NOTICE

All drawings located at the end of the document.

FINAL

HISTORICAL RELEASE REPORT
FOR THE ROCKY FLATS PLANT

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

ENVII PROGRAM

Comp

JUNE 1992

Volume I -- Text

ADMIN RECORD

REVIEWED FOR CLASSIFICATION/UCNI
By
Date

NOTICE

This document (or documents) is oversized for 16mm microfilming, but is available in its entirety on the 35mm fiche card referenced below:

Document # 000378

Titled: Plate 3 NEW PACs

Fiche location: A-SW-M31

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: March 6, 1992

TO: P. L. Fuller, Remediation Programs Division, Bldg. T130B, X5744

FROM: R. B. Hoffman, Classification Office, T893B, X4598 SLC for RBH

SUBJECT: CLASSIFICATION EXEMPTION WAIVER FOR REMEDIATION PROGRAMS DIVISION (RPD) DOCUMENTS

Your request for exemption from classiification/UCNI review of Remediation Programs Division (RPD) documents as proposed in your letter of March 5, 1992 has been considered.

Based upon a substantial historical perspective, we have concluded that the reporting activities in which your Division of the Environmental Management Department is involved are unclassified and UCNI-free in nature and content.

All reporting activities for those Operable Units (OUs) one thru sixteen, <u>except</u>, Operable Unit 15 - Inside Building Closures, can be considered as exempt from further classification/UCNI review by the Classification Office. This waiver includes internal, as well as, external letters, work plans, reports, interim measures, RCRA facilities investigations, interim remedial actions, site characterization studies, human health risk assessments, environmental evaluations and assessments, comparative analyses, and other environmental and administrative documentation, as outlined in your letter. At this time sufficient knowledge of the type of information which OU 15 will comprise has not been established and until this can be acertained, classification review will be necessary.

In general, should RPD documents begin to differ in scope and context from past practice, it will become mandatory that you contact this office to ensure that this classification review waiver be justified and correct.

Should you require any further information or have any questions regarding this matter, please feel free to contact me or Karl Dallarosa (X3792) at any time.

kld

cc:
P. S. Bunge
J. E. Evered
W. A. Hunt

FINAL

HISTORICAL RELEASE REPORT
FOR THE ROCKY FLATS PLANT

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

ENVIRONMENTAL RESTORATION PROGRAM

June 1992

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REVIEWED FOR CLASSIFICATION/UCNI
By
Date 6/2/92

ADMIN RECORD

TABLE OF CONTENTS

PAGE

LIST OF ACRONYMS vii

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1-1

1.1 PURPOSE AND OBJECTIVES 1-1

1.2 REGULATORY BACKGROUND 1-3

1.3 ROCKY FLATS PLANT BACKGROUND 1-3

1.3.1 Mission and Operational History 1-3

1.3.2 RFP Hazardous Materials and IHSSs 1-7

1.3.3 Environmental History 1-8

1.4 REPORT ORGANIZATION 1-10

2.0 TECHNICAL APPROACH 2-1

2.1 PERSONNEL TRAINING AND INDOCTRINATION 2-1

2.2 BACKGROUND RESEARCH 2-2

2.3 FILE REVIEW 2-3

2.3.1 Selection of Files for Detailed Review 2-4

2.3.2 Detailed File Review 2-5

2.3.3 Outdoor Releases 2-7

2.3.4 Indoor Releases 2-9

2.4 SITE VISITS AND PHOTOGRAPHY 2-11

2.5 RFP EMPLOYEE INTERVIEWS 2-11

2.6 COORDINATION WITH OTHER PROJECTS 2-12

2.7 RELEASE DESCRIPTION AND LOCATION 2-12

3.0 DESCRIPTIONS OF POTENTIAL AREAS OF CONCERN 3-1

3.1 Northeast Buffer Zone NE-1

3.2 Northwest Buffer Zone NW-1

3.3 Southeast Buffer Zone SE-1

TABLE OF CONTENTS
(continued)

PAGE

3.4 Southwest Buffer Zone SW-1
3.5 000 Area 000-1
3.6 100 Area 100-1
3.7 300 Area 300-1
3.8 400 Area 400-1
3.9 500 Area 500-1
3.10 600 Area 600-1
3.11 700 Area 700-1
3.12 800 Area 800-1
3.13 900 Area 900-1
3.14 Under Building Contamination UBC-1
3.15 Descriptions of Potential Incidents of Concern (PICs) PIC-1
3.16 Off-Site Releases Offsite-1

4.0 RECOMMENDATIONS FOR FURTHER WORK 4-1
4.1 FUTURE UPDATING OF THE HRR 4-1
4.2 ADDITIONAL SOURCES OF HISTORICAL DATA 4-1

APPENDICES

Appendix A References
Appendix B Historical Release Report File Sources and Environmental Master File Index/Record of File Selection
Appendix C Federal Records Center File Selection and Review
Appendix D List of RFP Files Purged or Removed from the Federal Records Center
Appendix E HRR Standard Forms
Appendix F Unplanned Event Summary
Appendix G DOE/Albuquerque Files Confiscated by the FBI
Appendix H RCRA Contingency Plan Implementation Reports Not Referenced in the HRR
Appendix I Rocky Flats Plant Electrical Transformer PCB Sites

LIST OF TABLES

TABLE	TITLE	PAGE
2-1	ROCKY FLATS PLANT HAZARDOUS SUBSTANCE LIST	2-8
3-1	RFP GEOGRAPHICAL AREAS	3-11
3-2	PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs	3-13
3-3	CROSS REFERENCE LIST IHSS/PACs	3-25
3-4	RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT CROSS REFERENCE	3-33
NE-1	OPERATIONAL PROBLEMS OR NPDES EXCEEDANCES A-SERIES DRAINAGE AND PONDS	NE-12
NE-2	B-SERIES POND CONSTRUCTION DATE AND DESIGNATIONS	NE-14
NE-3	B-SERIES DRAINAGE PONDS OPERATIONAL PROBLEMS PRIOR TO NPDES PERMIT	NE-20
NE-4	B-SERIES DRAINAGE NPDES PERMIT EXCEEDANCES	NE-21
NE-5	LIMITS AND TYPICAL CONCENTRATIONS OF SELECTED CONTAMINANTS APPLIED TO NORTH LANDFILL SPRAY FIELD	NE-30
NE-6	WATER VOLUMES AND TRITIUM CONCENTRATIONS APPLIED T0 NORTH LANDFILL SPRAY FIELD	NE-31
NE-7	NORTH LANDFILL SPRAY FIELD SOIL CONCENTRATIONS PRIOR TO SPRAYING	NE-31
000-1	SOLAR POND DESIGNATIONS AND STATUS	000-16
000-2	SUMMARY OF KNOWN OPWL RELEASES	000-25
000-3	RFP IHSSs TARGETING KNOWN OR SUSPECTED OPWL RELEASE SITES	000-35
000-4	HISTORICAL DISCHARGES TO SANITARY SEWER SYSTEM	000-54
000-5	ACCIDENTAL/INCIDENTAL DISCHARGES TO SANITARY SEWER SYSTEM	000-56
400-1	SUMMARY OF FUEL TANKS AT BUILDING 443	400-13
700-1	VALVE VAULT 12 WATER ANALYSIS	700-84
800-1	SUMMARIZATION OF WASTE STREAMS FROM BUILDING 883	800-28

LIST OF FIGURES

FIGURE	TITLE	PAGE
1-1	ROCKY FLATS LOCATION MAP	1-5
3-1	PAC AREA BOUNDARIES	3-5
NE-1	NORTHEAST AREA PACs	NE-3
NW-1	NORTHWEST AREA PACs	NW-3
SE-1	SOUTHEAST AREA PACs	SE-3
SW-1	SOUTHWEST AREA PACs	SW-3
000-1	000 AREA PACs	000-3
000-2	TRENCHES AND SUMPS	000-11
000-3	INTERCEPTOR TRENCH PUMP HOUSE SYSTEM	000-12
000-4	INTERCEPTOR TRENCH PUMP HOUSE SYSTEM EXTENSION	000-14
000-5	PAC 000-121 (ORIGINAL PROCESS WASTE LINES) LOCATION MAP	000-21
000-6	PAC 000-500 (SANITARY SEWER SYSTEM) LOCATION MAP	000-51
100-1	100 AREA PACs	100-3
300-1	300 AREA PACs	300-3
400-1	400 AREA PACs	400-3
400-2	BUILDINGS 447, 444, 453 LAYOUT	400-7
400-3	LOCATION OF SULFURIC ACID SPILL	400-29
400-4	ACID PIPING SCHEMATIC	400-27
500-1	500 AREA PACs	500-3
600-1	600 AREA PACs	600-3
700-1	700 AREA Original Individual Hazardous Substance Sites	700-3a
700-2	700 AREA Changed Individual Hazardous Substance Sites	700-3b
700-3	700 AREA Potential Areas of Concern	700-3c

LIST OF FIGURES
(continued)

FIGURE	TITLE	PAGE
800-1	800 AREA PACs	800-3
900-1	900 AREA PACs	900-3
UBC-1	UNDER BUILDING CONTAMINATION AREA PACs	UBC-3
PLATE 1	IAG IHSSs	BACK POCKET
PLATE 2	HRR IHSSs	BACK POCKET
PLATE 3	NEW PACs	BACK POCKET

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LIST OF ACRONYMS

AEC	U.S. Atomic Energy Commission
Am	Americium
ANML	Accession Number Master List
BOD	Biological Oxygen Demand
C	Celsius
CCl_4	Carbon Tetrachloride
CCR	Colorado Code of Regulations
CDH	Colorado Department of Health
CEARP	Comprehensive Environmental Assessment and Response Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHWA	Colorado Hazardous Waste Act
cm	Centimeter
CN	Cyanide
cpm	Counts per minute (also c/m)
CSU	Colorado State University
CWA	Clean Water Act
DOE	U.S. Department of Energy
dpm	Disintegrations per minute (also d/m)
EG&G	EG&G Rocky Flats, Inc.
EIS	Environmental Impact Statement
EMF	Environmental Master File
EP	Extraction Procedure
EPA	Environmental Protection Agency
ER	Environmental Restoration
ERDA	Energy Research and Development Administration
F	Fahrenheit
FIDLER	Field Instrument for Detection of Low-Energy Radiation
FRC	Federal Records Center
FS	Feasibility Study
ft	Foot
g	Gram
HAZMAT	Hazardous Materials
HEPA	High Efficiency Particulate Air
HF	Hydrofluoric
HRR	Historical Release Report
HS&E	Health Safety & Environment
IAG	Interagency Agreement
IHSS	Individual Hazardous Substance Site
IIR	Internal Investigation Report
ITPH	Interceptor Trench Pump House
kg	Kilograms
KOH	Potassium Hydroxide
l	Liter
LSA	Low Specific Activity
mCi	Millicuries
mg/l	Milligrams per liter
ml	Milliliter

LIST OF ACRONYMS
(continued)

MPL	Maximum Permissible Limit
mr	Millirems
ug	Micrograms (also ugm)
mCi	Millicuries
Na(OH)	Sodium Hydroxide
NCP	National Contingency Plan
NCR	No Carbon Required
NE	Northeast
NPDES	National Pollutant Discharge Elimination System
NW	Northwest
OPWL	Original Process Waste Line
OU	Operable Unit
PA	Protected Area
PAC	Potential Area of Concern
PCB	Polychlorinated Biphenyl
pCi	Picocuries
PIC	Potential Incident of Concern
PID	Photoionization Detector
ppb	Parts per billion
ppm	Parts per million
psig	Pounds per square inch gauge
PSZ	Perimeter Secured Zone
Pu	Plutonium
PU&D	Property Utilization and Disposal
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RCIP	RCRA Contingency Implementation Plan
RCRA	Resource Conservation and Recovery Act
RDMS	Relational Database Management System
RFAO	Rocky Flats Area Office
RFI	RCRA Facility Investigation
RFP	Rocky Flats Plant
RI	Remedial Investigation
RO	Reverse Osmosis
RQ	Reportable Quantity
S&W	Swinerton and Walberg
SE	Southeast
SF	Standard Form
SIR	Supervisor's Investigation Report
SW	Southwest
SWMU	Solid Waste Management Unit
TCA	Trichloroethane
TCE	Trichloroethylene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TRU	Transuranic
TSCA	Toxic Substances Control Act

LIST OF ACRONYMS
(continued)

U	Uranium
UOR	Unusual Occurence Reports
VOC	Volatile Organic Compound

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EXECUTIVE SUMMARY

This document presents the Historical Release Report (HRR) for the U.S. Department of Energy's Rocky Flats Plant (RFP). The HRR is a requirement of the Interagency Agreement (IAG) between the U.S. Environmental Protection Agency, the Colorado Department of Health, and the U.S. Department of Energy.

The purpose of the HRR is to provide information on existing and potentially new Individual Hazardous Substance Sites (IHSSs) at RFP. The scope of the HRR is derived from the IAG, which stipulates that the HRR will provide "...a complete listing of all spills, releases and/or incidents involving hazardous substances occurring since the inception of the Rocky Flats Plant..." The HRR project was structured to provide a reasonable and diligent effort towards meeting this goal, focusing upon: 1) incidental releases that took place outdoors or had an immediate impact on the out-of-building environment; and, 2) waste management practices that have been discontinued due to environmental concerns. In addition, the HRR addresses the potential cumulative effects of inside-building releases on the environment beneath the buildings, and discusses known and potential environmental impacts outside the RFP boundaries (off-site releases) due to RFP activities.

The HRR technical approach was designed to maximize the amount of information which could be compiled within the IAG schedule for the HRR. The project was divided into the following sequence of tasks:

- Personnel Training and Indoctrination: Project personnel were familiarized with RFP historical operations, past environmental studies, and sources of information. This training was provided by project personnel familiar with the RFP and review of key background documents.

- Background Research: Key groups and personnel that have had responsibilities pertaining to environmental releases through RFP history were identified. Relevant information was compiled from documents that contain previous inventories of RFP release sites to serve as a foundation for the HRR.

- File Review: The primary source of information for the HRR was records held in various RFP file repositories. These repositories were identified both prior to and during the course of the project. Because the files held in these repositories were far too voluminous to allow timely review of each file, available indexing records were used to select groups of files most likely to contain information relevant to the HRR. These groups of files were then reviewed in detail, and pertinent documents were copied and assembled into a project file. Documents were obtained through the EG&G Rocky Flats, Inc., Legal Department, which retained a copy of each requested document. In order to more readily

access and manipulate the large body of information obtained for the HRR, bibliographical and release information from each document was entered onto a project database with full searching and sorting capabilities. A duplicate database was maintained by EG&G Legal.

- Site Visits and Photography: Following completion of detailed file review and identification of individual release sites, visits were made to those sites for which direct observation could provide potentially useful information. Sites for which photography could provide additional information or clarification were photographed. Site visit notes and photographs were entered into the project files and database as reference material.

- Interviews: The HRR project avoided the approach often taken in past release investigations of relying on interviews to provide the basis of site histories and characterizations. Instead, past and present RFP employees involved with particular releases were identified as potential additional sources of information during the preparation of individual release site descriptions. These individuals were then interviewed in person or contacted by telephone with specific questions regarding the releases. Records of these interviews were entered into the project files and database as reference material.

- Coordination with Other Projects: Several projects similar in scope to the HRR were in progress during the HRR project. Open communication was maintained with the groups conducting these projects in order to exchange relevant information.

These project activities provided background information which was used to describe the individual RFP release sites. These sites (including existing RFP IHSSs) were designated for purposes of the HRR as Potential Areas of Concern (PACs) and assigned a unique release number based on the geographic location of the PAC and its status as an existing IHSS.

This study has provided additional information on nearly all of the 178 existing IHSSs, and in some cases, the additional information significantly changed the understanding of the event identified as the IHSS. The research has prompted the relocation of 82 of the existing IHSSs from their locations documented in previous studies. This study also identified 88 new potential areas of concern describing releases to the environment that were previously undescribed. Documents were found which provided limited details of incidents resulting in releases to the environment. Information on 61 of these incidents were found but without sufficient information to locate the site of the event on a map. These are identified as Potential Incidents of Concern (PICs).

Detailed descriptions of each PAC identified during the HRR are presented in Section 3.0. The descriptions are arranged according to 13 RFP geographical area subdivisions, and include both previously identified IHSSs and newly identified PACs. The PAC descriptions consist of the following information.

- PAC reference number and name
- IHSS reference number, if applicable
- Location
- Date(s) of operation or occurrence
- Description of operation or occurrence
- Physical/chemical description of constituents released
- Responses to operation or occurrence
- Fate of constituents released to the environment
- Comments
- References

The HRR also includes detailed PAC location maps. Particular efforts were made to determine the precise locations of both existing IHSSs and newly identified PACs. However, information compiled for some release sites could provide only an approximation of the actual site location. For these PACs, the PAC location maps reflect a best estimate based on available information. The Comments section of each PAC description provides any necessary qualifications to the locations shown on the PAC location maps. In a few instances, available information did not allow even a qualified approximation of release site location. However, sufficient documentation exists to indicate a potential release to the environment. These releases have been designated Potential Incidents of Concern (PICs).

In addition to the individual PAC and PIC descriptions, this document provides a brief bibliographical listing of all documents obtained during the HRR and appendices containing project materials or supporting information. These appendices are intended to provide representative samples of RFP file indexing materials and enable the reader to identify exactly what materials were reviewed in preparation of the HRR.

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1.0 INTRODUCTION

This document is the Historical Release Report (HRR) for the U. S. Department of Energy's Rocky Flats Plant (RFP) in Jefferson County, Colorado. The HRR presents a summary of information on previously identified Individual Hazardous Substance Sites (IHSSs) and newly identified Potential Areas of Concern (PACs) at the RFP, based primarily upon a detailed review of historical files with supporting information obtained during interviews with current and former RFP employees.

1.1 PURPOSE AND OBJECTIVES

The scope of the HRR is specified in the Interagency Agreement (IAG) between the U. S. Environmental Protection Agency (EPA), the Colorado Department of Health (CDH), and the U. S. Department of Energy (DOE). As stated in Paragraph I.B.5 of the IAG Statement of Work (Attachment 2 to the IAG), the scope of the HRR is as follows.

> Historical Release Report. DOE shall submit a Historical Release Report within 465 days of the effective date of this Agreement. This report shall provide a complete listing of all spills, releases and/or incidents involving hazardous substances occurring since the inception of the Rocky Flats Plant in 1951 and all spills, releases, and/or incidents requiring implementation of the contingency plan, the notification requirements of 40 CFR 265.56, 6 CCR 1007-3, 265.56, or as required by the Community Right to Know Act. The listing shall be accompanied by complete documentation of the events including the description of the events, complete physical and chemical description of the constituents released, responses to the events and the fate of the constituents released into the environment. This information will be utilized by EPA and the State to determine if any of these sites are individual hazardous substance sites and to evaluate the need for initiating Resource Conservation and Recovery Act (RCRA) Facility Investigations/Remedial Investigations (RFI/RI) for any and/or all of the events. After review of the initial Historical Release Report and any subsequent amendments provided through the process described in I.B.3 above, EPA and the State shall notify DOE of the requirement to initiate the RFI/RI(s). If EPA and the State decide that an RFI/RI is required for a newly identified site, DOE shall be required to submit a Phase I RFI/RI Work Plan for that site in accordance with Section VI.A of this attachment, and/or amend an existing Operable Unit (OU) RFI/RI Work Plan to address the newly identified site. DOE shall also identify any additional sites meeting the definition of an individual hazardous substance site, herein referred to as "site", not identified above (EPA, 1991).

As indicated in this passage, the purpose of the HRR is to summarize existing information on all historical incidents involving hazardous substances at the RFP. This information will be used by the EPA and CDH to determine whether the sites potentially affected by these incidents (Potential Areas of Concern or PACs) should be designated as IHSSs, which are defined in the IAG as "...individual locations where hazardous

substances have come to be located at a discrete area within the larger 'Site'..." Paragraph I.B.3 of the IAG Statement of Work further specifies that "...The DOE shall amend the Historical Release Report identified in I.B.5 below every three months to include the newly identified or suspected releases for which DOE has notified EPA and the State during the previous 3 months..." These quarterly HRR updates are addressed in Section 4.0 of this report.

Several factors affect the ability to identify and fully characterize all historical releases of hazardous materials. Files maintained by the DOE and by its RFP operating contractors are the primary source of information regarding historical releases. Although these files are the best source of information, it is recognized that these files may not provide complete details on all releases. The status of RFP files is discussed in Section 2.3. A second source of information on historical releases is current and former RFP employees. The number of employees that potentially have knowledge of hazardous materials releases at the RFP, and as a consequence the number of potential HRR interviewees, is considerable. There is no assurance that recollection of events by these employees would provide complete and accurate information on all releases.

Through the process of developing the HRR, information presented in previously prepared IHSS documents was verified and augmented. Potential new sites were identified which may present an impact to human health and the environment. The HRR focuses upon: 1) incidental releases that took place outdoors or that had immediate impacts on the out-of-building environment; and, 2) waste management practices which have been discontinued due to environmental concerns. In addition, inside building events meeting certain criteria were also included in the scope of the effort (Section 2.3.3).

The HRR has targeted localized releases which might have been overlooked by site-wide environmental monitoring at the RFP. The EPA and CDH will use the information generated by the HRR to evaluate whether the sites identified qualify as IHSSs. An IHSS by definition is an individual location where hazardous substances have come to be located at a discrete area within the Site. Therefore, the HRR does not address airborne releases produced from such events as stack emissions. Also excluded from consideration in the HRR was the use of compounds for the manner in which they were intended. Examples include the application of pesticides or herbicides at the RFP and bullets that remain in firing range backstops.

1.2 REGULATORY BACKGROUND

The IAG describes the general response processes for IHSSs at the RFP. All response activities performed by the DOE under the IAG are to be consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation Recovery Act (RCRA), the National Contingency Plan (NCP), and the Colorado Hazardous Waste Act (CHWA).

The identification, investigation, and remediation of RFP IHSSs are being conducted under the DOE Environmental Restoration (ER) Program. The ER Program is designed to identify, investigate, and, if necessary, remediate contaminated sites at DOE facilities. The program involves five major activities, as follows.

- Activity 1: Installation assessments, including preliminary assessments and site inspections to assess potential environmental concerns
- Activity 2: Remedial investigations, including the development and implementation of field sampling programs to determine the magnitude and extent of contamination at specific sites, evaluate contaminant fate and mobility in the environment, and perform baseline risk assessments
- Activity 3: Feasibility studies to evaluate remedial alternatives and develop remedial action plans, as necessary, to remediate sites identified during Activity 2
- Activity 4: Remedial designs/remedial actions, including design and implementation of site-specific remedial actions selected on the basis of Activity 3 Feasibility Studies
- Activity 5: Compliance and verification to monitor and assess the performance of remedial actions implemented under Activity 4 and to document their efficacy

The HRR falls under Activity 1 of the ER Program.

1.3 ROCKY FLATS PLANT BACKGROUND

The following sections describe the histories of RFP operations and environmental activities, including previous efforts to characterize hazardous materials release sites at the RFP.

1.3.1 Mission and Operational History

The RFP is part of a nationwide nuclear weapons complex owned by DOE and located northwest of Denver, Colorado (Figure 1-1). The facility is contractor-operated by EG&G Rocky Flats, Inc. (EG&G) and was operated until January 1992 as a nuclear weapons research, development, and production complex. The RFP had fabricated components for nuclear weapons from plutonium, uranium, beryllium, and stainless steel. Support activities had included chemical recovery and purification of recyclable

transuranic radionuclides, and research and development in metallurgy, machining, nondestructive testing, coatings, remote engineering, chemistry, and physics (DOE, 1987). The Rocky Flats Plant is currently in transition from a defense production facility to one whose planned future missions include:

- environmental restoration;
- waste management;
- maintaining production contingency; and
- eventual decontamination and decommissioning.

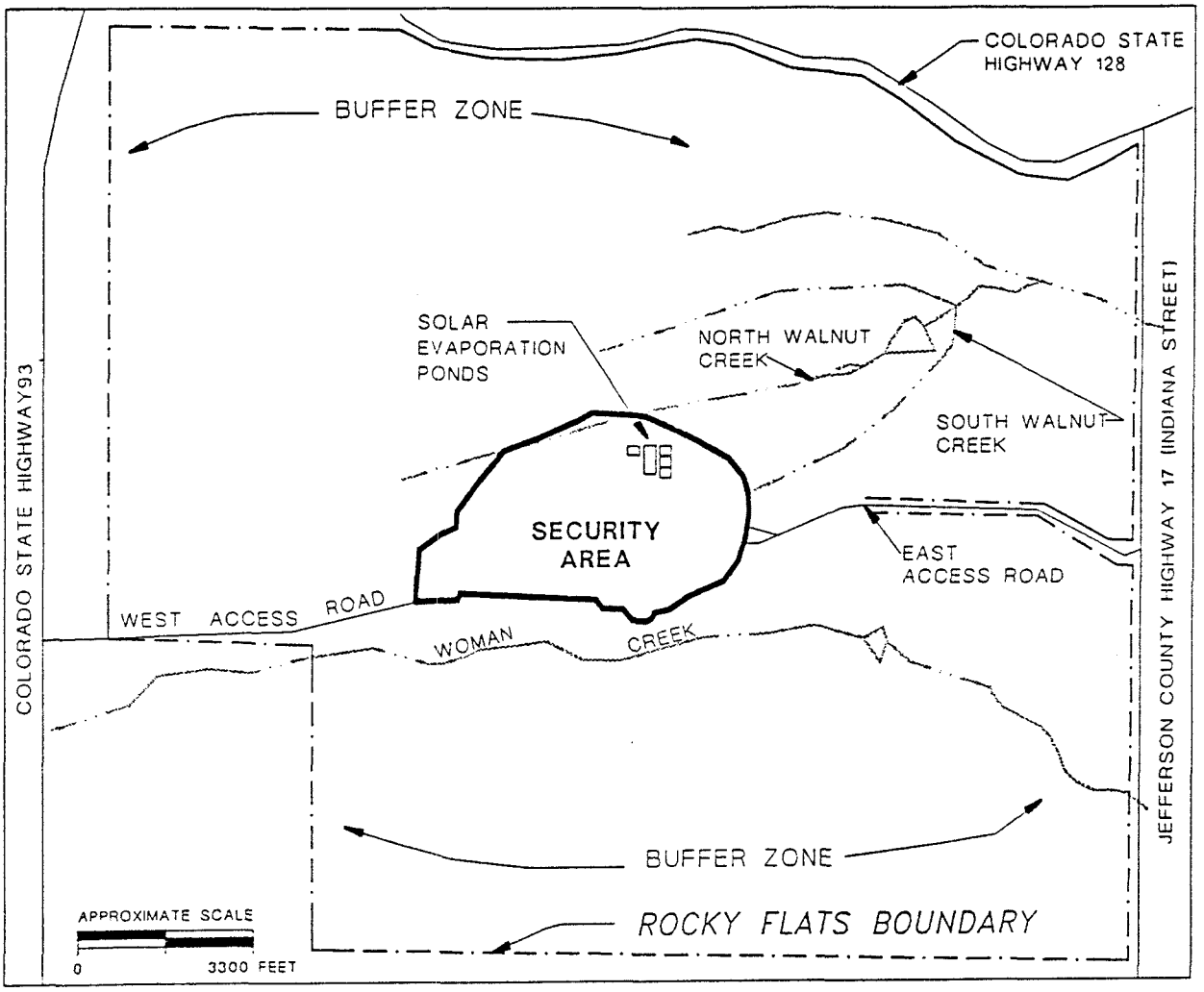
A transition plan is due to Congress in July 1992. This plan will better define the activities and actions necessary to effect the transition (DOE, 1992).

