site South of Building 776 (IAG Name: Radioactive Leak South of Building 776)	HRR <sup>1</sup>	-	-	-
150.8	IA	700-150.8	Radioactive Site Northeast of Building 779 (IAG Name: Radioactive Leak Northeast of Building 779)	HRR <sup>1</sup>	-	-	-
163.1	IA	700-163.1	Radioactive Site 700 Area Site No.3 Wash Area	HRR <sup>1</sup>	-	-	-
163.2	IA	700-163.2	Radioactive Site 700 Area Site No.3 Buried Slab	HRR <sup>1</sup>	-	-	-
185	16	700-185	Solvent Spill	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 16 CAD/ROD <sup>12</sup>
194	16	700-194	Steam Condensate Leak	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 16 CAD/ROD <sup>12</sup>
214	IA	700-214	750 Pad Pondcrete & Saltcrete Storage, Unit 25	HRR <sup>1</sup>	-	-	-
215	IA	700-215	Tank T-40, Unit 55.13	HRR <sup>1</sup>	-	-	-
NA	IA	700-1100	French Drain North of Building 776/777	HRR <sup>1</sup>	-	-	-
NA	IA	700-1101	Laundry Tank Overflow - Building 732	HRR <sup>1</sup>	-	-	-
NA	IA	700-1102	Transformer Leak - 776-4	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup> Annual 2001	Annual 1997 <sup>3</sup> Annual 2001	-
NA	IA	700-1103	Leaking Transformers - Building 707	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-

142

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	IA	700-1104	Leaking Transformers - Building 708	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	700-1105	Transformer Leak - 779-1/779-2	HRR <sup>1</sup>	-	-	-
NA	IA	700-1106	Process Waste Spill - Portal 1	HRR <sup>1</sup>	-	-	-
NA	IA	700-1107	Compressor Waste Oil Spill - Building 776	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	700-1108	771/774 Footing Drain Pond	HRR <sup>1</sup>	Annual 1999 <sup>23</sup>	-	-
NA	IA	700-1109	Uranium Incident - Building 778	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	700-1110	Nickel Carbonyl Burial West of Building 771	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	700-1111	Leaking Transformer - Building 750	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	700-1112	Leaking Transformer - 776-5	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
101	IA	700-1113	Water Released from 207C Solar Evaporation Pond	Quarterly 11 <sup>18</sup>	-	Quarterly 11 <sup>18</sup>	-
NA	IA	700-1114a	Release During Liquid Transfer Operations from Bldg. 774	Annual 1997 <sup>3</sup>	-	Annual 1997 <sup>3</sup>	-
NA	IA	700-1114b	Release During Liquid Transfer Operations from Bldg. 774	Annual 1997 <sup>3</sup>	-	Annual 1997 <sup>3</sup>	-
NA	IA	700-1115	Identification of Diesel Fuel in Subsurface Soils	Annual 1997 <sup>3</sup>	-	-	-
150.7	IA	700-1116	Leaking Transformer South of Building 776	Annual 1998 <sup>7</sup>	-	-	-
NA	IA	700-1117	Building 701 Water Line, Soil Put-back	Annual 1998 <sup>7</sup>	-	Annual 1998 <sup>7</sup>	CDPHE 1998 <sup>19</sup>
<b>800 AREA</b>							
102	1	800-102	Oil Sludge Pit	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>

143

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
103	1	800-103	Chemical Burial	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
104	1	800-104	Liquid Dumping	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
105.1	1	800-105.1	Bldg. 881 Westernmost Out of Service Fuel Tanks	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
105.2	1	800-105.2	Bldg. 881 Easternmost Out of Service Fuel Tanks	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
106	1	800-106	Bldg. 881, Outfall	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
107	1	800-107	Bldg. 881, Hillside Oil Leak	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
145	1	800-145	Sanitary Waste Line Leak	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
147.2	IA	800-147.2	Bldg. Conversion Activity Contamination Area	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
164.2	IA	800-164.2	Radioactive Site 800 Area Site #2, Building 886 Spills	HRR <sup>1</sup>	-	-	-
164.3	IA	800-164.3	Radioactive Site 800 Area Site #2, Building 889 Storage Pad	HRR <sup>1</sup>	-	-	-
177	IA	800-177	Building 885 Drum Storage and Paint Storage (IAG Name: Building 885 Drum Storage Area)	HRR <sup>1</sup>	-	-	-
178	15	800-178	Building 881 Drum Storage Area	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 15 CAD/ROD <sup>21</sup>
179	15	800-179	Building 865 Drum Storage, refer to OU 15 CAD/ROD)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 2001	Annual 1996 <sup>2</sup> Annual 2001	
180	15	800-180	Building 883 Drum Storage, refer to OU 15 CAD/ROD)	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 2001	Annual 1996 <sup>2</sup> Annual 2001	
211	15	800-211	Building 881 Drum Storage, Unit 26	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 15 CAD/ROD <sup>22</sup>
217	15	800-217	Building 881, CN Bench Scale Treatment, Unit 32	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	-	OU 15 CAD/ROD <sup>22</sup>
NA	IA	800-1200	Valve Vault 2	HRR <sup>1</sup>	-	-	-

144

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	IA	800-1201	Radioactive Site South of Building 883	HRR <sup>1</sup>	-	-	-
NA	IA	800-1202	Sulfuric Acid Spill, Building 883	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	800-1203	Sanitary Sewer Line Break Between Buildings 865 and 886	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	800-1204	Building 866 Spills	HRR <sup>1</sup>	-	-	-
NA	IA	800-1205	Building 881, East Dock	HRR <sup>1</sup>	-	-	-
NA	IA	800-1206	Fire, Building 883	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	800-1207	Transformer 883-4	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	800-1208	Transformer 881-4	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	800-1209	Leaking Transformers, 800 Area	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	800-1210	Transformers 865-1 and 865-2	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	800-1211	Capacitor Leak, Building 883	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	800-1212	Building 866 Sump Spill	Quarterly 5 <sup>10</sup>	-	-	-
<b>900 AREA</b>							
108	BZ	900-108	Trench T-1	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup> Annual 2000 <sup>26</sup>	Annual 1999 <sup>23</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
109	BZ	900-109	Trench T-2 - Ryan's Pit	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	-

145

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
112	BZ	900-112	903 Pad (IAG Name: 903 Drum Storage Area)	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup> Annual 1999 <sup>23</sup> Annual 2000 <sup>26</sup>	-	-
113	BZ	900-113	Mound Area	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
119.1	1	900-119.1	West Scrap Metal Storage Area and Solvent Spill (OU 1 CAD/ROD Specifies Continuance of Groundwater Collection from well (see ref. # 20).	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup>	-	1999 <sup>27</sup>
119.2	1	900-119.2	East Scrap Metal Storage Area and Solvent Spill	HRR <sup>1</sup>	Annual 1996 <sup>2</sup> Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
130	1	900-130	Contaminated Soil Disposal Area East of Bldg. 881	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 1 CAD/ROD <sup>20</sup>
140	BZ	900-140	Hazardous Disposal Area (IAG Name: Reactive Metal Destruction Site)	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup> Annual 2000 <sup>26</sup>	Annual 1998 <sup>7</sup>	-
141	6	900-141	Sludge Disposal	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
153	IA	900-153	Oil Burn Pit No. 2	HRR <sup>1</sup>	Annual 1999 <sup>23</sup>	-	-
154	IA	900-154	Pallet Burn Site	HRR <sup>1</sup>	Annual 1999 <sup>23</sup>	-	-
155	BZ	900-155	903 Lip Area	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 1998 <sup>7</sup> Annual 1999 <sup>23</sup> Annual 2000 <sup>26</sup>	-	-
165	IA	900-165	Triangle Area	HRR <sup>1</sup>	-	-	-

146

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
173	IA	900-173	South Dock - Building 991 (IAG Name: Radioactive Site - 900 Area)	HRR <sup>1</sup>	-	-	-
175	IA	900-175	S&W Building 980 Container Storage Facility	HRR <sup>1</sup>	-	-	-
176	IA	900-176	S&W Contractor Storage Yard	HRR <sup>1</sup>	-	-	-
183	BZ	900-183	Gas Detoxification Area	HRR <sup>1</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
184	IA	900-184	Building 991 Steam Cleaning Area	HRR <sup>1</sup>	-	-	-
210	IA	900-210	Building 980 Cargo Container, Unit 16	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	Annual 1997 <sup>3</sup>	1999 <sup>27</sup>
213	IA	900-213	Unit 15, 904 Pad Pondcrete Storage	HRR <sup>1</sup>	-	-	-
NA	IA	900-1300	RO Plant Sludge Drying Beds	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	900-1301	Building 991 Enclosed Area	HRR <sup>1</sup>	-	-	-
NA	IA	900-1302	Gasoline Spill	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	900-1303	Natural Gas Leak	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	900-1304	Chromic Acid Spill - Building 991	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	900-1305	Building 991 Roof	HRR <sup>1</sup>	-	-	EPA, 1992 <sup>4</sup>
NA	IA	900-1306	Transformers 991-1 and 991-2	HRR <sup>1</sup>	Annual 1996 <sup>2</sup>	Annual 1996 <sup>2</sup>	-
NA	IA	900-1307	Explosive Bonding Pit	HRR <sup>1</sup>	Annual 1999 <sup>23</sup>	-	-
NA	IA	900-1308	Gasoline Spill Outside of Building 980	Quarterly 6 <sup>16</sup>	Quarterly 8 <sup>15</sup> Annual 2001	Annual 2001	
NA	BZ	900-1309	OU 2 Field Treatability Unit Spill	Quarterly 6 <sup>16</sup>	Quarterly 7 <sup>9</sup> (900-1312) Quarterly 8 <sup>15</sup> Annual 1999 <sup>23</sup>	Annual 1999 <sup>23</sup>	2000 <sup>29</sup>

147

**Appendix 1. HRR Sites at RFETS.**

IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
NA	IA	900-1310	ITS Water Spill (identified as 000-502 in Quarterly 2; reassigned 900-1310 in Quarterly 7 <sup>9</sup> )	Quarterly 2 <sup>5</sup>	Quarterly 3 <sup>6</sup> Quarterly 7 <sup>9</sup>	-	-
NA	IA	900-1311	Septic Tank East of Building 991	Quarterly 7 <sup>9</sup>	Annual 1999 <sup>23</sup> Annual 2000 <sup>26</sup>	Annual 1999 <sup>23</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
NA	IA	900-1312	OU-2 Water Spill	Quarterly 7 <sup>9</sup>	Annual 1999 <sup>23</sup>	Annual 1999 <sup>23</sup>	1999 <sup>29</sup>
192	IA	900-1313	Seep Area Near OU-2 Influent	Quarterly 9 <sup>13</sup>	Annual 1999 <sup>23</sup>	Annual 1999 <sup>23</sup>	1999 <sup>29</sup>
101	IA	900-1314	Solar Evaporation Pond 207B Sludge Release	Quarterly 9 <sup>13</sup>	-	Quarterly 9 <sup>13</sup>	-
NA	IA	900-1315	Tanker Truck Release on East Patrol Road, North of Spruce Ave.	Quarterly 10 <sup>11</sup>	Quarterly 11 <sup>18</sup>	Quarterly 11 <sup>18</sup>	-
NA	BZ	900-1316	Elevated Chromium (total) Identified During Geotechnical Drilling	Quarterly 10 <sup>11</sup>	-	Quarterly 10 <sup>11</sup>	-
176	IA	900-1317	Soil Released from Wooden Crate in 964 Laydown Yard	Quarterly 11 <sup>18</sup>	-	Quarterly 11 <sup>18</sup>	-
NA	IA	900-1318	Release of F001 Listed Waste Water to Soil (identified as 900-1307 in Annual 1997; reassigned 900-1318 in Annual 1998)	Annual 1997 <sup>3</sup>	Annual 1998 <sup>7</sup> Annual 2000 <sup>26</sup>	Annual 1997 <sup>3</sup> Annual 2000 <sup>26</sup>	2001 <sup>31</sup>
<b>OFF-SITE AREA</b>							
199	3	OFF-SITE AREA 1	Off-Site Area 1	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 3 CAD/ROD <sup>22</sup>
200	3	OFF-SITE AREA 2	Great Western Reservoir	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 3 CAD/ROD <sup>22</sup>
201	3	OFF-SITE AREA 3	Standley Lake	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 3 CAD/ROD <sup>22</sup>

148

149

Appendix I. HRR Sites at RFEETS.							
IHSS	OU	PAC	Description	Identified	Updated	Proposed NFA	NFA Recommendation Approved
202	3	OFF-SITE AREA 4	Mower Reservoir	HRR <sup>1</sup>	Annual 1997 <sup>3</sup>	-	OU 3 CAD/RD <sup>22</sup>
<b>UNDER BUILDING CONTAMINATION</b>							
NA	IA	UBC-122	Building 122 (UBC-122)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-123	Building 123 (UBC-123)	HRR <sup>1</sup>	Annual 1998 <sup>7</sup>	-	-
NA	IA	UBC-125	Building 125 (UBC-125)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-331	Building 331 (UBC-331)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-371	Building 371 (UBC-371)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-374	Building 374 (UBC-374)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-439	Building 439 (UBC-439)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-440	Building 440 (UBC-440)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-441	Building 441 (UBC-441)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-442	Building 442 (UBC-442)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-444	Building 444 (UBC-444)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-447	Building 447 (UBC-447)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-528	Building 528 (UBC-528)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-559	Building 559 (UBC-559)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-701	Building 701 (UBC-701)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-707	Building 707 (UBC-707)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-731	Building 731 (UBC-731)	HRR <sup>1</sup>	-	-	-

<b>Appendix 1. HRR Sites at RFETS.</b>							
<b>IHSS</b>	<b>OU</b>	<b>PAC</b>	<b>Description</b>	<b>Identified</b>	<b>Updated</b>	<b>Proposed NFA</b>	<b>NFA Recommendation Approved</b>
NA	IA	UBC-770	Building 770 (UBC-770)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-771	Building 771 (UBC-771)	HRR <sup>1</sup>	Annual 2001	-	-
NA	IA	UBC-774	Building 774 (UBC-774)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-776	Building 776 (UBC-776)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-777	Building 777 (UBC-777)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-778	Building 778 (UBC-778)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-779	Building 779 (UBC-779)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-865	Building 865 (UBC-865)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-881	Building 881 (UBC-881)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-883	Building 883 (UBC-883)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-886	Building 886 (UBC-886)	HRR <sup>1</sup>	Annual 2001	-	-
NA	IA	UBC-887	Building 887 (UBC-887)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-889	Building 889 (UBC-889)	HRR <sup>1</sup>	-	-	-
NA	IA	UBC-991	Building 991 (UBC-991)	HRR <sup>1</sup>	-	-	-

150

- 1 *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO, June, 1992.
- 2 *Annual Update for the Historical Release Report*, RF/ER-96-0046, Rocky Flats Environmental Technology Site, Golden, CO, September, 1996.
- 3 *Annual Update for the Historical Release Report*, RF/RMRS-97-073.UN, Rocky Flats Environmental Technology Site, Golden, CO, September, 1997.
- 4 EPA, 1992. Correspondence to R. Schassburger, DOE RFO, from M. Hestmark, EPA Region VIII, RE: Potential Area of Concern Needing Further Investigation, December 23.
- 5 *Historical Release Report Second Quarterly Update, October 1, 1992 to January 1, 1993.*
- 6 *Historical Release Report, Third Quarterly Update, January 1, 1993 to April 1, 1993.*
- 7 *Annual Update for the Historical Release Report*, RF/RMRS-98-269.UN, Rocky Flats Environmental Technology Site, Golden, CO, September.
- 8 *Historical Release Report, Fourth Quarterly Update, April 1, 1993 to July 1, 1993.*
- 9 *Historical Release Report, Seventh Quarterly Update, January 1, 1994 to March 31, 1994.*
- 10 *Historical Release Report, Fifth Quarterly Update, July 1, 1993 to October 1, 1993.*
- 11 *Historical Release Report, Tenth Quarterly Update, October 1, 1994 to December 31, 1994.*
- 12 *Corrective Action Decision/Record of Decision for OU 16: Low Priority Sites*, Rocky Flats Environmental Technology Site, Golden, CO August, 1994
- 13 *Historical Release Report, Ninth Quarterly Update, July 1, 1994 to September 30, 1994.*
- 14 *Operable Unit 11 Final Combined Phases RFI/RI Report*, Rocky Flats Environmental Technology Site, Golden, CO, June, 1995.
- 15 *Historical Release Report, Eighth Quarterly Update, April 1, 1994 to June 30, 1994.*
- 16 *Historical Release Report, Sixth Quarterly Update, October 1, 1993 to January 1, 1994.*
- 17 *Historical Release Report, Twelfth Quarterly Update, April 1, 1995 to June 30, 1995.*
- 18 *Historical Release Report, Eleventh Quarterly Update, January 1, 1995 to March 31, 1995.*
- 19 CDPHE, 1998, *Excavated Soil Adjacent to Building 701 (cc mail from C. Spreng to L. Brooks)*, Rocky Flats Environmental Technology Site, Golden, CO, July.
- 20 *Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, February, 1997.
- 21 *Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures*, Rocky Flats Environmental Technology Site, Golden, CO, August, 1995.
- 22 *Final Corrective Action Decision/Record of Decision Declaration, Operable Unit 3*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, CO, July, 1997.
- 23 *Annual Update for the Historical Release Report*, RF/RMRS-99-428.UN, Rocky Flats Environmental Technology Site, Golden, CO, September, 1999.
- 24 *Historical Release Report, First Quarterly Report submitted September 30, 1992.*
- 25 KH, 2000, *Historical Release Report (Interim Update) and Response to Comments for HRR Annual Updates (1997, 1998 & 1999)*, Rocky Flats Environmental Technology Site, Golden, CO, September.