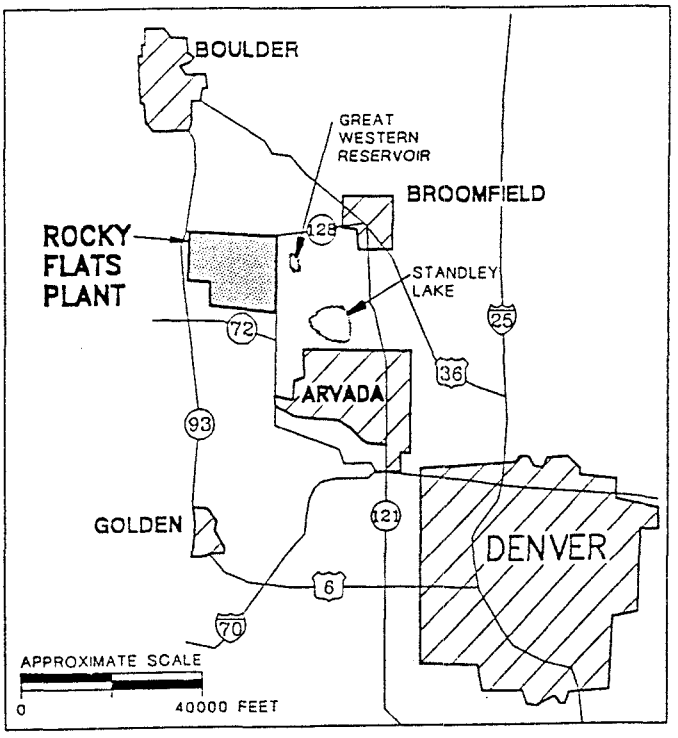
Construction of the RFP began in 1951 and the first production activities commenced the following year. Operation of the RFP fell under the administration of the U. S. Atomic Energy Commission (USAEC) from 1951 until the USAEC was dissolved in January 1975. Responsibility for the plant was then transferred to the Energy Research and Development Administration (ERDA), which was succeeded in 1977 by DOE. Dow Chemical USA (Dow) was the prime operating contractor of the facility from 1951 until 1975. Rockwell International (Rockwell) succeeded Dow from 1975 through 1989. On January 1, 1990, EG&G assumed RFP operations.

General events of significance have occurred at the RFP which have potentially affected the environment of the entire plantsite and not just one discrete location. A major facility expansion was initiated in 1955 and referred to as Part IV construction. The expansion provided the RFP with greater process capabilities and many more buildings and facilities. When the buildings went into operation, contaminated liquid and solid waste was produced at a greater rate than before the expansion. Storage and disposal of the wastes became a major concern and several waste management practices were initiated that are now considered to have caused negative impacts on the environment. Some of these waste management practices created several of the areas of concern now being identified and addressed.

In 1957, a fire occurred in Building 771, a plutonium recovery facility, that caused the plenum filters to be breached. In addition to airborne releases due to the fire, fire-fighting efforts and clean-up activities contributed to releases to the environment.

A second major plant expansion, Part V construction, was begun in 1967, prompting increased manufacturing capabilities and waste-producing activities. Significant environmental clean-up efforts of waste produced during the 1950s and early 1960s were initiated at the same time.





ADAPTED FROM: FIG. 1-1, E.G. & G. DRAFT GEOLOGIC CHARACTERIZATION REPORT, JAN. 3, 1990.

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 1-1

TITLE:
ROCKY FLATS LOCATION MAP

PROJ. NO.	304944	DWG. NO.	304944-A88
DESIGN BY	G. BRAND	CHECKED	FJB
DRAWN BY	RITA HYNA	APPROVED	
DATE	12/10/91	SCALE	AS SHOWN

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In 1969, a fire occurred in Building 776 and Building 777 which spread contamination into the buildings, the surrounding asphalt and soil, and the atmosphere. Subsequent clean-up activities produced a significant amount of contaminated fire wastes which were stored and/or disposed of at the RFP. Following the fire, waste storage problems increased and concerns were heightened regarding the potential for off-site releases via air, surface water, and groundwater. In addition to contaminated waste clean-up activities, waste management procedures were altered to reduce potential environmental impact. Detention ponds in the drainages were upgraded and additional controls installed to monitor surface water prior to off-site discharge. Additional land surrounding the plant was purchased by the DOE in 1974 which expanded the buffer zone and further isolated the manufacturing area from surrounding communities.

A site-wide radiometric survey was performed from 1977 to 1984 using hand-held FIDLER instruments. The purpose of the survey was to detect extremely contaminated areas of the plantsite. By 1984, over 11 million square feet of the RFP was surveyed and relative concentrations of plutonium in the surficial materials were mapped. Although arrangements for removal or cleanup of discrete areas were made if the detected contamination was considered an immediate hazard, cleanup was not intended to be an integral part of the survey. The identification of 'hot spots' prompted consideration in the development of subsequent environmental activities.

1.3.2 RFP Hazardous Materials and IHSSs

RFP operations generate nonhazardous, hazardous, radioactive, and mixed hazardous and radioactive waste streams (DOE, 1987). Hazardous substances which have been detected in the environment on the RFP as a result of RFP operations include various radionuclides, nonradioactive metals, volatile organic compounds (VOCs), semi-volatile organic compounds, and inorganic ions. These substances have been released to the environment through past waste management practices (e.g., waste incineration or burial) and unplanned events such as leaks, spills, and fires. Herbicides which have been applied in the past at various location on the RFP have also been detected.

Attachment 4 of the IAG provides a hazardous substance list for the RFP (EPA, 1991). The IAG list includes compounds which have been released to the environment or which pose a threat of release to the environment. The list is based on historical information and has been subject to change since its development. An ongoing dose reconstruction effort for the RFP by CDH includes an attempt to identify primary compounds of concern at the RFP based on quantities used during historical operations.

The IAG identifies 117 IHSSs at the RFP. These IHSSs, designated 101 through 217, are grouped into sixteen Operable Units (OUs) for purposes of conducting field investigations and remediation activities. A number of the IHSSs consist of multiple release locations which are grouped together as a single IHSS because of similar contaminant characteristics or site conditions; the 117 numbered IHSSs are comprised of a total of 178 separate sites. RFP IHSSs have been identified in the past primarily through a limited search of RFP records, employee interviews, and aerial photograph interpretation. Field investigation activities have not yet commenced at many of the sixteen RFP OUs, and therefore most of the IHSSs have been characterized only on the basis of historical information. Detailed information regarding the existence, concentration, and extent of contamination at the current time is not yet available for most RFP IHSSs.

1.3.3 Environmental History

Since the inception of the RFP in 1951, routine monitoring has been conducted for potential RFP-derived contaminants in various environmental media. In addition to routine monitoring, numerous studies have been undertaken to characterize the RFP environment and to identify and characterize potential sites of environmental contamination at the RFP. These efforts have been driven by USAEC, ERDA, and DOE policy, and by State and Federal environmental regulations which have been promulgated during the operating history of the RFP.

Routine Environmental Monitoring

The RFP conducts routine radiological and nonradiological environmental monitoring of effluent air, ambient air, surface water, groundwater, tap water, stream sediments, and soil. Specific sampling and analysis programs for the various media have evolved throughout the history of RFP operations. Since 1970, results from most of these monitoring programs have been summarized monthly and/or annually in RFP environmental monitoring reports. Pre-1970 environmental monitoring data are contained in RFP file repositories.

Ambient air, soil, surface water, and tap water quality are also monitored at locations around the RFP by CDH and by cities utilizing surface water downstream of the RFP as municipal water supplies.

Past Environmental Studies

Many detailed studies of the RFP site environment have been performed. These studies include characterizations of RFP geology, hydrology, biology, meteorology, and demography, as well as prior efforts to identify and characterize potential hazardous substance sites at the RFP. These latter studies

provide most of the information upon which the current IHSS and OU structure at the RFP is based, and are of primary importance to the HRR because they were intended to meet many of the same requirements as the HRR. The following paragraphs present brief descriptions of these studies.

A 1973 study was initiated by USAEC and focused on potentially contaminated soils on the RFP site (Dow, 1973). The study was performed through a combination of RFP records/literature review and employee interviews. A draft report was submitted (presumably to the USAEC) in October 1973. The USAEC directive which prompted the study also requested a plan of action for the location and investigation of all contaminated soils on the RFP, including cost estimates and schedules for remediation.

In May 1975, ERDA (which succeeded USAEC in 1975) initiated an environmental assessment of the RFP as part of an ongoing program of assessments at various ERDA facilities. The eventual result of the assessment was the Final Environmental Impact Statement (EIS), produced by the DOE in April 1980 (DOE, 1980). The EIS document contains descriptions of the RFP facility, environs, and operations from the viewpoint of environmental impact, but does not include specific descriptions of hazardous substance sites at the RFP.

In response to the promulgation of CERCLA in 1980, DOE developed an internal program, the Comprehensive Environmental Assessment and Response Program (CEARP). CEARP specified a phased approach to site investigation and remediation which was intended to enable DOE to comply with CERCLA requirements at its facilities, and therefore incorporated many elements of CERCLA. CEARP was later succeeded by the ER Program (Section 1.2). The DOE initiated an assessment of the RFP under Phase 1 of CEARP through their Los Alamos operations office. The CEARP Phase 1 assessment included the identification and characterization of potential CERCLA sites at the RFP (i.e., inactive or former disposal facilities, activities, spills, or leaks), and a ranking of potential hazards and contaminant migration at each site. Sites were identified and characterized based on limited records review and interviews with RFP employees. The draft CEARP Phase 1 report was produced in April 1986 (DOE, 1986a) and was never finalized. The report contains the first systematic descriptions of many of the individual sites which would later be designated as RFP IHSSs.

CERCLA sites identified in the CEARP Phase 1 report were described, categorized, and supplemented with some additional sites in Table 1 of Appendix 1, RCRA 3004(u) Waste Management Units, of the RFP RCRA Part B Operating Permit Application frst in November 1986, and then modified in December 1987 (DOE, 1987). Also included in RCRA 3004(u) were "Inactive Waste Unit Summary Sheets" that

provided brief descriptions of most of these sites as well as an evaluation of whether each site was regulated under the RCRA closure regulations, or whether it was strictly a CERCLA site. This document was prepared in response to the requirements of Section 3004(u) of RCRA, and was also specified under a Compliance Agreement of July 1986 between DOE, EPA, and CDH. The individual inactive sites from the CEARP Phase 1 report were designated as RCRA Solid Waste Management Units (SWMUs). These SWMUs later were redefined as IHSSs under the IAG. The RCRA 3004(u) document also presented an extensive list of active and planned waste management units at the RFP. A number of these units were also identified as IHSSs under the IAG, due to their removal from service.

1.4 REPORT ORGANIZATION

This report first presents general background information on the RFP. The information is followed by a description of the technical approach used during this project to complete the HRR report. Individual release sites are then identified and arranged based on their geographic location. These release sites are described as per the IAG requirements. References in support of the release site description or location are identified for each release site. Finally, recommendations for future work are provided.

2.0 TECHNICAL APPROACH

Information used in the preparation of the HRR was compiled and interpreted largely over an eight-month period beginning in February 1991. In February 1991, a preliminary approach was outlined by which information useful to the HRR could be gathered, manipulated, and utilized to accomplish the HRR goals identified in Section 1.1. The HRR technical approach was designed to maximize the amount of information which could be compiled and interpreted within the IAG schedule for the HRR and provide more complete, accurate, and defensible information on RFP releases than previous documents. In order to accomplish these goals, a computerized database was created that was later used to help identify those documents that relate to a particular release. These documents were then evaluated in detail and the information pertinent to the release was used to describe it.

The project team personnel were provided with RFP background training and indoctrination at the start of the project (see Section 2.1). This training enabled project personnel to develop an understanding of the important relationship between RFP historical operations and specific release sites, and to correctly associate historical data with the many release sites located at RFP. For each major activity in the HRR, the project team members were issued detailed work instructions covering the activities to be performed. Each project team member maintained a log book which summarized work performed on the project.

The HRR technical approach was subdivided into the following sequence of project tasks:

- Personnel Training and Indoctrination;
- Background Research;
- File Review;
- Site Visits and Photography;
- RFP Employee Interviews; and
- Coordination with Other Projects.

These tasks are addressed in detail in the following sections.

2.1 PERSONNEL TRAINING AND INDOCTRINATION

It was recognized before the HRR project began that project personnel needed to be familiar with RFP historical operations and known release sites in order to recognize information relevant to the HRR. The

locations and characteristics of historical releases from the RFP are closely tied to the plant's long operating history and complex production activities. Prior to the commencement of data compilation, project personnel received background training on RFP history, operations, past environmental studies, and sources of historical information. This training was provided by project personnel familiar with the RFP and by review of the following background documents:

- CERCLA 104(e) Report for the RFP (DOE, 1990);
- Appendix 1, RCRA 3004(u) Inactive Waste Management Units, of the RFP RCRA Part B Operating Permit Application (DOE, 1987);
- CEARP Phase 1 Report (DOE, 1986b);
- The final Environmental Impact Statement for the RFP (DOE, 1980);
- "Environmental Inventory: A Historical Summation of Environmental Incidents Affecting Soils at or Near the U.S. AEC Rocky Flats Plant," by Dow Chemical, October 1973 (Dow, 1973); and
- The various RFP RCRA Contingency Plan Implementation Reports.

2.2 BACKGROUND RESEARCH

Of great importance to the HRR file selection process (see Section 2.3.1) was the identification of groups that have had responsibilities pertaining to environmental releases during the history of the RFP. These groups can be broadly categorized as the environmental group, the health physics group, the emergency response group, and the waste operations group. At any point in the history of the RFP, one or more of these groups was likely involved in the majority of releases of interest to the HRR. These groups and key personnel within them were identified in order to aid in the selection of appropriate files for review, see Section 3.3.1 of this report. The names and directorships of these groups have changed often throughout the history of the RFP, but these general disciplines have always been present to some extent.

HRR background research also entailed identifying and compiling information from documents that contain previous inventories of RFP release sites. These documents were included in the list of background reading for project personnel (Section 2.1). The previous inventories served as a foundation for the HRR, and in some instances provided the only information found during the HRR project for a particular site. The HRR effort did, however, gather information on known release sites and occurrences. The descriptions of previously identified PACs in Section 3.1 incorporate both newly gathered information and existing information from past release site inventories.

2.3 FILE REVIEW

The primary source of information used in preparation of the HRR was records held in various RFP file repositories. These records include internal memoranda, letters and reports, log books, meeting minutes, photographs, press releases, and other written documentation of RFP operations, incidents, and past practices. The primary data compilation activities for the HRR involved selecting files for review from the large volume of material at each repository and reviewing these files in detail to locate documents of potential interest to the HRR.

Environmental data such as routine air and water samples were not reviewed or assembled in detail, although examples of the types of data available were obtained. Most routinely generated environmental data cannot be associated with a specific release. Historical environmental data at the RFP are largely limited to radionuclide and nitrate data. Other analytes were less commonly analyzed until the mid-1980s.

RFP files are held in separately maintained repositories in various locations on and near the RFP. File indexing systems vary widely between these repositories, and few of the catalogues are computerized. The file repositories listed below were the primary sources of the over 4,000 documents used in the preparation of the HRR:

- The RFP Environmental Master File, located at the RFP;
- The Federal Records Center, located at the Denver Federal Center;
- The Building 881 file repository, located at the RFP;
- RFP land litigation files, located at the RFP;
- Dr. Carl Johnson's files, located at the University of Colorado, Boulder;
- RFP photography files, located at the RFP;
- DOE/Los Alamos CEARP files, located at the RFP;
- RFP Polychlorinated Biphenyl (PCB) files, located at the RFP;
- RFP unplanned incident tracking files, located at the RFP;
- RCRA Contingency Plan Implementation Reports, located at the RFP;
- Files for the Community Right to Know Notifications, located at the RFP; and
- Building 750 contamination incident files, located at the RFP.

The following sections describe each of these repositories in detail and outline the procedures used to select and review files from each.

2.3.1 Selection of Files for Detailed Review

A systematic approach was developed for identifying those portions of each file repository most pertinent to the HRR, based primarily upon indexed and cataloged information. Most of the file repositories were organized and catalogued in boxes of approximately one cubic foot of files each. A single box of files was the smallest file subdivision that the file selection process could typically address, although some file repositories could be (and were) searched for individual documents.

Because the file catalogue systems were different at the various repositories, it was necessary to develop file selection procedures for each repository. In some instances, detailed indexing allowed a very accurate selection of files for detailed review. For other repositories, very general information on each box of files was available, which required hand searching of a relatively large number of files. In all cases, however, a very conservative approach was taken, such that files of questionable or uncertain interest to the HRR were selected for review in addition to those obviously pertinent to the project. General selection criteria for each file repository included:

- Group/department of origin;
- Name(s) of individuals who submitted files;
- Title/subject; and
- Description of file contents (often sketchy).

Where more detailed indexing records were available, it was sometimes possible to implement a multiple step selection process to further limit the amount of hand searching necessary. In some cases, the indexing records indicated a particular type of document which was likely to be of interest to the HRR. Examples of such document types include meeting minutes, history reports, routine progress reports, Unusual Occurrence Reports (UORs), Supervisor's Investigation Reports (SIRs), and Internal Investigation Reports (IIRs).

Appendix B presents a summary of pertinent information about each of the file repositories used for the HRR, including the contents, organization, and selection methodology employed. Complete information was maintained regarding those boxes or file categories searched at each file repository. Appendix B also includes the Environmental Master File (EMF) index and records used in the file selection effort. Appendix C describes the file numbering system, the file selection process, and the boxes searched at the Federal Records Center. Uncatalogued and unindexed files found in files of potential interest to the HRR were searched document by document for information relevant to the HRR. The EMF index and records

of the Federal Center files are presented in these appendices as examples of the types of information available for the files searched.

It is standard procedure at federal file repositories to purge files after a certain period of time. This requires written notification of the originating federal agency or agency department, which may either choose to preserve the files or agree to their destruction. Files may also be designated as permanent records by the originating agency at the time of their submittal. A list of RFP files which have been purged from the Denver Federal Records Center is included in Appendix D. These purged files were not available from the Denver Federal Records Center, although another copy of these documents may have been found in other file repositories.

2.3.2 Detailed File Review

Files selected for detailed review by the procedures described in Section 2.3.1 were hand searched for documents of interest to the HRR. All file subsets which were selected for detailed review (generally boxes of files) were searched. Arrangements for access to the files had to be made separately with each file custodian. Access to each set of files was handled differently. Documents of interest were identified based on the following criteria:

- Key words of interest in document title;
- Document type; and
- Brief review of document subject matter (i.e., does event meet HRR definition of release?).

Project personnel briefly described the contents of each box of files reviewed in their project logbook and whether or not the box contained documents of interest to the HRR.

Copies of all documents identified during detailed review as useful to the HRR were obtained through the EG&G Legal Department, which has responsibility for tracking RFP document requests. Documents of interest were summarized on a Precoding Sheet (Appendix E). The Precoding Sheet identified data extracted from documents to be entered into the project database, and was developed in conjunction with the EG&G Legal Department to meet both HRR needs and EG&G Legal document control responsibilities. The Precoding Sheet included a set of detailed instructions, including lists of acceptable key words to be used in summarizing the contents of each document.

The Precoding Sheet was printed on colored paper to flag documents for classification and copying by EG&G Legal Department. After a document was summarized on the Precoding Sheet, it was returned to the box from which it was taken with the Precoding Sheet attached. A copy of each completed Precoding Sheet was retained by the project team as a tracking form to ensure that copies of each document requested through EG&G Legal were obtained.

Boxes containing files to be copied for the HRR project file were delivered to EG&G Legal, which turned the files over to EG&G Information Security for classification review. The few documents found to contain classified information had that classified information removed before being returned to EG&G Legal. EG&G Legal then copied the documents and assigned unique, sequential page numbers to the documents, entered Precode sheet information onto the HRR database, and arranged for transfer of the files to the HRR project team.

In order to more readily access and manipulate the large body of information obtained for the HRR, the Precoding Sheets were entered into an HRR project customized computer bibliographical software application developed in Advanced Revelation, a commercially available Relational Database Management System (RDMS) software package. This database assigned each document a unique numeric identification code. Primary data entry was performed by EG&G Legal personnel using information from the HRR Precode sheets completed by project personnel. After the database entry was complete, EG&G Legal provided a hard copy of the requested document along with a floppy disk copy of the database file to the HRR project team. Copies of the database were maintained by EG&G Legal and the HRR project team.

At periodic intervals after receipt of requested documents from EG&G Legal, HRR project personnel reviewed the database for errors, omissions, and duplicate documents. Duplicate documents are identical documents for which more than one HRR team member identified and completed Precode Sheets. Duplicate documents were identified by performing a search for identical titles and then directly comparing the potential duplicates. The most complete or cleanest copy of a document was designated as the master copy. Other copies of the document on the database were flagged on the database as duplicates of this master copy. The HRR project database and files will be turned over to EG&G at the completion of the HRR project.

Additional information about the HRR database is provided in Section 2.8.

2.3.3 Outdoor Releases

The HRR focuses primarily on outdoor releases of hazardous substances. These releases may potentially qualify as an Individual Hazardous Substance Site (IHSS). The following IAG definitions further explain what qualifies as an IHSS.

- Individual Hazardous Substance Sites (IHSSs) refer to individual locations where hazardous substances have come to be located at a discrete area within the larger site.

- Site refers to the federal enclave known as the Rocky Flats Plant, including the buffer zone, and shall also include all areas that are contaminated by hazardous substances, pollutants, or contaminants as those terms are defined in sections 101(14) and (33) of CERCLA, and/or any hazardous waste or hazardous constituents as those terms are defined in section 1004 of RCRA or the Colorado Hazardous Waste Act (CHWA) from sources at the federal enclave (EPA, 1991).

The IAG includes a list of hazardous substances which have been released at the RFP or pose a threat of release to the environment at the RFP. The list is presented as Table 2-1. The majority of releases identified for the HRR involved one or more of the hazardous substances listed in the IAG table. However, "hazardous substance" is not specifically defined in Chapter 1, Part 5 of the IAG, meaning that the definition must follow from CERCLA, RCRA, or CHWA. The HRR therefore focuses on hazardous substances as defined in CERCLA under 42 USC, Section 9601(14), and was not limited to materials in the IAG listing. In many of the incidents described in the HRR, it could not be determined whether the incident did or did not specifically involve a hazardous substance. The approach taken was to prepare a description of the incident unless a reasonable person would willingly handle the material.

Based on these definitions, information for the HRR was recorded on any release that met the following criteria:

- It affected the outdoor environment.
- It potentially involved a hazardous substance (regardless of quantity or concentration).
- It came to be deposited at a discrete location.

An exception to this approach was taken with respect to materials used for their intended purpose. For instance, pesticides or herbicides applied as intended were not included in the HRR as a release of interest. However, the presence of atrazine, an herbicide, in the drainage ponds was included in the drainage pond discussions since this material was not supposed to be present in the drainage ponds. Another example

TABLE 2-1

ROCKY FLATS PLANT HAZARDOUS SUBSTANCE LIST*

Radionuclides:

Plutonium 239, 240
Americium 241
Uranium 233, 234, 235, and 238
Tritium
Gross alpha
Gross beta

Metals:

Aluminum
Beryllium
Calcium
Cadmium
Cobalt
Chromium
Barium
Lead
Magnesium
Selenium
Sodium
Silver
Strontium
Thallium
Zinc
Mercury
Nickel
Lithium

Inorganics:

Sulfuric Acid
Nitric Acid
Hydrofluoric Acid
Sodium Hydroxide
Hydrochloric Acid
Nitrate
Sulfate
Hydroxide

Volatile Organics:

1,1,2-Trichloroethylene
Chloroform
1,1,1-Trichloroethylene
Carbon Tetrachloride
1,2-Dichloroethane
Acetone
Perchloroethane
Benzene
Toluene
Methylethyl Ketone Peroxide
Dichloromethane
Xylene
2-Butanone
Methylene Chloride
Methyl Ethyl Ketone

Semi-Volatile Organics:

Bis(2-ethylhexyl) phthalate
Ethylene glycol

Miscellaneous:

Diesel Fuel
Fuel Oil
Peroxide
Asbestos
Oil Sludge
Polyester Resin
Still Bottom Sands

* Source: IAG Attachment 4 (EPA, 1991)

of an area/material used according to its intended purpose and therefore not included in the HRR as a PAC are the firing range backstops in which many bullets have come to be located. This sort of activity/event has been determined by the EPA to constitute the intended purpose of military ordinance, and therefore cannot qualify as a Solid Waste Management Unit (EPA, 1990). Many (but not all) outdoor events are summarized on a list entitled "Summary of Events" which is maintained at the RFP and provided in Appendix F. Also included in Appendix F is a report made regarding a five pound release of sulfur dioxide to the air in 1990. This event did not meet the HRR criteria for inclusion as a PAC but is included in this appendix because the IAG requires that the HRR address reports made under the Community Right to Know Act. This is the only incident for which a Community Right to Know Act report was made. A brief list of known incidents of off-site contamination is included in Appendix F as well.

Appendix G is provided for informational purposes. It identifies files that the HRR team could not review because the Federal Bureau of Investigation had confiscated these files. Information on indoor or outdoor releases of interest to the HRR may be contained in these files.

Appendix H is provided to meet the IAG requirement that the HRR address incidents requiring the implementation of the RCRA Contingency Plan. The RCRA Contingency Plan Implementation Reports included in this appendix do not describe potential releases to the environment and therefore do not qualify as PACs. RCRA Contingency Plan Implementation Reports which did describe releases which qualified as PACs were used where appropriate in the development of Section 3.0 and are identified in the References (Appendix A).

2.3.4 Indoor Releases

Throughout the operating history of the RFP, numerous accidental releases and contamination incidents have occurred inside production buildings. Files reviewed for the HRR identified many hundreds of indoor unplanned events. Many (but not all) of these events are summarized on a list titled "Summary of Events" which is maintained at the RFP (provided in Appendix F). The great majority of indoor incidents were isolated and cleaned up without any recognizable effect on the out-of-building environment. Nevertheless, it is obvious that many indoor events had the potential to contribute to contamination of the environment beneath and around the building. Indoor events are not specifically excluded from the IAG requirement that the HRR provide information on "...all spills, releases, and/or incidents involving hazardous substances..." at the RFP (Section 1.1).

Based on these considerations, it was decided during the course of detailed file review activities that indoor unplanned events needed to be addressed, albeit differently from releases to the outdoor environment. Because of the great number of these events, it was not feasible to attempt to identify and document each event separately. The following criteria were therefore established for the tracking of indoor unplanned events for the HRR:

- The event had to meet the definition of "release" established for outdoor events (Section 1.1);
- The event had to have an identifiable cause. Occurrences of contamination inside a building without an identifiable event or cause were not tracked;
- The event had to involve either ten pounds (or ten pints) or more of material, or 1000 square feet or more of inside building area; and
- The event was not included on the "Summary of Events" list (Appendix F).

The criteria regarding a release involving either ten pounds or 1,000 square feet were set based on an evaluation of the CERCLA Reportable Quantities (RQs) and on RFP records. In general, the smallest CERCLA RQ is one pound when the material is released or potentially exposed to the environment. Since a release strictly within a building is not released or potentially exposed to the environment, it was felt that a higher threshold quantity than one pound could be used. The threshold quantity chosen was an order of magnitude higher than the minimum RQ, or ten pounds. The choice of 1,000 square feet of inside building area involved in a release differentiated between very numerous minor contamination incidents and those larger incidents of more importance. Once again, since these releases are indoors, it was felt that a higher threshold level could be set while still serving to protect the environment. Documents detailing indoor events which met these criteria were entered into the HRR database with a flag to distinguish them from outdoor events.

Certain buildings at the RFP have been used extensively for production, waste handling, and/or laboratory activities. In recognition of this, areas beneath a number of RFP buildings have been identified as Potential Areas of Concern (PACs) in Section 3.14 of this report. This approach is consistent with a previous release site inventory compiled in 1973 by Dow Chemical, which identified potential soil contamination beneath several major production buildings based on historical release information (Dow, 1973). It is unlikely that contamination beneath any such building could be traced to a single indoor unplanned event or other release.

2.4 SITE VISITS AND PHOTOGRAPHY

Following completion of detailed file review and collection of the raw data for each individual release sites, project personnel visited the release sites to observe their present condition and photograph the sites, where appropriate. Present site conditions were compared to early site descriptions and photographs (where available) to help indicate whether the site was remediated, disrupted or covered by subsequent construction, or otherwise altered since the release occurred. Site photographs also aided interviewees in recalling release details during employee interviews (see Section 2.5).

Field observation notes were recorded by project personnel in project log books. All photographs were taken by EG&G personnel in compliance with RFP security procedures, and were reviewed for classification before being used by project personnel. Photographs of release sites were entered into the HRR database similar to any other document. Duplicate copies of photographs are retained by EG&G Legal. Field notes, photographs, and Photo Record Logs were placed into the release-specific project files discussed in Section 3.0.

2.5 RFP EMPLOYEE INTERVIEWS

Detailed interviews were conducted with selected current and former RFP employees. The purpose of interviews was to fill specific gaps in the known histories of RFP operations and releases. In particular, information was sought on RFP releases that are recognized to be potentially significant sources of environmental contamination. Interviews were conducted late in the project so that project personnel were able to ask specific, knowledgeable questions during the interviews. This also allowed documents compiled for the particular releases to be on hand during the interviews.

The HRR interviews focused on individuals who could likely provide useful information on a number of release sites. Potential interviewees were identified through screening of HRR file documents for authors, addressees, and distribution lists, and also through other interviews. Interviewee selection considered how directly or indirectly the individual was involved in the particular releases, and whether the individual had previously been interviewed for a similar purpose. Interviewees were often former employees of groups which historically held environmental responsibilities at the RFP.

The interview record includes a list of core questions about the interviewee's employment history and involvement in the release(s) in order to evaluate the credibility of the information obtained. The interviewee has been asked to review any PAC narrative that used information attributed to that

interviewee. Completed interview logs will be entered into the HRR project database and retained in the project files.

In many instances, specific questions about a release were answered through brief telephone interviews, and formal interviews were not necessary. These telephone calls were recorded on a form designed for the purpose (Appendix E) and became part of the PAC files for which it contributed information.

2.6 COORDINATION WITH OTHER PROJECTS

Several projects similar in scope to the HRR were in progress during preparation of the HRR. These included:

- The Offsite Dose Reconstruction Project (being performed by Chem-Risk for CDH);
- Ongoing class action lawsuits against Dow Chemical and Rockwell International; and
- Ordering, arranging, optically scanning, and computer cataloging of RFP environmental files by DOE.

It was recognized that open communication with the groups conducting these other projects would be beneficial to all projects. The EG&G Legal Department managed data acquisition for these projects as well as the HRR project team, greatly facilitating the exchange of information between the projects.

2.7 RELEASE DESCRIPTION AND LOCATION

The HRR project activities described in the preceding subsections provided background information which was used to describe the HRR PACs. The first step in the process of describing a release was to use geographical location information or other information as a database search criterion to isolate documents pertaining to the area or specific release of interest. These documents were then sorted into groups of documents relevant to particular releases within the area by utilizing release-specific search criteria (e.g., material, date, and type of unit). These groups of documents were then used to prepare the individual PAC descriptions. The information found in these documents was supplemented by other relevant documents available to the project team but not yet entered on the database. These other documents will be added to the database before it is turned over to EG&G.

The HRR database is only a tool to help identify documents potentially related to a release, and does not summarize the contents of the HRR file documents. Hard copies of the documents were pulled from the HRR files and carefully read in order to prepare the detailed PAC descriptions presented in Section 3.0. Once the PAC description was drafted, RFP utility drawings and available photographs were reviewed in

order to help identify and map the location of the release. At times, engineering drawings for a structure or building were also used to further understand the details or location of a release. Each PAC description includes a list of documents used and considered in its preparation.

2.8 HRR Database Organization

As discussed in Section 2.3.2, precoding information from all documentation gathered during the HRR was entered onto a database to facilitate document searching and data compilation. Because individual documents often contain information on more than one release, the precoding was designed to subdivide each document into releases that can be sorted and searched separately using the database.

As each release was associated with a specific PAC or PIC, it was "flagged" on the database with the appropriate PAC or PIC number. This enabled the database to be searched for releases which were not yet flagged. These unflagged releases, or "orphan releases," were then reviewed to ensure complete utilization of the release information contained on the database. At the current time, there are no orphan releases on the HRR database.

Also identified were "orphan documents," which are documents that do not contain specific release information but were precoded for useful background information. An example of an orphan document is a letter of request from the HRR project team to the EG&G Legal Department requesting photocopies of documents of potential interest to the HRR project team. Another example of an orphan document is a letter specifying discharge limits or criteria for discharge, but not describing a release.

A number of reference codes were developed to flag database releases in addition to PAC and PIC numbers. The following are explanations of these various reference codes:

- PAC or PIC Number: Whenever appropriate, the specific PAC or PIC number was used to flag the database (e.g.; 400-122, UBC-444, PIC-15).

- Photographs: Photographs which were determined to pertain to a specific release were flagged with the appropriate PAC or PIC number. Photographs which encompass part or all of a particular RFP geographical area or areas were flagged with the appropriate geographical area number(s) (e.g., 700, NE, 800). Aerial photographs showing the entire plant site were flagged with the nonspecific geographical area designation "000." Photographs which do not pertain to a release and do not encompass part of a particular RFP geographical area were flagged "NONE."

- Indoor Events: It was assumed that any given indoor event may have contributed to under-building contamination. Indoor events were therefore flagged with the appropriate building-specific "UBC" PAC number (see Section 3.14 for a complete listing of UBC PACs). If the building was unknown due to insufficient information, the release was flagged "UBC-UNK."

- Offsite Releases: Releases that occurred outside the RFP boundary were flagged "OFFSITE." This designation includes information about areas immediately surrounding the RFP, offsite burials, and offsite accidents. Some of the offsite releases described in these documents are not RFP-related.

- Air Releases: Information about releases which impacted only air were flagged with the appropriate RFP geographical area followed by "AIR" (e.g., 700-AIR). If the area was unknown due to insufficient information, "SITE-AIR" was used.

- Orphan Documents: Documents which were precoded for background information and contain no specific release information were flagged "NONE."

3.0 DESCRIPTIONS OF POTENTIAL AREAS OF CONCERN

This section presents detailed descriptions of the various Potential Areas of Concern (PACs) at the RFP. The PAC descriptions are based on RFP release information gathered through file review, interviews, site visits, and photographs. Although some RFP IHSSs have been investigated or are undergoing investigation, the HRR defines all of the 117 existing RFP IHSSs (Plate 1) as PACs. Systematic descriptions of these previously identified IHSSs and of newly identified PACs are provided in this section. Location maps for PACs which are existing IHSSs and newly identified PACs are presented in Plates 2 and 3, respectively.

Section 2 of this report provides additional details regarding what indoor and outdoor releases were considered for inclusion in this report as PACs. Again, releases that occurred after January 1, 1991, were typically not included in this report. Information on releases that occurred after January 1, 1991, will be included in the June 1992 HRR submittal. A release that was potentially of interest to the HRR for which a location has not been established was included as a Potential Incident of Concern (PIC). Locations for these incidents may yet be established by the HRR team. No attempt was made to screen any PACs or PICs from this HRR report. If documentation on an incident was found, and the materials involved possibly qualified as a hazardous substance as defined in the IAG, the event was included in this report. No de-minimis quantity or concentration was used for screening purposes. This approach was considered consistent with the perceived intent of the IAG since the regulatory agencies are the parties with authority to determine whether or not a particular release qualifies as an IHSS.

PAC descriptions were prepared using relevant HRR file documents that were identified by means of database searches. These documents were supplemented by RFP documents not precoded or entered into the HRR database. The HRR database contains data entry fields that correspond with the Precoding Sheet filled out for each document of interest to the HRR (Appendix E). The data entry fields were searched individually or in combination to isolate and list documents pertaining to a specific location, date, release type, or release constituent. The listed documents were then pulled from the HRR files and reviewed for relevance to a particular PAC. Working copies of each relevant document were made, and the originals were returned to the HRR file. Summary descriptions of each PAC were prepared that referenced these documents and other supplemental documents as appropriate. Site visits, photographs (both new and existing), RFP site utility location maps, interviews, and telephone interviews were then utilized to gather additional information for the PAC descriptions, as described in Section 2.0.

Because a great amount of effort went into researching each PAC, individual PAC files were established to preserve this effort for future HRR users. The PAC files contain working copies of the documents used to prepare the PAC descriptions, as well as photographs, interview logs, telephone logs, notes, and other information relevant to the PAC.

As the PAC descriptions were completed, documents relevant to a particular PAC were flagged on the HRR database with the appropriate PAC number. Documents containing information on two or more PACs were flagged accordingly. Thereafter, it was possible to identify documents relevant to a given PAC by simply searching the database for the PAC number. Because of variation in the use of Precoding Sheets and database searches, however, it was recognized that all documents of interest to a PAC might not be readily located using the established procedures. Therefore, a list was obtained from the database of all HRR documents which had not been flagged as pertinent to an identified PAC. These documents are being reviewed individually so that no information on an identified PAC is missed and so that no PACs are overlooked. Section 2.7 of this report addresses this issue more completely.

PAC descriptions consist of the following information:

- PAC reference number and name;
- IHSS reference number;
- Unit name;
- PAC location;
- Date(s) of operation or occurrence;
- Description of operation or occurrence;
- Physical/chemical description of constituents released;
- Responses to operation or occurrence;
- Fate of constituents released to the environment;
- Comments; and
- References.

Each of these items is discussed below.

PAC Reference Number and Name, IHSS Reference Number, and Unit Number

Each PAC has been assigned a unique alphanumeric PAC reference code consisting of two alpha-numeric series separated by a dash. Because PACs can be arranged based on geographical location, the PAC numbering system incorporates the general location of the PAC. The RFP-related area was subdivided into fourteen areas for this purpose (Table 3-1 and Figure 3-1). Two areas, the 000 Area and Offsite, are not identified on the map, because they refer to releases contained in more than one area, and releases which did not occur on the plantsite, respectively. The PAC number prefix identifies the general RFP area in which the particular PAC is located.

The numbered RFP areas refer to the established geographical area designations of the RFP manufacturing facility (Figure 3-1). Buildings within these areas are numbered according to the area designation; for example, RFP buildings in the 100 area are assigned numbers between 100 and 200. As an example, the reader will immediately know that a PAC is in the 100 area of the RFP if the PAC number starts with the prefix of 100. The 200 series was not used as a PAC number prefix because it is not a specific area at the RFP.

The RFP buffer zone quadrants (northeast, NE; northwest, NW; southeast, SE; and southwest, SW) are subdivided by a projection of Central Avenue as the north-south dividing line and a projection of Eighth Avenue as the east-west dividing line. The buffer zone quadrant identifications only apply to those PACs which are located outside of the numbered manufacturing facilities.

Any given Operable Unit may consist of PACs with buffer zone designations (i.e. NE), multi-area designations (000), and manufacturing facility designations (i.e. 300). Operable Units are independent of the fourteen area designations.

Offsite releases from the RFP are specifically identified as such. In addition to the fourteen geographic areas, potential under building contamination (UBC) sites were identified, as well as potential incidents of concern (PIC) sites. UBC sites were identified separately due to the significantly different cause of potential contamination. UBC site designations start with UBC. PIC sites are incidents for which a location has not yet been identified.

The second part of the PAC number reflects the established RFP IHSS numbering system for PACs which are existing IHSSs. The existing IHSS numbers consist of three digits, sometimes with decimal designations. For newly identified PACs, the second part of the PAC number is a unique three or four

digit number within a range of 100 available numbers assigned to each RFP area, as shown in Table 3-1. These numbers begin at 500 to avoid duplication of the existing IHSS numbers, which range from 101 to 217.

PAC names for existing IHSSs generally consist of the established IHSS names, although changes have been made as deemed appropriate. Names were selected for newly identified PACs to adequately identify the PAC. Table 3-2 lists PACs that are both existing IHSSs and newly identified PACs in each area. Table 3-3 provides a cross-reference of IHSS and PAC numbers for existing IHSSs.

PAC Location

Plate 1 presents the location of previously identified IHSSs as defined in the IAG. The IHSSs were located by previous studies as precisely as possible based on existing information and knowledge of the configuration of the RFP throughout its operating history. In some instances, it was necessary to approximate IHSS locations or to estimate the dimensions of the IHSSs because existing information was insufficient for accurate definition.

Plates 2 and 3 present the locations of PACs which are existing IHSSs and newly identified PACs, respectively, as defined during the HRR project. Based on information developed for the HRR, it is believed that some of the existing IHSS locations should be revised from those locations presented in the IAG. These proposed revisions are identified on Plate 2, and the rationale for the new location is provided in the "Comments" section of the individual PAC descriptions.

The PAC descriptions provide a general indication of PAC location. This is represented by the State northing and easting grid and is provided on Plates 1, 2, and 3, and in some cases a brief descriptive location referenced to RFP buildings or other landmarks. The coordinate reference indicates the grid intersection closest to the PAC location, approximated to the nearest 500 feet. These references are intended to aid in locating the PAC on Plates 2 and 3.

Date(s) of Operation or Occurrence

The date(s) of PAC operation or occurrence are identified to the extent possible with existing information. Often, releases were detected long after they had started (e.g., a release from an underground pipeline or tank) and it was necessary to estimate a beginning date based on the operating history of the PAC. Release dates which could not reasonably be estimated were reported as unknown.

Description of Operation or Occurrence

Release details are reported exactly as they were found in reference materials. No attempt was made to interpret the accuracy or significance of the release details, or to screen out seemingly contradictory or discrepant information. Descriptions of the occurrences are often based on several sources to provide as clear a report of the event as can be determined from available resources.

Physical/Chemical Description of Constituents Released

In researching each PAC, an emphasis was placed on identifying all constituents released to the environment as described in the references. Citations were made where known as to the physical nature of the constituents (e.g., depleted or enriched uranium) and the amount of each constituent involved.

Responses to Operation or Occurrence

Documents were reviewed for responses to each event by RFP personnel. Details of these responses are provided without added discussion about the appropriateness or effectiveness of the response. In some cases, the results of the response action was also included as a release to the environment. The preparation and filing of a RCRA Contingency Plan Implementation Report in response to an incident was specifically noted in this section.

Fate of Constituents Released to the Environment

Information on known or estimated fates of constituents is detailed when described in the references. In most cases, such information was not found. No speculation has been made estimating what could have been the fates of contaminants in air, soil, or water where details were not available.

All previously identified PACs (IHSSs) are scheduled to undergo investigation by the IAG. The schedule of the first deliverable report is identified for each IHSS. The research for several IHSSs has yielded documentation that suggests the IHSS is currently mapped in the wrong location. This information is provided in this section with additional detail discussed in the comments section as needed.

Comments

Any additional information pertinent to the PAC is included. This section is often used to identify discrepancies or inconsistencies in the PAC information, or to cross-reference other PACs which are related or appear to be related to the particular PAC. The basis for IHSS location revision is also provided in this section where appropriate.

References

All documents used in preparing each PAC description are referenced in this section by a seven-digit HRR document number. A complete list of all HRR documents keyed to this seven-digit number is provided in Section 5.0 of this report. Documents used in preparation of the PAC description that are not yet on the HRR database are identified with a brief bibliographical reference. Also listed are any other documents relevant to the PAC which were not referenced directly in the PAC description but which

provided additional information related to the PAC. As an example, a document that has information on the process which lead to the release might be included as another document of interest.

RCRA CONTINGENCY PLAN IMPLEMENTATION REPORTS

Since 1988, it has been a requirement that the RFP prepare RCRA Contingency Plan Implementation Reports each time the RCRA Contingency Plan is implemented. The RCRA Contingency Plan is a requirement of 6 CCR 1007-3 Subpart D and is designed to minimize hazards to human health or the environment from unplanned releases of hazardous waste to the air, soil, or surface water. A RCRA Contingency Plan Implementation Report, a requirement of 6 CCR 1007-3, Part 265.56(j), is a written report submitted within 15 days of the implementation of the RCRA Contingency Plan. The report must include, among other details, a discussion of the incident and an assessment of the actual or potential hazards to human health and the environment.

RCRA Contingency Plan Implementation Reports were reviewed as a requirement of the IAG and referenced where applicable to specific releases. Table 3-4 is a list of Contingency Plan Implementation Reports and the associated PAC Reference Numbers. Some RCRA Contingency Plan Implementation Reports did not detail a release to the environment and therefore are not associated with a PAC. These reports are identified in Table 3-4 and are presented in Appendix H.

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TABLE 3-1
RFP GEOGRAPHICAL AREAS

AREA	NUMBER RANGE FOR NEWLY IDENTIFIED PACs	DESCRIPTION
000	500-599	000 Area -- not specific to one of the twelve discrete RFP areas (i.e., PACs which exist in two or more areas)
100	600-699	100 Area
300	700-799	300 Area
400	800-899	400 Area
500	900-999	500 Area
600	1000-1099	600 Area
700	1100-1199	700 Area
800	1200-1299	800 Area
900	1300-1399	900 Area
NE	1400-1499	NE Buffer Zone
NW	1500-1599	NW Buffer Zone
SE	1600-1699	SE Buffer Zone
SW	1700-1799	SW Buffer Zone
Offsite	Not Applicable	Offsite Releases and Incidents

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TABLE 3-2
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
NORTHEAST BUFFER ZONE				
110	2	NE-110	Trench T-3	NE-5
111.1	2	NE-111.1	Trench T-4	NE-7
111.2	2	NE-111.2	Trench T-5	NE-7
111.3	2	NE-111.3	Trench T-6	NE-7
111.4	2	NE-111.4	Trench T-7	NE-7
111.5	2	NE-111.5	Trench T-8	NE-7
111.6	2	NE-111.6	Trench T-9	NE-7
111.7	2	NE-111.7	Trench T-10	NE-7
111.8	2	NE-111.8	Trench T-11	NE-7
142.1	6	NE-142.1	Retention Pond A-1	NE-9
142.2	6	NE-142.2	Retention Pond A-2	NE-9
142.3	6	NE-142.3	Retention Pond A-3	NE-9
142.4	6	NE-142.4	Retention Pond A-4	NE-9
142.5	6	NE-142.5	Retention Pond B-1	NE-14
142.6	6	NE-142.6	Retention Pond B-2	NE-14
142.7	6	NE-142.7	Retention Pond B-3	NE-14
142.8	6	NE-142.8	Retention Pond B-4	NE-14
142.9	6	NE-142.9	Retention Pond B-5	NE-14
142.12	6	NE-142.12	Flume Pond (IAG Name: Newly Identified Pond A-5)	NE-23
156.2	6[1]	NE-156.2	Soil Dump Area	NE-25
166.1	6	NE-166.1	Trench A	NE-27
166.2	6	NE-166.2	Trench B	NE-27
166.3	6	NE-166.3	Trench C	NE-27
167.1	6	NE-167.1	North Area Spray Field	NE-29
167.2	6	NE-167.2	Pond Area Spray Field (Center Area)	NE-29
167.3	6	NE-167.3	South Area Spray Field	NE-29
216.1	6	NE-216.1	East Spray Fields - North Area	NE-33
216.2	2	NE-216.2	East Spray Fields - Center Area	NE-33

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
216.3	2	NE-216.3	East Spray Fields - South Area	NE-33
NA[2]	NA	NE-1400	Tear Gas Powder Release	NE-36
NA	NA	NE-1401	NE Buffer Zone Gas Line Break	NE-37
NA	NA	NE-1402	East Inner Gate PCB Spill	NE-38
NA	NA	NE-1403	Gasoline Spill - Building 920 Guard Post	NE-39
NORTHWEST BUFFER ZONE				
114	7	NW-114	Present Landfill	NW-5
170	10	NW-170	PU&D Storage Yard - Waste Spills	NW-13
174	10	NW-174	PU&D Container Storage Facilities (2)	NW-15
195	16	NW-195	Nickel Carbonyl Disposal	NW-17
203	7	NW-203	Inactive Hazardous Waste Storage Area	NW-19
SOUTHEAST BUFFER ZONE				
142.10	5	SE-142.10	Retention Pond C-1	SE-5
142.11	5	SE-142.11	Retention Pond C-2	SE-5
209	5	SE-209	Surface Disturbance Southeast of Building 881	SE-9
NA	NA	SE-1600	Pond 7 - Steam Condensate Releases	SE-10
NA	NA	SE-1601	Pond 8 - Cooling Tower Discharge Releases	SE-13
SOUTHWEST BUFFER ZONE				
115	5	SW-115	Original Landfill	SW-5
133.1	5	SW-133.1	Ash Pit I-1	SW-8
133.2	5	SW-133.2	Ash Pit I-2	SW-8
133.3	5	SW-133.3	Ash Pit I-3	SW-8
133.4	5	SW-133.4	Ash Pit I-4	SW-8
133.5	5	SW-133.5	Incinerator	SW-10
133.6	5	SW-133.6	Concrete Wash Pad	SW-12
196	16	SW-196	Water Treatment Plant Backwash Pond	SW-13
NA	NA	SW-1700	Fuel Spill into Woman Creek Drainage	SW-15
000 AREA				
101	4	000-101	Solar Ponds (IAG Name: 207 Solar Evaporation Ponds	000-5

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
121	9	000-121	Original Process Waste Lines	000-19
162	14	000-162	Radioactive Site - 700 Area Site # 2	000-37
168	11	000-168	West Spray Field	000-39
172	8	000-172	Central Avenue Waste Spill	000-41
190	13	000-190	Caustic Leak	000-44
192	16	000-192	Antifreeze Discharge	000-47
NA	NA	000-500	Sanitary Sewer System	000-49
NA	NA	000-501	Roadway Spraying	000-60
100 AREA				
148	13	100-148	Waste Spills	100-5
NA	NA	100-600	Mercury Spill - Valve Vault 124-B, Building 124	100-8
NA	NA	100-601	Building 123 Phosphoric Acid Spill	100-10
NA	NA	100-602	Building 123 Process Waste Line Break	100-11
NA	NA	100-603	Building 123 Bioassay Waste Spill	100-13
NA	NA	100-604	T130 Complex Sewer Line Leaks	100-15
NA	NA	100-605	Building 115 Hydraulic Oil Spill	100-16
NA	NA	100-606	Building 125 TCE Spill	100-17
NA	NA	100-607	Building 111 Transformer PCB Leak	100-18
NA	NA	100-608	Building 131 Transformer Leak	100-20
NA	NA	100-609	Building 121 Security Incinerator	100-21
NA	NA	100-610	Asbestos Release - Building 123	100-22
NA	NA	100-611	Building 123 Scrubber Solution Spill	100-23
NA	NA	100-612	Battery Solution Spill - Building 119	100-25
300 AREA				
128	13	300-128	Oil Burn Pit No. 1	300-5
134	13	300-134	Lithium Metal Destruction Site	300-7
135	8	300-135	Cooling Tower Blowdown	300-10
151	8	300-151	Fuel Oil Leak	300-12
156.1	14	300-156.1	Building 334 Parking Lot	300-14

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
171	13	300-171	Solvent Burning Ground	300-16
181	10	300-181	Building 334 Cargo Container Area	300-18
186	13	300-186	Valve Vault 12	300-19
188	8	300-188	Acid Leak	300-22
206	10	300-206	Inactive D-836 Hazardous Waste Tank	300-23
212	15	300-212	Building 371 Drum Storage, Unit 63	300-24
NA	NA	300-700	Scrap Roofing Disposal	300-25
NA	NA	300-701	Sulfuric Acid Spill - Building 371	300-26
NA	NA	300-702	Pesticide Shed	300-27
NA	NA	300-703	Building 331 North Area	300-28
NA	NA	300-704	Roof Fire, Building 381	300-29
NA	NA	300-705	Potassium Hydroxide Spill North of Building 374	300-30
NA	NA	300-706	Evaporator Tanks North of Building 374	300-31
NA	NA	300-707	Sanitizer Spill	300-33
NA	NA	300-708	Transformers North of Building 371	300-34
NA	NA	300-709	Transformer Leak 334-1	300-35
NA	NA	300-710	Gasoline Spill North of Building 331	300-36
			400 AREA	
116.1	12	400-116.1	West Loading Dock, Building 447 (IAG Name: West Loading Dock Area)	400-5
116.2	12	400-116.2	South Loading Dock, Building 444 (IAG Name: South Loading Dock Area)	400-9
122	9[1]	400-122	Underground Concrete Tank	400-11
129	10	400-129	Oil Leak	400-13
136.1	12	400-136.1	Cooling Tower Pond West of Building 444 (IAG Name: Cooling Tower Pond Northeast Corner of Building 460)	400-15
136.2	12	400-136.2	Cooling Tower Pond East of Building 444 (IAG Name: Cooling Tower Pond West of Building 460)	400-15
157.1	13	400-157.1	Radioactive Site North Area	400-17
157.2	12	400-157.2	Radioactive Site South Area	400-19

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
182	10	400-182	Building 444/453 Drum Storage Area	400-22
187	12	400-187	Sulfuric Acid Spill (IAG Name: Acid Leaks (2))	400-24
191	13	400-191	Hydrogen Peroxide Spill	400-31
193	16	400-193	Steam Condensate Leak	400-32
204	15	400-204	Original Uranium Chip Roaster	400-33
205	10	400-205	Building 460 Sump #3 Acid Side	400-35
207	10	400-207	Inactive 444 Acid Dumpster	400-37
208	10	400-208	Inactive 444/447 Waste Storage Area	400-39
NA	NA	400-800	Transformer 443-1	400-40
NA	NA	400-801	Transformer, Roof of Building 447	400-41
NA	NA	400-802	Storage Area, South of Building 334	400-42
NA	NA	400-803	Miscellaneous Dumping, Building 460 Storm Drain	400-44
NA	NA	400-804	Road North of Building 460	400-45
NA	NA	400-805	Building 443 Tank #9 Leak	400-46
NA	NA	400-806	Catalyst Spill, Building 440	400-47
NA	NA	400-807	Sandblasting Area	400-48
NA	NA	400-808	Vacuum Pump Leak - Building 442	400-49
NA	NA	400-809	Oil Leak - 446 Guard Post	400-51
NA	NA	400-810	Beryllium Fire - Building 444	400-52
500 AREA				
117.1	13	500-117.1	North Site Chemical Storage	500-5
117.2	13	500-117.2	Middle Site Chemical Storage	500-6
158	13	500-158	Radioactive Site - Building 551	500-7
159	9[1]	500-159	Radioactive Site - Building 559	500-9
169	13	500-169	Waste Drum Peroxide Burial	500-11
197	16	500-197	Scrap Metal Sites	500-13
NA	NA	500-900	Transformer Leak - 515/516	500-15
NA	NA	500-901	Transformer Leak - 555	500-17
NA	NA	500-902	Transformer Leak - 559	500-18