- 26 Annual Update for the Historical Release Report, KH-00-900.UN, Rocky Flats Environmental Technology Site, Golden, CO, September, 2000.
- 27 EPA, CDPHE, 1999. Correspondence to J. Legare, DOE RFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, RE: 1997 Annual HRR Review, July 9, 1999.
- 28 EPA, CDPHE, 1999. Correspondence to J. Legare, DOE RFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, RE: 1998 Annual HRR Review, July 9, 1999.
- 29 EPA, CDPHE, 2000. Correspondence to J. Legare, DOE RFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, RE: 1999 Annual HRR Review, June 23, 2000.
- 30 EPA, CDPHE, 2001. Correspondence to J. Legare, DOE RFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, RE: NFA PAC 100-607, April 12, 2001.
- 31 CDPHE, 2001, Preliminary Electronic Correspondence to M.C. Broussard, from C. Speng CDPHE, RE: 2000 Annual HRR Review, September 2001.

## Appendix 2

# Correspondence



Colorado Department  
of Public Health  
and Environment



July 9, 1999

Mr. Joe Legare  
RFCA Coordinator  
Department of Energy-RFFO  
P.O. Box 928  
Golden CO 80402-0928

RE: Annual Update for the Historical Release Report (September 1997)

Dear Mr. Legare:

The Colorado Department of Public Health and Environment (CDPHE) and the Environmental Protection Agency (EPA) have reviewed the 1997 Annual Update for the Historical Release Report. CDPHE and EPA are providing the attached comments and are also responding to recommendations for No Action or No Further Action (NFA) by categorizing each PAC/IHSS into three groups: 1. Concur with NFA, 2. More information required, and 3. Do not concur with NFA. To adequately justify NFA, each recommendation should include the specific criteria from RFCA Appendix 6 (as also described in the RFCA Implementation Guidance Document) which allow NFA to be proposed. If the justification is based on specific measurements or risk evaluations, then those values, exposure scenarios, etc. should be extracted from the original data source and summarized in text or tables. The adequacy of QA/QC that was performed on analyses should also be mentioned. In some cases, providing maps showing sampling locations would make a review of the narratives more complete and efficient.

1. The agencies concur with the recommendation for NFA for the following PACs/IHSSs:

300-715	400-191	800-107
700-1115	600-117.3	800-145
NE-111.1	600-152,	800-147.2
NE-156.2	800-102	900-113
NE-167.	800-103	900-119.1
SE-209	800-104	900-119.2
300-135	800-105.1	900-130
300-151	800-105.2	900-141
300-181	800-106	900-210
300-188		

2. The agencies require more information to be able to approve NFA for the following PACs/IHSSs:

900-1307	SW-133.6	600-189
NE-110	SW-1701	600-1001
NE-216.2	300-156.1	700-123.1
NE-216.3	600-164.1	700-1102
SW-133.5		

3. The agencies do not concur with the recommendation for NFA for the following PACs/IHSSs:

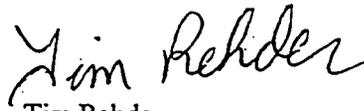
NE-142.1	NE-142.6	SE-142.10
NE-142.2	NE-142.7	SE-142.11
NE-142.3	NE-142.8	900-183
NE-142.4	NE-142.9	900-109
NE-142.5		

If you have any questions concerning these comments, please contact Carl Spreng at 303-692-3358 or Garv Kleeman at 303-312-6246.

Sincerely,



Steven H. Gunderson  
RFCA Project Coordinator  
Colorado Department of Public  
Health and Environment



Tim Rehder  
Rocky Flats Project Manager  
Environmental Protection Agency

cc: Norma Casteñeda, DOE  
Laura Brooks, K-H  
Nick Demos, RMRS  
Dan Miller, AGO  
Steve Tarlton, CDPHE-RFOU  
Susan Chaki, CDPHE

Colorado Department of Public Health and Environment  
Hazardous Materials and Waste Management Division  
and  
Environmental Protection Agency

comments on

Annual Update for the Historical Release Report  
September 1997 (Rev. 0)  
(RF/RMRS-97-073.UN)

---

1. PAC 300-715  
This narrative should identify the specific NFA criteria used to justify the NFA recommendation. In this case, a source evaluation was conducted, which indicated that no current or potential source exists.
2. PAC 700-1114  
The NFA recommendation should specify that sampling indicates no current or potential source exists.
3. PAC 700-1115  
The "RFCA UST cleanup thresholds" mentioned on page 12 should be identified.
4. PAC 900-1307  
The phrase "so that no current or potential source exists" should be added to the NFA recommendation. A summary of the analytical results (chemical and radiological) which confirmed the removal of contaminated soil must be included.
5. PAC NE-110 (IHSS 110)  
The Physical/Chemical Description of Constituents Released section on page 17 describes conditions and level of knowledge prior to the remedial action. It should be updated based on knowledge gained from taking the action.  
  
The "black material" mentioned in the second paragraph on page 18 should be identified as depleted uranium.  
  
The statement on page 18 that, "disposal of the 2,400 gallons of water and lathe coolant from Building 444 occurred in another trench and not T-3" should be documented and considered in determining the Environmental Restoration rankings for the remaining East Trenches.  
  
The justification for NFA should be that remaining contaminant levels are below action levels. However, the stated action levels ("cleanup values") have recently been modified as a part of the annual review process. The Tier I action levels for carbon tetrachloride

and tetrachloroethene (PCE) are 3.56 mg/kg and 3.15 mg/kg respectively. Therefore, one of the verification samples for PCE exceeds the Tier I action level and all three detections for PCE and the one for carbon tetrachloride exceed the Tier II action level. The text should be revised to state that, "These cleanup values were also consistent..." Leaving levels above Tier II action levels requires an explanation of how these levels are not expected to cause surface water to exceed standards. This explanation can refer to the condition in the PAM that source removal in the trench would be considered complete if verification samples were below cleanup levels or upon reaching groundwater or bedrock. The rationale for this condition was that any remaining contamination beyond these criteria would be subject to groundwater remediation.

The first statement in the Comments section should be revised to state, "Trenches T-1 through T-13..."

6. PAC-111.1 (IHSS 111.1)

The last sentence on page 21 should be revised to state that, "A letter to EPA..."

The 2,400 gallons of water and lathe coolant from Building 444, which are mentioned on page 20 as being disposed of in one of the East Trenches, has not been found in any of the trenches excavated so far. This should be considered when determining the Environmental Restoration rankings for the remaining East Trenches.

The justification for NFA should be that remaining contaminant levels in subsurface soil are below action levels. However, the stated action levels ("cleanup values") have recently been modified as a part of the annual review process. The Tier I action levels for trichloroethene (TCE) tetrachloroethene (PCE) are 3.28 mg/kg and 3.15 mg/kg respectively. Therefore, the trench bottom verification samples exceed the Tier I action level for TCE or PCE in primary grids 26, 29, 30, and 32. All detections above quantitation limits exceed Tier II action levels. The text should be revised to state that, "The cleanup values stipulated in the PAM (DOE, 1996c) were also consistent..." The agreement among the agencies concludes that the conditions for source removal in the PAM had been met once bedrock or groundwater was reached. The rationale for this condition was that any remaining contamination beyond these criteria would be subject to groundwater remediation. The changes to action levels does not affect the agreement among the agencies.

The approval of this NFA recommendation may need to be reviewed if radionuclide soil action levels are revised in the future.

7. PACs NE-142.1, NE-142.2, NE-142.3, & 142.4 (IHSSs 142.1, 142.2, 142.3, & 142.4)

Since this series of ponds serve as contaminant sinks and will continue to receive contaminants from the Site, particularly during continuing D&D and ER activities, it is premature to consider them for NFA. In addition, there is uncertainty about how the ponds will be used/managed in the future.

Instead of mentioning "low levels of radioactivity" on page 29, specific activity levels should be stated. On page 32, the "current and future onsite receptors" should be specified. The statement on page 33 that indicates that the OU 6 CAD/ROD is being prepared can be deleted.

8. PACs NE-142.5, NE-142.6, NE-142.7, NE-142.8 & 142.9 (IHSSs 142.5, 142.6, 142.7, NE-142.8 & 142.9)

Since this series of ponds will continue to receive contaminants from the Site, particularly during continuing D&D and ER activities, it is premature to consider them for NFA. It is also uncertain as to how the ponds will be managed in the future.

On page 39, the "current and future onsite receptors" should be specified. The statement on page 40 that indicates that the OU 6 CAD/ROD is being prepared can be deleted.

9. PAC NE-156.2 (IHSS 156.2)

The NFA justification should be that the AOC that included this PAC has passed the CDPHE conservative screen.

10. PAC NE-167.1 (IHSS 167.1)

The discussion on page 46 concerning the risk evaluation should identify the one current and four future receptors referred to by the statement, "all current and future onsite receptors." In Table 3, the units for two of the contaminants are expressed in units of volume rather than in units of mass as is usual.

11. PACs NE-216.2 & NE-216.3 (IHSSs 216.2 & 216.3)

The text on page 50 discussing NFA justification must be more specific. The statement that contamination associated with these IHSSs poses "no significant risk" is inadequate. The "remediation goals" to which the chromium concentrations were compared must be identified. If these goals are the PPRGs, the most recently revised PPRGs should be reviewed. The text should also report the measured radionuclide activity levels which support the statement that the surface soils are below levels which would produce a 15 mrem/year dose to an open space user. The 15 mrem/year dose to an open space user was not established as a Tier I action level since it is an order of magnitude greater than the 85 mrem dose to a resident. Therefore, the significance of comparing to that level is unclear and does not constitute grounds for NFA.

12. PACs NE-142.10 & NE-142.11 (IHSSs 142.10 & 142.11)

Since this series of ponds serve as contaminant sinks and will continue to receive contaminants from the Site, particularly during continuing D&D and ER activities, it is premature to consider them for NFA. In addition, there is uncertainty about how the ponds will be used/managed in the future.

The "SE" prefix should be removed from the IHSS Reference Numbers on page 51. The "low levels of radioactivity" mentioned on page 52 should be specified. On page 53, the "current and future onsite receptors" should be identified

13. PAC SE-209 (IHSS 209)  
The boundary for this IHSS does not contain the entire disturbed area evident on aerial photographs.
14. PAC SE-133.5 (IHSS 133.5)  
The discussion of the recommendation for NFA on page 59 should identify the "contaminants associated with the incinerator facility." The text should also report the measured radionuclide activity levels which support the statement that the surface soils are below levels which would produce a 15 mrem/year dose to an open space user. The 15 mrem/year dose to an open space user was not established as a Tier I action level since it is an order of magnitude greater than the 85 mrem dose to a resident. Therefore, the significance of comparing to that level is unclear and does not constitute grounds for NFA.
15. PAC SE-133.6 (IHSS 133.6)  
On page 59, the discussion of the recommendation for NFA should identify the "contaminants associated with the Concrete Wash Pad." The text should also report the measured radionuclide activity levels which support the statement that the surface soils are below levels which would produce a 15 mrem/year dose to an open space user. The 15 mrem/year dose to an open space user was not established as a Tier I action level since it is an order of magnitude greater than the 85 mrem dose to a resident. Therefore, the significance of comparing to that level is unclear and does not constitute grounds for NFA.
16. PAC SW-1701 (IHSS 1701)  
In the discussion of the recommendation for NFA on page 63, the "contaminants associated with the suspected ash pit finding" should be identified. The text should also report the measured radionuclide activity levels which support the statement that the surface soils are below levels which would produce a 15 mrem/year dose to an open space user. The 15 mrem/year dose to an open space user was not established as a Tier I action level since it is an order of magnitude greater than the 85 mrem dose to a resident. Therefore, the significance of comparing to that level is unclear and does not constitute grounds for NFA.
17. PAC 300-151 (IHSS 151)  
Since sampling indicates no current source exists, that is the NFA criterion that applies.
18. PAC 300-156.1 (IHSS 156.1)  
The justification for NFA cannot be based on: "All analytical data were below PRGs." This fact may allow for NFA justification based on a comparison to action levels (PPRG values are used as action levels for surface soil and for inorganics in subsurface soil), or through a risk evaluation. This section recommending NFA should include a summary of the analytical data which shows, by comparison to action levels or through a risk evaluation, that a NFA criterion is met.

19. PAC 400-191 (IHSS 191)  
The "exposure conditions" used to evaluate the "threat of adverse health effects" should be provided.
20. PACs 600-117.3 & 600-152 (IHSSs 117.3 & 152)  
The presumed disposal of contaminated asphalt in the East Trenches should be noted for Environmental Restoration Ranking.
21. PAC 600-164.1 (IHSS 164.1)  
The statement on page 90 that "there were no detections above PRGs..." does not specify either the values of the detections or the exposure scenario of the PRGs. This IHSS will likely qualify for one or more of the NFA criteria once this information is provided.
22. PAC 600-189 (IHSS 189)  
Since the location and quantities of acid releases are not documented, it is implausible to state on page 93 that "small amounts of acid spilled." The evidence and basis for proposing that the cumulative hazard indices for noncarcinogenic health effects are less than or equal to precisely 0.01 are also unclear. Neutralization may well have rendered the acid harmless and a few pH verification measurements would be relatively inexpensive and could support an NFA based on the lack of a current source.
23. PAC 600-1001  
The agencies concur that the source of the June 23, 1997 occurrence no longer exists and that this portion therefore qualifies for NFA. The rest of this PAC requires further investigation, as stated.
24. PAC 700-123.1 (IHSS 123.1)  
The statement on page 100 that, "No threat of adverse health effects exist under the exposure conditions evaluated" leaves the exposure scenario applied unspecified. The referenced OU 8 Data Summary Report is unavailable in the State records. If this report indicates that essentially no contamination remained when this IHSS was sampled, then the relevant NFA criterion is that no current source exists.
25. PAC 700-1102  
The updated subsurface soil action levels for Araclor 1260 are 5.31 mg/kg (Tier II) and 531 mg/kg (Tier I). Since the 70 ppm left in the subsurface exceeds the Tier II limit, an evaluation is required to determine if this level is protective of surface water and ecological resources.
26. PAC 800-147.2 (IHSS 147.2)  
The applicable criterion for no action is that sampling indicates that no source exists or that measured contaminant levels are below action levels for the appropriate medium.
27. PAC 900-109 (IHSS 109)  
The thermal desorption unit performance standards referenced in the NFA recommendation

1160

are not a NFA criterion. Neither are the PPRGs for a construction worker scenario, which are referenced in the Closeout Report for this IHSS. Analytical results of confirmation samples along the south wall of the trench exceed current Tier II action levels for several VOCs: PCE, TCE, toluene, and ethylbenzene. This exceedance requires an evaluation of the impacts of these remaining contaminants on surface water and ecological resources. The south wall confirmation samples also exceed the Tier I action levels for PCE and TCE. This IHSS cannot, therefore, be considered for NFA.

28. PAC 900-113 (IHSS 113)

The justification for NFA needs to additionally state that by meeting the PAM objectives, specific NFA criteria were also met. At the top of page 135, IHSS 113 is referred to as PAC NE-113 rather than PAC 900-113.

29. PAC 900-130 (IHSS 130)

The northing for the approximate location should apparently be N748,000 rather than N746,000. In three instances in the text, this IHSS is referred to as PAC 800-130 rather than PAC 900-130 as in the title and in the Table of Contents. The meaning and relevance of the second sentence at the top of page 145 is unclear, particularly its reference to PAC 800-145.