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS NO.	OU NO.	PAC NO.	PAC NAME	PAGE
NA	NA	500-903	RCRA Storage Unit #1	500-19
NA	NA	500-904	Transformer Leak - 223-1/223-2	500-20
NA	NA	500-905	Transformer Leak - 558-1	500-22
600 AREA				
117.3	13	600-117.3	South Site Chemical Storage	600-5
120.1	12	600-120.1	Fiberglassing Area North of Building 664	600-7
120.2	12	600-120.2	Fiberglassing Area West of Building 664	600-7
152	13	600-152	Fuel Oil Tank	600-9
160	14	600-160	Radioactive Site Building 444 Parking Lot	600-11
161	14	600-161	Radioactive Site - Building 664	600-13
164.1	14	600-164.1	Radioactive Site 800 Area Site No. 2 Concrete Slab	600-15
189	12	600-189	Multiple Acid Spills 218 Tanks (IAG Name: Multiple Acid Spills)	600-16
NA	NA	600-1000	Transformer Storage Building 662	600-18
NA	NA	600-1001	Temporary Waste Storage Building 663	600-20
NA	NA	600-1002	Transformer Storage - West of Building 666	600-24
NA	NA	600-1003	Transformers North and South of 661-675 Substation	600-25
700 AREA				
118.1	8	700-118.1	Multiple Solvent Spills West of Building 730	700-9
118.2	8	700-118.2	Multiple Solvent Spills South End of Building 776	700-12
123.1	8	700-123.1	Valve Vault 7	700-14
123.2	9[1]	700-123.2	Valve Vault West of Building 707	700-16
124.1	9[1]	700-124.1	30,000 Gallon Tank (Tank #68)	700-18
124.2	9[1]	700-124.2	14,000 Gallon Tank (Tank #66)	700-18
124.3	9[1]	700-124.3	14,000 Gallon Tank (Tank #67)	700-18
125	9[1]	700-125	Holding Tank (Tank #66)	700-20
126.1	9[1]	700-126.1	Westernmost Out-of-Service Waste Tank	700-22
126.2	9[1]	700-126.2	Easternmost Out-of-Service Waste Tank	700-22

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
127	9[1]	700-127	Low-Level Radioactive Waste Leak	700-24
131	14	700-131	Radioactive Site - 700 Area Site #1	700-26
132	9[1]	700-132	Radioactive Site - 700 Area Site #4	700-28
137	8	700-137	Cooling Tower Blowdown Buildings 712 and 713 (IAG Name: Cooling Tower Blowdown Building 774)	700-30
138	8	700-138	Cooling Tower Blowdown Building 779	700-32
139.1	8	700-139.1	Caustic/Acid Spills Hydroxide Tank Area	700-34
139.2	8	700-139.2	Caustic/Acid Spills Hydrofluoric Acid Tanks	700-37
143	6	700-143	Old Outfall - Building 771 (IAG Name: Old Outfall)	700-39
144	8	700-144	Sewer Line Overflow (IAG Name: Sewer Line Break)	700-43
146.1	9[1]	700-146.1	Concrete Process Waste Tanks 7,500 Gallon Tank (31)	700-45
146.2	9[1]	700-146.2	Concrete Process Waste Tanks 7,500 Gallon Tank (32)	700-45
146.3	9[1]	700-146.3	Concrete Process Waste Tanks 7,500 Gallon Tank (34W)	700-45
146.4	9[1]	700-146.4	Concrete Process Waste Tanks 7,500 Gallon Tank (34E)	700-45
146.5	9[1]	700-146.5	Concrete Process Waste Tanks 3,750 Gallon Tank (30)	700-45
146.6	9[1]	700-146.6	Concrete Process Waste Tanks 3,750 Gallon Tank (33)	700-45
147.1	9[1]	700-147.1	Process Waste Line Leaks (IAG Name: Maas Area)	700-48
149	9[1]	700-149	Effluent Pipe	700-50
150.1	8	700-150.1	Radioactive Site North of Building 771 (IAG Name: Radioactive Leak North of Building 771)	700-52
150.2	8	700-150.2	Radioactive Site West of Buildings 771 and 776 (IAG Name: Radioactive Leak West of Building 771)	700-57
150.3	8	700-150.3	Radioactive Site Between Buildings 771 & 774 (IAG Name: Radioactive Leak Between Buildings 771 & 774)	700-59

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
150.4	8	700-150.4	Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)	700-61
150.5	8	700-150.5	Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)	700-62
150.6	8	700-150.6	Radioactive Site South of Building 779 (IAG Name: Radioactive Leak South of Building 779)	700-63
150.7	8	700-150.7	Radioactive Site South of Building 776 (IAG Name: Radioactive Leak South of Building 776)	700-64
150.8	8	700-150.8	Radioactive Site Northeast of Building 779 (IAG Name: Radioactive Leak Northeast of Building 779)	700-66
163.1	8	700-163.1	Radioactive Site 700 Area Site No.3 Wash Area	700-67
163.2	8	700-163.2	Radioactive Site 700 Area Site No.3 Buried Slab	700-69
185	16	700-185	Solvent Spill	700-71
194	16	700-194	Steam Condensate Leak	700-72
214	10	700-214	750 Pad Pondcrete & Saltcrete Storage, Unit 25	700-73
215	9[1]	700-215	Tank T-40, Unit 55.13	700-75
NA	NA	700-1100	French Drain North of Building 776/777	700-76
NA	NA	700-1101	Laundry Tank Overflow - Building 732	700-77
NA	NA	700-1102	Transformer Leak - 776-4	700-78
NA	NA	700-1103	Leaking Transformers - Building 707	700-80
NA	NA	700-1104	Leaking Transformers - Building 708	700-82
NA	NA	700-1105	Transformer Leak - 779-1/779-2	700-83
NA	NA	700-1106	Process Waste Spill - Portal 1	700-84
NA	NA	700-1107	Compressor Waste Oil Spill - Building 776	700-86
NA	NA	700-1108	771/774 Footing Drain Pond	700-87
NA	NA	700-1109	Uranium Incident - Building 778	700-90
NA	NA	700-1110	Nickel Carbonyl Burial West of Building 771	700-91
NA	NA	700-1111	Leaking Transformer - Building 750	700-92
NA	NA	700-1112	Leaking Transformer - 776-5	700-93
800 AREA				
102	1	800-102	Oil Sludge Pit	800-5

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
103	1	800-103	Chemical Burial	800-7
104	1	800-104	Liquid Dumping	800-8
105.1	1	800-105.1	Westernmost Out-of-Service Fuel Tanks	800-9
105.2	1	800-105.2	Easternmost Out-of-Service Fuel Tanks	800-9
106	1	800-106	Outfall	800-10
107	1	800-107	Building 881 Hillside Oil Leak (IAG Name: Hillside Oil Leak)	800-12
145	1	800-145	Sanitary Waste Line Leak	800-14
147.2	12	800-147.2	Building 881 Conversion Activity Contamination (IAG Name: Owen Area)	800-15
164.2	14	800-164.2	Radioactive Site 800 Area Site #2, Building 886 Spills	800-17
164.3	14	800-164.3	Radioactive Site 800 Area Site #2, Building 889 Storage Pad	800-19
177	10	800-177	Building 885 Drum Storage and Paint Storage (IAG Name: Building 885 Drum Storage Area)	800-21
178	15	800-178	Building 881 Drum Storage Area	800-23
179	15	800-179	Building 865 Drum Storage Area	800-24
180	15	800-180	Building 883 Drum Storage Area	800-25
211	15	800-211	Building 881 Drum Storage, Unit 26	800-26
217	15	800-217	Building 881, CN^- Bench Scale Treatment, Unit 32	800-27
NA	NA	800-1200	Valve Vault 2	800-28
NA	NA	800-1201	Radioactive Site South of Building 883	800-30
NA	NA	800-1202	Sulfuric Acid Spill, Building 883	800-31
NA	NA	800-1203	Sanitary Sewer Line Break Between Buildings 865 and 886	800-32
NA	NA	800-1204	Building 866 Spills	800-33
NA	NA	800-1205	Building 881, East Dock	800-35
NA	NA	800-1206	Fire, Building 883	800-36
NA	NA	800-1207	Transformer 883-4	800-37
NA	NA	800-1208	Transformer 881-4	800-38

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
NA	NA	800-1209	Leaking Transformers, 800 Area	800-39
NA	NA	800-1210	Transformer 865-1 and 865-2	800-40
NA	NA	800-1211	Capacitor Leak, Building 883	800-41
			900 AREA	
108	2	900-108	Trench T-1	900-5
109	2	900-109	Trench T-2	900-7
112	2	900-112	903 Pad (IAG Name: 903 Drum Storage Area)	900-10
113	2	900-113	Mound Area	900-14
119.1	1	900-119.1	West Scrap Metal Storage Area (IAG Name: West Area Multiple Solvent Spills)	900-17
119.2	1	900-119.2	East Scrap Metal Storage Area (IAG Name: East Area Multiple Solvent Spills)	900-19
130	1	900-130	Radioactive Site - 800 Area Site No. 1	900-21
140	2	900-140	Hazardous Disposal Area (IAG Name: Reactive Metal Destruction Site)	900-23
141	6	900-141	Sludge Dispersal	900-25
153	2	900-153	Oil Burn Pit No. 2	900-28
154	2	900-154	Pallet Burn Site	900-30
155	2	900-155	903 Lip Area	900-31
165	6	900-165	Triangle Area	900-33
173	8	900-173	South Dock - Building 991 (IAG Name: Radioactive Site - 900 Area)	900-35
175	10	900-175	S&W Building 980 Container Storage Facility	900-37
176	10	900-176	S&W Contractor Storage Yard	900-38
183	2	900-183	Gas Detoxification Area	900-40
184	8	900-184	Building 991 Steam Cleaning Area	900-42
210	10	900-210	Unit 16, Building 980 Cargo Container	900-43
213	10	900-213	Unit 15, 904 Pad Pondcrete Storage	900-44
NA	NA	900-1300	RO Plant Sludge Drying Beds	900-47
NA	NA	900-1301	Building 991 Enclosed Area	900-48

TABLE 3-2 (continued)
PREVIOUSLY IDENTIFIED and NEWLY IDENTIFIED PACs

IHSS N0.	OU NO.	PAC NO.	PAC NAME	PAGE
NA	NA	900-1302	Gasoline Spill	900-50
NA	NA	900-1303	Natural Gas Leak	900-51
NA	NA	900-1304	Chromic Acid Spill - Building 991	900-52
NA	NA	900-1305	Building 991 Roof	900-53
NA	NA	900-1306	Transformers 991-1 and 991-2	900-54
NA	NA	900-1307	Explosive Bonding Pit	900-55
NA	NA	UBC-###	Under Building Contamination	UBC-1

[1] Based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy.
[2] Not Applicable

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TABLE 3-3
CROSS REFERENCE LIST IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
101	000-101	Solar Ponds
102	800-102	Oil Sludge Pit
103	800-103	Chemical Burial
104	800-104	Liquid Dumping
105.1	800-105.1	Westernmost Out-of-Service Fuel Tanks
105.2	800-105.2	Easternmost Out-of-Service Fuel Tanks
106	800-106	Outfall
107	800-107	Hillside Oil Leak
108	900-108	Trench T-1
109	900-109	Trench T-2
110	NE-110	Trench T-3
111.1	NE-111.1	Trench T-4
111.2	NE-111.2	Trench T-5
111.3	NE-111.3	Trench T-6
111.4	NE-111.4	Trench T-7
111.5	NE-111.5	Trench T-8
111.6	NE-111.6	Trench T-9
111.7	NE-111.7	Trench T-10
111.8	NE-111.8	Trench T-11
112	900-112	903 Pad
113	900-113	Mound Area
114	NW-114	Present Landfill
115	SW-115	Original Landfill
116.1	400-116.1	West Loading Dock, Building 447 (IAG Name: West Loading Dock Area)
116.2	400-116.2	South Loading Dock, Building 444 (IAG Name: South Loading Dock Area)
117.1	500-117.1	North Site Chemical Storage
117.2	500-117.2	Middle Site Chemical Storage
117.3	600-117.3	South Site Chemical Storage

TABLE 3-3
CROSS REFERENCE LIST - IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
118.1	700-118.1	West of Building 730 Solvent Spill
118.2	700-118.2	South End of Building 776 Solvent Spill
119.1	900-119.1	West Scrap Metal Storage Area (IAG-Name: West Area Solvent Spill)
119.2	900-119.2	East Scrap Metal Storage Area (IAG Name: East Area Solvent Spill)
120.1	600-120.1	Fiberglassing Area North of Building 664
120.2	600-120.2	Fiberglassing Area West of Building 664
121	000-121	Original Process Waste Lines
122	400-122	Underground Concrete Tanks
123.1	700-123.1	Valve Vault 7
123.2	700-123.2	Valve Vault West of Building 707
124.1	700-124.1	30,000 Gallon Tank (Tank #68)
124.2	700-124.2	14,000 Gallon Tank (Tank #66)
124.3	700-124.3	14,000 Gallon Tank (Tank #67)
125	700-125	Holding Tank (Tank #66)
126.1	700-126.1	Westernmost Out-of-Service Waste Tank
126.2	700-126.2	Easternmost Out-of-Service Waste Tank
127	700-127	Low-Level Radioactive Waste Leak
128	300-128	Oil Burn Pit No. 1
129	400-129	Oil Leak
130	900-130	Radioactive Site - 800 Area Site No. 1
131	700-131	Radioactive Site - 700 Area Site No. 1
132	700-132	Radioactive Site - 700 Area Site No. 4
133.1	SW-133.1	Ash Pit I-1
133.2	SW-133.2	Ash Pit I-2
133.3	SW-133.3	Ash Pit I-3
133.4	SW-133.4	Ash Pit I-4
133.5	SW-133.5	Incinerator
133.6	SW-133.6	Concrete Wash Pad

TABLE 3-3
CROSS REFERENCE LIST - IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
134	300-134.1 & 300-134.2	Metal Disposal Site North Area (IAG Name: Lithium Metal Destruction Site) & Reactive Metal Destruction Site South Area
135	300-135	Cooling Tower Blowdown
136.1	400-136.1	Cooling Tower Pond West of Building 444 (IAG Name: Cooling Tower Pond Northeast Corner of Building 460)
136.2	400-136.2	Cooling Tower Pond East of Building 444 (IAG Name: Cooling Tower Pond West of Building 460)
137	700-137	Cooling Tower Blowdown Buildings 712 and 713 (IAG Name: Cooling Tower Blowdown Building 774)
138	700-138	Cooling Tower Blowdown Building 779
139.1	700-139.1	Hydroxide Tank Area Spill
139.2	700-139.2	Hydrofluoric Acid Tanks Spill
140	900-140	Hazardous Disposal Area (IAG Name: Reactive Metal Destruction Site)
141	900-141	Sludge Dispersal
142.1	NE-142.1	A-1 Pond
142.10	SE-142.10	C-1 Pond
142.11	SE-142.11	C-2 Pond
142.12	NE-142.12	Flume Pond (IAG Name: A-5 Pond)
142.2	NE-142.2	A-2 Pond
142.3	NE-142.3	A-3 Pond
142.4	NE-142.4	A-4 Pond
142.5	NE-142.5	B-1 Pond
142.6	NE-142.6	B-2 Pond
142.7	NE-142.7	B-3 Pond
142.8	NE-142.8	B-4 Pond
142.9	NE-142.9	B-5 Pond
143	700-143	Old Outfall - Building 771 (IAG Name: Old Outfall)
144	700-144	Sewer Line Overflow (IAG Name: Sewer Line Break)
145	800-145	Sanitary Waste Line Leak
146.1	700-146.1	7,500 Gallon Tank (31)

TABLE 3-3
CROSS REFERENCE LIST - IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
146.2	700-146.2	7,500 Gallon Tank (32)
146.3	700-146.3	7,500 Gallon Tank (34W)
146.4	700-146.4	7,500 Gallon Tank (34E)
146.5	700-146.5	7,500 Gallon Tank (30)
146.6	700-146.6	7,500 Gallon Tank (33)
147.1	700-147.1	Process Waste Line Leaks (IAG Name: Maas) Area
147.2	800-147.2	Building 881 Conversion Activity Contamination (IAG Name: Owen Area)
148	100-148	Waste Spills
149	700-149	Effluent Pipe
150.1	700-150.1	Radioactive Site North of Building 771 (IAG Name: Radioactive Leak North of Building 771)
150.2	700-150.2	Radioactive Site West of Building 771 (IAG Name: Radioactive Leak West of Building 771)
150.3	700-150.3	Radioactive Site Between Buildings 771 & 774 (IAG Name: Radioactive Leak Between Buildings 771 & 774)
150.4	700-150.4	Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)
150.5	700-150.5	Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)
150.6	700-150.6	Radioactive Site South of Building 779 (IAG Name: Radioactive Leak South of Building 779)
150.7	700-150.7	Radioactive Site South of Building 776 (IAG Name: Radioactive Leak South of Building 776)
150.8	700-150.8	Radioactive Site Northeast of Building 779 (IAG Name: Radioactive Leak Northeast of Building 779)
151	300-151	Fuel Oil Leak
152	600-152	Fuel Oil Tank
153	900-153	Oil Burn Pit No. 2
154	900-154	Pallet Burn Site
155	900-155	903 Lip Area
156.1	300-156.1	Building 334 Parking Lot
156.2	NE-156.2	Soil Dump Area
157.1	400-157.1	Radioactive Site North Area

TABLE 3-3
CROSS REFERENCE LIST - IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
157.2	400-157.2	Radioactive Site South Area
158	500-158	Radioactive Site - Building 551
159	500-159	Radioactive Site - Building 559
160	600-160	Radioactive Site Building 444 Parking Lot
161	600-161	Radioactive Site West of Building 664
162	000-162	Radioactive Site - 700 Area Site # 2
163.1	700-163.1	Radioactive Site 700 Area Site No.3 Wash Area
163.2	700-163.2	Radioactive Site 700 Area Site No.3 Buried Slab
164.1	600-164.1	Radioactive Site 800 Area Site No. 2 Concrete Slab
164.2	800-164.2	Radioactive Site 800 Area Site #2, Building 886 Spills
164.3	800-164.3	Radioactive Site 800 Area Site #2, Building 889 Storage Pad
165	900-165	Triangle Area
166.1	NE-166.1	Trench A
166.2	NE-166.2	Trench B
166.3	NE-166.3	Trench C
167.1	NE-167.1	Spray Field; North Area
167.2	NE-167.2	Spray Field; Pond Area (Center Area)
167.3	NE-167.3	Spray Field; South Area
168	SW-168	West Spray Field
169	500-169	Waste Drum Peroxide Burial
170	NW-170	PU&D Storage Yard - Waste Spills
171	300-171	Solvent Burning Ground
172	000-172	Central Avenue Waste Spill
173	900-173	South Dock - Building 991 (IAG Name: Radioactive Site - 900 Area)
174	NW-174	PU&D Container Storage Facilities (2)
175	900-175	S&W Building 980 Contractor Storage Facility
176	900-176	S&W Contractor Storage Yard
177	800-177	Building 885 Drum Storage Area
178	800-178	Building 881 Drum Storage Area

TABLE 3-3
CROSS REFERENCE LIST - IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
179	800-179	Building 865 Drum Storage Area
180	800-180	Building 883 Drum Storage Area
181	300-181	Building 334 Cargo Container Area
182	400-182	Building 444/453 Drum Storage Area
183	900-183	Gas Detoxification Area
184	900-184	Building 991 Steam Cleaning Area
185	700-185	Solvent Spill
186	300-186	Valve Vault 12
187	400-187	Sulfuric Acid Spill (IAG Name: Acid Leaks (2))
188	300-188	Acid Leak
189	600-189	Multiple Acid Spills 218 Tanks (IAG Name: Multiple Acid Spills)
190	000-190	Caustic Leak
191	400-191	Hydrogen Peroxide Spill
192	000-192	Antifreeze Discharge
193	400-193	Steam Condensate Leak
194	700-194	Steam Condensate Leak
195	NW-195	Nickel Carbonyl Disposal
196	100-196	Water Treatment Plant Backwash Pond
197	500-197	Scrap Metal Sites
203	NW-203	Inactive Hazardous Waste Storage Area
204	400-204	Original Uranium Chip Roaster
205	400-205	Building 460 Sump #3 Acid Side
206	300-206	Inactive D-836 Hazardous Waste Tank
207	400-207	Inactive 444 Acid Dumpster
208	400-208	Inactive 444/447 Waste Storage Area
209	SE-209	Surface Disturbance Southeast of Building 881
210	900-210	Unit 16, Building 980 Cargo Container
211	800-211	Building 881 Drum Storage, Unit 26
212	300-212	Building 371 Drum Storage, Unit 63

TABLE 3-3
CROSS REFERENCE LIST - IHSS/PACs

IHSS N0.	PAC NO.	PAC NAME
213	900-213	Unit 15, 904 Pad Pondcrete Storage
214	700-214	750 Pad Pondcrete & Saltcrete Storage, Unit 25
215	700-215	Tank T-40, Unit 55.13
216.1	NE-216.1	East Spray Fields - North Area
216.2	NE-216.2	East Spray Fields - Center Area
216.3	NE-216.3	East Spray Fields - South Area
217	800-217	Building 881, CN^- Bench Scale Treatment, Unit 32

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TABLE 3-4
RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT CROSS REFERENCE

RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NUMBER	GENERAL LOCATION	ASSOCIATED PAC NUMBER
88-001	904 Pad	900-213 NE-142.5 - NE-142.9
88-002	904 Pad	900-213 NE-142.5 - NE-142.9
89-001	Building 444 STP B-3 Pond B-5 Pond	UBC-444 000-500 NE-142.7 NE-142.9 NE-216
89-002	Building 460 C-2 Pond	400-205 SE-142.11
89-003	Building 123 Valve Vault 17 Valve Vault 18 Man Hole 1 Man Hole 2 Man Hole 3	100-602
89-004	Building 771	UBC-771
89-005	Building 374	300-706
89-006	Building 123	100-603
89-007	Valve Vault 2	800-1200
89-008	Building 374	UBC-374
89-009	Building 771	None
89-010	Building 444	UBC-444
89-011	Building 371	UBC-371
89-012	Solar Pond 207B North	000-101
89-013	Building 887	UBC-887
89-014	Building 444	UBC-444
89-015	Valve Vault 11 Valve Vault 12 Valve Vault 13 Building 374	300-710 000-101

TABLE 3-4 (continued)
RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT CROSS REFERENCE

RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NUMBER	GENERAL LOCATION	ASSOCIATED PAC NUMBER
89-016	Building 776	UBC-776
89-017	Building 444	UBC-444
89-018	Building 883	UBC-883
89-019	Building 123	100-611
89-020	Building 771	700-139.1
89-021	Building 374	UBC-374
89-022	Building 374	UBC-374
89-023	Building 371	UBC-371 300-709
90-001	904 Pad	None
90-002	Building 788	000-101
90-003	Solar Pond 207A Solar Pond 207B	000-101
90-004	Building 374	UBC-374
90-005	Building 444	UBC-444
90-006	904 Pad	None
90-007	Building 124	100-600
90-008	Building 374	UBC-374
90-009	Building 374	UBC-374
91-001	Building 883	UBC-883
91-002	Site	Site
91-003	Building 442	400-808
91-004	Building 119	100-610
91-005	Building 709	700-1112
91-006	920 Guard Post	NE-1403
91-007	Building 707	UBC-707
91-008	Building 707	UBC-707

TABLE 3-4 (continued)
RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT CROSS REFERENCE

RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NUMBER	GENERAL LOCATION	ASSOCIATED PAC NUMBER
91-009	Building 707	UBC-707
91-010	Building 707	UBC-707
91-011	Building 130D	PIC-24
91-012	Building 771 Parking Lot	PIC-25
91-013	Parking Lot 205	PIC-26
91-014	Building 250	PIC-27
91-015	446 Guard post	400-809
91-016	Building 731	UBC-731
91-017	Building 865	PIC-29
91-018	300 Area	300-703
91-019	Building 131	PIC-30
91-020	Building 115	PIC-31
91-021	Building 125	PIC-32
91-022	904 Pad Building 331	PIC-33
91-023	300 Area	300-703
91-024	T130 Parking Lot	PIC-34
91-025	Portal 1	PIC-35
91-026	Decon Facility near 903 Pad Building 231 Tanks	PIC-36
91-027	Building 886	PIC-37
91-028	555 Power Station	PIC-38
91-029	Building 440	PIC-39
91-030	Building 732	UBC-732
91-031	300 Area	300-703
91-032	Building 441 Parking Lot	PIC-40
91-033	Building 443	PIC-41

TABLE 3-4 (continued)
RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT CROSS REFERENCE

RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NUMBER	GENERAL LOCATION	ASSOCIATED PAC NUMBER
91-034	Building 883	UBC-883
91-035	RCRA Storage Unit #1	500-903

3.1 Northeast Buffer Zone

The Northeast (NE) Buffer Zone is the quadrant of the plant outside of the approximately 400-acre manufacturing area, north of Central Avenue and east of Eighth Street (see Figure NE-1). The buffer zone was extended in 1974 with the DOE purchase of additional land. Prior to that purchase, the RFP ended only slightly farther east than the eastern edge of the manufacturing area at a fence commonly referred to as the "Cattle Fence." Since the purchase of the land in 1974, the cattle fence is well within the RFP boundary. The Northeast Buffer Zone area slopes east and is incised with deep gullies. A portion of the Upper Church Ditch, McKay Ditch Bypass, North Walnut Creek, South Walnut Creek and Rock Creek are waterways that traverse the northeast quadrant. Several retention ponds are located on North Walnut Creek and South Walnut Creek.

Permanent structures in the Northeast Buffer Zone are the inner and outer east guard posts and the Walnut Creek Gauging Station. Also, water treatment systems are located at Pond A-4 and Pond B-5.

The following subsections contain detailed release descriptions of PACs located in the Northeast Buffer Zone. The PACs in this area are shown in Figure NE-1.

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PAC REFERENCE NUMBER: NE-110

IHSS Reference Number: 110, Operable Unit 2

Unit Name: Trench T-3

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

Date(s) of Operation or Occurrence

The exact dates of operation of this trench are unknown, but it is known that the trench operated sometime in the period of July 2, 1955[1] through August 14, 1968.[2] Trench T-3 is not apparent in a 1955 aerial photograph,[1] but is apparent in a 1964 aerial photograph.[3]

Description of Operation or Occurrence

Trench T-3 was used primarily for the disposal of sanitary wastewater treatment plant sludge.[2] Trench T-2 (PAC 900-109) and Trenches T-4 through T-11 (PAC NE-111) were also used primarily for the disposal of sanitary wastewater treatment plant sludge.[2] The sludge removed from the wastewater treatment plant was placed on sludge drying beds. The dried material removed from the sludge drying beds was placed in the disposal trenches. The sanitary sludge disposal trenches are reported to be approximately 10 feet deep and are provided with two feet of soil cover.[4] The total amount of sludge disposed in Trenches T-2 through T-11 is estimated at 125,000 kilograms (kg).[5]

From August 1968 until February 1970, sanitary wastewater treatment plant sludge was disposed of in the RFP sanitary landfill.[2] After February 1970, sanitary wastewater treatment plant sludge was shipped offsite for disposal.[6]

Physical/Chemical Description of Constituents Released

Some uranium and plutonium contamination is present in this sludge. It is reported that the older sludge would have had primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination.[2] Total long-lived alpha activity present in the sludge was reported between a minimum of 382 pCi/g in August 1964 and a maximum of 3,591 pCi/g in June 1960.[2] Uranium contamination may also be present in flattened drums that may have been disposed in this trench following burning of the contaminated oils that had been held in the drums. The burning of the contaminated oils had been done in PAC 900-153 (Oil Burn Pit #2) from March 1957 to mid-1965,[7] not in Trench T-3. These flattened drums, estimated at up to 300 in total number, could be present in any of the East Trenches or Trench T-2.[2]

On at least one occasion it is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was also disposed of in one of the East Trenches or Trench T-2. This waste had an average activity of 150,000 dpm/l. It is believed that this is total alpha activity. The activity of this material was reported as 1.35×10^8 dpm with approximately 1.3 kg of depleted uranium present in the waste.[8] It is unknown whether or not this material was in drums.

Responses to Operation or Occurrence

No documentation was found which detailed a response to the existence of this trench. Responses, if necessary, will be implemented as scheduled in the IAG.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents disposed of in Trench T-3. This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible remediation. The Final Phase II RFI/RI Report is to be completed by March 12, 1993.

Comments

Trenches T-4 through T-11 along with this trench are also called the East Trenches.

Trench T-3 (PAC NE-110) has few operational differences from Trench T-2 (PAC 900-109) and Trenches T-4 through T-11 (PAC NE-111). All of these trenches were used primarily for the disposal of sanitary wastewater treatment plant sludge.

The sludge disposed of in these trenches would typically consist primarily of concentrated organic matter typically present in sanitary wastewater treatment plant sludge.

No documentation was found regarding the exact dates of operation of individual trenches. Interviewees were unaware of operating dates and could provide no additional information.

References

[1] 1502710
[2] 1500793
[3] 1502717
[4] 1500898
[5] 1500890
[6] 1500921
[7] 1500656
[8] 1700445

Other references of interest

1500296
1600430
1500340
1500287
1500901
1500304
1500458
1500888
1501097
1500399
1500460
1500556
1500887
1501719
1500768

PAC REFERENCE NUMBER: NE-111.1 - NE-111.8

IHSS Reference Number: 111.1 - 111.8, Operable Unit 2

Unit Name: Trenches T-4 through T-11.

Approximate Location: N750,000; E2,087,500

Date(s) of Operation or Occurrence

The exact dates of operation are unknown, except for the period of July 29, 1954, through August 14, 1968.[1] Trenches T-9, T-10, and T-11 were differentiated from the other trenches and added to the disposal trench inventory in 1977.[2] See the "Comments" section below for additional discussion of this point.

Description of Operation or Occurrence

Trenches T-4 through T-11, along with Trench T-2 (PAC 900-109) and Trench T-3 (PAC NE-110), were used primarily for the disposal of sanitary wastewater treatment plant sludge.[1] The sludge removed from the wastewater treatment plant was placed on sludge drying beds. The dried material removed from the sludge drying beds was placed in the disposal trenches. The sanitary sludge disposal trenches are reported to be approximately 10 feet deep and are provided with two feet of soil cover.[3] The trenches are variable in length, with the average length being approximately 250 feet.[4] The total amount of sludge disposed in Trenches T-2 through T-11 is estimated at 125,000 kilograms.[5] Some amounts of additional materials were also disposed in Trenches T-4, T-9, and T-11. These other materials consisted of asphalt planking (approximately 130,000 square feet of asphalt planking) in T-4 and T-11 from the re-design of Solar Pond 207A (PAC 000-101) in 1963, and scrap metal and junk in T-9.[5]

At the same time that Trenches T-9, T-10, and T-11 were identified (1977), it appears that the numbering system for the trenches was slightly modified. Whereas earlier documents had presented a consistent numbering system, in a 1983 document a trench that had previously been referred to as Trench T-4 became T-11.[5] This 1983 document placed the T-4 trench essentially as an addition to Trench T-3.[1,5] This same 1983 document designated Trench T-9 as essentially an extension of Trench T-7,[5] but in earlier documents this trench had been referred to as Trench T-5.[1] Trench T-10 had not been identified or named prior to 1983. The trench identified as Trench T-5 in the 1983 document was a trench not previously identified (comparison of maps in references 1 and 5).

Physical/Chemical Description of Constituents Released

Some uranium and plutonium contamination is present in this sludge. It is reported that the older sludge would have had primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination.[1] Total long-lived alpha activity present in the sludge was reported between a minimum of 382 pCi/g in August 1964 to a maximum of 3,591 pCi/g in June 1960.[1] Uranium contamination may also be present in flattened drums that may have been disposed in any of trenches T-2 through T-11 following burning of the contaminated oils that had been held in the drum.[6] The burning of the contaminated oils had been done in Oil Burn Pit No-2 (PAC 900-153) from March 1957 to mid-1965,[6] not in the trenches. These flattened drums, estimated at up to 300 in total number, could be present in any of Trenches T-3 through T-11.[1] It was estimated in a 1973 document that Trench T-4 (currently designated Trench T-11 as discussed above) contains 16.2 grams of uranium-235.[7]

On at least one occasion it is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was also disposed in one of the East Trenches. This waste had an average activity of 150,000 dpm/l. It is believed that this is total alpha activity. The activity of this material was reported as 1.35×10^8 dpm with approximately 1.3 kilograms (kg) of depleted uranium present in the waste.[8] It is unknown whether or not this material was in drums.

Responses to Operation or Occurrence

Soil samples were collected from the three new trenches identified in 1977 (Trenches T-9, T-10, and T-11) during the 1977 to 1983 time-frame. Soil from Trench T-9 was found to vary from 0.40 to 68 pCi/g in plutonium activity, and from 2.4 to 450 pCi/g uranium activity. Trench T-10 was found to contain from 0.18 to 14 pCi/g plutonium

activity and from 40 to 126 pCi/g uranium activity. Trench T-11 was found to contain 4.5 to 50 pCi/g plutonium activity and 0.9 to 158 pCi/g in uranium activity.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents disposed in Trenches T-4 through T-11. This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible remediation. The Final Phase II RFI/RI Report is to be completed by March 12, 1993.

Comments

Trench T-3, along with these trenches, are also called the East Trenches.

Trenches T-4 through T-11 (PAC NE-111) have few operational differences from Trenches T-2 (PAC 900-109) and T-3 (PAC NE-110).

The sludge disposed of in these trenches should consist primarily of concentrated organic matter typically present in sanitary wastewater treatment plant sludge.

From August 1968 until February 1970 sanitary wastewater treatment plant sludge was disposed in the RFP sanitary landfill.[1] After February 1970, sanitary wastewater treatment plant sludge was shipped offsite for disposal.[9]

To date no documentation has been found that records the time-frame during which any particular trench was receiving waste. Similarly, none of the HRR interviewees were knowledgeable on dates of operation of individual trenches.

The locations of these trenches on Plate 2 differ from the IAG map but are taken from the OU2 Phase II RFI/RI Work Plan (Alluvial) (July 1991).

References	Other references of interest	
[1] 1500793	1500296	1501097
[2] 1501719	1600430	1500399
[3] 1500898	1500340	1500460
[4] 1502713	1500287	1500556
[5] 1500890	1500901	1500887
[6] 1500656	1500304	1500768
[7] 1500579	1500458	1500921
[8] 1700445	1500888	

PAC REFERENCE NUMBER: NE-142.1 - NE-142.4

IHSS Reference Number: 142.1 - 142.4, Operable Unit 6

Unit Name: A-Series Drainage and Ponds (Ponds A-1, A-2, A-3, and A-4). The A-Series drainage is also known as the North Walnut Creek Drainage. (IAG Name: Retention Ponds: A-1, A-2, A-3, A-4)

Approximate Location: N752,000; E2,088,000

Date(s) of Operation or Occurrence

From January 1954 to the present. Pond A-1 (designated Pond 1 until the early 1970s) was built in January 1954.[1] The first release from Pond A-1 occurred on March 10, 1954.[2] Pond A-2 was built in 1973, Pond A-3 in 1974, and Pond A-4 in 1979.[3]

Description of Operation or Occurrence

The use of the A-Series drainage has varied over the history of the RFP. The highlights of pond usage are given below.

- From at least July 1953,[4] until 1957, discharges of Building 771 (PAC 700-143, the Building 771 outfall) wastewater with low levels of radioactivity were routinely made to the A-Series drainage (above Pond A-1).[5]

- In 1957 a pipeline was completed which allowed an option of releasing the Building 771 liquids to the Building 774 outfall south of Building 995 (the sanitary wastewater treatment plant) on the B-Series drainage (PAC NE-142.5 - NE-142.9). Due to equipment problems, periodic releases of Building 771 wastewater to the A-Series drainage were still made until 1965.[5]

- The use of water passing through the A-Series drainage was modified from irrigation only to both irrigation and drinking water supply for Broomfield Heights in approximately late 1955.[6]

- In 1970, two intercept trenches and pumps were installed between the Solar Ponds and the A-Series drainage to collect high nitrate seepage.[3] During the 1970s, additional trenches, sumps, and pumps were added until a total of six trenches and two sumps were in existence.[7]

- In the early 1970s, Pond A-1 and Pond A-2 were isolated from the rest of the A-Series drainage and became available for spill control and other waste management activities.[8]

- In early 1971, remediation of contaminated soil at the Building 771 Outfall was underway.[9] This activity is more fully discussed in PAC 700-143.

- From December 21, 1973,[10] until the early 1980s, a pipeline allowed transfer of the water directly to Pond A-2 from Pond B-2. Untreated decontamination laundry wastewater was discharged to Pond B-2 and transferred to Pond A-2 during this period.[10]

- On May 15, 1975, a fog evaporation system was placed in service on Pond A-2.[11] The intent of this fog evaporation system was to increase the evaporative loss of water and thereby reduce the process wastewater inventory.[12] At this same time, the only direct discharge to the A-drainage was steam condensate from the Building 774 Evaporator. Treated process waste could also be transferred to Pond A-2 from Pond B-2.[8]

- The RFP received a National Pollutant Discharge Elimination System (NPDES) Permit on September 6, 1974.[3] Pond A-3 discharges were included in this permit.

- The McKay Ditch routed water through the A-Series drainage until the fall of 1974. In the fall of 1974, a bypass was constructed, allowing the water to be transferred around the portion of the A-Series drainage that is immediately adjacent to the RFP.[13] This bypass routed the ditch around the locations of the A-Series Ponds. This change decreased the possibility of contaminating McKay Ditch flow with nitrate or other RFP contaminants.[13]

- The system of six trenches and two sumps near the solar ponds was replaced with a more extensive groundwater and seepage collection system in 1981.[13] At this time, the six previously constructed trenches, sumps, and related pumps were abandoned in place.[7]

Physical/Chemical Description of Constituents Released

The general types of materials that have been directly or indirectly released to the A-series drainage (these are non-emergency and non-spill related) during the history of the RFP include: untreated wastewater from Building 771,[5] cooling tower and roof drain water from Building 774, Building 774 evaporator condensate water, and footing drain flows.[14,15] The Building 771 wastewater was primarily composed of decontamination laundry wastewater, but it also contained water from the analytical laboratory, radiography operations, personnel decontamination room, and runoff.[5] Building 771 waste discharged to a storm drain north (PAC 700-143) and west of Building 771 which flowed to the A-Series drainage.[5] In 1971, it was stated that the Building 774 evaporator condensate drain typically released 20,000 gallons per day of water at 100 dpm/l, with 5 parts per million (milligrams per liter) of nitrate.[14]

Table NE-1 presents information on operational problems and NPDES Permit exceedances experienced in the A-Series drainage. Knowledge of these problems may be useful in the identification of appropriate chemical constituents during site characterization investigations. The typical response to these problems was appropriate action to prevent the recurrence of the problem. A known problem in the A-Series drainage for some time has been the presence of nitrate and radioactive contamination in the stream and pond sediments. In 1973, it was estimated that 14 microcuries (mCi) of plutonium was present in Pond A-1 sediment.[15]

Responses to Operation or Occurrence

The recurring problem with the A-Series drainage has been high nitrate concentrations in the water leaving the plant.[13] In response to this problem, a series of trenches and pumps to collect contaminated groundwater and seepage was constructed between the solar ponds (PAC 000-101) and the A-Series Drainage.[7]

Other response actions to contamination in the A-Series drainage included the removal of contamination near the Building 771 outfall (PAC 700-143), the re-routing of discharges to other facilities,[5] and the elimination of flows from Building 774.[16]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU6. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994.

Comments

This PAC is indicated on the maps as only the drainage ponds, but it is considered to include the drainages upstream and downstream of the ponds. Downstream of the ponds, the PAC continues to the RFP boundary. Beyond the RFP boundary the drainage becomes IHSS 200 (Offsite Releases).

Studies have shown that the A-series ponds have performed their design function, i.e., to provide residence time and holding capacity for spills and sedimentation of suspended material. However, some of the stream and pond sediments have become contaminated in the process. Data are primarily available regarding radioactive contamination of the sediments. For example, much information is available regarding contamination near the Building 771 outfall and the remediation of this contamination (PAC 700-143).

A considerable amount of analytical data has been generated for the A-Series Drainage. These data primarily address radioactivity and nitrate concentrations in the terminal pond on the A-Series Drainage (which has varied with time), but other data are available in more limited quantities. These data are found in the monthly reports, highlights, and laboratory analytical reports of the RFP groups responsible for operation of the A-Series Drainage. The group or groups responsible for these data on the A-Series Drainage has varied over time.

TABLE NE-1
OPERATIONAL PROBLEMS OR NPDES PERMIT EXCEEDANCES
A-SERIES DRAINAGE AND PONDS

Date	Problem	Cause
1970/1971[17,18]	High nitrate concentrations in Walnut Creek from Pond A-1	Nitrate seepage from solar pond area
1972/1973[19]	Contamination in Pond A-1 sediment to at least 975 dpm/g	Discharges of waste into the A-Series drainage
April 1973[20]	6 - 10 tons of nitrate leached to drainage	High water flows leaching nitrate from soil north of the solar ponds
April/May 1974[21]	Release of Building 774 footing drain water to drainage. Analyses of this water indicate elevated nitrate and tritium concentrations[22,23]	Construction and corrosion of a drain that was supposed to be out of service
June 1979[24]	Rhodamine WT dye colored water red in Ponds A-1, A-2, and A-3	Rhodamine WT dye was introduced into Building 371 footing drains
May 1981[25]	Water flowing to A-3 at 120 mg/l of nitrate	Overflow pipe in new ITPH* system discharging water direct to drainage
June 1981[26]	Nitrate concentrations above the 10 mg/l limit in Pond A-3	Heavy rainfall (1.3") causing runoff of nitrate contamination
June 1981[26]	Cooling tower cleaning from Building 373 leaked into drainage. Phosphate compounds were added to cooling tower but were not detected in cooling tower water or in water from Pond A-3	Leakage through a soil dike
July 1981[27]	Nitrate concentrations up to 21 mg/l were identified in drainage water	The new ITPH system was not sufficiently effective
October 1984[28]	Runoff from West Spray Field entered McKay Ditch and bypassed the RFP NPDES discharge points	Excessive application of liquids to West Spray Field
September 1989[29]	Leakage from a pump into Pond A-4 - no other details given	Pump leakage

* ITPH is the Interceptor Trench Pump House System which consists of french drains, a sump, and an interceptor trench that collects groundwater, footing drain flow, and surface water runoff. See PAC 000-101 (the Solar Evaporation Ponds) for a more complete discussion of the ITPH System.

References

[1] 1600669
[2] 1600599
[3] 1503447
[4] 1600350
[5] 1500405
[6] 1500834
[7] 1503437
[8] 1500460
[9] 1500445
[10] 1500636
[11] 1500955
[12] 1500951
[13] 1500804
[14] 1500572
[15] 1500652
[16] 1500954
[17] 1500638
[18] 1500757
[19] 1600089
[20] 1500925
[21] 1501094
[22] 1500949
[23] 1501230
[24] 1501178
[25] 1501176
[26] 1501175
[27] 1501077
[28] 1501746

Other references of interest

1500871
Personal communication , Hawes, R., retired RFP employee.
1500834
1500961
1501850

PAC REFERENCE NUMBER: NE-142.5 - NE-142.9

IHSS Reference Number: 142.5 - 142.9, Operable Unit 6

Unit Name: B-Series Drainage Ponds (Ponds B-1, B-2, B-3, B-4, and B-5). The B-Series drainage is also known as the South Walnut Creek Drainage. (IAG Name: Retention Ponds: B-1 B-2, B-3, B-4, B-5)

Approximate Location: N750,500; E2,087,000

Date(s) of Operation or Occurrence

The RFP began use of the B-Series drainage immediately upon opening of the plant. Until the early 1970s, most drainage ponds at the RFP were identified by strictly numeric designations. In the early 1970s, an alphanumeric identification system was implemented. Table NE-2 lists the current pond designations, the earlier numeric designations and dates of pond construction.

TABLE NE-2
B-SERIES POND CONSTRUCTION DATE AND DESIGNATIONS

Original Pond Number	Current Designation	Date of Construction
2	Pond B-1	November 1962[1]
3	Pond B-2	July 1953[2]
4	Pond B-3	July 1953[2]
5	Pond B-4	Before July 1953[2]
Not Applicable	Pond B-5	1979[3]

Description of Operation or Occurrence

The following details the highlights and major changes in B-series pond use.

- The original pond on the B-series drainage (Pond B-4) operated as a flow-through detention pond. Building 995 (RFP sanitary wastewater treatment plant) discharged to South Walnut Creek upstream from the pond.

- After July 1953, the three detention ponds (Pond B-2, Pond B-3, and Pond B-4) operated as a series of flow-through detention ponds.[2] Building 995, the sanitary wastewater treatment plant, discharged upstream of Pond B-2.

- After November 1962, the four detention ponds (Ponds B-1 through B-4) operated as a series of flow-through detention ponds.[4] Building 995 discharged water upstream of Pond B-1.

- An evaporator with a nominal capacity of 150 gallons per hour was installed in Building 774 in 1966. This evaporator was to process all high nitrate wastes. Use of this evaporator decreased the quantities of treated process effluent requiring discharge to the B-Series Drainage.[5] The Building 774 Evaporator operated only a short time after Building 374 began operations in the late 1970s.

- In 1968, a ten-inch bypass line was installed around Pond B-1, Pond B-2 and Pond B-3 providing the ability to divert flows into or around selected B-series ponds. This pipe normally discharges its flows into Pond B-4.[3]

- From 1971 to 1973, Pond reconstruction activities took place upstream of Pond B-1.[6] The dams of Pond B-1, Pond B-2, Pond B-3 and Pond C-1 were also upgraded during this general timeframe.

- From December 21, 1973[7], until the early 1980s, laundry water was discharged to Pond B-2 which was no longer operated as a flow-through pond.[8] A pipeline allowed transfer of the water directly to Pond A-2 from Pond B-2.[7] Pond A-2 was also isolated from the remainder of the A-Series drainage.[8]

- In December 1978, Ponds B-1 and B-2 were isolated from the South Walnut Creek drainage. These ponds were no longer flow-through ponds, and could be used for spill control.[9] Building 995 now discharged water to Pond B-3.

- In 1979, Pond B-5 was completed on the South Walnut Creek Drainage to provide adequate capacity for stormwater control.[3]

- From 1979 to 1983, there were no discharges from the B-Series Drainage to off-site areas because excess waters were eliminated through spray evaporation.[10]

- From 1983 to 1989, there were intermittent discharges from the B-Series drainage. These discharges from the B-series drainage passed through Pond B-5, with Building 995 discharges flowing through Pond B-3, Pond B-4, and Pond B-5.[3]

- From 1979 to the present, stormwater flow was diverted around Pond B-1, Pond B-2 and Pond B-3. Stormwater flowed to Pond B-4 which discharged to Pond B-5.[3]

- In 1990, a new pipeline was built to allow transfer of water from Pond B-5 to Pond A-4 for treatment and subsequent discharge.[3]

Physical/Chemical Description of Constituents Released

The major component of RFP discharges to the B-series drainage throughout the history of the plant has been treated sanitary effluent discharged from the sanitary wastewater treatment plant (Building 995). However, at various times, other materials have been released directly to the B-series drainage or B-series ponds.

The general types of materials that have been routinely released to the B-series drainage during the history of the RFP include: treated sanitary effluent, treated and untreated process waste, treated and untreated decontamination laundry wastewater, cooling tower blowdown, footing drain flows and stormwater runoff. The time-frames for discharge of each of these materials are given below.

- Sanitary wastewater treatment plant effluent has been discharged from plant inception to present.[6] This water has been discharged to various B-series ponds. From 1979 until 1983, there were no discharges offsite from the B-Series Drainage.[10] Since 1989, water from the B-Series Drainage has been transferred to Pond A-4, and released to the Upper Church Ditch or to Broomfield Diversion Ditch. These ditches route the water around Great Western Reservoir.[11]

- Process waste:

  - Treated process waste from Building 774 was discharged to Pond B-2 from an outlet below Building 995 from at least July 1953[12] until the early 1980s.[10] These flows included treated decontamination laundry wastewater.[10]

  - Untreated process waste from Building 774 was discharged to Pond B-2 from an outlet below Building 995 from at least July 1953[12] until January 1954.[13] It is believed that this untreated water was primarily decontamination laundry wastewater.

- Decontamination laundry wastewater was discharged to the B-Series Ponds from a number of buildings:

  - Untreated laundry wastewater from Building 771 was discharged from at least July 1953[12] until 1965.[14] This water was discharged to Pond B-2 from an outlet below Building 995 and may have included waste from the Building 771 analytical laboratory, radiography sinks, personnel decontamination room, and runoff.[14]

  - Untreated laundry wastewater was discharged to Pond B-2 from Building 778 from December 21, 1973[7,15] until 1980.[10] This pond was isolated from the remainder of the B-series drainage. A pipeline allowed transfer of the water directly to Pond A-2 from B-2.[7]

  - Untreated laundry wastewater from the Building 442 laundry.[16]

  - Untreated laundry wastewater from the Building 881 laundry.[17]

- Footing drains have discharged water to the B-series drainage from plant inception to the present.

- Stormwater flows have discharged to the B-series drainage from the inception of the plant to the present. The stormwater flows that enter the B-Series drainage are from the central portion of the plant.[10] These stormwater flows are normally routed to Pond B-4 and then to Pond B-5 where the water is impounded prior to controlled off-site discharge.[10]

A sediment study conducted by Colorado State University (CSU) resulted in data that indicated radioactive contamination of sediments in the B-Series drainage.[6,18] Pond reconstruction activities in 1971 to 1973 were found to cause resuspension and downstream migration of contaminated sediment. This caused the inventory of plutonium in Pond B-1 sediment to increase from 0.085 curies in 1971 to 2.9 curies in 1973.[6] Plutonium activity in Pond B-1 sediment in June 1973 varied from 10 to 502 picocuries per gram (pCi/g) of dry sediment based on the CSU sampling.[18]

An RFP study completed in June 1973 indicated radioactive contamination of sediments upstream from the drainage ponds. This study found an average activity concentration of 40 dpm/g from the "west culvert" (the culvert west of the Building 995 outfall) to the "east culvert" (the culvert immediately east of the Building 995 outfall). The area of contaminated soil/sediment was estimated to cover an area approximately 650 feet in length with an estimated width of 6 feet.[18]

On December 3 and 4, 1978, a bulk caustic storage tank leaked sodium hydroxide which flowed eastward in the Central Avenue Ditch (PAC 000-190). The sodium hydroxide was diverted to Pond B-1 for temporary holding.[19,20,21]

On September 26, 1979, a steam condensate line break in the Building 707 area occurred (PAC 700-194). This break allowed the steam condensate to reach Pond B-4 and South Walnut Creek below Pond B-4.[22]

On December 2, 1980, approximately 155 gallons of a 25% solution of ethylene glycol (antifreeze) was discharged to the B-Series drainage (PAC 000-192).[23]

A release of chromic acid to Pond B-3 by discharge through the sewage treatment plant (Building 995) occurred on February 22 and 23, 1989. It is believed that approximately 30 pounds of chromium reached Building 995, but that approximately 4.7 pounds of chromium were released by Building 995 to Pond B-3. The water from Pond B-3 was then sprayed on the East Spray Fields (PAC NE-216.1 - NE-216.3) and some of the Pond B-3 water reached Pond B-5.[24] This release of chromic acid was reported in a RCRA Contingency Plan Implementation Report (Number 89-001).[25]

The Sanitary Sewer System discussion (PAC 000-500) has additional information on materials released to the sanitary sewer system that may have had some impact on the B-Series drainage.

Responses to Operation or Occurrence

Prior to the NPDES permit system (1974), action was taken in response to the exceedance of guidelines or standards established for RFP discharges by either the AEC or by the operating contractor for AEC. The standards that were adopted were often standards or guidelines of outside agencies such as the U.S. Public Health Service.[26,27,28]

In response to the identification of plutonium contamination in the sediments of the drainages in 1973, a study was conducted to ascertain the source of the plutonium contamination present in the B-Series drainage. This study indicated that approximately 88% of the total activity released by Building 995 was due to the release of laundry decontamination water to the sanitary sewer.[29] After December 21, 1973, laundry water was only discharged to Pond B-2 which could also be pumped to Pond A-2. In the fall and winter of 1973, removal operations for contaminated soil were being conducted in the stream bed below the Building 995 outfall.[30]

Consideration was also given to good engineering practices in evaluation of discharges and operations of the B-series drainage. Table NE-3 details some of the problems experienced in the B-series drainage prior to the NPDES Permit.

Following the implementation of the NPDES Permit system at the RFP, responses to permit exceedances were structured so that the applicable discharge limits would be met for future discharges. Materials released in an NPDES permit exceedance were typically not addressed by any sort of collection or treatment response action. Table NE-4 details the NPDES permit exceedances for the B-series drainage at the Rocky Flats Plant.

The response to the 1979 sodium hydroxide spill was to divert it to Pond B-1, neutralize the water in B-1 with alum, and then pump the liquid to Solar Pond 207B-North.[20,21] See PAC 000-190 narrative for a more complete discussion on these response activities.

In response to the September 26, 1979 steam condensate release (PAC 700-194) valve settings were changed so that most of the water was routed to Pond B-1 where it was impounded. Sampling of the pond and drainage waters was also conducted. Results indicated tritium activity concentrations of up to 926 pCi/l in Pond B-4, and 24 hour composite samples at Walnut Creek at Indiana Street of 1,163 pCi/l for September 26, and 700 pCi/l for September 27.[22]

In response to the December 2, 1980 antifreeze spill (PAC 000-192), all flow upstream of the B-Series drainage was routed to Pond B-1. An additional 5,000 gallons of water was used to flush the system to Pond B-1.[23]

In the early 1980s, actions were taken at Pond B-5 to reduce the potential for off-site movement of contaminated sediments. The discharge structure for this pond was modified by adding a vertical standpipe and a perforated pipe along the bottom of the pond surrounded by granular material. Some sediments present in Pond B-5 were also removed from the drainage and deposited in the Soil Dump Area in the northeast buffer zone discussed as PAC NE-156.2. These activities helped to minimize off-site transport of contaminated sediments.