30. PAC 900-141 (IHSS 141)

The statement on page 147 that, "In June 1973, air samples...were unusually high..." is vague and should specify the contaminant and the measurement. The HHRA results indicate that the AOC which includes IHSS 141 would pass a risk evaluation and the CDPHE Conservative Screen. This should be stated as the NFA justification. This discussion should also mention which specific current and future onsite receptors the HHRA assessed. The Comment section mentions that the PAC boundary was extended to include the area of the sludge drying beds. This seems to be in contrast to the Fate of Constituents Released to Environment section which states that this area is being investigated as a separate action.

31. PAC 900-183 (IHSS 183)

One nearby borehole is not sufficient to characterize this building which contained toxic gases. This IHSS should be treated similarly to other IHSSs associated with buildings. Once the 903 Lip Area remediation allows access and the building is down, the slab can be tested (e.g., rinsate sampling or chips). If warranted by these tests, additional soil samples adjacent to or under the slab can be analyzed.

32. PAC 900-210 (IHSS 210)

"No positive detections" indicates that the appropriate no action justification for this IHSS is that no current or potential source could be found.



Colorado Department  
of Public Health  
and Environment



July 9, 1999

Mr. Joe Legare  
RFCA Coordinator  
Department of Energy-RFFO  
P.O. Box 928  
Golden CO 80402-0928

RE: Annual Update for the Historical Release Report (September 1998)

Dear Mr. Legare:

The Colorado Department of Public Health and Environment (CDPHE) and the Environmental Protection Agency (EPA) have reviewed the 1998 Annual Update for the Historical Release Report. CDPHE and EPA are providing the attached comments and are also responding to recommendations for No Action or No Further Action (NFA) by categorizing each PAC/IHSS into three groups: 1. Concur with NFA, 2. More information required, and 3. Do not concur with NFA. To adequately justify NFA, each recommendation should include the specific criteria from RFCA Appendix 6 (as also described in the RFCA Implementation Guidance Document) which allow NFA to be proposed. If the justification is based on specific measurements or risk evaluations, then those values, exposure scenarios, etc. should be extracted from the original data source and summarized in text or tables. The adequacy of QA/QC that was performed on analyses should also be mentioned. In some cases, providing maps showing sampling locations would make a review of the narratives more complete and efficient.

1. The agencies concur with the recommendation for NFA for the following PACs/IHSSs:
- |          |         |           |
|----------|---------|-----------|
| 700-1117 | NW-203  | 400-800   |
| NE-1405  | NW-1500 | 400-811   |
| NE-1406  | 000-172 | 700-150.5 |
| NW-174B  | 100-608 |           |

162

2. The agencies require more information to be able to approve NFA for the following PACs/IHSSs:

NW-170  
500-169

NE-1404

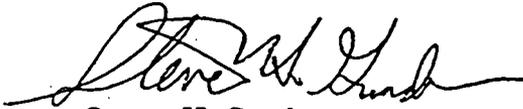
900-1318

3. The agencies do not concur with the recommendation for NFA for the following PAC/IHSS:  
NW-174A

900-140

If you have any questions concerning these comments, please contact Carl Spreng at 303-692-3358 or Gary Kleeman at 303-312-6246.

Sincerely,



Steven H. Gunderson  
RFCA Project Coordinator  
Colorado Department of Public  
Health and Environment



Tim Rehder  
Rocky Flats Project Manager  
Environmental Protection Agency

cc: Norma Casteñeda, DOE  
Laura Brooks, K-H  
Nick Demos, RMRS  
Dan Miller, AGO  
Steve Tarlton, CHPHE-RFOU  
Susan Chaki, CDPHE

Colorado Department of Public Health and Environment  
Hazardous Materials and Waste Management Division  
and  
Environmental Protection Agency

comments on

Annual Update for the Historical Release Report  
September 1998 (Rev. 0)  
(RF/RMRS-98-269.UN)

---

1. PAC 700-1117  
The NFA criterion is that analytical results for all contaminants are below Tier II action levels.
2. PAC NE-1404  
Analytical data are described in the text as being from the excavated soil. The data sheet, however, indicates a water matrix. BTEX and TPH analyses should be performed on the remaining soil to confirm the assumption that no source remains.
3. PAC NW-170 (IHSS 170)  
A review of this narrative suffers from a lack of primary data available to the agencies. The referenced Data Summary Report (RMRS, 1997) is not in the CDPHE records and presumably was not submitted to the State or to EPA. The "internal investigation report" that was generated following the "unknown powder incident" in 1987 is also not available.

While the soil-gas survey reported in Technical Memorandum 1 detected acetone, benzene, methane, tetrachloroethene, 1,1,1-trichloroethane, and trichloroethene, the analytical results for subsurface soil in Table 1 of this narrative reports analyses for only methylene chloride and naphthalene. The last sentence of the first paragraph on page 27 is unclear since the Tier I action level for naphthalene in subsurface soil is  $1.01 \times 10^4$  mg/kg. It is expected that the detected amounts of trichlorotrifluoroethane are below hazardous levels. Slope factors for this compound are not available in sources used for PPRG calculations (IRIS, HEAST, etc.).

The NFA recommendation states that VOC concentrations in subsurface soil are below Tier I action levels. The 1997 Data Summary Report needs to be provided so that the subsurface soil concentrations can be checked against the new Tier II subsurface soil action levels. The NFA recommendation can also mention that the analytical results for surface soil reported in Technical Memorandum 1 are all below Tier II action levels for surface soil. Once the above-mentioned data has been provided for review, it is expected that this IHSS can be approved for no further action.

4. PAC NW-174A and NW-174B (IHSS 174)

The referenced Data Summary Report (RMRS, 1997) is not in the CDPHE records and presumably was not submitted to the State or EPA. The action levels mentioned in the discussion of the results of this report have been revised. The PCE concentration in Borehole 17497 exceeds the new Tier I subsurface soil action level of 3,150 µg/kg which triggers a removal action. The groundwater in this same borehole exceeds the Tier I PCE action level, so that the necessity of an action to protect surface water must be evaluated. The TCE subsurface soil concentration in Borehole 18997 exceeds the new Tier II action level of 32.8 µg/kg which likewise requires an evaluation of impacts to surface water.

Particularly since the Draft Summary Report is unavailable, the isotopic results for the surface soil analyses, as well as the background values against which they were measured, should be included in the narrative. In spite of "administrative controls to prevent radioactively contaminated material from being shipped to the yard," the "unknown powder incident" described in the IHSS 170 narrative occurred in 1987. External radiation monitoring did not prevent storage of radioactively-contaminated materials with at least moderate activity levels.

The exceedances of Tier I subsurface soil and groundwater action levels at IHSS 174A precludes a NFA recommendation. The agencies can consider the NFA recommendation for IHSS 174B once the 1997 Draft Summary Report is provided.

5. PAC NW-203 (IHSS 203)

The surface soil action levels for cobalt, copper, vanadium, Aroclor 1254, and Aroclor 1260 listed in Table 1 on page 38 have been modified slightly as part of the PPRG annual review process. The reported analytical results are still well below the revised action levels.

6. PAC 000-172 (IHSS 172)

The referenced OU 8 Data Summary (DOE, 1995) is not in the CDPHE records and presumably was not submitted to the State. In Table 1, the correct Tier II surface soil action level for benzo(a)pyrene is 0.784 mg/kg.

7. PAC 100-608

The criterion for NFA should be that no current or potential source in soils has been detected.

8. PAC 400-800

The cleanup levels in TSCA guidance are not established as NFA criteria. The criterion for NFA should be that the PCB concentrations are all below Tier II action levels.

9. PAC 400-811

The cleanup levels in TSCA guidance are not established as NFA criteria. The criterion for NFA should be that the PCB concentrations are all well below Tier I action levels. All PCB analyses, with the exception of Aroclor 1248, are below Tier II action levels as

1165

well. The highest Araclor 1248 concentration is barely above that action level so no action is required.

10. PAC 500-169 (IHSS 169)

The agencies concur that it is reasonable to conclude that no current or potential threat exists due to the possible spill of hydrogen peroxide. However, information in this narrative alluding to a buried drum suggests that other drums, possibly with more hazardous constituents, may have been buried in the area. Before potential drum burial sites such as the chemical storage yard are considered for NFA, characterization activities should include attempts to locate buried drums. The referenced OU 13 documents indicate that no efforts to locate potentially buried drums were conducted or proposed.

11. PAC 900-140 (IHSS 140)

The list of metal COCs does not correspond with the list of metallic compounds and residues known to have been buried at this site. Possible conclusions are that boreholes were not suitably located or that the list of metals handled at the site is incomplete. Sampling in IHSS 140 appears to have occurred around the periphery rather than in the middle of the IHSS raising concerns that contamination may have been missed. Several of the isoconcentration maps in the OU 2 report appear to indicate a source in IHSS 140 for several contaminants seen in the Alluvial/Colluvial UHSU flow system.

The phrase, "in  $\mu\text{g}/\text{Kg}$ ", should be deleted from the heading for Table 1 on page 86 since this differs from the units given in the table itself. This table should show that, according to the OU 2 RFI/RI Report, carbon tetrachloride, cis-1,3-dichloropropene, methylene chloride, tetrachloroethene, and trichloroethene exceed the new Tier II action levels for subsurface soil. The reported range of values for arsenic exceeds the Tier II action level for open space use. The collection of composite samples, rather than discrete samples, in the boreholes (over a 6-foot interval for all but the VOC analyses), which may have diluted the levels of contamination, is also a concern.

12. PAC 900-1318

The phrase "so that no current or potential source exists" should be added to the NFA recommendation. A summary of the analytical results (chemical and radiological) which confirmed the removal of contaminated soil must be included.

146



Colorado Department  
of Public Health  
and Environment

June 23, 2000



Mr. Joe Legare  
Assistant Manager for Environment  
and Infrastructure  
Department of Energy-RFFO  
P.O. Box 928  
Golden CO 80402-0928

RE: Annual Update for the Historical Release Report (September 1999)

Dear Mr. Legare:

The Colorado Department of Public Health and Environment (CDPHE) and the Environmental Protection Agency (EPA) have reviewed the 1999 Annual Update for the Historical Release Report. This report proposes three new PACs, updates existing IHSSs/PACs with additional information including the results of characterization and remediation activities, and makes recommendations for No Further Action (NFA). The agencies concur with the recommendations for NFA for the following PACs/IHSSs:

900-1309	900-1312	900-1313	NW-74B
NW-1501	NE-1408		

The agencies need further information, as explained in the attached comments, to be able to concur with the recommendation for NFA for the following PACs/IHSSs:

NE-1409	NW-170	900-1311
---------	--------	----------

If you have any questions concerning these comments, please contact Carl Spreng at 303-692-3358 or Gary Kleeman at 303-312-6246.

Sincerely,

Steven H. Gunderson  
RFCA Project Coordinator  
Colorado Department of Public  
Health and Environment

Tim Rehder  
Rocky Flats Project Manager  
Environmental Protection Agency

cc: Norma Casteñeda, DOE  
Laura Brooks, K-H  
Nick Demos, RMRS

Dan Miller, AGO  
Steve Tarlton, CHPHE-RFOU  
Susan Chaki, CDPHE

Colorado Department of Public Health and Environment  
Hazardous Materials and Waste Management Division

comments on

Annual Update for the Historical Release Report  
September 1999  
(RF/RMRS-99-428.UN)

---

1. PAC #000-504 (New Process Waste Lines)

This PAC identifies 3 documented releases from the NPWL and 4 potential waste streams in overlapping OPWL and NPWL. It is understood that the releases identified in this update may not be all of the possible releases that have occurred.

2. PAC #000-505 (Storm Drains)

This PAC identifies several releases/discharges into the storm drains associated with specific buildings. Again, it is understood that these may not be the only areas of concern for this PAC.

3. PAC SE-1602 (East Firing Range)

The two possible contaminants identified for this PAC are lead and depleted uranium. Additional information needs to be provided regarding other activities that may have been conducted at the range. These are:

- Were weapons cleaned at the east firing range? If so, or if this can not be determined, then solvents may need to be included as possible contaminants of concern.
- Was there any shell reloading or management of the propellant/explosives at this site? If so, or if this can not be determined, then explosives and other metals associated with the propellants may need to be included as possible contaminants of concern.
- Possible radiological concerns due to contaminant contribution from other sources, such as the 903 Pad need to be considered, since the presence of these contaminants may cause interference and safety concerns during the investigation of the East Firing Range.

4. PAC NE-1408 (OU2 Test Well)

The appropriate values to compare to the detections listed in Table 3.2 are the Tier II Groundwater Action Levels. The basis for the "Regulatory Limits" listed in the right-hand column is unclear.

5. PAC NE-1409 (Interceptor Trench Pump House)

In Table 3.5, the superscripted "2" on the mean for the cadmium results should probably be a "3". The appropriate values to compare to the detections listed in this table are the surface water standards. The reported mean values for cadmium, silver, carbon tetrachloride, tetrachloroethene, trichloroethene, and cyanide exceed those standards. Neither this table nor the text locate this sampling station in relation to the PAC or explain the relationship of these analyses to the PAC.

In Table 3.7, the correct values for the Surface Soil Tier I and Tier II Action Levels for methylene chloride are 7.63E+02 and 7.63E+04 respectively.

6. PAC NW-170 (PU&D Storage Yard)

The levels of methylene chloride reported in Table 3.9 indicate an analytical system problem and even a potential risk to lab workers in some cases. The significantly higher results for Boreholes #17797 and #18197 cannot be explained away as lab contamination.

The recommendation for NFA on page 42 ignores the Subsurface Soil Tier II Action Level, the level at which contamination may leach into groundwater at levels which could impact surface water above the standards. The statement that, "IHSS 170 poses no threat to either surface water or ground water, and therefore, is proposed for NFA" is not justified by the text. An acceptable justification could include some of the information in the last paragraph in this section, which explains that a VOC plume has been identified and is being monitored under the Integrated Water Management Plan.

7. PAC NW-174A (Drum Storage Facility)

The recently proposed geostatistical sampling methods could be applied to the detections of beryllium and vanadium to predict if and where additional sampling may be necessary.

There is inadequate data to support the assertion that the contamination in IHSS 174A has stabilized as stated on page 54. BH17497 was not completed as a well nor included in the IMP; therefore, there is no trend data indicating the source to ground water is stable. Please refer to CDPHE comments in correspondence on February 7, 2000.

8. PAC 900-108 (Trench T-1)

The disposition of Trench 1 waste was part of the original milestone for this removal project. Page 65 of this update states that this waste will remain in interim storage until an appropriate treatment process can be identified. The status of this search for a treatment process should be reported, either in the next annual HRR update or in separate correspondence.

9. PAC 900-1311 (Septic Tank East of Building 991)

Attempts should be made to calculate appropriate action levels for those contaminants lacking one, rather than compare concentrations to Region 3 values, which are based on ingestion only. Alternative references for physical parameters (subsurface soil) and slope factors or toxicity factors (surface soil) could be used. Since these contaminants have been detected in the environment at RFETS, these newly calculated action levels should be added to the RFCA Attachment 5 tables.



Colorado Department  
of Public Health  
and Environment



---

April 12, 2001

Mr. Joe Legare  
Assistant Administrator for Environment and Infrastructure  
U.S. Department of Energy-RFFO  
10808 Highway 93, Unit A  
Golden CO 80401-8200

RE: NFA Justification Document for the Building 111 Transformer Area (PAC 100-607)

Dear Mr. Legare:

The Colorado Department of Public Health and Environment and the Environmental Protection Agency have reviewed the Interim Update for the Historical Release Report dated April 6, 2001. The agencies concur with the justification for no further action. A No-Further-Action status is therefore approved for PAC 100-607.

If you have any questions concerning the approval of this document, please contact Carl Spreng of CDPHE at 303-692-3358 or Gary Kleeman of EPA at 303-312-6246.

Sincerely,

Steven H. Gunderson  
RFCA Project Coordinator  
Colorado Department of Public  
Health and Environment

Tim Rehder  
Rocky Flats Project Manager  
Environmental Protection Agency

cc: Norma Castaneda, DOE  
Dave Shelton, K-H  
Lane Butler, K-H  
Administrative Record, B850

Dan Miller, AGO  
Susan Chaki, CDPHE  
Steve Tarlton, CDPHE-RFOU

## Appendix 3

### Areas of (Non RFCA) Soil Put-back

171

# Appendix 4

## Plates

THIS TARGET SHEET REPRESENTS AN  
OVER-SIZED MAP / PLATE FOR THIS DOCUMENT:  
(Ref: 01-RF-02273; JLB-021-01)

# **Annual Update Historical Release Report**

(August 1, 2000 through August 1, 2001)

**September 27, 2001**

**Plate 1:**

## **Individual Hazardous Substance Sites by Consolidated Operable Unit**

As of September 2001

Map ID: 01-0916

September 24, 2001

**CERCLA Administrative Record Document, SW-A-004400**

U.S. DEPARTMENT OF ENERGY  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

THIS TARGET SHEET REPRESENTS AN  
OVER-SIZED MAP / PLATE FOR THIS DOCUMENT:  
(Ref: 01-RF-02273; JLB-021-01)

# **Annual Update Historical Release Report**

(August 1, 2000 through August 1, 2001)

**September 27, 2001**

**Plate 2:**

## **No Further Action Individual Hazardous Substance Sites and Potential Areas of Concern**

(Including Proposed NFAs)

As of September 2001

Map ID: 01-0916

September 24, 2001

**CERCLA Administrative Record Document, SW-A-004400**

U.S. DEPARTMENT OF ENERGY  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

THIS TARGET SHEET REPRESENTS AN  
OVER-SIZED MAP / PLATE FOR THIS DOCUMENT:  
(Ref: 01-RF-02273; JLB-021-01)

# **Annual Update Historical Release Report**

(August 1, 2000 through August 1, 2001)

**September 27, 2001**

**Plate 3:**

## **Original Process Waste Lines and New Process Waste Lines**

**Map ID: 01-0916**

**September 20, 2001**

**CERCLA Administrative Record Document, SW-A-004400**

U.S. DEPARTMENT OF ENERGY  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO

THIS TARGET SHEET REPRESENTS AN  
OVER-SIZED MAP / PLATE FOR THIS DOCUMENT:  
(Ref: 01-RF-02273; JLB-021-01)

# **Annual Update Historical Release Report**

(August 1, 2000 through August 1, 2001)

**September 27, 2001**

**Plate 4:**

## **Potential Areas of Concern and Under Building Contamination Sites**

**As of September 2001**

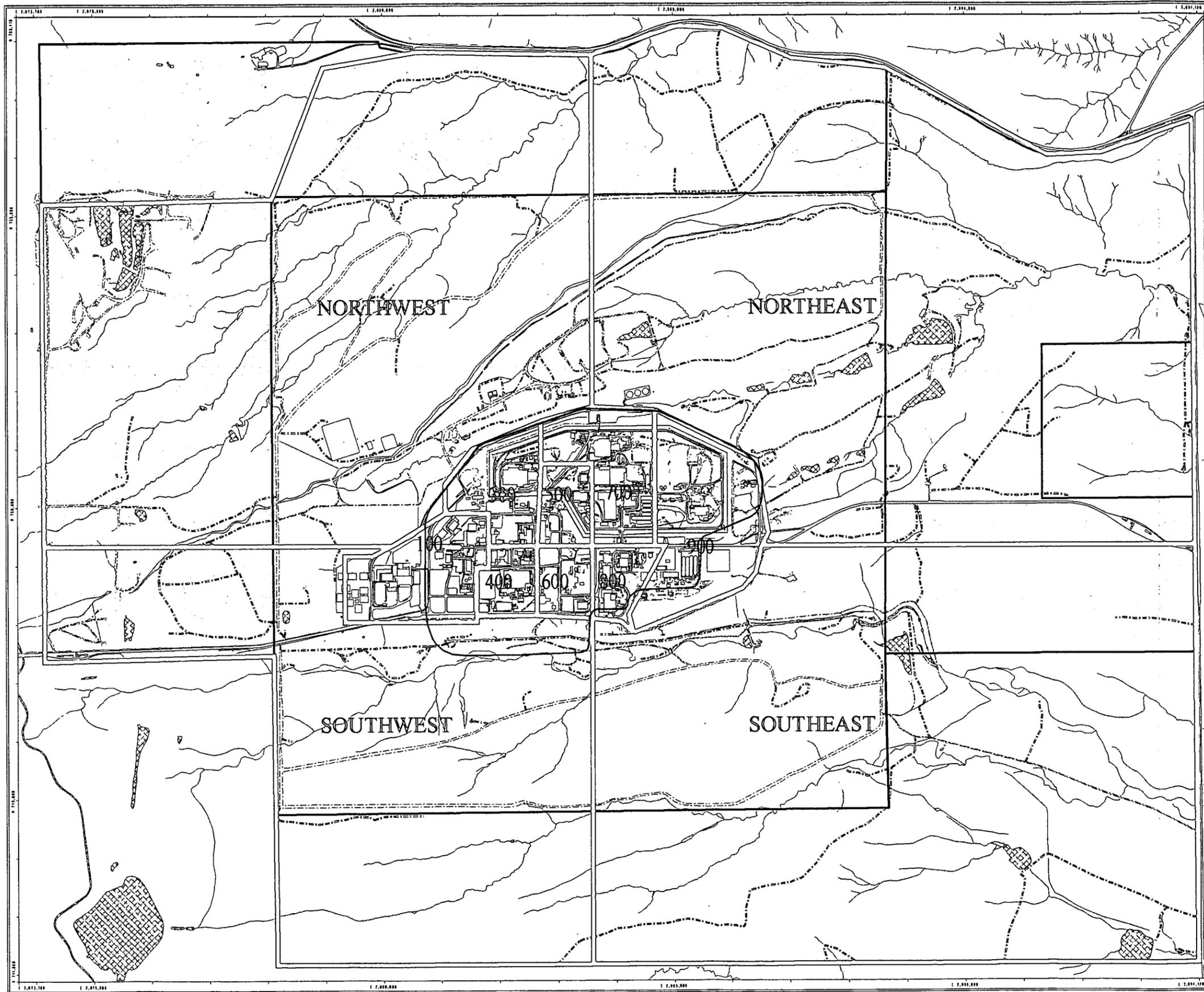
**Map ID: 01-0916**

**September 24, 2001**

**CERCLA Administrative Record Document, SW-A-004400**

U.S. DEPARTMENT OF ENERGY  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO



**Figure 1.1**  
**Historical Release Report**  
**PAC Area Boundaries**

- EXPLANATION**
- PAC Area Designation Boundary
  - Industrial Area Boundary
  - Property Purchase Boundary
  - 1951 Purchase (2,558 Acres)
  - 1974 Purchase
  - 1975 Purchase
  - 1976 Purchase
- (13,936 Acres)
- Standard Map Features**
- Buildings and other structures
  - Lakes and ponds
  - Streams, ditches, or other drainage features
  - 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 RSI, Las Vegas. Digitized from the orthophotographs, 1995.

**NOTES:**  
 All IHSS and PAC Area Boundaries are Approximate. For more detail, please contact Nick Demas (N4805) for the following document: Historical Release Report (HRR) September 2001 Annual Update.

Scale = 1 : 21330  
 1 inch represents approximately 1776 feet  
  
 State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

U.S. Department of Energy  
 Rocky Flats Environmental Technology Site  
 GIS Dept. 303-858-7707

Prepared by: **DynCorp** THE ART OF TECHNOLOGY  
 Prepared for: **KAISER HILL** COMPANY

MAP ID: 01-0016 September 16, 2001

NT\_Svr h:\projects\fy2001\01-0916\pac\_bdy\_prop\_bdy\_fig1.1.am

# North Firing Range PAC NW-1505 (2.7 Acres)

Bermed Area

Building 303

IHSS 170  
PU & D Yard

**Figure 2.1**  
**Historical Release Report**  
**PAC NW-1505**

**EXPLANATION**

 PAC NW-1505

**Standard Map Features**  
Streams, ditches, or other drainage features

 Fences and other barriers

 Paved roads

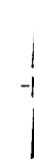
 Dirt roads

**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. 1/95*

**NOTES:**

All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4605) for the following document:  
Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 810  
1 inch represents approximately 68 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

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

GIS Dept. 303-866-7707

Prepared by:

**DynCorp**

THE ART OF TECHNOLOGY

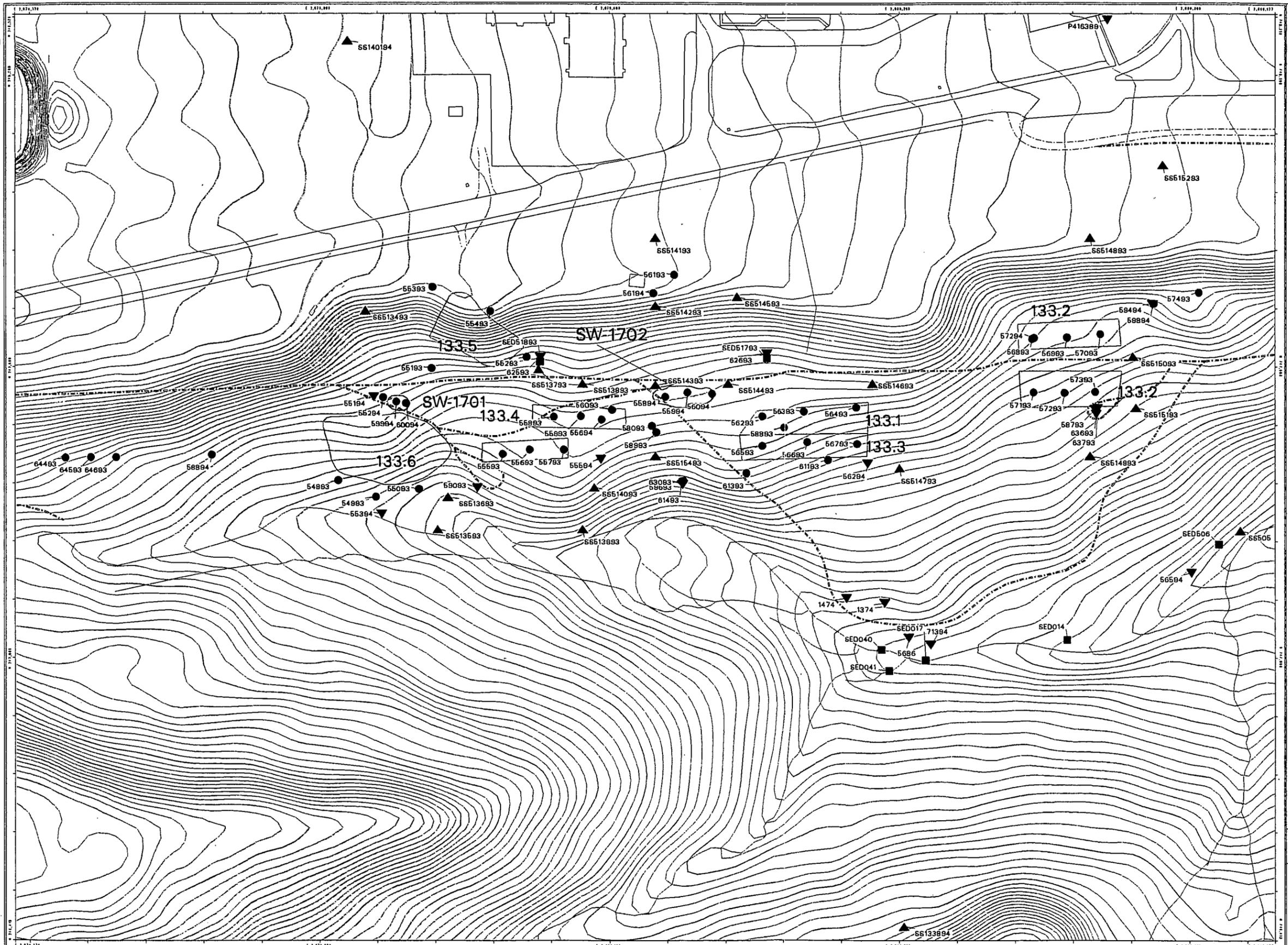
Prepared for:



KAISER-HILL  
COMPANY

MAP ID: 01-0916

September 19, 2001



**Figure 2.2**  
**Historical Release Report**  
**Ash Pit Boundary Changes**  
 IHSS 133.1  
 IHSS 133.2  
 IHSS 133.3  
 IHSS 133.4  
 IHSS 133.5  
 IHSS 133.6  
 PAC SW-1701  
 PAC SW-1702

- EXPLANATION**
- Subsurface Soil
  - ▲ Surface Soil
  - Sediment
  - ▼ Groundwater Well
  - OU5 (IHSS)
  - PAC
- Standard Map Features**
- ▭ Buildings and other structures
  - Streams, ditches, or other drainage features
  - Topographic Contour (2-Foot)
  - == 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 RSI, Las Vegas. Digitized from the orthophotographs, 1/95. Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LANTICE to process the DEM data to create 2-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.

**NOTES:**  
 All IHSS and PAC's Boundaries are Approximate. For more detail, please contact: Rich Demare (744551) for the following document: Historical Release Report (HRR) September 2001 Annual Update

  
 Scale = 1 : 2460  
 1 inch represents 205 feet  
  
 State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

Prepared by: **DynCorp**  
 THE ART OF TECHNOLOGY

Prepared for: **KAISER HILL COMPANY**

GIS Dept. 303-866-7707  
 MAP ID: 01-0681  
 September 16, 2001

**Figure 2.3**  
**Historical Release Report**  
**Ash Pits**  
**HPGe Data for**  
**Americium 241 (pCi/g)**

**EXPLANATION**

- HPGe Location
- OU5
- PAC
- ∩ HRR Zone Boundary
- ∩ Industrial Area Boundary

**Standard Map Features**

- Buildings and other structures
- ▨ Lakes and ponds
- Streams, ditches, or other drainage features
- Topographic Contour (2-Foot)
- 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, 1/95  
 Topographic contours were derived from digital elevation model (DEM) data by Merison Knudson (MK) using ESRI Arc TIN and LANTICE to process the DEM data to create 2-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.

**NOTES:**  
 All OU5 and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X49051) for the following document:  
 Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 2520  
 1 inch represents 210 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

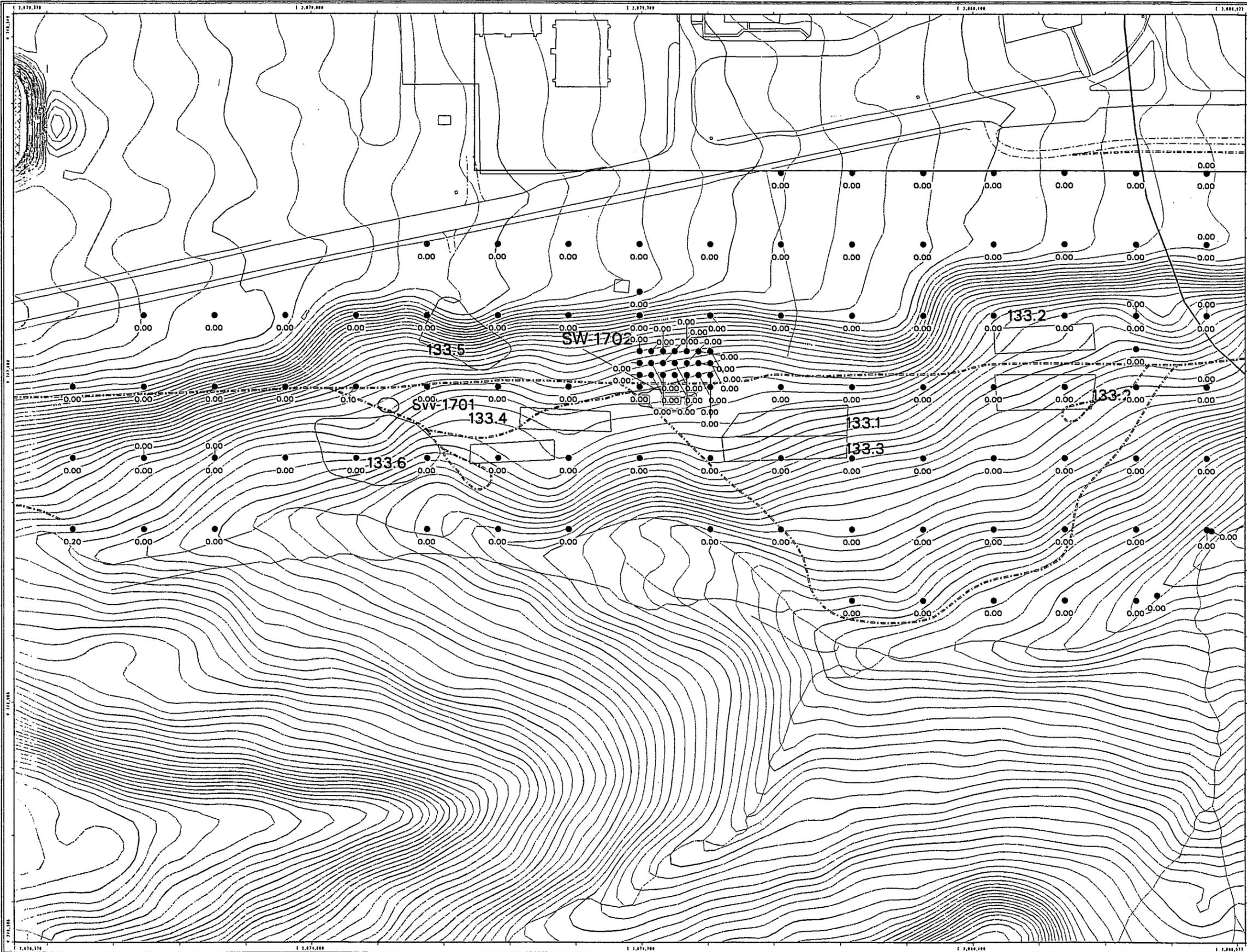
U.S. Department of Energy  
 Rocky Flats Environmental Technology Site

GIS Dept. 303-868-7707

Prepared by: **DynCorp** THE ART OF TECHNOLOGY

Prepared for: **KAISER HILL COMPANY**

MAP ID: 01-0681 September 18, 2001



**Figure 2.4**  
**Historical Release Report**  
**Ash Pits**  
**HPGe Data for**  
**Uranium 235 (pCi/g)**

**EXPLANATION**

- HPGe Location
- OU5
- PAC
- ∩ HRR Zone Boundary
- ∩ Industrial Area Boundary

**Standard Map Features**

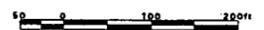
- Buildings and other structures
- ▨ Lakes and ponds
- Streams, ditches, or other drainage features
- Topographic Contour (2-Foot)
- Paved roads
- - - Dirt roads

**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 orthophotograph, 1/95. 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 2-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.