In response to leaching of contaminants out of pondcrete, which led to the presence of contaminants in the B-Series Drainage, two RCRA Contingency Plan Implementation Reports, 88-001 and 88-002, were filed. These events are more fully discussed in PAC 900-213.

In response to the 1989 release of chromic acid, a RCRA Contingency Plan Implementation Report (89-001) was submitted to the EPA. In addition to this, surface water and soil sampling was conducted. The analytical results for these samples indicated that, in general, the drainage ponds had chromium concentrations below the drinking water standard of 0.05 milligrams per liter (mg/l). Although a number of the initial water samples exceeded the drinking water standard for chromium, later samples verified that the chromium concentration had decreased to below the drinking water standard. Analysis of soil samples indicated that the concentrations of leachable chromium were far below the RCRA Extraction Procedure Toxicity limits.[24]

In 1990, a pipeline was built from Pond B-5 to Pond A-4 in order to allow transfer of water to Pond A-4 for treatment. Since the construction of this pipeline, the B-series ponds have only discharged through Pond A-4 following treatment.[3] Prior to construction of this pipeline, treatment had taken place at the terminal pond of each drainage leaving the RFP (Pond A-4, Pond B-5, and Pond C-2). Centralized treatment of the water is now conducted

at Pond A-4. The treatment consists of pre-filtration of the water followed by treatment in two activated carbon tanks in series. This action was taken in response to the identification of low concentrations of atrazine, an herbicide, in waters discharged from the RFP.[11]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU6. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994.

Comments

This PAC is indicated on the maps as only the drainage ponds, but it is considered to include the drainages upstream and downstream of the ponds. Downstream of the ponds, the PAC continues to the RFP boundary. Beyond the RFP boundary the drainage becomes IHSS 200.

1991 NPDES permit exceedances, if any, have not been included in this discussion.

Studies have shown that the ponds have performed as designed, i.e., to provide residence time and holding capacity and to provide for sedimentation of suspended material. However, some of the stream and pond sediments have become contaminated in the process.

A considerable amount of analytical data has been generated for the B-Series Drainage. These data primarily address radioactivity and nitrate concentrations in the terminal pond or direct discharges to the B-Series Drainage, but other data are available in more limited quantities. These data are found in the monthly reports, highlights, and laboratory analytical reports of the RFP group responsible for operation of the B-Series Drainage.

Atrazine treatment systems, as described above, were constructed at Pond C-2, Pond B-5, and Pond A-4, but the unit at Pond A-4 has treated the majority of the water and is expected to treat all the water in the future.

In summary, based on the wastes and discharges known to have been made to the B-Series Drainage, the types of contaminants that may reasonably be expected to be present in the sediments include uranium, plutonium, beryllium, chromium, silver, and miscellaneous other metals. Table NE-3 and Table NE-4 identify problems experienced in the B-Series Drainage that may be suggestive of additional analytes to consider in a site characterization activity.

References	Other References of Interest
[1] 1600413	
[2] 1600349	1501867
[3] 1503447	1501870
[4] 1600430	1501869
[5] 1500757	1601052
[6] 1503439	1501865
[7] 1500636	1501879
[8] 1500460	1601050
[9] 1500804	1601048
[10] 1502733	1601040
[11] 1500828	1501857
[12] 1601055	1601035
[13] 1600669	1501853
[14] 1500445	1600655
[15] 1500304	1600523
[16] 1600655	1500952
[17] 1501860	1500953
[18] 1600438	1500954
[19] 1501003	1500951
[20] 1501270	1500962
[21] 1600466	1500976
[22] 1501006	1500977
[23] 1501200	1500979
[24] 1500280	1600510
[25] 1800025	1500984
[26] 1601054	1500985
[27] 1600585	1500990
[28] 1600426	1501236
[29] 1600103	1500991
[30] 1500444	1500992
[31] 1500490	1700151
[32] 1601042	1501238
[33] 1600397	1501239
[34] 1600155	1500994
[35] 1600605	1500995
[36] 1500435	1500996
[37] 1700197	1500997
[38] 1500413	1600511
[39] 1600473	1600420
[40] 1600278	1501052
[41] 1500506	1501230
[42] 1500547	1500800
[43] 1700175	1501728
[44] 1500503	1600426
[45] 1500929	1500341
[46] 1500961	1500488
[47] 1500988	1500337
[48] 1501000	1500869
[49] 1700149	1500276

TABLE NE-3
B-SERIES DRAINAGE PONDS OPERATIONAL PROBLEMS
PRIOR TO NPDES PERMIT

Date	Concern	Cause
July 1953	Large amount of oil received at Building 995, sewage bypassed plant for a period of time[31]	Not identified
September 1955	2,700 gallons of laundry water above the 8500 d/m/l limit discharged to sanitary sewer[32]	Process waste line break
January 1959	Contaminated coolant from a still in Building 444 discharged to the sanitary sewer[33]	Not identified
May - June 1962	Pond B-2, Pond B-3 and Pond B-4 septic due to release of partially treated sewage[34]	Overloading of sewage treatment plant
October 1962 - April 1963	Foaming conditions, causing poor treatment of wastewater at Building 995, and septic conditions in Pond B-1[35]	Detergent use in laundries
June 1963	A considerable quantity of concentrated solution of chromium VI received at Building 995[36]	Not identified
March 1964 - January 1965	High concentrations of silver in incoming waste to Building 995. Concern that off-site discharges will not meet standard of 0.05 mg/l[37,38]	Radiography waste from two new radiography machines
February 1965 - April 1965	High nitrate concentrations at Pond B-4[39]	Unknown
November 1966	High Pond B-4 nitrate concentrations[40]	Release of high nitrate liquid from Building 774
March 1972	High activity concentrations in Pond B-1, Pond B-2, Pond B-3, and Pond B-4[41,42]	Inadvertent release of liquid from Building 774
January 1972 - December 1972	High plutonium concentrations in effluent water at Pond B-4[43]	Number of changes in waste handling, waste treatment, and drainage pond use as well as pond reconstruction activities
April 1973 - May 1973	56 Curies of tritium released to Walnut Creek drainage[4]	Unexpected receipt of tritium with a scrap metal shipment
November 1973	Plutonium contaminated soil and sediments west of Building 995 Outfall[44]	None stated, but contaminated materials removed prior to construction activities
November 1973	Sewage sludge discharged to Pond B-1[45]	Unknown

TABLE NE-4
B-SERIES DRAINAGE NPDES PERMIT EXCEEDANCES

DATE	EXCEEDANCE	PROBABLE CAUSE
October 1974[3]	Suspended solids 53 - limit 45 mg/l	Unknown
January 1975[3]	Biological Oxygen Demand (BOD) exceeded the limit of 25 mg/l a number of times	Experimental addition of methanol for denitrification -- Experiment stopped Jan. 10
January 1975[3]	BOD exceeded the limit of 25	Unknown
March 1975[3]	Visible foam	Fire Department soap
December 1975[46]	pH 5.9 - Limit 6-9	Low effluent flow and chlorine bottle change
March 1976[3]	BOD exceeded the limit of 25 mg/l twice	Unknown
September 1976[3]	BOD exceeded the limit of 25 mg/l	Unknown
March 1977[3]	Fluoride exceeded the limit of 1.7 mg/l a number of times	Unknown when reported -- Resolved Jan. 1978
October 1977[3]	Fluoride exceeded the limit of 1.7 mg/l a number of times	Unknown when reported -- Resolved Jan. 1978
December 1977[47]	BOD exceeded the limit of 25 mg/l twice	Unknown
January 1978[3]	Fluoride exceeded the limit of 1.7 mg/l twice	Unknown when reported -- Resolved. Cement floor hardener -- DOE construction project Building 371
February 1978[3]	pH 3.5 - Limit 6-9	Steam Plant acid cleaning
February 1978[3]	Suspended solids exceeded the limit of 30 mg/l	Lime addition to neutralize acid
February 1978[3]	BOD exceeded the limit of 25 mg/l	Unknown
March 1978[3]	BOD exceeded the limit of 25 mg/l three times	Due to higher solids which were within limits
July 1978[48]	BOD 45	Aerator blower not operating properly
May 1979[3]	pH 9.7 - limit 6-9	Algae growth in solar pond 207-B where the Building 995 Effluent was stored prior to release

TABLE NE-4
B-SERIES DRAINAGE NPDES PERMIT EXCEEDANCES

DATE	EXCEEDANCE	PROBABLE CAUSE
October - December 1979[49]	Chlorine exceeded the limit of 0.1 mg/l	Unknown
February 1985[3]	Chlorine exceeded the limit of 0.1 mg/l	Faulty valve -- Discharge was to go to reverse osmosis plant, but discharged to Pond B-3 and Pond B-5 -- Pond B-5 water held until chlorine dissipated
May 1987[3]	BOD exceeded the limit of 10 mg/l	Pond B-3 Algal Growth
February 1988[3]	BOD exceeded the limit of 10 mg/l	Under study. Probable cause appears to be Building 995 operating efficiency and possible algal growth in Pond B-3
March 1988[3]	BOD exceeded the limit of 10 mg/l	Sewage plant operating efficiency and possible algal growth in Pond B-3
April 1988[3]	BOD exceeded the limit of 10 mg/l	Sewage plant operating efficiency and possible algal growth in Pond B-3
May 1988[3]	BOD exceeded the limit of 10 mg/l	Sewage plant operating efficiency and possible algal growth in Pond B-3
December 1989[3]	Fecal coliform 780 limit - 200	Unknown
May 1990[3]	BOD exceeded the limit of 10 mg/l	Pond B-3 algae bloom
June 1990[3]	BOD exceeded the limit of 10 mg/l	Pond B-3 algae bloom
July 1990[3]	Fecal coliform 320 limit 200	Unknown
August 1990[3]	Fecal coliform 285 limit 200	Possible contaminated sample
September 1990[3]	BOD exceeded the limit of 10 mg/l	Pond B-3 algae bloom

PAC REFERENCE NUMBER: NE-142.12

IHSS Reference Number: 142.12, Operable Unit 6

Unit Name: Flume Pond (Walnut Creek Gauging Station) (IAG Name: Retention Pond A-5)

Approximate Location: N754,000; E2,094,000

Date(s) of Operation or Occurrence

Fall 1978 - Present[1,2]

Description of Operation or Occurrence

The flume pond is located on the Walnut Creek drainage immediately west and upstream from Indiana Street. The flume pond was built at the same time that McKay Ditch was being re-routed away from the RFP A-Series Drainage. The primary purpose is flow measurement of Walnut Creek using two Parshall Flumes (6-inch and 36-inch throat). The Walnut Creek drainage has received discharges from the RFP throughout the history of the plant. This pond was identified as an IHSS during the IAG negotiations.[3]

Physical/Chemical Description of Constituents Released

The constituents potentially present in this IHSS are the same constituents as are potentially present in North Walnut Creek or South Walnut Creek (A-Series ponds or B-Series ponds), as well as the McKay Ditch Bypass. These ponds are described in PAC NE-142.1 - NE-142.4, and PAC NE-142.5 - NE-142.9, respectively.

Responses to Operation or Occurrence

This pond has been cleaned out occasionally due to the buildup of sediments on the bottom or due to the need to reconstruct the flumes. The sediments were placed on the south side of Walnut Creek upstream of the pond and within the PAC NE-142.12 boundary.[4] A primary source of these sediments was McKay Ditch Bypass which was originally constructed as an unlined ditch,[4] and therefore carried considerable amounts of entrained sediments.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU6. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994.

Comments

Although the PAC maps in this document only identify the drainage ponds as PACs, the B-Series PAC is considered to extend upstream and downstream of the drainage ponds.

Sediments transported by Walnut Creek may settle out at this point due to the quiescent conditions of the pond.

In response to the perceived threat of pollution from RFP waters, waters from the RFP A-Series drainage and B-Series drainage are now routed around Great Western Reservoir by the Broomfield Diversion Ditch. The Broomfield Diversion Ditch diverts these waters to Walnut Creek below Great Western Reservoir.

The waters from the RFP A-Series drainage and B-Series drainage enter the Broomfield Diversion Ditch just east of Indiana Street.

References

[1] 1501256
[2] Hornbacher, D.D., "Environmental Analysis and Control Weekly Highlights, Week Ending January 5, 1979," January 5, 1979.
[3] 1502735
[4] Personal Communication, Ralph Hawes, Retired RFP Employee, December 17, 1991.

PAC REFERENCE NUMBER: NE-156.2

IHSS Reference Number: 156.2, Operable Unit 6

Unit Name: Soil Dump Area (between the A-Series drainage and B-Series drainage)

Approximate Location: N751,000; E2,087,000

Date(s) of Operation or Occurrence

1968 - 1973

Description of Operation or Occurrence

An area immediately north of Pond B-1 (PAC NE-142.5) and between the A-Series drainage and B-Series drainage was used for the dumping of soil. The possible sources of the soil disposed of in this area are listed below.

- Soil excavated for a multiple building construction project (Part V) may have been placed in this area in the late 1960s.[1]
- Sediments removed from the Pond B-5 discharge outlet modification activities were also placed in this general area.[2]

RCRA 3004(u) identified this area as a soil disposal location from construction activities at Building 774.[3] The RCRA 3004(u) document is considered to be in error on this point (see comments section).

Physical/Chemical Description of Constituents Released

No documentation was found that contained analyses of the soil from the Part V project or from the Pond B-5 modification work.

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU6 (based on an April 21, 1992 from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I Report is to be completed by September 6, 1994.

Comments

Although a document for this PAC discusses "off-site" disposal of the soil from Part V,[1] this probably refers to on-site disposal of soils. To some RFP personnel, "offsite" is outside the security fence around the approximately 400-acre manufacturing area, not outside the entire RFP reservation. Part V was a multiple building project which included Building 707 excavation work. There may have been soil removal operations at other buildings as well.[4] Furthermore, the location of the gate mentioned in

reference 1 (Gate T-11, located just west of the area for this PAC), and the fact that a guard was posted there, is suggestive of soil dumping operations between the A-Series ponds and the B-Series ponds.

RCRA 3004(u) indicates that soils excavated from the Building 774 area were disposed in the location of NE-156.2. It is believed that RCRA 3004(u) is in error on this point. Soil (approximately 200 cubic yards) was excavated from around some waste storage tanks north[5] and adjacent to Building 774 in February 1972[6]. This soil was first stored behind Building 334 (PAC 300-156.1) and moved in approximately February 1973[7] to the eastern portion of PAC 900-165 (the Triangle Area).[5,7] This soil was contaminated with radioactivity.[5,7] This soil was later removed from this area and placed in the landfill on September 5, 1973.[5] Examination of aerial photographs suggests that soil was already placed between the A-Series drainage and B-Series drainage in 1969, well before the 1973 date given in RCRA 3004(u).[8,9,10]

The analyses of the Building 774 soil were widely variable, with activity varying from 0.04 to 2,500 disintegrations per minute per gram (dpm/g).[5] In January 1973, 12 soil samples were collected from the stockpiled soil behind Building 334. The analysis of these samples indicated activity ranging from 3 - 704 dpm/g.[5] There is no reference to disposal of the Building 774 soil in the location of PAC NE-156.2.[5]

A 1975 document makes a vague reference to an area that is probably this PAC, noting that 50 to 75 dump trucks of soil were deposited "North of the B Ponds" during an unstated time period. It is believed this was soil from the Part V expansion.

The Soil Dump Area boundaries have been extended to the southwest. A review of aerial photos indicates that the affected area extends farther southwest than the area which the original IHSS boundaries include.

References

[1] 1501784
[2] Personal Communication, Ralph Hawes, Retired RFP Employee, December 17, 1991.
[3] 1502735
[4] Personal Communication, Daryl D. Hornbacher, Retired RFP Employee, October 25, 1991.
[5] 1600438
[6] 1500576
[7] 1500333
[8] 1502717
[9] 1502712
[10] 1500886

Other references of interest

1500919

PAC REFERENCE NUMBER: NE-166.1 - NE-166.3

IHSS Reference Number: 166.1 - 166.3, Operable Unit 6

Unit Name: Trenches South of the Present Landfill (IHSS Name: Trenches A, B, and C, Trench C consists of two smaller trenches)

Approximate Location: N752,000; E2,084,000

Date(s) of Operation or Occurrence

Prior to 1964 and also 1970 (see discussion below for explanation).

Description of Operation or Occurrence

Conflicting information has been found regarding the description of operation or occurrence. Listed below are the four explanations for the existence of these trenches.

> According to one reference, these trenches received a few hundred gallons of liquid from the RFP sanitary wastewater treatment plant (Building 995) in 1970. A map with that reference indicates only one trench in the area.[1]
>
> RCRA 3004(u) states that sludge from Building 995 was disposed in two trenches and possibly in a third trench near the landfill. This sludge was generated during a period of high sewage sludge output from Building 995, but no other time frame for these activities is given.[2]
>
> A brief discussion of possible sludge disposal "out north of the plant" is found. This document also discusses sludge disposal by Austin (a construction firm) to the north of the plant. The source of this waste was the number 1 digester at Building 995.[3]
>
> Another reference states that the sanitary sewage sludge that was disposed in this area was simply pumped on the ground and never actually trenched.[4]

Photographs of the RFP do not indicate any disturbances in the location of these trenches in 1955, but in 1964, disturbed areas corresponding to these three trenches are visible.[5,6] The disturbed areas do not show significant change in 1971 (the year following that in which wastes were supposedly disposed in them according to one reference), nor in any other photographs taken after 1964.[7]

Physical/Chemical Description of Constituents Released

The material reported to be placed in this unit consisted of sanitary wastewater treatment plant sludge.[1,2] Older sludge would have had primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination. Total long-lived alpha activity present in the sludge has been reported between a minimum of 382 picocuries/gram (pCi/g) in August 1964 to a maximum of 3,591 pCi/g in June 1960.[8] Analysis of soil samples collected during exploratory drilling did not indicate any radioactivity.[1]

Responses to Operation or Occurrence

Some soil sampling at these trenches in the late 1970s or early 1980s did not find radioactivity.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents disposed in these trenches. This IHSS is being studied in accordance with the IAG schedule for OU6. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 4, 1994.

Comments

The activity described in the first bullet for this PAC, as listed above, was performed under the scrutiny of a former RFP employee (now retired). When this retiree was contacted, he stated that he did not remember any sludge or sewage disposal in trenches to the south of the landfill.[9]

No other documents were found supporting the use of these trenches for disposal of either Building 995 sludge or liquid. Records searched included all Monthly Status Reports for the Waste Disposal Coordination Group for 1970. These monthly status reports indicate off-site shipments of Building 995 sludge as well as off-site releases of liquids during 1970.

These possible trenches were misidentified in the first versions (1986) of the RCRA 3004(u) document. It is believed that the trenches were located too far to the north in that document. This conclusion was drawn from the following information. Soil sampling in 1987 at these probably incorrect locations did not identify any above-background concentrations of uranium or plutonium activity. Based on that information and a review of aerial photographs, the solid waste management units corresponding to these trenches were moved 500 feet to the south to correspond with an identifiable surface disturbance.[10]

The wastewater treatment plant sludge should consist predominantly of concentrated organic matter typically present in sanitary wastewater treatment plant sludge. However, due to various operations at the RFP, some uranium and plutonium contamination of this sludge may be present.

A number of documents have recently been found that make reference to the existence of data ("Uranium, 2-butanol, 1,1,1-TCA, TCE, and toluene have been detected in Trench A soil.") from Trench A near the landfill. All of the documents found to date reference another document for the source of the information on the data, or do not actually present the data. A search for this data has been made and no data has been identified, nor is any other person (such as project managers for the various past projects that used this information) aware of any such data. The first reference to this "data" was made in a 1988 Rockwell International document ("Draft Remedial Investigation and Feasibility Study Plans for Low Priority Sites") that states the issue very close to the quote above. The project files from that project have been searched and no data was identified. Based on these activities it is not currently believed that any data for uranium, 2-butanol, 1,1,1-TCA, TCE, and toluene in Trench A soil exist from before 1988.

References

[1] 1500765
[2] 1502735
[3] 1700387
[4] 1600818
[5] 1502710
[6] 1502717
[7] 1502713
[8] 1500793
[9] Personal Communication, Al Voight, Retired RFP Employee, October 23, 1991.
[10] 1600816

Other References of Interest

1600817
1600430
1500921
1500434
1500433
1500436
1500564
1500573

PAC REFERENCE NUMBER: NE-167.1 - NE-167.3

IHSS Reference Number: 167.1 - 167.3, Operable Unit 6

Unit Name: Landfill Spray Fields (North Area - 167.1, Center Area - 167.2, and South Area - 167.3) (IAG Name: North Area Spray Field, Pond Area Spray Field, and South Area Spray Field)

Approximate Location: N753,000; E2,084,000. Three sites in the vicinity of the present landfill (PAC NW-114) have been used for spray evaporation. One of these sites, the north spray field, was located approximately 1,000 feet northwest of the east pond near the McKay Irrigation Ditch. The other two spray fields are located along the north and south banks of the east landfill pond, immediately above the water line.[1]

Date(s) of Operation or Occurrence

Spray evaporation at the north spray field began in approximately May 1974.[2] Spray evaporation on the north spray field ceased no later than May 1981, when the landfill was expanded and the west landfill pond (also known as landfill pond 1 or the leachate collection pond) was buried.[1] Spray evaporation of the east landfill pond water along the north and south banks of the east landfill pond (also known as landfill pond 2) is also believed to have begun approximately May 1974. The spray fields to the north and south of the east landfill pond continue to operate, as necessary.

Description of Operation or Occurrence

Spray evaporation was conducted near the landfill to prevent the release of waters from the landfill ponds. These ponds were intended to protect surface water and groundwater in the vicinity of the landfill. The west pond was constructed to impound any leachate generated by the landfill. The east pond was built to catch any overflow from the west pond, intercepted groundwater (if necessary), and surface runoff.[1]

North Spray Field

Spray evaporation water in the north spray field originated from the west landfill pond. The north spray field covered an area of approximately three acres with the dimensions of approximately 280 feet by 480 feet.[1]

Water from Building 771 and Building 774 footing drains was also applied to land north of the landfill.[3] This water was collected from the Building 771 and Building 774 outfall pond, trucked out to the landfill area, and then sprinkled from the truck onto the north spray field area.[4] After March 1975, the Building 771 and Building 774 footing drain water was no longer sprinkled or spread at the landfill area because of "damage to the landscape."[4]

Prior to spraying activities, water to be sprayed on the spray field was analyzed to ensure that the Rocky Flats Plant criteria for spraying were met (see Table NE-5). Similarly, the water present in the east and west landfill ponds was also routinely monitored regardless of spray evaporation activities.[1]

Landfill Pond Spray Fields

Water collected in the east pond is spray irrigated on the north and south banks of the east pond. The dimensions of the east landfill pond spray fields are approximately 100 feet by 460 feet for the north spray field and 120 feet by 440 feet for the south spray field.[1]

Physical/Chemical Description of Constituents Released

Spray evaporation activities at the north spray field were monitored to prevent environmental degradation. Table NE-5 details the characteristics of the west landfill pond waters prior to the start of spray evaporation, and the self-imposed standards for spraying.[2]

TABLE NE-5
LIMITS AND TYPICAL CONCENTRATIONS OF SELECTED CONTAMINANTS
APPLIED TO NORTH LANDFILL SPRAY FIELD

COMPOUND	TYPICAL CONCENTRATION[2]	LIMIT FOR SPRAYING[2]
Phenol	200 ppb	500 ppb
Tritium	5,000 pCi/l	100,000 pCi/l
Strontium 90	5 pCi/l	25 pCi/l
Plutonium	5 pCi/l	20 pCi/l
Americium	100 pCi/l above background	200 pCi/l above background
Total Long-Lived Alpha	200 pCi/l	400 pCi/l
Nitrate	100 mg/l	200 mg/l

The west pond was expected to collect approximately 1,500,000 gallons of water per year prior to spray evaporation. It was estimated that the spray evaporation of west pond water, at the concentrations or activity levels given above, would only create slight long-term impacts on plutonium levels in a spray evaporation area of 50,000 square feet.[2]

Average tritium concentrations and volumes of water sprayed for the north spray field are given in Table NE-6.

TABLE NE-6
WATER VOLUMES AND TRITIUM CONCENTRATIONS APPLIED TO
NORTH LANDFILL SPRAY FIELD

DATE	AVERAGE TRITIUM RADIOACTIVITY CONCENTRATION (pCi/l)[2]	VOLUME SPRAYED (gallons)[2]
May 1974[3]	5,300	51,600
June 1974[5]	26,000	160,000
August 1974[6]	26,000	36,000
October 1974[7]	20,200	83,000
March 1975[8]	950	242,200
May 1975[9]	1,270	140,600
June 1975[10]	950	319,500
November 1975[11]	1,600	21,400
March 1976[12]	Not Available	56,100

The source of spray evaporation water listed above is either water from the landfill pond, water collected from the Building 771 and Building 774 footing drain pond, or a combination of both. The above data pertain to the water which was actually applied to the spray field.[2] Much more data for a number of different analytes is presented in the Present Landfill Closure Plan.[1] These data were developed from analysis of east landfill pond waters regardless of whether spraying operations were being conducted.

Background laboratory analyses of soil samples collected in the north spray field area (prior to evaporation activities) are given in Table NE-7.[2]

TABLE NE-7
NORTH LANDFILL SPRAY FIELD SOIL CONCENTRATIONS
PRIOR TO SPRAYING

SAMPLE NUMBER	PHENOL (ppb)	STRONTIUM 90 (pCi/l)	PLUTONIUM (dpm/g)	NITRATE (mg/l)
1	60	1.04	0.39	300
2	120	0.83	0.24	330
3	50	0.84	0.26	240
4	170	0.76	0.21	260
5	120	0.68	0.25	270
6	50	0.50	0.21	250

Laboratory analysis records for soil samples collected during or after spray evaporation at the north spray field were not found.

Historical water quality data have been compiled for the west and east landfill ponds and are presented in the Present Landfill Closure Plan.[1]

Responses to Operation or Occurrence

Operation of the north landfill spray field ceased by May 1981 when the West Landfill Pond was buried beneath landfill waste due to the expansion of the landfill boundaries to the east.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU6. However, it is believed that the IAG had improperly located these spray fields. The IAG activities will include site investigations, site characterizations, and possible remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994.

Comments

The original locations given for IHSS 167.2 and IHSS 167.3 are incorrect because they were mapped too far from the pond. These spray fields are immediately adjacent to the landfill pond.

References

[1] 1503438
[2] Rockwell International, "Disposition of Water - Sanitary Landfill," Internal Letter from M.A. Thompson, March 19, 1974.
[3] 1501273
[4] 1500954
[5] 1501274
[6] 1501094
[7] 1500949
[8] 1500951
[9] 1500420
[10] 1500956
[11] 1500950
[12] 1500298

PAC REFERENCE NUMBER: NE-216.1 - NE-216.3

IHSS Reference Number: 216.1 - 216.3, 216.1 is in Operable Unit 6, 216.2 and 216.3 are in Operable Unit 2

Unit Name: East Spray Fields (216.1 - North Area, 216.2 - Center Area, 216.3 - South Area)

Approximate Location: N750,000; E2,089,000

Date(s) of Operation or Occurrence

The general dates of operation for the East Spray Fields are from 1979[1] to 1990.[2] For specific portions of the East Spray Fields the dates of operation are:

PAC NE-216.1 - North Area: spring of 1989 only,
PAC NE-216.2 - Center Area: 1979 to the early 1980s, and
PAC NE-216.3 - South Area: early 1980s to 1990.