**NOTES:**  
 All HRR and PAC boundaries are approximate. For more detail, please contact Rick Demos (X4905) for the following document:  
 Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 2520  
 1 inch represents 210 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

GIS Dept. 803-866-7707

Prepared by:

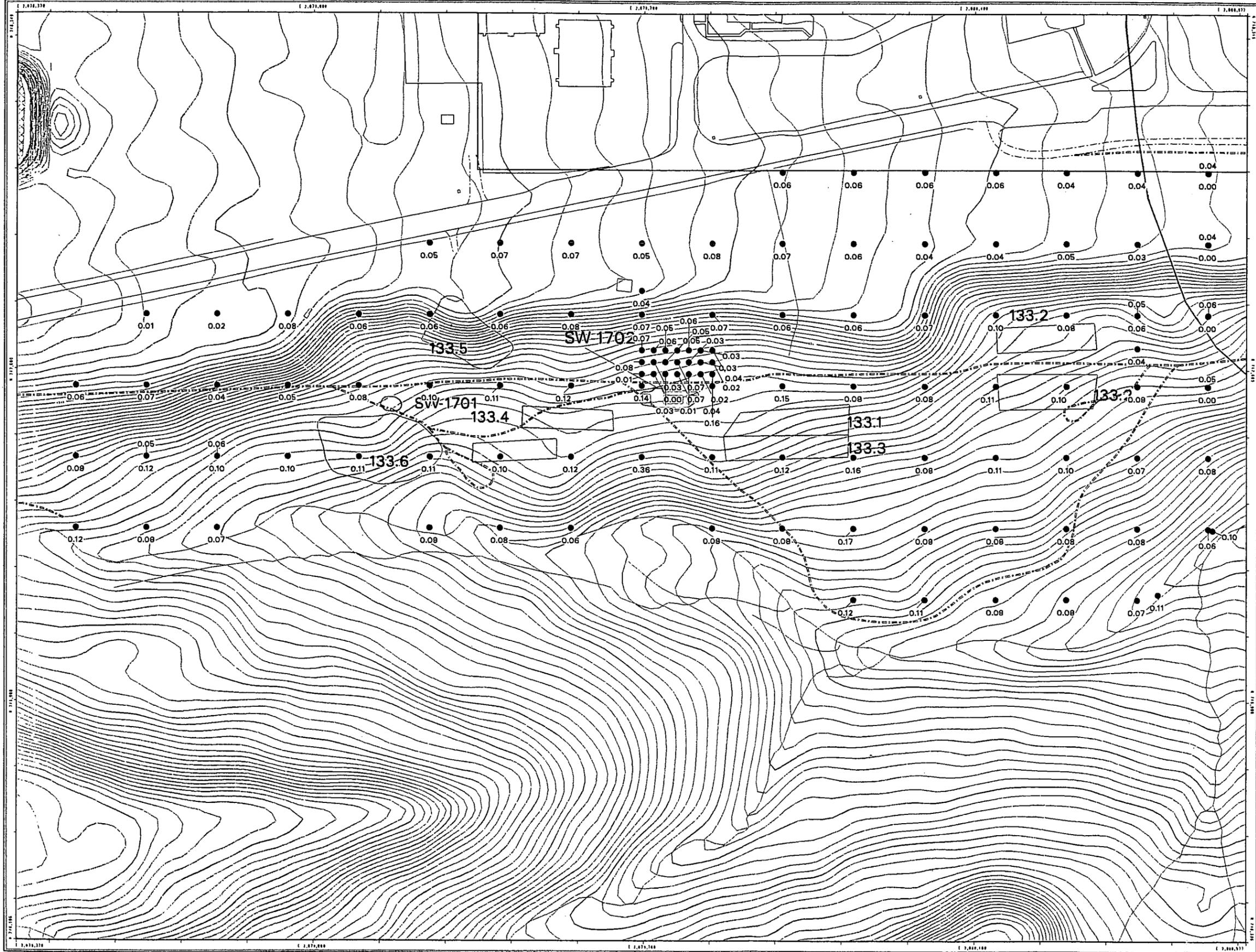


Prepared for:



MAP ID: 01-0681

September 18, 2001





**Figure 2.6**  
**Historical Release Report**  
**PAC 100-603**

**EXPLANATION**

- ⊗ HDD Soil Sample Location
- ⊙ Manhole
- ⊕ Geoprobe Soil Sample Location
- ⊗ HDD Soil Sample Location

**Process Waste Lines**

- ∧ P1 1972
- ∧ P1 1989
- ∧ Horizontal Borehole

**Potential Areas of Concern**

- Potential Area of Concern
- Casing Advancement Frame Assembly (CAFA) Trench Location

**Standard Map Features**

- Buildings and other structures
- Paved roads fill
- Fences and other barriers
- Paved roads

**NOTES:**

- VV = Valve Vault
- WPS = Waste Pumping Station
- SP = Sump Pit
- MH = Manhole

The Original and New Process Waste Line locations shown on map are approximate and should not be used for determining the line location when performing excavation work.

All HDDS and PAC's Boundaries are Approximate. For more detail, please contact Rick Dumas (RDUMAS) for the following document: Historical Release Report (HRR) September 2001 Annual Update



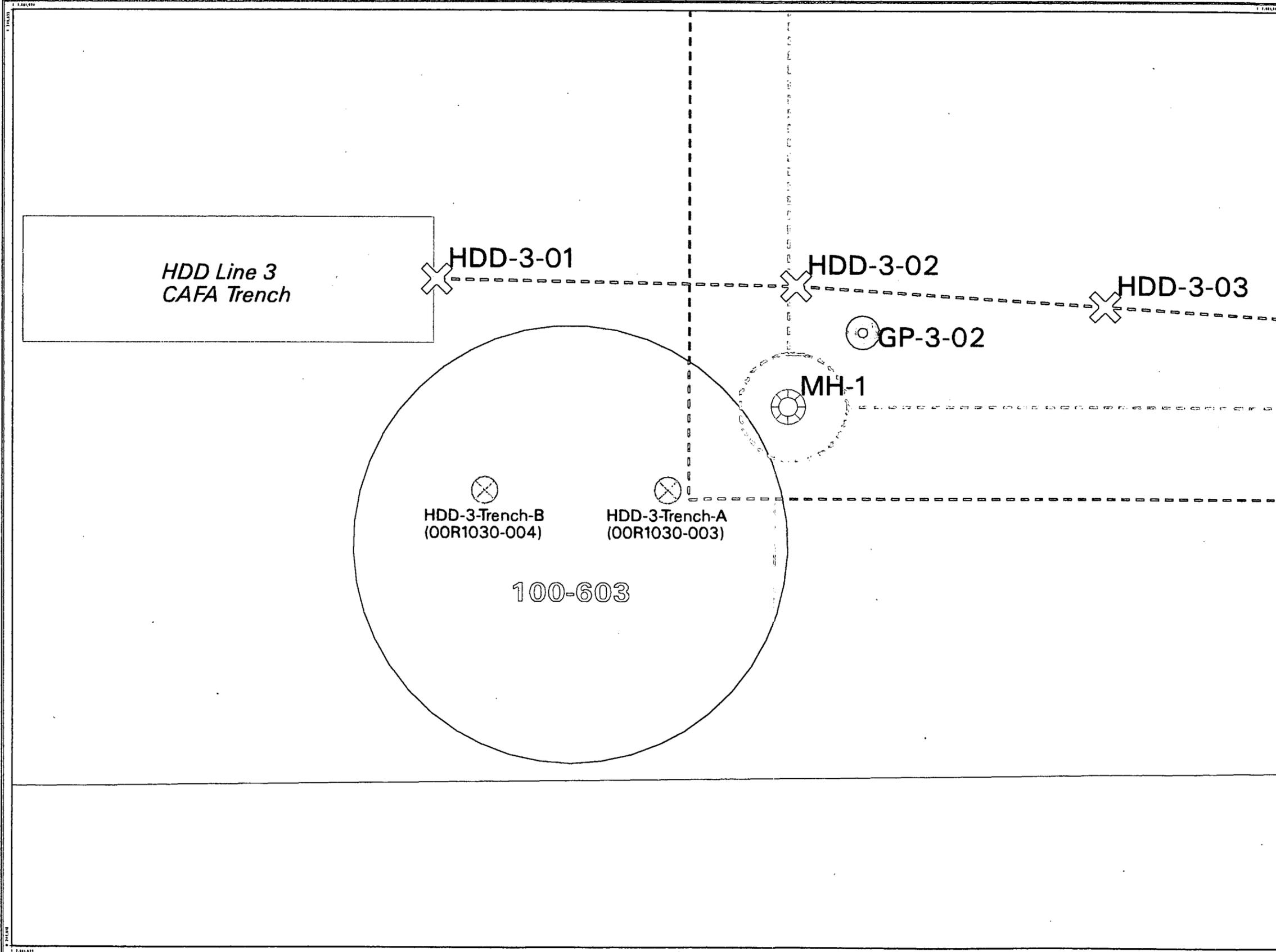
Scale = 1 : 60  
 1 inch represents 6 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

Prepared by: GIS Dept. 303-866-7707  
 Prepared for:



58

NT\_Svr h:\projects\fy2001\01-0916\pac100-603\_fig2-6.am

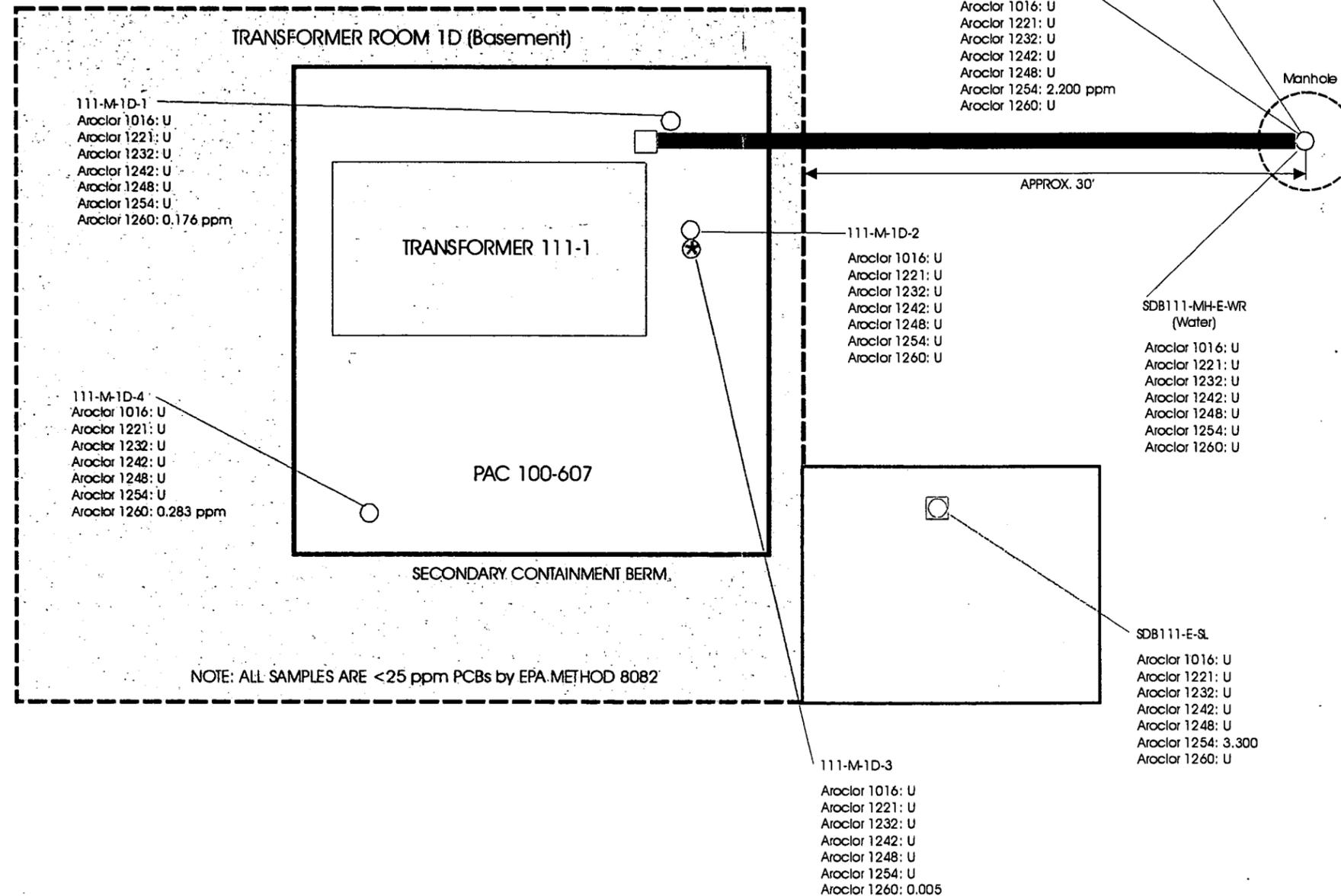
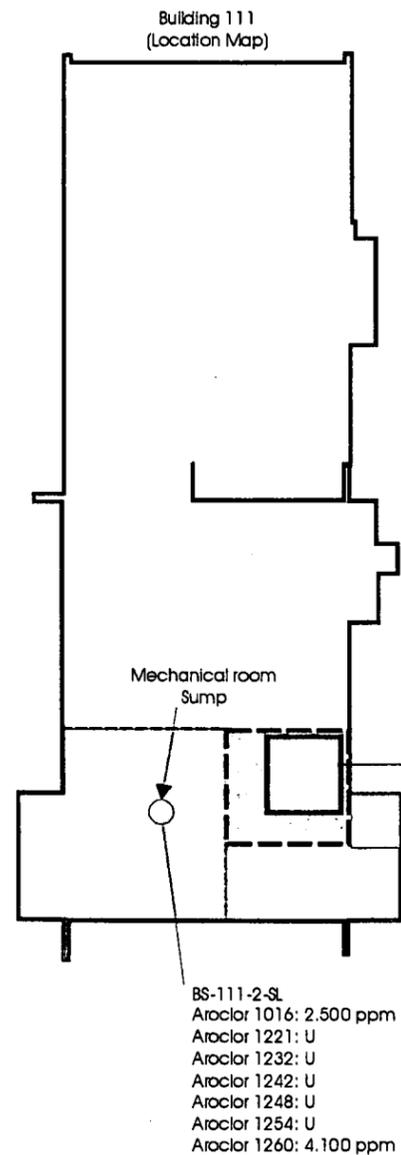
**Figure 2.7**  
**Historical Release Report**  
**PAC 100-607**  
**PCB Sampling Locations**

**EXPLANATION**

-  PAC 100-607
-  Electrical Room
-  Outside Dock Lift Area
-  Mechanical Room
-  Footing Drain
-  4 Inch Drain Pipe

-  Sample Point
-  Split Sample Duplicate
-  Not Detected

**DATA SOURCE BASE FEATURES:**  
 All IHSS and PAC's Boundaries are Approximate. For more detail,  
 please contact Nick Demos (X4605) for the following document:  
 Historical Release Report (HRR) September 2000 Annual Update



U.S. Department of Energy  
 Rocky Flats Environmental Technology Site  
 GIS Dept. 303-968-7707