Description of Operation or Occurrence

The North Area (PAC NE-216.1) of the East Spray Fields was opened in 1989 due to excessive runoff from the existing east spray fields. The area was closed shortly after opening due to excessive runoff from this new spray field. This spray field was located on the top of a hill between the A-Series drainage and the B-Series drainage, east of the fence around the RFP main manufacturing area.

The Center Area (PAC NE-216.2) of the East Spray Field operated for a few years, but closed due to erosion and soil slumping problems on hillsides near the spray field.[3] This spray field was located between the B-Series drainage and the C-Series drainage, on top of a hillside to the north of the East Access Road.[4]

The South Area (PAC NE-216.3) of the East Spray Field was located between the B-Series drainage and the C-Series drainage, on top of a hillside to the south of the East Access Road.[4]

Spray irrigation of Pond B-3 water was initiated in 1979[1] as an action to achieve zero off-site discharge of sanitary effluent from the Rocky Flats Plant. Water from Pond B-3, which receives treated sanitary wastewater flows, was applied to these spray fields. This activity was allowed in the NPDES Permit of May 1981.[2]

For spray irrigation at the East Spray Fields, water is pumped from Pond B-3 and spray irrigated on nearby land. Gasoline-driven pumps and a series of laterals and sprinkler nozzles distributed the water to the ground surface for evaporation and infiltration into the subsurface. It is estimated that during spray irrigation activities, up to 20 million gallons per year of water was disposed in this manner. When used, the spray system often saturated the soils near the spray fields, leading to overland flow of the sprayed effluent into the detention ponds.[5]

Direct runoff of spray-irrigated water from the south portion of the East Spray Field into Woman Creek was observed on March 2, 1987. This direct runoff constituted a technical NPDES violation since the point of discharge to Woman Creek was not an NPDES permitted discharge point.[1]

A second incident occurred following a spill of chromic acid in Building 444 on February 22, 1989. This chromic acid was inadvertently pumped to the sanitary sewer system. Eventually it was estimated that 4.7 pounds of chromium was discharged to Pond B-3. The water from this pond was then spray irrigated

on the North and South portions of the East Spray Fields.[6] Some of the runoff from the North portion of the East Spray Field was collected in Pond B-5. This incident required the submittal of a RCRA Contingency Plan Implementation Report (Number 89-001). Additional details of this incident can be found in that report.[7]

Physical/Chemical Description of Constituents Released

The analyses of treated sanitary effluent discharged to Pond B-3 are representative of the waters applied to the East Spray Fields. The analytical data for treated sanitary effluent discharges to Pond B-3 are presented on a monthly basis in the "Rocky Flats Plant Monthly Environmental Monitoring Report," and summarized annually in the "Rocky Flats Plant Annual Environmental Monitoring Report." The chemical analytes for which data are presented in these reports consist of: pH, five day biochemical oxygen demand, total suspended solids, nitrate as nitrogen, total chromium, total phosphorus, total residual chlorine, fecal coliform, and, in more recent years, oil and grease.[7,8] Additional analyses of sanitary effluent discharges have also been conducted; the data are available from the EG&G Surface Water Division as individual data reports from the internal RFP laboratories. The data are not compiled into a summary report.

Dates of application and volumes of water applied to the east spray fields are maintained by the Rocky Flats Utilities Department.

Responses to Operation or Occurrence

In response to the NPDES technical violation of March 2, 1987, a ditch was constructed to divert runoff waters from the south portion of the East Spray Field into Pond C-2. Pond C-2 is an NPDES permitted discharge point.[1]

In response to the application of waters potentially contaminated with chromium to the north and south portions of the East Spray Fields, 34 soil samples were collected from the spray fields. Two of the samples were duplicates. The samples were collected from the ground surface, zero to one-inch depth, and from the six- to seven-inch depth. Samples were analyzed for total chromium using the EPA Extraction Procedure (EP) Toxicity test in order to measure the amount of chromium that is leachable from the soil. Sampling locations were representative of the application, surface run-off and background areas. The EP Toxicity chromium analyses of these soil samples indicated that background soil concentrations of leachable chromium varied from <0.010 to 0.023 mg/l, whereas the spray field soils had leachable chromium concentrations of <0.010 to 0.082 mg/l.[5] Sampling locations and specific sample analyses are contained in reference 5. Also in response to these activities a RCRA Contingency Plan Implementation Report 89-001 was prepared and submitted.

Spray field operation ceased in the spring of 1990 due to concerns over the validity of spray irrigation as a water control technique, possible interactions of the spray field with old waste disposal sites, and uncertainty over the definition of spray irrigation "good engineering practice" as specified in the Plant's NPDES permit.[2]

Fate of Constituents Released to Environment

No documents were found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the Inter-Agency Agreement schedule for OU6. However, it is believed that portions of the East Spray Field were improperly located in the IAG. The IAG activities will include site investigations, site characterization, and possible remediation. The Final Phase I RFI/RI Report is to be completed January 7, 1994.

Comments

Although currently not practiced, the use of spray irrigation as a water management technique is being studied with regard to its inclusion in the NPDES permit currently being negotiated.

It should be noted that the treated sanitary effluent would mix with Pond B-3 waters prior to spray irrigation, introducing the possibility that other chemical constituents already in the pond might have been included in the irrigation water. Therefore, the analyses of treated sanitary effluent might not be fully representative of the irrigation water.

Information on the ponds related to the spray fields may be found in the following PACs:

A-Series Ponds; PAC NE-142.1 - PAC NE-142.4,
B-Series Ponds; PAC NE-142.5 - PAC NE-142.9, and
C-Series Ponds; PAC SE-142.10 and PAC SE-142.11.

The size and location of the East Spray Fields presented in this report are different than those presented in the IAG for the center and south areas. The center area was presented in the IAG as a western portion of the south spray area. This location was incorrect. The center portion of the spray field is actually north of the east access road, an area not identified with the East Spray Fields in the IAG map. Furthermore, the south portion of the East Spray Field is a much larger area than that identified in the IAG. The south portion of the East Spray Field extends farther to the west, east, and south than the area identified in the IAG. These revised locations are based on a site visit.[4] The spray nozzles and distribution pipes are currently (December 1991) still located where the center and south portions of the East Spray Fields were operated.

References

[1] 1600815
[2] DOE, "Surface Water Management Plan, Draft Final," October 1991.
[3] 1502746
[4] Site Visit, Frank Blaha, December 11, 1991.
[5] 1501048
[6] 1500825
[7] 1800025
[8] 1503442
[9] 1503443

PAC REFERENCE NUMBER: NE-1400

IHSS Reference Number: Not Applicable

Unit Name: Tear Gas Powder Release

Approximate Location: N755,000; E2,086,000

Date(s) of Operation or Occurrence

August 5, 1987.

Description of Operation or Occurrence

A member of Plant Protection dumped approximately five pounds of CS tear gas powder on the roadway in the buffer zone on the evening of August 5, 1987. The powder became airborne the next day when other members of Plant Protection drove through the tear gas powder.[1]

Physical/Chemical Description of Constituents Released

The material released consisted of CS Tear Gas Powder.[1]

Responses to Operation or Occurrence

Three individuals were affected by the powder and were taken to medical and received attention. The area where the tear gas was located was hosed down by the Plant Fire Department.[1]

Fate of Constituents Released to Environment

No documentation was found detailing the fate of the constituents released to the environment. The powder was diluted with water.

Comments

The approximate location of the release was identified by an RFP employee who was a former member of Plant Protection.[2]

References

[1] 1501822
[2] Personal Communication, Chuck Wilson, RFP Employee, December 11, 1991.

PAC REFERENCE NUMBER: NE-1401

IHSS Number: Not Applicable

Unit Name: NE Buffer Zone Gas Line Break

Location: N749,500; E2,089,000

Date(s) of Operation or Occurrence

April 28, 1987[1]

Description of Operation or Occurrence

A 12-inch high-pressure natural gas line was ruptured by a bulldozer during construction of a spray irrigation runoff control ditch in the southeast buffer zone. The line was reported by Coors Company, the owner, to be 36 to 42 inches deep. No explosion, fire, or injuries occurred as a result of the rupture; however, overhead electrical lines were damaged by debris blown into the air by the escaping gas.[1]

Physical/Chemical Description of Constituents Released

The material involved was natural gas. Approximately five million cubic feet of gas were released to the environment.[1]

Responses to Operation or Occurrence

On-site emergency response measures were initiated because of the explosion hazard presented by the gas. The RFP fire department shut off the flow of gas to the line. The line was repaired and returned to service on April 30, 1987.[1]

Fate of Constituents Released to Environment

Because of the rapid diffusion characteristics of natural gas, it was concluded at the time that the release never presented a hazard to off-site populations.[1] No documentation was found which detailed the fate of any constituents released to the environment.

Comments

None.

References

[1] 1500244

PAC REFERENCE NUMBER: NE-1402

IHSS Reference Number: Not Applicable

Unit Name: East Inner Gate PCB Spill

Approximate Location: N749,500; E2,086,000

Date(s) of Operation or Occurrence

August 8, 1983.

Description of Operation or Occurrence

PCB-contaminated transformer oil leaked onto the asphalt at the east gate. The oil came from a commercial truck which was to pick up a shipment of PCB wastes from the plant. The truck already contained wastes from elsewhere, which apparently were leaking. When the truck was opened for inspection before entering, the leakage was noticed. While attempts were being made to clean up the spill, the oil leaked out of the truck and onto the asphalt. The truck left without entering the RFP plant.[1]

Physical/Chemical Description of Constituents Released

PCB-contaminated transformer oil.[1]

Responses to Operation or Occurrence

The following day, approximately 1 square foot of contaminated asphalt was removed and stored with other RFP PCB-contaminated waste.[1]

Fate of Constituents Released to Environment

Contaminated asphalt was removed and packaged with other RFP PCB-contaminated waste.

Comments

The approximate location of the release was identified by a retired RFP employee.[2]

References

[1] 1700458
[2] Personal Communication, Daryl D. Hornbacher, Retired RFP Employee, December 20, 1991.

PAC REFERENCE NUMBER: NE-1403

IHSS Reference Number: Not Applicable.

Unit Name: Gasoline Spill - Building 920 Guard Post

Approximate Location: N749,500; E2,093,000

Date(s) of Operation or Occurrence

August 5, 1991

Description of Operation or Occurrence

Approximately 1 quart of gasoline spilled from the portable generator in the parking lot just east of the Building 920 Guard Post. The spill was a result of a defective fuel level gauge.[1]

Physical/Chemical Description of Constituents Released

Approximately 1 quart of unleaded gasoline, managed as a RCRA-regulated hazardous waste for its benzene content, was released to the asphalt.[1]

Responses to Operation or Occurrence

The Fire Department responded. The spill was contained by the use of Oil-Dri, an absorbent, and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-006 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt, but was contained and removed immediately. There did not appear to be any threat to the environment. The packaged material was transferred to the Building 331 storage area.[1]

Comments

None.

References

[1] 1503407

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3.2 Northwest Buffer Zone

The Northwest (NW) Buffer Zone is the quadrant of the plant outside of the 400-acre manufacturing area, north of Central Avenue and West of Eighth Street (Figure NW-1). Currently, the north boundary is Colorado Highway 128 and the west boundary abuts privately owned land. The buffer zone was extended in 1974 with the DOE purchase of additional land. Prior to that purchase, the RFP ended only slightly farther west than the western edge of the manufacturing area at a fence commonly referred to as the "Cattle Fence". Since the purchase of the land in 1974, the cattle fence is well within the RFP boundary. The gently sloping plateau is incised with deep gullies. Rock Creek, Upper Church Ditch, McKay Ditch, and the West Interceptor Ditch are waterways which traverse the northwest quadrant. The McKay Ditch was rerouted in 1974 to bypass North Walnut Creek and the A-Series Ponds (PACs NE-142.1 - NE-142.4). The West Interceptor Ditch was modified in 1982 prompted by activities in the West Spray Field (PAC SW-168) requiring surface water management.

Permanent structures in the area are limited to Lindsay Ranch and the Wind Site. Lindsay Ranch is an unoccupied farm consisting of several buildings and was in existence prior to the construction of the RFP. The Small Wind Energy Conversion System Test facility was established in the early 1980s and is located on a 451-acre site in the northwest corner of the area. The groundwater near the Wind Site is currently undergoing investigation for potential contamination; however, the activities associated with the Wind Site are not thought to pose a threat to the environment. The site was actively used for energy research until the late 1980s.

The foundation to a concrete batching area is located south of the PU&D storage area and was initially used for the mixing of concrete for the construction of Building 371 in 1973. The concrete batching area was used from 1973 to 1980. A firing range located west of the Present Landfill was constructed in 1984 and is used for rifle and pistol shooting.

An open storage area near the Present Landfill has been used by various groups at RFP for surplus storage has existed since approximately 1974. This fenced area is located adjacent to the PU&D storage yard (PAC NW-170) to the east. Currently, the area is used by the carpentry, power, trucking, and modification groups. Historically, such items as surplus roofing tar and motor oil have been stored in the area but no documentation has been found detailing any releases of hazardous materials to the environment. A power substation is located east of this open storage area and south of the landfill. No documentation was found which detailed incidents of concern related to the power substation.

The following subsection contains detailed descriptions of PACs located in the Northwest Buffer Zone.

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PAC REFERENCE NUMBER: NW-114

IHSS Reference Number: 114, Operable Unit 7

Unit Name: Present Landfill

Approximate Location: N752,500; E2,083,000

Date(s) of Operation or Occurrence

August 14, 1968 - Present

Description of Operation or Occurrence

The landfill was constructed in August 1968 for the disposal of the plant's uncontaminated solid wastes.[1] Preliminary landfill designs and anticipated operating procedures are documented.[2] The development and use of this landfill replaced the incinerator (PAC SW-133.5) and original landfill (PAC SW-115) as the method of sanitary solid waste disposal. Although initially this landfill had a projected life of 50 years, it is undergoing closure. Discussion of the Present Landfill has been divided into Routine Operation, Regulatory Issues, Structure/Construction, and Non-Routine Occurrences.

Routine Operation

The landfill is used for the disposal of general RFP refuse collected from various locations throughout the plant. Operation of the disposal activities is directed by a landfill operator. Debris from production areas must be monitored and approved by appropriate on-site supervisors prior to placement in dumpsters. Liquids, sludge, or noncontaminated potentially hazardous solid materials must be reviewed and meet RFP specifications before disposal. Wastes include paper, rags, floor sweepings, cartons, demolition material, and miscellaneous items.[2] Routine operation of the landfill included the disposal of sanitary wastewater treatment plant sludge, asbestos, and polychlorinated biphenyls (PCBs).

Sludge

Radioactively contaminated sludge from the sanitary wastewater treatment plant (Building 995) was routinely disposed of at the landfill from August 1968 through May 1970. The contamination consisted of uranium and plutonium which had entered the sanitary sewage system with laundry water.[3] Approximately 2,200 pounds of sludge containing an estimated 8 milligrams of plutonium were buried in the landfill.[4] This sludge also contained depleted uranium.[5] This practice was discontinued in May 1970 when offsite shipment of sludge as low-level waste began.[6]

In 1974, it was concluded that sludges from the sanitary sewage treatment plant could be safely disposed of onsite in either the landfill or as fertilizer when it was determined that the sludges were not contaminated with radionuclides.[7] In 1980, sludge from the reverse osmosis sludge beds was sampled for determination of suitability for landfill disposal.[8,9] It is not known if Reverse Osmosis Plant sludge from the reverse osmosis plant drying beds was placed in the landfill or not. Also in 1980, during the cleaning of Building 373 cooling tower, disposition of the sludge became a problem; the sludge was to be transported to the landfill.[10]

Water from backflushing the raw-water treatment plant filters contains solids removed during treatment. Settling tanks were provided for this water, which was pumped back to the treatment plant, and the sludge then pumped to drying beds. Dried sludge is trucked to the landfill.[11]

Asbestos

In 1985, asbestos generated onsite was disposed of in a designated area which consisted of a 10-foot deep pit.[12] Routine disposal practice consisted of placing asbestos-containing material in heavy plastic bags. These bags were disposed of in a designated pit and covered with clean dirt when the pit became full.[12] At the time, warning signs were displayed at the entrance to the disposal area and at 100 feet distance around the asbestos disposal pit. This operation was evaluated in 1985 and considered to be in compliance with the appropriate Federal regulations.[12]

A DOE environmental survey of RFP in September 1987 identified some deficiencies in asbestos disposal operations. Actions were initiated to upgrade these disposal operations.[13] At the time, the disposal practice was not in compliance because the pit was not covered with soil after each working day.[14] By December 1988, asbestos was disposed of in several pits in specified areas near the center of the landfill.[15] The locations of these areas were estimated by landfill operators and later marked with asbestos warning signs to comply with appropriate regulations. Records from June 1989 through April 1990 detail daily activities of asbestos disposal at the landfill. The records indicate some non-routine events associated with asbestos disposal such as ripped bags and insufficient daily cover.[14] Actions were taken to correct these problems.

PCBs

Small quantities of PCBs are contained in materials that were routinely disposed of in the landfill. In 1976, it was determined that used fluorescent light ballasts could no longer be sent to the landfill because they contained small quantities of PCBs.[16] A 1985 reference identifies a designated area of the landfill as the disposal site of PCBs.[17] Supporting documentation for this has not been found; however, a specified cargo container located in the currently inactive hazardous waste storage area (PAC NW-203), east of the landfill, was used for PCB storage prior to offsite disposal. This area is located in the western portion of the landfill.

Regulatory Issues

In October 1972, RFP policies on waste disposal at the landfill were reviewed and judged to be in accordance with applicable regulations.[1] Regulatory guidelines were issued in 1973 to control burial of solid and liquid wastes in the landfill prompting Health Physics to initiate a program of radioactive monitoring and scanning of the wastes.[1]

In 1977, a Solid Waste Management Plan was prepared in compliance with 40 CFR 241. This plan included both radiation monitoring and groundwater monitoring programs. Radiation monitoring included measurements at the point of waste origination and at the landfill. The groundwater monitoring program consisted of sampling the wells at the landfill every five months. The water samples were analyzed for plutonium, gross alpha, conductivity, pH, and nitrate.[18]

The Colorado Department of Health inspected the landfill in 1978 and 1979 at which times the landfill was reported to comply with state and federal minimum standards.[19,20] In 1986 and 1987, studies identified 241 nonhazardous solid waste streams and 97 hazardous waste streams disposed in the landfill. As of November 1986, disposal of the hazardous waste streams in the landfill was discontinued.[1] Because hazardous waste was disposed of at the landfill, it was designated as an interim status Resource Conservation and Recovery Act (RCRA) regulated unit and was included in the 1986 Part B Permit Application as a facility to be closed under interim status. Only non-hazardous waste disposal operations were to continue from that time forward.

Structure/Construction

The landfill was sited in a natural drainage tributary to North Walnut Creek. A portion of the drainage was filled with soil from an on-site borrow area to a depth of up to five feet for the construction of a surface on which to place the first lift of waste.[1]

In 1974, prompted by the identification of elevated tritium activity downgradient of the landfill, significant changes were made to the landfill design. These included the construction of a surface water diversion ditch, a groundwater interceptor system, a leachate collection system, and two ponds.[1]

The surface water interceptor ditch was installed to intercept any surface water flowing toward the landfill and direct the collected water away from the landfill. The cross-sectional geometry of the ditch is a gravel-filled trapezoid approximately three feet deep.[18]

Among the 1974 improvements was a groundwater intercept system constructed to intercept and divert groundwater flow around the landfill. The design of the intercept system enabled groundwater to be discharged to the western pond (also called Pond 1 in some documents at that time), the eastern pond (also called Pond 2 in some documents at that time), or to surface drainage downslope of the eastern pond. The eastern pond was improved to meet engineering standards as a dam shortly after it was constructed.[21] The new East Landfill Pond had an engineered embankment which included a low-permeability clay core keyed into bedrock.[21]

Until January 1974, water collected in the ponds was pumped to the Solar Evaporation Ponds (PAC 000-101). After January 1974, it was diverted to a manhole northwest of Building 990 and discharged to Pond B-2 (PAC NE-142.6). By September 1975, spraying of the water onto spray fields adjacent to the landfill was initiated[18] (PAC NE-167.2 and PAC NE-167.3). Spraying was performed after the pond water was analyzed and indicated to meet established RFP guidelines. Authorization of spraying was obtained from the Manager of Environmental Analysis and Control's office. The weekly pond water samples were analyzed for gross alpha, gross beta, gamma emitting isotopes, and tritium activity.[18] Areas where spray evaporation operations historically occurred are discussed in detail in PAC NE-167.1, PAC NE-167.2, and PAC NE-167.3. Currently, water from the East Landfill Pond is sprayed along the banks of the pond in areas considered part of PAC NW-114.[1]

The western and eastern ponds were situated downgradient from the landfill. The western pond was 500 feet east of the advancing face of the landfill and the eastern pond was 1,000 feet east of the western pond at the time of construction.[22] A leachate-collection system was constructed for landfill expansion and waste was subsequently placed over it.[1] Leachate generated in the landfill discharged into the western pond until May 1981 when the pond was buried beneath the advancing face of the landfill.[23] Additional detail about the surface water, groundwater, and leachate collection systems can be found in the RCRA Facility Investigation/Remedial Investigation Workplan and the closure plans.[1,18,22] Design specifications for the construction activities of 1974 are available.[24]

In 1981 and 1982, in response to the need for more landfill space, two slurry walls were constructed to prevent groundwater migration into an expansion of the landfill to the east. The slurry walls are tied into the north and south arms of the groundwater diversion system. The walls are constructed of soil and bentonite and intersect the previously existing drainpipe. Design drawings of the slurry wall are available.[18]

Non-Routine Occurrences

Numerous "hot items" have been identified in the landfill by routine FIDLER surveys performed during the placement of each lift of waste. Records indicate these radioactive materials were retrieved, returned to the building of origin, and disposed of properly. Routine FIDLER surveys were initiated in 1973 after the tritium source was discovered in the landfill.[1] References specifically describing individual events pertaining to the discovery of radioactive materials are identified in the reference list.[25]

Several non-routine incidents of non-radioactive waste disposed of in the landfill have been documented. These incidents include the disposal of a mercaptan (odor additive to natural gas) tank[26] and the disposal and puncturing of a bag containing tear gas powder.[27] In 1978, an information sheet was proposed which was to cover the nonroutine disposal of waste to the landfill.[28] Approval was given by the Environmental Analysis and Control Group for the disposal of nonroutine waste into the landfill. For example, approval was given for the disposal of one drum of solidified polystyrene resin used in fiberglassing.[28]

On January 29, 1971, approximately 700 gallons of No. 6 fuel oil was spilled in the 600 area (PAC 600-152). Clean-up activities resulted in the removal of the oil from various locations at the plant which was subsequently sent to the landfill for disposal. Consideration had been given to the potential pollution problems associated with this disposal method prior to burial in the landfill.[29]

Fill dirt from north and south of the landfill is routinely used for cover. An incident occurred in August 1987 in which stockpiled cover material taken from the area east of the landfill was identified at that time as potentially being from Trenches A, B, and C (PAC NE-166.1, PAC NE-166.2, and PAC NE-166.3). These trenches are designated as IHSSs because they reportedly contained sanitary sewage sludge contaminated with trace amounts of radionuclides. In response to disturbing the IHSSs, the area was roped off and the soil was sampled. All IHSSs within the landfill area were identified in the field with signs and rope.[30,31] No radioactive contamination was identified through the soil analyses. The location of the trenches was re-evaluated in response to this incident, and the mapped locations were moved to the south to correspond with surface soil features that might correspond to disposal trenches (see PAC NE-166.1, PAC NE-166.2, and PAC NE-166.3 for additional detail).

Incidental activities have occurred at the landfill or landfill area which are poorly documented but which should be researched further to determine their significance. One such event was the initiation of burning chromium-contaminated wood near the landfill in May 1975.[32] The source of the wood was from the demolition of the Building 444 cooling tower. This material was size-reduced by supervised controlled burning. The residuum from the chromium-contaminated wood was suspected of also being contaminated with uranium and was shipped offsite as low-level waste.[33]

Various chemicals have been disposed of at the landfill. Unwanted chemicals or chemicals of unknown composition have been disposed of by dumping them on the ground if they were volatile and considered not to harm the groundwater.[34] Other chemicals were ultimately disposed of in the landfill after reaction with neutralizing agents through various processes.[35] Aluminum oxide was disposed of after electrical activation of 10 pounds of thermite powder at the landfill in March 1977.[36] A small fire occurred at the landfill caused by hot ashes from an incinerator in December 1980.[37] These events were considered at the time to not pose a threat to the environment.

Physical/Chemical Description of the Constituents Released

After the discovery of tritium in the landfill drainage in 1973, actions were taken to sample and analyze surface water and groundwater collected from the wells, leachate collection system, groundwater intercept system, and surface water impoundments.[18] Tritium activity concentrations in surface water were greatest

downgradient of the landfill, with the highest concentration of 91,800 picocuries per liter (pCi/l) in September 1973.[38] From the monitoring wells placed in the landfill to attempt to pinpoint the source, the greatest concentration of tritium activity was found to be 301,609 pCi/l.[23] Tritium activity concentrations for the western pond are available from 1974 through 1980.[23] It was found that the tritium activity concentrations within the landfill decreased to the east. The intercepted groundwater, when analyzed in 1974, was found to have tritium activity concentrations in the range of background values.[18] The surface water collected in the western pond was monitored from the pond's construction until shortly before the pond's removal (burial) in 1981. The tritium activity concentration measured steadily decreased with time and were within measured background values when the pond was removed.[18] Monitoring of tritium activity levels in the surface waters and groundwater in the landfill wells drilled in 1974 ceased in 1981.[18] It was concluded that the tritium source was effectively separated from the environment and was causing no environmental degradation beyond the immediate area of the tritium source.[23] By 1987, no migration of radioactivity had been identified downgradient or laterally from the landfill.[23]

From September 1973 through January 1974, the results of surface water and groundwater monitoring indicated large variations in strontium concentrations. Water-quality data are available from 1973 through 1984 for strontium in landfill ponds. The monitoring for strontium was prompted by erroneous lab results reporting an abnormally high strontium value in samples from September 1973. When re-analyzed, it was determined that the actual strontium concentration was above background but half the value initially identified.[23]

Hazardous waste that routinely went to the landfill included four categories: 1) containers partially filled with paint, solvents, and foam polymers; 2) wipes and rags contaminated with listed hazardous wastes; 3) filters, typically including silicone oil filters, paint filters, and other miscellaneous filters that may have contained hazardous constituents; and 4) metal cuttings and shavings, including mineral and asbestos dust and metal chips coated with hydraulic oil and organic solvents. These were summarized after a 1986 survey of RFP waste streams.[1,18] Approximately 90 hazardous waste streams were identified in the 1986 survey. This disposal of wastes with hazardous constituents ceased in the fall of 1986.[18]

Responses to Operation or Occurrence

In April and May 1973, significant increases in the concentration of tritium activity were detected in water leaving RFP. An extensive search was initiated to determine the source of the tritium release. In the process of identifying the source (later determined not to be related to the landfill), low radioactivity concentrations of tritium activity were detected in the landfill leachate.[21]

In response, fifty-two monitoring wells were drilled into the landfill itself to identify the source of the elevated tritium activity concentrations. Initially, twenty-one test wells were drilled about 25 feet deep and cased with plastic pipe. The pattern of these was a grid of 100-foot spacing down the centerline of the landfill. Samples taken from the wells contained background amounts of tritium activity except for the area of the landfill used in 1970. These tritium activity values were up to 36,000 pCi/l. Additional monitoring wells were drilled in the center area until the source area was identified. It was concluded that the source area, in the area of the landfill active in 1970, would remain in place and the landfill design would be upgraded to prevent the contamination of surface water and groundwater. Contaminated leachate was retained in the ponds.[21] These landfill improvements are identified in the Structure/Construction section above. The 52 monitoring wells (also called environmental test holes) were apparently used only for the period of time immediately after the tritium incident. As landfill operations continued, the wells were covered over with waste or otherwise destroyed. Some of the wells installed in inactive portions of the landfill still remain.