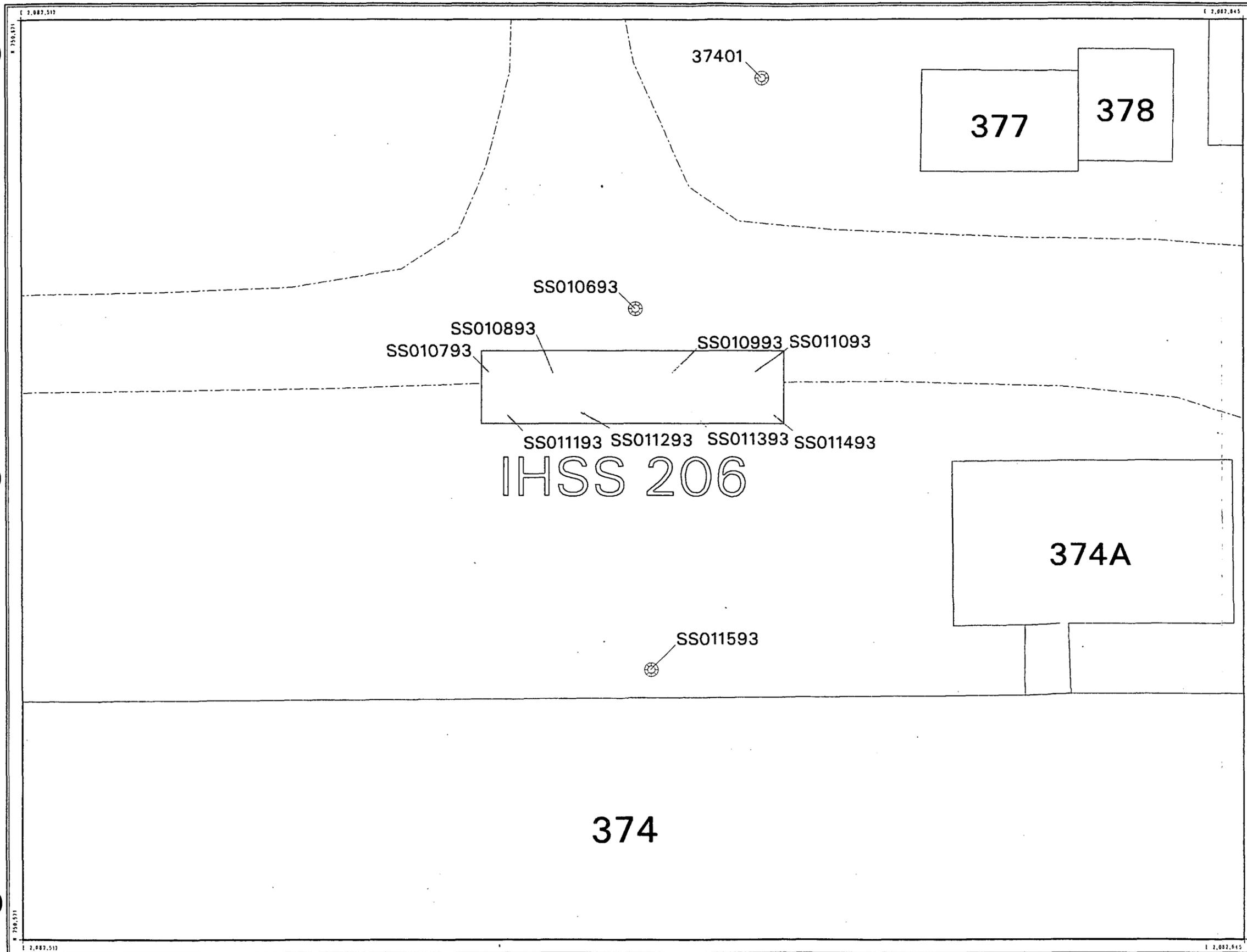
Prepared by:  
**DynCorp**  
 THE ART OF TECHNOLOGY

Prepared for:  
  
 KAISER-HILL  
 COMPANY  
 September 5, 2001

MAP ID:01-0422

W:\projects\01-0422\111\_pcb\_concrete\_core\_loc\_fig2-7.cdf

62



**Figure 2.8**  
**Historical Release Report**  
**IHSS 206**

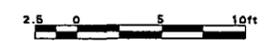
- EXPLANATION**
- IHSS 206
  - Sample Location
- Standard Map Features**
- Buildings and other structures
  - Fences and other barriers
  - Paved roads
  - Dirt roads

**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. 1/95

**NOTES:**  
 All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4605) for the following document: Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 130  
 1 inch represents approximately 11 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

Prepared by:  
**DynCorp**  
 THE ART OF TECHNOLOGY

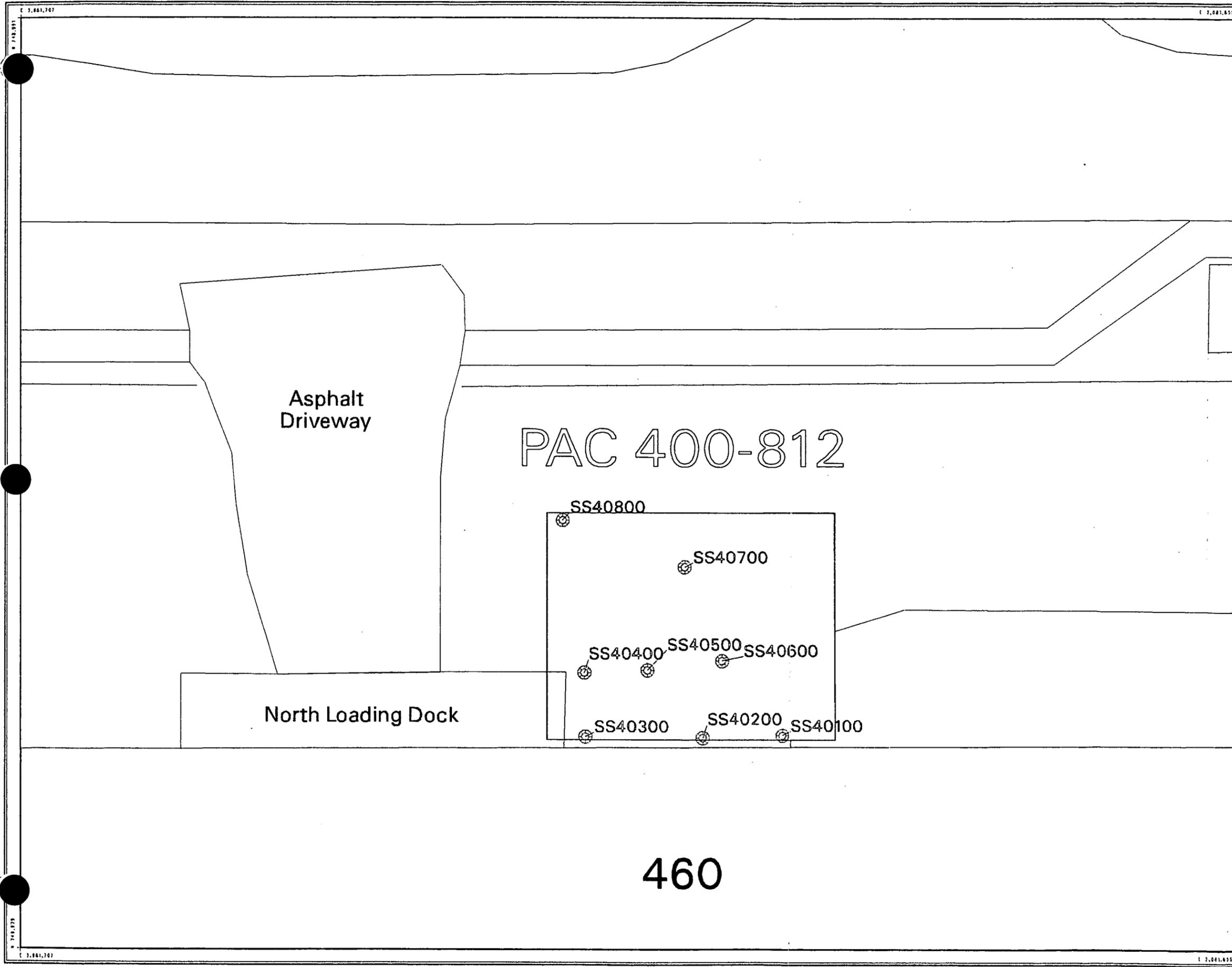
Prepared for:  
  
 KAISER-HILL  
 CONSULTANTS

MAP ID: 01-0916

September 18, 2001

68

MT\_Svt h:/projects/2001/01-0916/ihss206\_fig2-8.am1



**Figure 2.9**  
**Historical Release Report**  
**PAC 400-812**

**EXPLANATION**

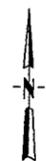
- PAC 400-812
- Sample Location

**Standard Map Features**

- Buildings and other structures
- Fences and other barriers
- Paved roads
- Dirt roads

**DATA SOURCE BASE FEATURES:**  
*Buildings, fences, hydrography, roads and other structures from 1954 aerial fly-over data captured by FGS&F RSI, Las Vegas. Digitized from the orthophotographs. 1/01*

**NOTES:**  
 All EHS and PAC's boundaries are Approximate. For more detail, please contact Mark Hanna (24805) for the following document:  
 Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 140  
 1 inch represents approximately 12 feet

State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

Prepared by:  
**DynCorp**  
 THE ART OF TECHNOLOGY

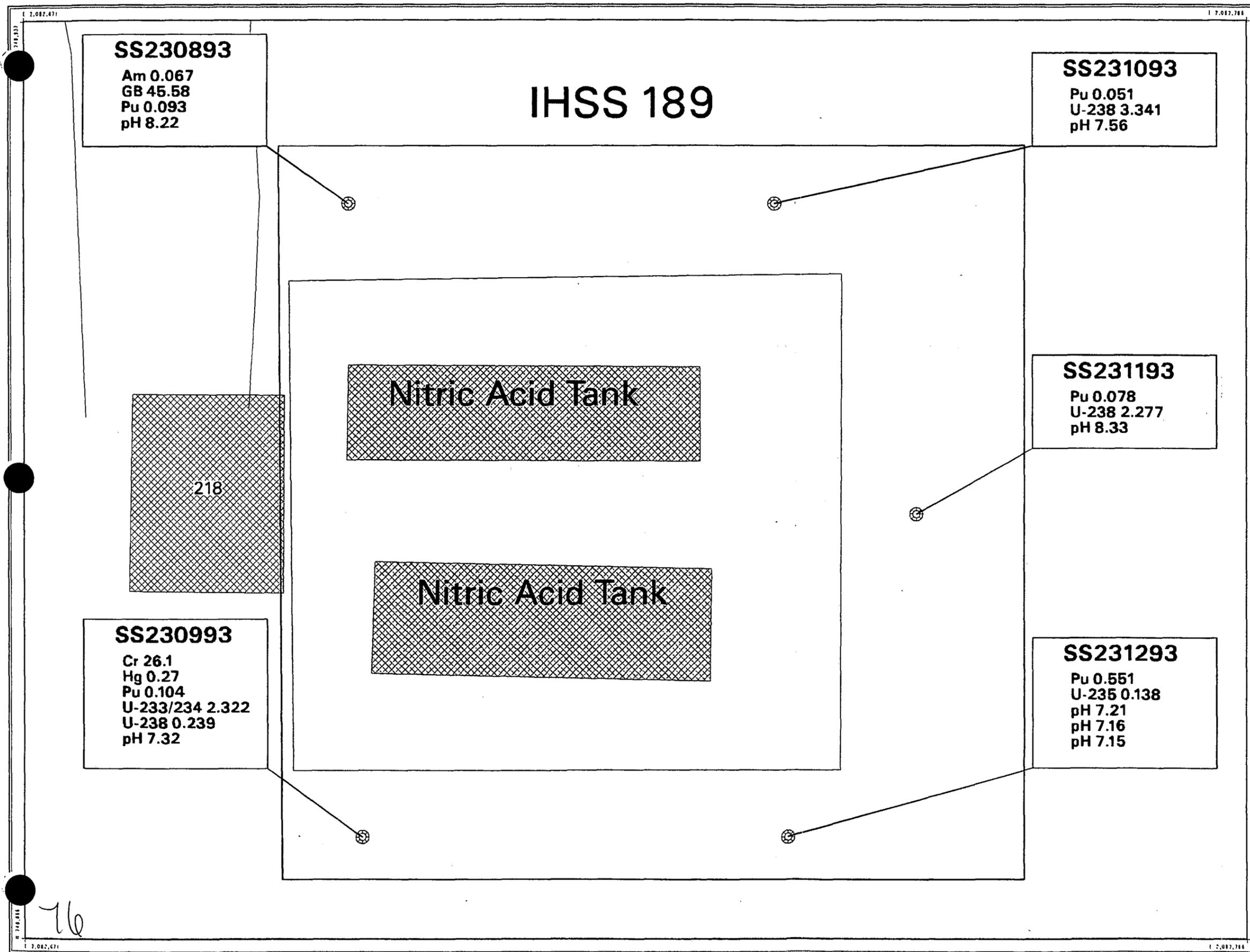
Prepared for:  
  
 KAISER-HILL  
 COMPANY

MAP ID: 01-0916

September 19, 2001

NT\_Svt h:/projects/2001/01-0916/pac400-812\_fig2-5.aml

72



**Figure 2.10**  
**Historical Release Report**  
**IHSS 600-189**

- EXPLANATION**
- Sampling Location
  - IHSS 189

- Standard Map Features**
- Removed Buildings
  - Fences and other barriers
  - Paved roads

**DATA SOURCE BASE FEATURES:**  
 Buildings, fences, hydrography, roads and other structures from 1954 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1:25. All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4605) for the following document: Historical Release Report (HRR) September 2001 Annual Update

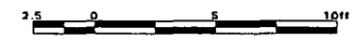
**NOTES:**

Radionuclides (pCi/g):	Metals (ppm):
AM-241 = Americium-241	Cr = Chromium
GB = Gross Beta	Hg = Mercury
PU = Plutonium-239/240	
U-233/234 = Uranium-233/234	
U-235 = Uranium-235	
U-238 = Uranium-238	

All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4605) for the following document: Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 90  
 1 inch represents approximately 8 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

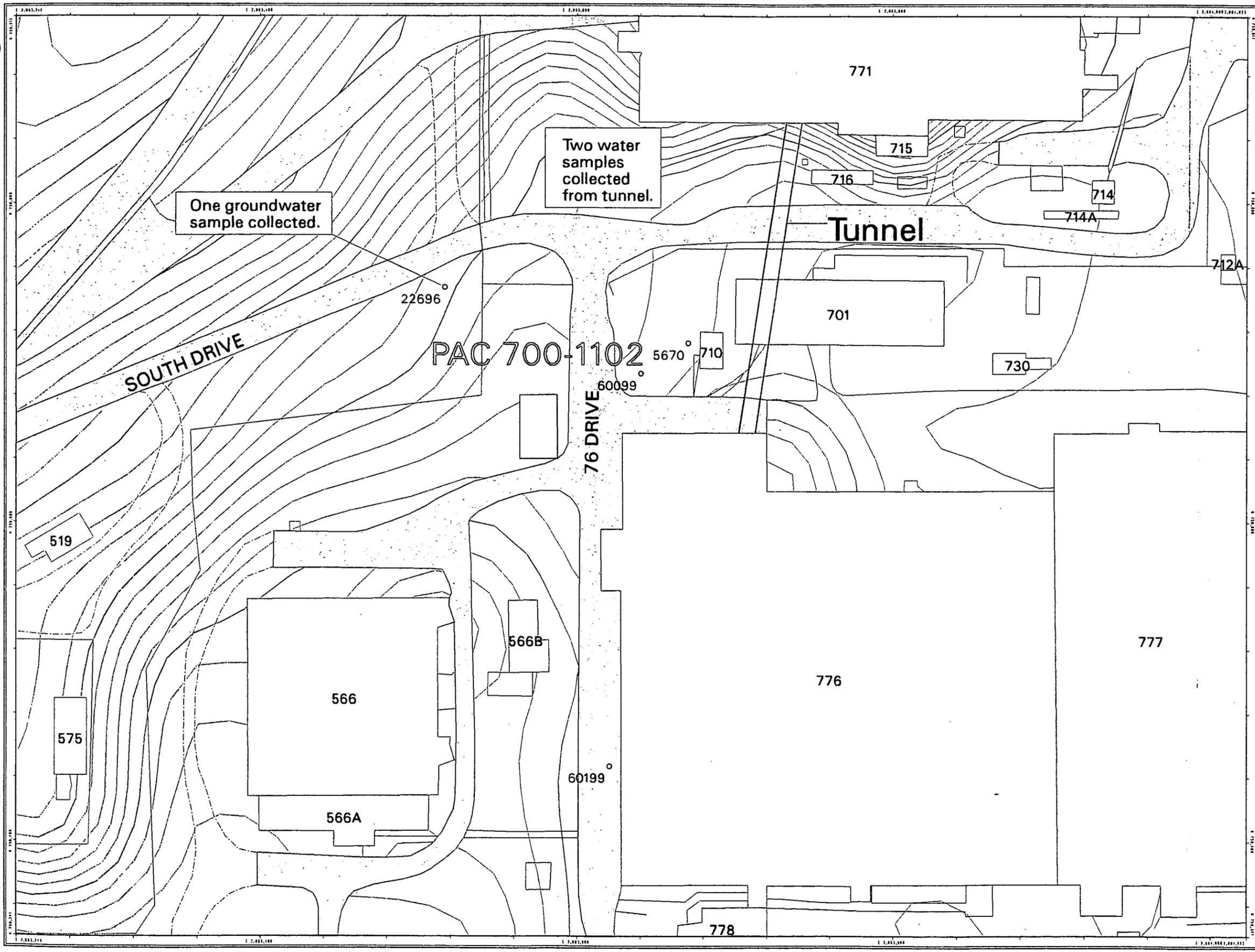
Prepared by:  
**DynCorp**  
 THE ART OF TECHNOLOGY

Prepared for:  
  
 KAISER-HILL  
 COMPANY

76

NT\_Srv\_h:\projects\fy2001\01-0616\hss189 fig2-10.aml

**Figure 2.11**  
**Historical Release Report**  
**Potential Area of Concern**  
**PAC 700-1102**



**EXPLANATION**

- PAC 700-1102
- Tunnel
- Groundwater Well Location

**Standard Map Features**

- Buildings and other structures
- Paved roads fill
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (2-Foot)
- Paved roads
- Dirt roads

**DATA SOURCE BASE FEATURES:**

*Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by E&B RSL, Las Vegas. Digitized from the orthophotographs. 1/95. 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 2-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.*  
**Data Source:**  
 Groundwater Well data - Approved by Steve Singer (RMRS, 303-866-3387).

**NOTES:**

All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4605) for the following document:  
 Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 740  
 1 inch represents approximately 62 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

GIS Dept. 303-866-7707

Prepared by:



Prepared for:

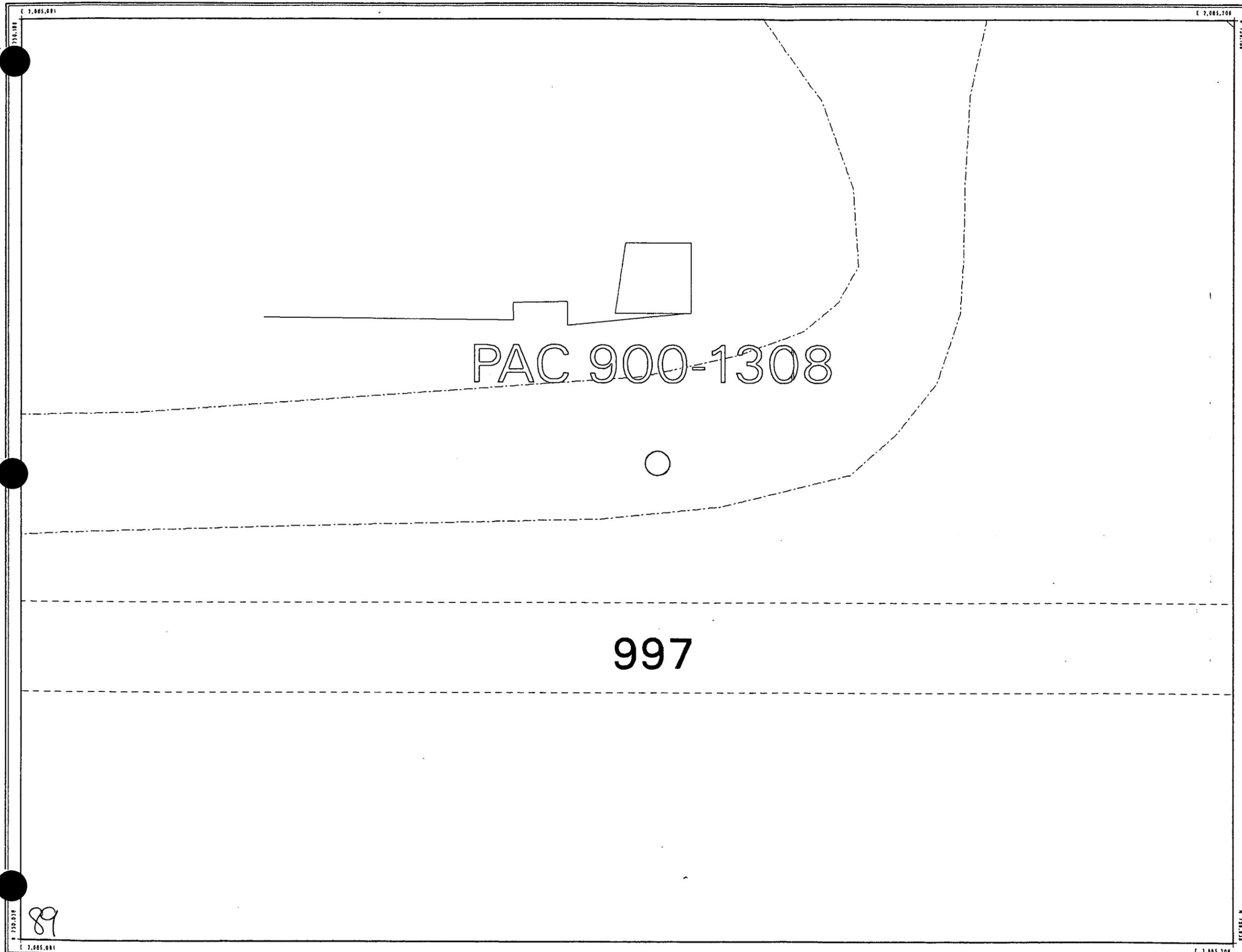


MAP ID: 01-0916/hr-pec-700-1102\_fig2-11.aml

September 18, 2001

80

NT\_Svr\_h:\projects\fy2001\01-0916/hr-pec-700-1102\_fig2-11.aml



**Figure 2.12**  
**Historical Release Report**  
**PAC 900-1308**

**EXPLANATION**

PAC 900-1308

**Standard Map Features**

Buildings and other structures

Fences and other barriers

Paved roads

Dirt roads

**DATA SOURCE BASE FEATURES:**  
 Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by FSG/RSI, Las Vegas. Digitized from the orthophotographs. 1/00

**NOTES:**  
 All HRS and PAC's boundaries are Approximate. For more detail, please contact Nick Damos (X4600) for the following document: Historical Release Report (HRR) September 2001 Annual Update



Scale = 1 : 190  
 1 inch represents approximately 16 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

GIS Dept. 303-968-7707

Prepared by:



Prepared for:



MAP ID: 01-0816

September 19, 2001

NT\_Srv h:/projects/fy2001/01-0816/pac900-1308\_fig2-12.dwg

89

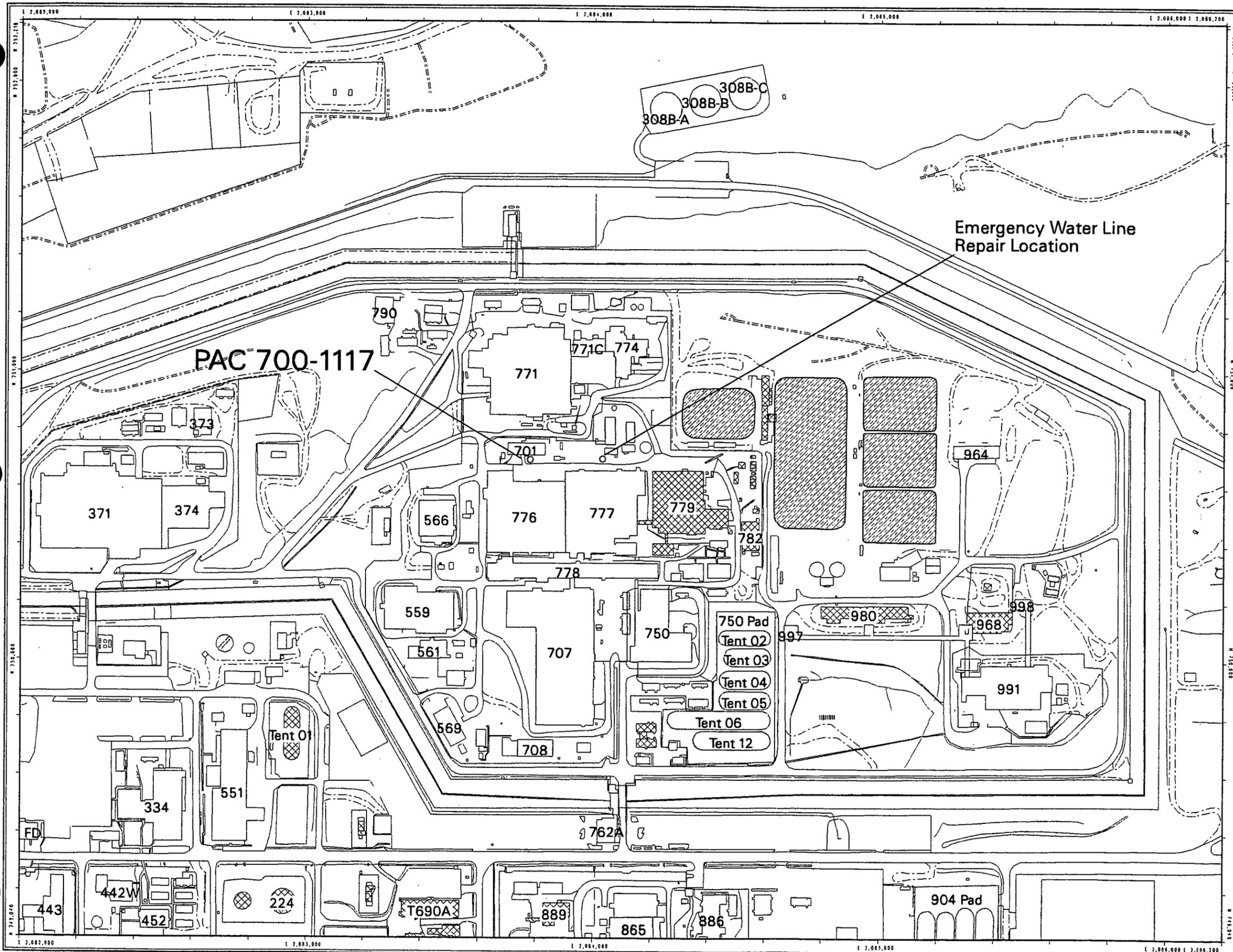


Figure A-3.1

2001 Historical Release Report  
Generated Soils Returned  
to Place of Origin

EXPLANATION

- Soil Replacement Area  
Assigned NFA PAC Designation

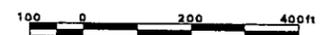
Standard Map Features

- Buildings and other structures
- ▣ Removed Buildings
- ▨ Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- 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. 1/95



Scale = 1 : 4090  
1 inch represents approximately 341 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

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

Prepared by:  
**DynCorp**  
THE ART OF TECHNOLOGY

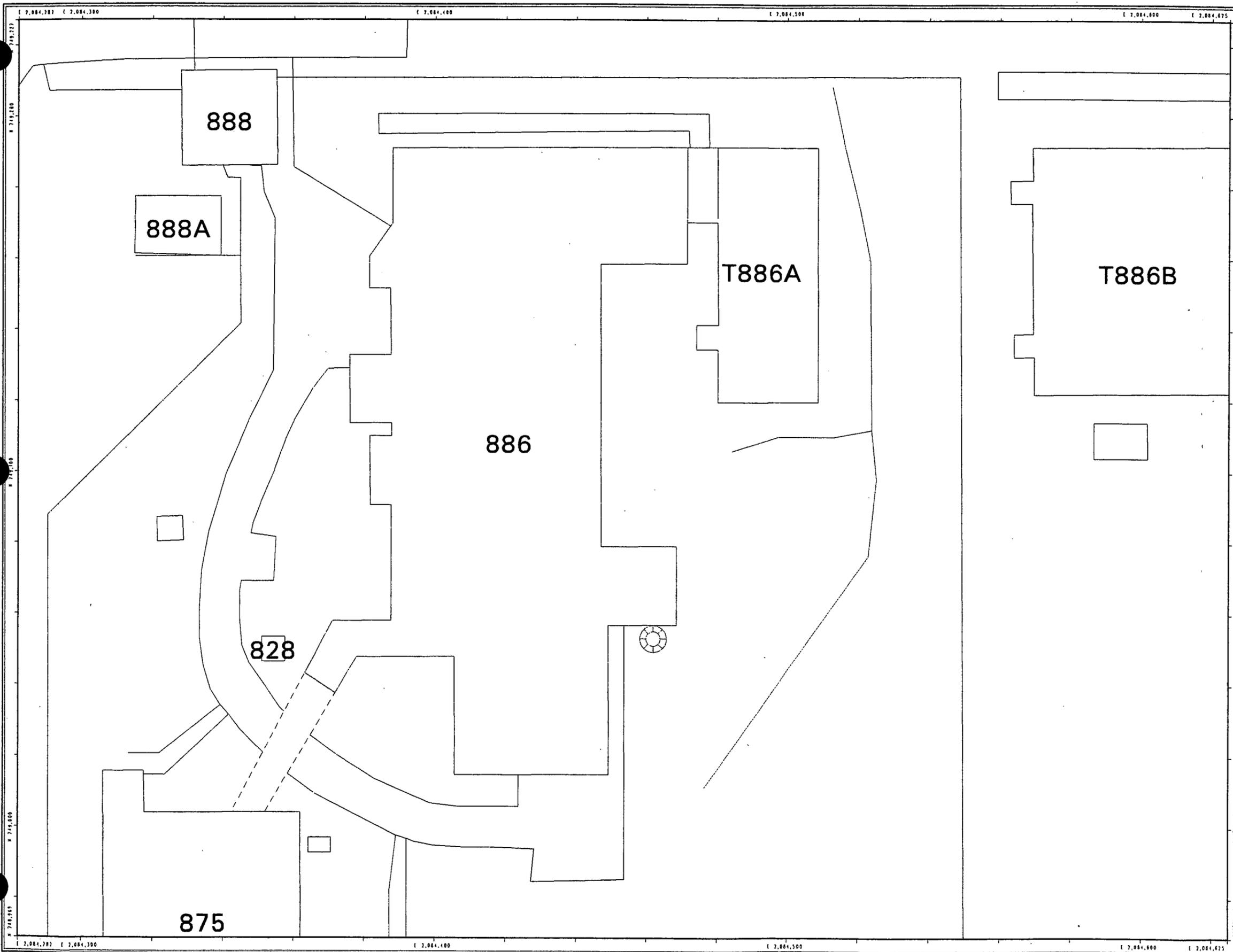
Prepared for:  
**KAISER HILL**  
CORPORATION

MAP ID: 01-0816

September 24, 2001

172

NT\_Srv h:\projects\fy2001\01-0816\non-rfa-soils\_figA3-1.amt



**Figure A-33**

**2001 Historical Release Report**  
**Building 886 Soils Returned to Place of Origin**

**EXPLANATION**

-  Sample Location
- Standard Map Features**
-  Buildings and other structures
-  Streams, ditches, or other drainage features
-  Fences and other barriers
-  Paved roads

DATA SOURCE BASE FEATURES:  
 Buildings, fences, hydrography, roads and other structures from 1954 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95



Scale = 1 : 330  
 1 inch represents approximately 28 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

Prepared by:  
**DynCorp**  
 THE ART OF TECHNOLOGY

GIS Dept. 303-866-7707  
 Prepared for:  
  
 KAISER-HILL  
 COMPANY

MAP ID: 01-0916

September 24, 2001

174

NT\_Srv\_h:\projects\fy2001\01-0916\non-flca-soils\_b886\_figA3-3.aml

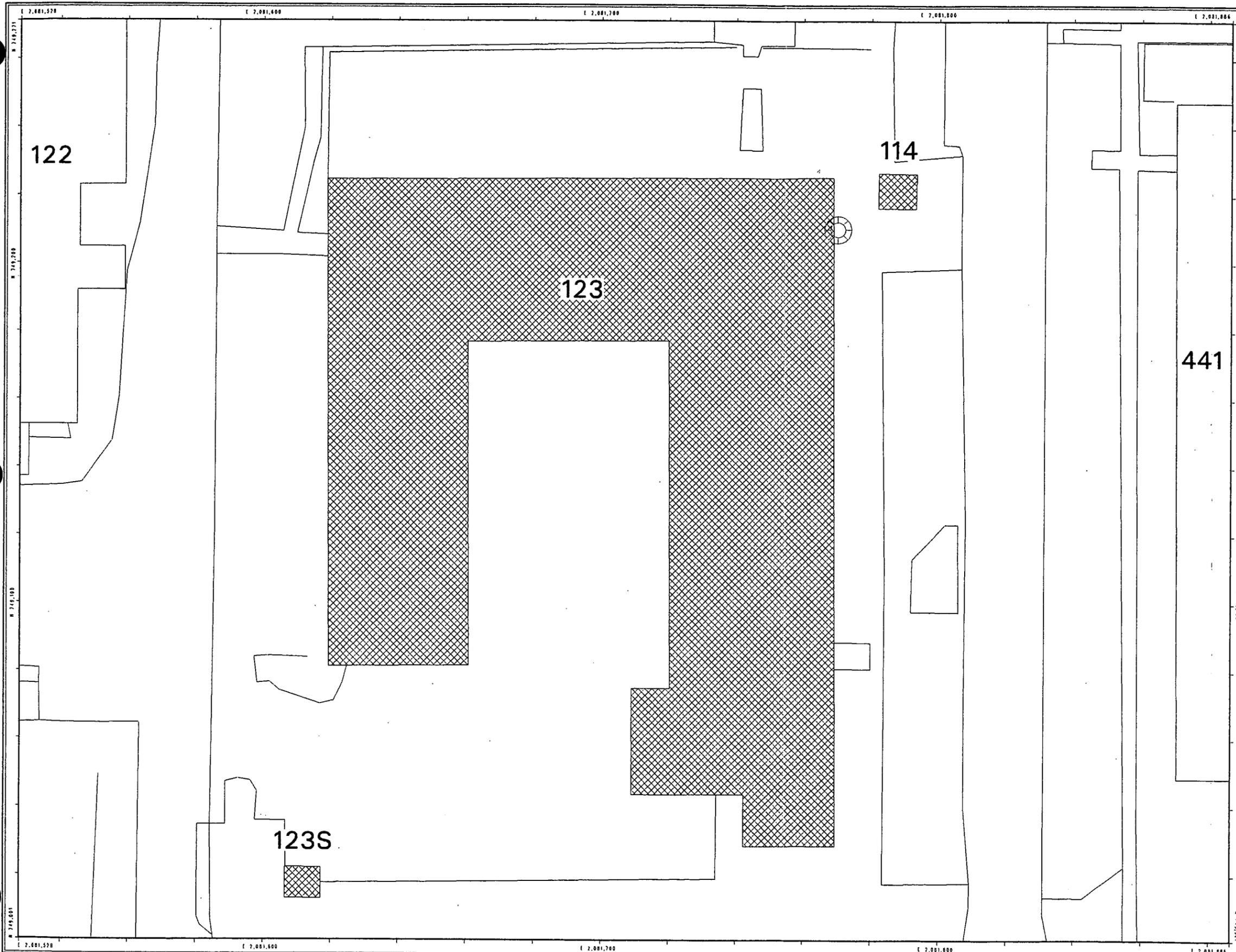


Figure A-3.2

2001 Historical Release Report  
 Building 123 Soils Returned  
 to Place of Origin

EXPLANATION

-  Sample Location
- Standard Map Features**
-  Buildings and other structures
-  Removed Buildings
-  Streams, ditches, or other drainage features
-  Fences and other barriers
-  Paved 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. 1/95



Scale = 1 : 350  
 1 inch represents approximately 29 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

Prepared by:  
**DynCorp**  
 THE ART OF TECHNOLOGY

Prepared for:  
  
 KAISER-HILL  
 COMPANY

MAP ID: 01-0916

September 24, 2001

173

NT\_Srv\projects\fy2001\01-0916\non-rfe-soils\_b123\_figA3-2.am

# ANNUAL UPDATE

AUGUST 1, 2000, THROUGH  
AUGUST 1, 2001

# HISTORICAL RELEASE REPORT

Prepared by

**Kaiser-Hill Company, L.L.C.**

Revision 0

Document Classification  
Review Waiver per  
Classification Office  
CEX-010-98



1 / 179

DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE

ADMIN RECORD

SW-A-004400

# Plate 1 Individual Hazardous Substance Sites by Consolidated Operable Unit (As of Sept. 2001)

**Industrial Area Operable Units**  
Industrial Area OU

**Buffer Zone Operable Units**  
Buffer Zone OU  
Operable Unit 1  
Operable Unit 5  
Operable Unit 6  
Operable Unit 7

**NOTES:**  
Former Operable Unit 9 (OU9), that is now part of the Industrial Area Operable Unit, is shown on a separate map for clarity. (See Map-ID 98-0254(97-0173)OPWL.)

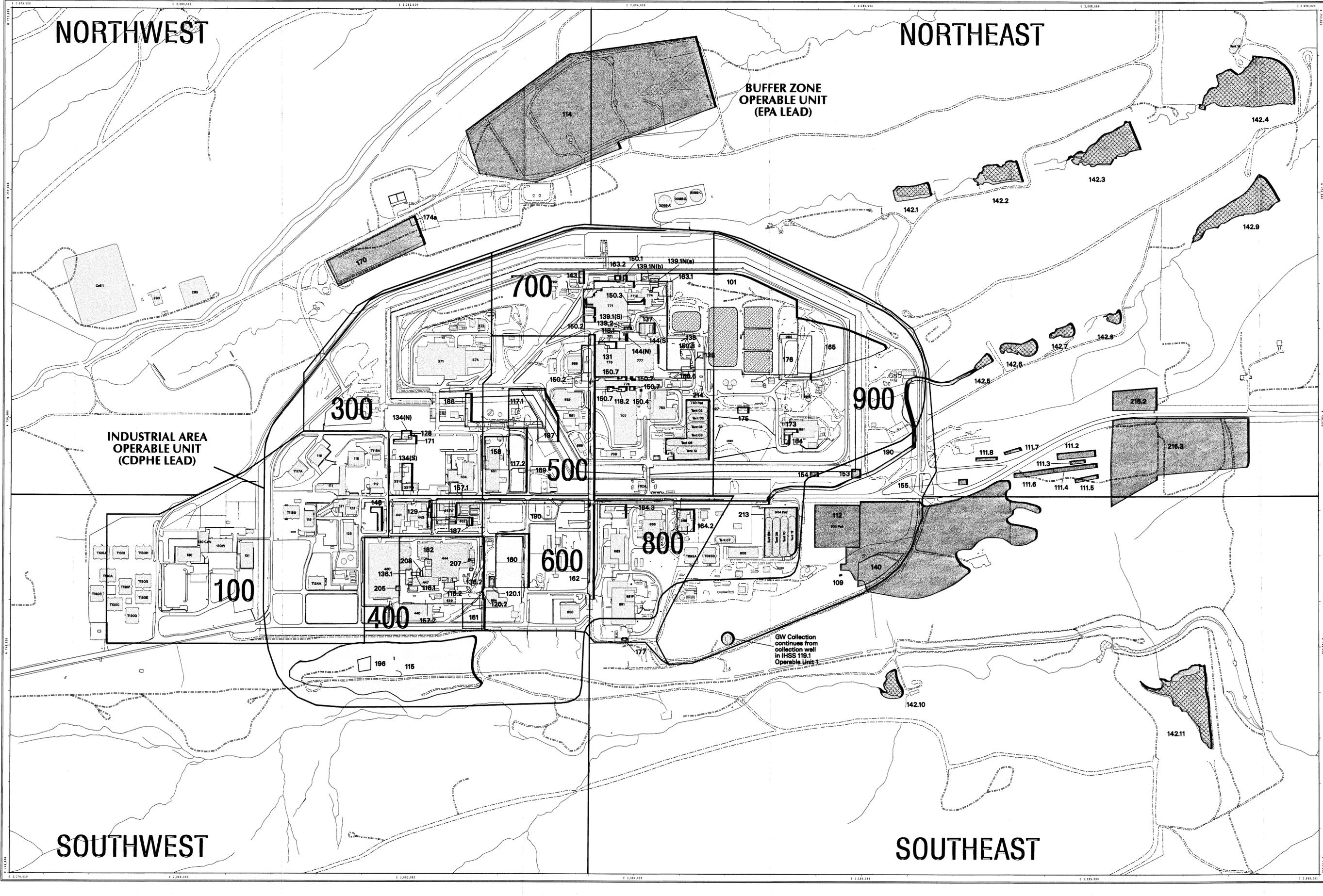
IHSS NE-142.12 (Indiana Flume Pond) not shown due to map scale.

**Other Map Features**  
Buildings and other structures  
Solar Evaporation Ponds (SEPs)  
Lakes and ponds  
Streams, ditches, or other drainage features  
Fences and other barriers  
Paved roads  
Dirt roads  
Industrial Area Operable Unit Boundary

**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 Individual Hazardous Substance Sites (IHSSs) DOE, 1992, HRR Report and Subsequent Updates.  
All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4605) for the following document: Historical Release Report (HRR) September 2001 Annual Update

Scale = 1 : 3600  
1 inch represents 300 feet  
State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site  
GIS Dept. 303-966-7707  
Prepared by: **DynCorp**  
THE ART OF TECHNOLOGY  
Prepared for: **KAISER HILL COMPANY**



No Further Action Individual Hazardous Substance Sites and Potential Areas of Concern (Including Proposed NFAs) (As of Sept. 2001)

EXPLANATION

- Operable Unit 1 (Closed through CAD/ROD Process)
Former Operable Unit 2
Operable Unit 5
Operable Unit 6
Operable Unit 7
Former Operable Unit 8
Former Operable Unit 10
Operable Unit 11 (Closed through CAD/ROD Process)
Former Operable Unit 12
Former Operable Unit 13
Former Operable Unit 14
Operable Unit 15 (Closed through CAD/ROD Process)
Operable Unit 16 (Closed through CAD/ROD Process)
Potential Area of Concern (Proposed as No Further Action)
No Further Action PACs approved by Colorado Department of Health and EPA in 1992.
Foamed & Stabilized Tanks (Source Removed - RCRA Interim Status)
Industrial Area Operable Unit Boundary
HRR Designation Area Boundary

Standard Map Features

- Buildings and other structures
Solar Evaporation Ponds (SEPs)
Lakes and ponds
Streams, ditches, or other drainage features
Fences and other barriers
Paved roads
Dirt roads

DATA SOURCE BASE FEATURES: Locations of the Operable Units and their associated Individual Hazardous Substance Sites (IHSS) were derived from the DOE 1992 - HRR Report and subsequent updates. Operable Units 1, 3, 11, 15, 16 are designated to be NFA by the Corrective Action Decision/Record of Decision (CAD/ROD). Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1/95

NOTES: All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Nick Demos (X4805) for the following document: Historical Release Report (HRR) September 2001 Annual Update



Scale = 1:4800 1 inch represents 400 feet



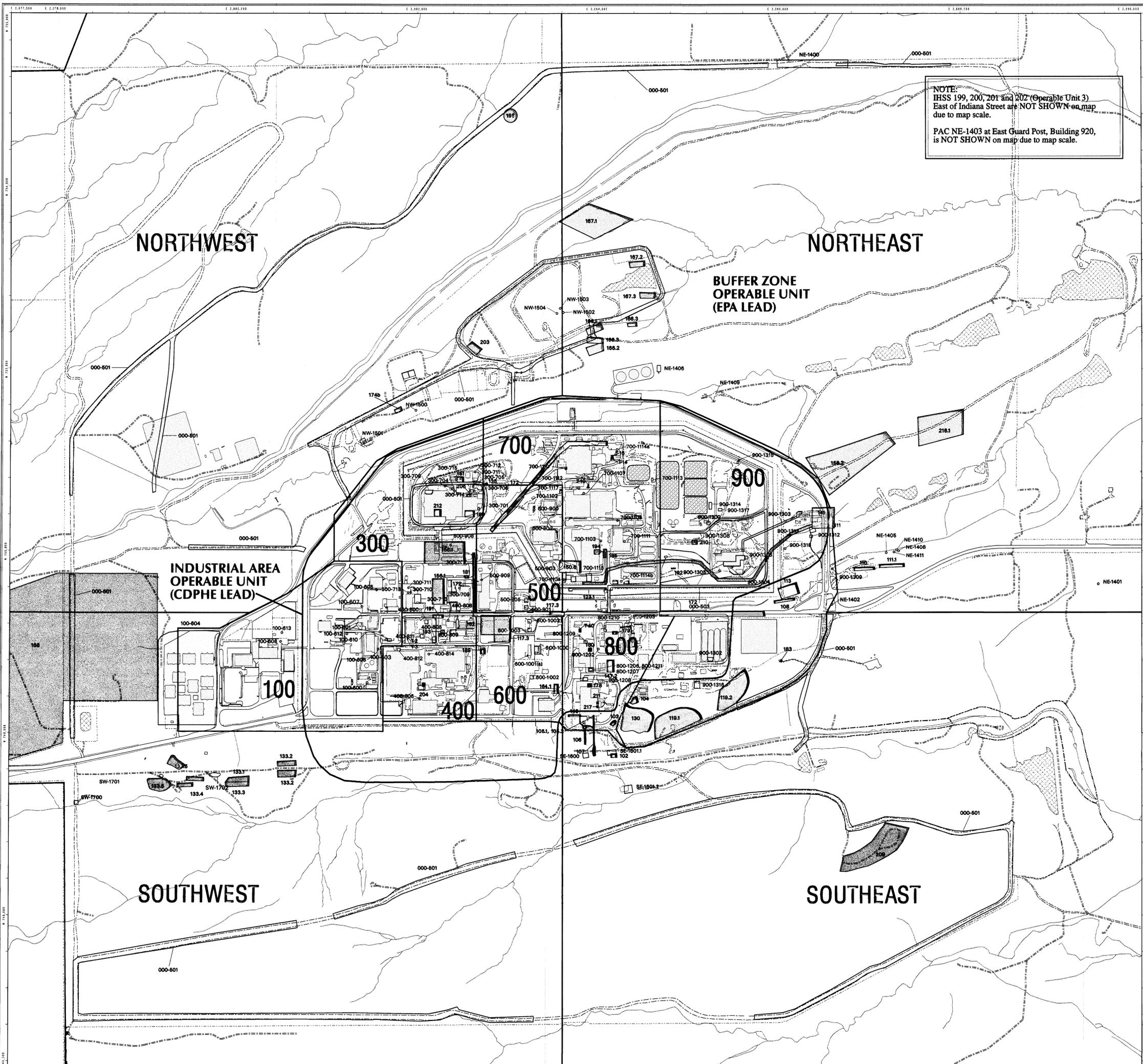
State Plane Coordinate Projection Colorado Central Zone Datum: NAD27

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

Prepared by: DynCorp THE ART OF TECHNOLOGY



Prepared for: GIS Dept. 303-966-7707



NOTE: IHSS 199, 200, 201 and 202 (Operable Unit 3) East of Indiana Street are NOT SHOWN on map due to map scale. PAC NE-1403 at East Guard Post, Building 920, is NOT SHOWN on map due to map scale.

NORTHWEST

NORTHEAST

SOUTHWEST

SOUTHEAST

BUFFER ZONE OPERABLE UNIT (EPA LEAD)

INDUSTRIAL AREA OPERABLE UNIT (CDPHE LEAD)

**Historical Release Report**  
**Original Process Waste Lines and New Process Waste Lines**

**EXPLANATION**

- Tanks of Concern
- Foamed and Stabilized Tanks (Source Removed - Interim Status)
- Remaining Tanks
- Process Waste IHSS Locations (Former OU 9 IHSSs)
- Original Process Waste Lines
- Location of Original Process Waste Lines that may have been removed
- Pipe Currently in Use
- Pipe Made of Vitrified Clay
- Cannot Verify if Pipe Exists
- Leaks Along the Pipe
- Pipe Failed Pressure Test
- Known Leaks
- Manholes
- Approximate Location of New Process Waste Lines
- Valve Vault Locations

NOTES:  
VV = Valve Vault  
PS = Pumping Station

**Standard Map Features**

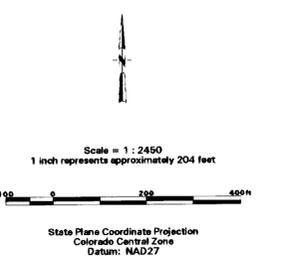
- Buildings and other structures
- Removed Buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Underground tunnels

**DATA SOURCE BASE FEATURES:**  
Individual Hazardous Substance Sites (IHSSs)  
DOE, 1992, HRR Report and Subsequent Updates.

The Original and New Process Waste Line locations shown on map are approximate and should not be used for determining the line location when performing excavation work.

PAC 000-500 (Sanitary Sewer System)  
and  
PAC 000-505 (Storm Drains)  
not shown.

All IHSS and PAC's boundaries are Approximate. For more detail, please contact Nick Demos (X4406) for the following document:  
Historical Release Report (HRR) September 2001 Annual Update



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

Prepared by: **DynCorp**  
THE ART OF TECHNOLOGY

Prepared for: **KAISER HILL COMPANY**