In response to the 1973 tritium incident, daily FIDLER surveys were initiated to detect any radioactive substances in the waste.

When RCRA regulations were implemented at RFP, the landfill was designated as a regulated unit because hazardous waste had been disposed of in it. Because it was a land disposal unit, groundwater monitoring was required. Four wells were installed in the immediate vicinity in 1986; 16 wells in 1987, and 13 wells in 1989 for a total of 33 monitoring wells to monitor the groundwater near and in the landfill. These wells monitored water in both the alluvium and bedrock.[1] Results of groundwater quality analyses are presented in the Annual RCRA Groundwater Monitoring Reports for Regulated Units produced each year at RFP.

In 1978, a survey of some landfill test holes indicated the presence of methane gas.[39] In response, plans were developed to conduct initial identification and quantification of landfill gases. Following the initial work, a routine monitoring program was to be developed if warranted.[40] Preliminary sampling for methane was conducted at two of the test holes. The methane concentrations ranged from 37% to 52% by volume at depths from 2 to 15 feet below the surface. These values were considered typical for landfills.[41] A follow-up survey was conducted in the spring of 1979 with the cooperation of the Colorado Department of Health.[42]

A real time soil-gas survey was conducted at the landfill on September 1 and 2, 1987. Twenty points in the landfill were measured for methane and hydrogen sulfide. Methane was detected in two of the twenty sites at values of 0.2 parts per million (ppm) and 0.4 ppm; hydrogen sulfide was not detected.[1] The utility of the data was questioned because the sampling methodology was not documented and it is suspected that the sampling was not done at the landfill.[1]

Fate of Constituents Released to Environment

The surface water diversion ditch and the groundwater interceptor system divert uncontaminated background water around the landfill to prevent degradation of that water by the landfill. Collected leachate is prevented from being released offsite. The groundwater monitoring wells detect and monitor contaminants in the groundwater within, beneath, and around the landfill. The landfill pond is not a NPDES discharge point.

This IHSS is being studied in accordance with the IAG schedule for OU7. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by March 16, 1994.

Comments

It is unknown whether the sludge which was placed in the landfill until 1970 was buried in specified trenches within the landfill or placed with other waste as part of routine operations.

All references identified in this study indicated the radioactive materials found were removed and directed toward proper disposal. However, the FIDLER surveys began in 1973[1] and any radioactive materials which may have been disposed of in the landfill prior to that time would not have been detected or removed.

Much more detail about the landfill design and operation is available in the references cited and are summarized here. Information concerning groundwater quality and surface water quality are also available in the references cited.

The boundary for this IHSS is modified from the IAG map to include the East Landfill Pond and reflects the boundaries presented in the Phase I RFI/RI Workplan.[1]

References

[1] U.S. DOE, Draft, Final Phase I Resource Conservation and Recovery Act Facility Investigation/ Remedial Investigation Work Plan; Rocky Flats Plant Present Landfill IHSS 114 and Inactive Hazardous Waste Storage Area IHSS 203 (Operable Unit No. 7), August, 1991.
[2] 1500454
[3] 1500793
[4] 1700398
[5] 1501097
[6] 1500564
[7] 1600647
[8] 1502756
[9] 1501192
[10] 1501218
[11] 1503439
[12] 1502790
[13] 1502791
[14] 1600434
[15] 1501118
[16] 1700032
[17] 1600826
[18] 1503438
[19] 1502755
[20] 1500804
[21] 1500764
[22] 1503440
[23] 1502768
[24] 1502703
[25] References that specify radioactive material removed from the landfill:
1500928
1500956
1501094
1501119
1501127
1501132
1501214
1501273
1600209
1600496
1700401
1700403
1700404
1700407
1700414
1700415
[26] 1500504
[27] 1600210
[28] 1501268

[29] 1501787
[30] 1600818
[31] 1600807
[32] 1500420
[33] Personal Communication, D.D. Hornbacher, Retired RFP Employee, November 18, 1991.
[34] 1500473
[35] 1500511
[36] 1502784
[37] 1501196
[38] 1501790
[39] 1502783
[40] 1502782
[41] 1502781
[42] 1501233

Other References of Interest:

1500566
1500573
1600428
1500955

PAC REFERENCE NUMBER: NW-170

IHSS Reference Number: 170, Operable Unit 10

Unit Name: PU&D Storage Yard

Approximate Location: N751,500; E2,082,000

Date(s) of Operation or Occurrence

1974 - Present

Description of Operation or Occurrence

The main area of the Property Utilization and Disposal (PU&D) storage yard has been used for storing empty drums and dumpsters, cargo boxes, cable spools, and similar materials.[1] The yard is enclosed by a fence and areas are specified for groups of similar material.[2] Two areas of the yard were specified for the storage of hazardous materials and are to be closed in accordance with appropriate procedures (PAC NW-174a and PAC NW-174b). The yard is divided in thirds with wire fences. The eastern third is used for storage of scrap metal and contains the drum and dumpster storage areas. The center third is used for the storage of equipment such as stainless steel tanks. The western third is used for the storage of excess property. The greatest potential for contamination is within the eastern third where scrap metal may have been stored without prior decontamination and where hazardous materials in drums and dumpsters was transferred.[3]

An incident involving a radioactively contaminated drum in the yard occurred in December 1987. An unknown powder spilled out of a drum while the drum, which had no bung and was believed to the empty, was being rolled over to a truck for off-site recycling. The drum was found to contain a small amount of radioactive powder. This powder was not detected by exterior radiation monitoring.[4,5]

An incident occurred in October 1990 involving drums stored in the yard. Approximately 100 empty drums were stored in the yard with the bungs unsecured. Rainwater which had entered the drums became contaminated with residual hazardous materials previously contained in the drums. The rainwater was not radioactively contaminated. Approximately 1,000 drums are stored in the PU&D yard and a procedure is being implemented to ensure they do not contain rainwater contaminated with hazardous materials.[6]

Physical/Chemical Description of Constituents Released

An unknown radioactively contaminated powder was spilled.[4,5] Other releases may have occurred from leaking batteries and drums, and areas within the yard may be contaminated.[1] No additional documentation was found to further detail releases to the environment.

Responses to Operation or Occurrence

An internal investigation report (IIR 87-101, 551-1) was generated after the unknown powder incident. PU&D, Waste Operations, and Waste Guidance groups were involved with the clean-up operations resulting from the rainwater in the drums. The liquid in the drums was disposed of by an off-site contractor. The drum bungs were tightened to prevent the occurrence. Implementation of drum decontamination procedures is ongoing.[6] No other documentation was found which further details responses to the PU&D Storage Yard operation.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU10. The activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

None.

References

[1] 1502735
[2] 1700915
1700914
1700913
1700912
1700911
1700910
1700909
1700908
1700907
[3] 1502780
[4] 1501819
[5] 1501821
[6] 1502789

PAC REFERENCE NUMBER: NW-174a & NW-174b

IHSS Reference Number: 174, Operable Unit 10

Unit Name: PU&D Drum Storage Facility (NW-174a)
PU&D Dumpster Storage Facilities (NW-174b)

Approximate Location: N752,000; E2,082,000

Date(s) of Operation or Occurrence

1974 - Present

Description of Operation or Occurrence

Two areas within the PU&D storage yard (PAC NW-170) were specified for container storage. One area stored drums (PAC NW-174a) and the other was designated for a dumpster (PAC NW-174b). Until August 1985, the drum storage area was used for the storage of Resource Conservation and Recovery Act-(RCRA-) regulated waste. Since then, it has been used for the storage of empty drums. All drums were externally monitored for radiation prior to shipment to the PU&D yard. The contents of any drums originating from areas that handled radioactive materials were sampled and analyzed prior to shipment to the PU&D yard. At times, the level of radioactivity set for acceptance in the yard was exceeded and drums returned to their building of origin. Dumpsters were located at buildings and moved to the storage area when filled. Both the dumpster and the drums were stored directly on the ground surface. Material was stored in these areas prior to shipment for off-site recycling.[1]

An incident in May 1982 identified two drums of liquid stored in the PU&D storage area as being pressurized with bulging drum heads. A third drum was noted to have exploded with the bottom blown out.[2] No documentation was found which indicated a release to the environment as a result of these damaged drums. No other documentation was found describing other releases to the environment.

Physical/Chemical Description of Constituents Released

The drums held waste oils which contained hazardous constituents, waste paints, and spent paint thinner. Waste oils were typically derived from equipment and vehicle maintenance activities. The dumpster storage area was for the storage of stainless steel chips coated with freon-based or oil-based lathe coolant.[1]

The drums involved in the May 1982 incident were to have subsequently been removed to the hazardous waste storage area (PAC NW-203) west of the Present Landfill and the contents identified.[2] It is presumed that the drums were located in the drum storage area of the PU&D storage facility.

The dumpster contained stainless steel chips coated with lathe coolant. The lathe coolant was either freon-based or oil-based. Radioactive contamination of the chips should not have been present due to the presence of administrative controls at the RFP to prevent radioactively contaminated material from being shipped to the yard.[1]

Visible staining is apparent on the soil in the dumpster storage area from spills which occurred during transfer and from rainwater washing residual oil from metal shavings onto the ground. This area is being monitored and soil and water samples collected to identify to extent of contamination.[3]

Responses to Operation or Occurrence

Visual monitoring of the drum and dumpster storage areas was conducted periodically.[1] Although visible staining on the ground surface was documented in the drum storage area, no documentation for leaks or spills was found.[1] Soil and water samples are to be collected to identify the extent of contamination in the area.[3]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU10. However, the information developed for this study indicates that the IHSS location presented in the IAG for PAC NW-174b is inaccurate. HRR information indicates that the dumpster storage area was toward the east of the PU&D storage yard. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

The dumpster storage area was located along the western side of the east third of the PU&D. The dumpsters were stored in various locations over an area along the fence in an area significantly larger than that indicated on the IAG map. There is visible staining on the ground in the dumpster storage area.[3,4] It is proposed that IHSS 174 be enlarged to include the observed staining in the dumpster storage area (PAC NW-174b).

These areas are RCRA-regulated units because they contained hazardous waste and were in operation in 1981. An Interim Status Closure Plan for these storage areas was prepared in 1986 and revised in 1988. These RCRA closure plans have been superseded by the RFI/RI process outlined in the IAG. EPA aerial photos reveal no activity in the PU&D area in August 1971 but clearly indicate that the area was used for storage in August 1978.[5,6]

References

[1] 1502767
[2] 1700470
[3] 1502779
[4] 1502780
[5] 1502713
[6] 1502714

PAC REFERENCE NUMBER: NW-195

IHSS Reference Number: 195, Operable Unit 16

Unit Name: Nickel Carbonyl Disposal

Approximate Location: N754,500; E2,083,000 (see Comments)

Date(s) of Operation or Occurrence

March 1972 - September 1972

Description of Operation or Occurrence

From March through September 1972, approximately 185 pounds of nickel carbonyl stored in the toxic gas storage building (Building 952) were decomposed in a drywell in the buffer zone.[1] References state conflicting information as to the well's dimensions. The drywell was either 3 feet in diameter and 15 feet deep,[1] 4 feet in diameter and about 20 feet deep,[2] or 2 feet in diameter and 15 feet deep.[3] The valves of the cylinders of nickel carbonyl were opened to vent the cylinders and the cylinders lowered into the well with rope. The cylinders were later retrieved, vented with small arms fire, and placed in the landfill.

Physical/Chemical Description of Constituents Released

Nickel carbonyl vapors are denser than air. Consequently, the vapors collected and decomposed in the bottom of the well. They ignite spontaneously and ignition occurred either immediately after release into the well or sometime after collection at the bottom of the well.[1]

Responses to Operation or Occurrence

After 24 hours of placement in the well, the cylinders were removed from the hole, vented by small arms fire, and buried in the Present Landfill (PAC NW-114). Two cylinders became stuck in the hole and were buried in place.[2] Samples from the lip of the well taken after the initial disposal indicated nickel carbonyl concentrations of approximately 10 parts per million being released during disposal.[1] It is believed that the samples were taken from the air and not soil, but this could not be confirmed.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for Operable Unit 16. However, the information developed for this study indicates that the IHSS location presented in the IAG is inaccurate. HRR information indicates that the release location is marked with a stake in the field and differs from the location indicated on the IAG IHSS map. This PAC is not placed on Plate 2 (see Comments). The Final No Further Action Justification Document for Operable Unit 16 is scheduled to be completed by July 30, 1992.

Comments

According to RFP employees involved with the operation, the location of the well was along the road leading north from the landfill.[4,5] This road is no longer in existence and is not easily identified. The well was reportedly marked with a six-foot high fence post; however, the post could not be located during site visits conducted December 3 and 9, 1991.[6] It could not be recalled whether the drywell was to the east or the west of the road. This location differs from the location indicated on the IAG map which places

it along the firebreak road northeast of where the road north of the landfill intersects the firebreak road. The nickel carbonyl destruction site had been placed on the IAG map based on a review of a map and an aerial photograph in 1989 by an employee involved in the operation. Upon further discussion with employees involved with the operation and several site visits, it is now believed that the location indicated on the IAG map is in error. Efforts to locate the marker in the field were unsuccessful and therefore this PAC cannot be placed on a map with any conviction.[6] The location indicated on the IAG map could not be verified and is strongly believed to be false and misleading.

References

[1] 1500914
[2] 1500743
[3] 1500506
[4] 1503380
[5] 1503451
[6] 1503380

Other References of Interest

1500507
1500508
1500510

PAC REFERENCE NUMBER: NW-203

IHSS Reference Number: 203, Operable Unit 7

Unit Name: Inactive Hazardous Waste Storage Area

Approximate Location: N752,000; E2,082,500

Date(s) of Operation or Occurrence

1986 - 1987

Description of Operation or Occurrence

An area at the southwestern portion of the Present Landfill (PAC NW-114) was operated as a hazardous waste storage area for both drummed liquid and solid waste. All containers with free liquids were stored within two 40 foot cargo containers with interior secondary containment. Some drums containing only solid waste were stored outside. At maximum capacity, the area consisted of eight 20-foot long cargo containers and six 40-foot cargo containers. A total of 384 55-gallon drums could be stored. Two of the containers were used to store polychlorinated biphenyl- (PCB-) contaminated soil and debris and PCB-contaminated transformer oil.[1]

An incident occurred on June 11, 1987 in which a drum of epoxy chemicals was found to be overheated. The overheating was caused by an exothermal reaction during the formation of epoxy. No release to the environment occurred because of this incident.[2] A small (less than 4 fluid ounce) spill from a leaking drum was discovered in a cargo container June 21, 1988. The material had traces of PCBs.[3]

The use of this area for the storage of hazardous waste stopped due to the distance of the area from RFP operations. The area is currently being used for storage of drilling and monitoring well construction materials.[1]

Physical/Chemical Description of Constituents Released

Miscellaneous solid and liquid hazardous non-radioactive wastes containing organic solvents and PCBs were stored at this site.[1] Controls which met regulatory standards were installed to prevent leaks and spills.[1] Spills of less than reportable quantities may have occurred from the drums during transfer of materials into and out of the drums.[1] Analytical results of the materials stored in the area suggest that contamination may be limited to metals, PCBs, and radionuclides sorbed to surficial soils and volatile organic compounds present at shallow depths in the surficial materials.[1] The presence or absence of these constituents is unknown.[1]

Responses to Operation or Occurrence

In response to the incident of the overheated drum in 1987, the Fire Department removed the drum to an open area to cool down. The drum was later opened by the Waste Management Group without further incident.[2] The drum which leaked PCBs in 1988 was placed into an 83-gallon overpack drum and the clean-up debris was placed in a waste drum.[3]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU7. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by March 16, 1994.

Comments

This area was Unit #1 in the November 1986 RCRA Part B Permit Application. Unit #1 was relocated to its present position in the 500 Area in 1988 (PAC 500-903).

References

[1] U.S. DOE, Draft, Final Phase I Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Work Plan Rocky Flats Plant, Present Landfill IHSS 114 and Inactive Hazardous Waste Storage Area IHSS 203 (Operable Unit No. 7), August 1991.
[2] 1501080
[3] 1700125

3.3 Southeast Buffer Zone

The Southeast (SE) Buffer Zone is the quadrant of the plant outside the 400-acre manufacturing area, south of Central Avenue, and east of Eighth Street (see Figure 3-1). The Southeast Buffer Zone is bounded on the south by private open rangeland and pasture land, and on the east by Indiana Avenue. The buffer zone was extended in 1974 with the DOE purchase of additional land. Prior to that purchase, the RFP ended only slightly farther east than the eastern edge of the manufacturing area at a fence typically referred to as the "Cattle Fence." Since the purchase of the land in 1974, the cattle fence is well within the RFP boundary. The area slopes east and is incised with one major drainage basin, Woman Creek. Smart Ditch also flows through the southern portion of the area. Pond C-1, a monitoring pond built in 1955, is located on Woman Creek. Additionally, the South Interceptor Ditch is located north of Woman Creek and flows to Pond C-2, which was built in 1979. Permanent structures in this area are a rifle range, the Pond C-1 gauging station, and a monitoring station on Woman Creek at the east boundary. A granular activated carbon water treatment system also exists at Pond C-2, but this treatment unit is no longer operating.

The following subsection contains detailed descriptions of PACs located in the Southeast Buffer Zone. These PACs are shown in Figure SE-1.

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PAC REFERENCE NUMBER: SE-142.10 - SE-142.11

IHSS Reference Number: SE-142.10 - SE-142.11, Operable Unit 5

Unit Name: C-Series Drainage and Ponds (Ponds C-1 and C-2). The C-Series drainage is also known as the Woman Creek Drainage. For the purposes of this discussion, the C-Series drainage is considered to include both Woman Creek and the South Interceptor Ditch.

Approximate Location: N747,000; E2,088,000

Date(s) of Operation or Occurrence

From plant inception to the present. Pond C-1 (which had previously been known as Pond 9) was built in March 1955.[1] Pond C-2 was built in 1979.[2] The South Interceptor Ditch was built in 1979. The South Interceptor Ditch discharges to Pond C-2.[2]

Description of Operation or Occurrence

Pond C-1 was built in 1955 to provide temporary holding and provide for monitoring of Woman Creek waters and waters discharged from RFP Ponds 6, 7, and 8.[3] Pond 6, Pond 7, and Pond 8 were located adjacent to Woman Creek upstream from Pond C-1. The first discharge from Pond C-1 was observed on March 29, 1955.[1] Pond 6 received water treatment plant backwash, Pond 7 received steam condensate from the Building 881 cooling towers and could have received sewage lift station overflows, and Pond 8 probably received Building 881 cooling tower overflow/blowdown. See descriptions for PAC SW-196, PAC SE-1600, PAC SE-1601.1, and PAC SE-1601.2 for a more complete discussion of these ponds. It is believed that Pond 6 was a multi-purpose pond, with the following materials being placed in the pond in October 1954: ashes from the plant incinerator, graphite, used caustic drums, and general trash.[3] Pond 6, Pond 7, and Pond 8 are no longer in existence and never received an alpha-numeric designation. The numeric pond numbering system at the RFP was replaced by an alpha-numeric system in the early 1970s. Because Pond C-1 received waters from Pond 6, Pond 7, and Pond 8, all potential contaminants in Ponds 6, 7, and 8 are also potential contaminants in Pond C-1 and the portions of the Woman Creek drainage downstream of Pond C-1.

The South Interceptor Ditch was built in order to re-route runoff from the southern portions of the RFP main manufacturing area to Pond C-2. Water from the South Interceptor Ditch is the only input to Pond C-2, allowing Pond C-2 to serve as a surface water retention and spill control pond. Woman Creek flow enters Pond C-1 which serves as a flow-through temporary detention pond.[2] Discharges from Pond C-1 are routed around Pond C-2 and back into the natural Woman Creek channel.

Problems or releases that are known to have occurred on the C-Series drainage are listed below.

- Sanitary sewer overflow and discharge of untreated sanitary sewage were released to Woman Creek. Discharges ceased on February 21, 1955.[4]

- A release of 2,700 gallons of steam condensate from Building 881 to Pond 7 occurred due to a break in the process waste line leading to Building 774. The break occurred on September 27, 1955.[5]

- Pond C-1, the drainage, and the general area near Pond C-1 and Pond C-2 are believed to have been impacted by resuspended soils and runoff from the 903 Pad area (PAC 900-112 and PAC 900-155).

- An armored vehicle turned over into Woman Creek upstream of Pond C-1 on October 19, 1975 (PAC SW-1700).

- An oil slick was observed on the C-series drainage west of the clay pits during the week of October 20, 1975. This oil slick was not observed at pond C-1 nor where the C-Series drainage passed beneath Indiana Street.[6] The source of this oil slick is believed to be from the overturned vehicle (PAC SW-1700).

- Leakage from the South Interceptor Ditch to Woman Creek near the outfall of the Building 881 footing drain was observed during the week ending March 12, 1982. Repairs to the South Interceptor Ditch were requested.[7]

- Direct runoff from the East Spray Field (PAC NE-216.1 - NE-216.3) to Woman Creek was observed on March 2, 1987. This constituted a technical violation of the Rocky Flats National Pollutant Discharge Elimination System Permit.[8]

- A spill of waste acid may have impacted the South Interceptor Ditch and Pond C-2 on April 10, 1989.[9]

- Measurable quantities of Atrazine were identified in Pond C-2 in 1989.[10]

Physical/Chemical Description of Constituents Released

Monitoring of effluents discharged offsite from the Woman Creek drainage has routinely taken place since the first discharge from Pond C-1. In 1955 these analyses consisted of daily composite samples for pH, nitrate, and activity, with a detailed mineral analysis on a monthly composite.[5] More recently, the analytes that have been monitored in offsite discharges from the C-Series drainage have consisted of pH, nitrate as nitrogen, and nonvolatile suspended solids.[11] Pond C-1 sediments are known to contain low levels of plutonium, americium, and uranium contamination.

Some data are available on the characteristics of the backwash and sludge blowdown waters from the water treatment plant. The 1953 data indicate that the water discharged from the water treatment plant was very turbid, slightly basic, and had a slightly higher concentration of dissolved chemicals than the raw water treated by the water treatment plant.[12]

Based on the RCRA Contingency Plan Implementation Report done for the April 10, 1989 waste acid spill, 5 to 7 gallons of a dilute nitric acid and nitrad waste solution entered a storm drain that eventually drains to Pond C-2 (via the South Interceptor Ditch).[9] A more complete discussion of the activities surrounding this event can be found in PAC 400-205.

Responses to Operation or Occurrence

Since the C-Series drainage was potentially impacted by the 903 Pad, response actions to the 903 Pad are also partly response actions applicable to the C-Series drainage. These response actions were soil removal, soil capping, grass seeding, restriction of traffic in areas contaminated by the wind-blown contamination, and restriction of access to the buffer zone area impacted.[13] A more complete discussion of the problems and response actions can be found in the 903 Pad Area narrative (PAC 900-112) and 903 Lip Area narrative (PAC 900-155).

Discharges of cooling tower wastes ceased when the RFP directed these flows to the sanitary wastewater treatment system. This re-routing of flows was probably accomplished in the mid-1970s.[14]

The water treatment plant backwash waters were discharged to the Woman Creek drainage until a sludge drying bed system was installed for these waters at the water treatment plant. This recycle system was probably installed sometime in the mid-1970s.[14]

Procedures and physical structures were modified following the April 10, 1989 release of dilute acid. These changes were made to prevent the recurrence of similar events. This event was reported in RCRA Contingency Plan 89-002, dated April 18, 1989.[9]

The identification of Atrazine in Pond C-2 resulted in the construction of an activated carbon treatment plant on Pond A-4, Pond B-5, and Pond C-2. Currently all flows requiring treatment are being treated at Pond A-4. Flows from Pond C-2 are transferred to Pond A-4 through a pipeline.[2]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU5. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 3, 1994.

Comments

This PAC is indicated on the maps as only the drainage ponds, but it is considered to include the drainage on the RFP site upstream and downstream of the ponds.

The October 19, 1975 and October 20, 1975 Woman Creek incidents are thought to be related.

1991 NPDES permit exceedances, if any, have not been included in this discussion.

A considerable amount of analytical data has been generated for the C-Series Drainage. These data primarily address radioactivity concentrations in the terminal pond. Other data are available in more limited quantities. These data are found in the monthly reports, highlights, and laboratory analytical reports of the RFP group responsible for operation of the C-Series Drainage.

Atrazine treatment systems as described above were constructed at Pond C-2, Pond B-5, and Pond A-4. Currently, all water requiring treatment is treated at Pond A-4.

References

[1] 1601045
[2] DOE, "Surface Water Management Plan, Draft Final," October 1991.
[3] 1601040
[4] 1601046
[5] 1601042
[6] 1500958
[7] 1700473
[8] 1600815
[9] 1800026
[10] 1600823
[11] 1503446

[12] 1700243
[13] Personal Communication, Hornbacher, D.D., Retired RFP Employee, October 25, 1991.
[14] 1500648

Other References of Interest

1601041
1601046
1601047
1501213
1501208

PAC REFERENCE NUMBER: SE-209

IHSS Number: 209, Operable Unit 5

Unit Name: Surface Disturbance Southeast of Building 881

Location: N746,500; E2,087,000

Date(s) of Operation or Occurrence

No documentation was found which detailed the dates of operation. Aerial photographs indicate that the site existed in July 1955.[1]

Description of Operation or Occurrence

This area consists of a surface disturbance at the site of a former borrow pit. Gravel taken from the pit was used for RFP construction activities. Although waste disposal is not believed to have taken place at this location, RFP has agreed to investigate the site as a possible waste disposal area.[2]

Physical/Chemical Description of Constituents Released

No documentation was found detailing a release at this site.

Responses to Operation or Occurrence

No documentation was found detailing responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed a release at this site. This IHSS is being studied in accordance with the IAG schedule for Operable Unit No. 5. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 3, 1994.

Comments

None.

References

[1] 1502710
[2] 1502734

PAC REFERENCE NUMBER: SE-1600

IHSS Reference Number: Not Applicable

Unit Name: Pond 7 - Steam Condensate Releases

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

Date(s) of Operation or Occurrence

Dates of Operation: March 1955 - Prior to October 1964

Description of Operation or Occurrence

Pond 7 was constructed in March 1955 to serve as a retention pond and was located south of the Building 881 sewage lift station (see Comments).[1,2] The Building 881 sewage lift station is also known as Building 887.

On about September 27, 1955 steam condensate from Building 881 was released to Pond 7. This was necessary due to a break in the process waste line leading to Building 774.[3]

On November 16, 1955 steam condensate from Building 881 was again released to Pond 7. This was necessary due to freezing of the process waste line leading to Building 774.[4]

Effluent was found discharging from a pipe south of Building 881 in December 1977, and samples of that water were collected on December 22, 1977. It was stated that this pipe was a clean-out or overflow line from a cooling tower.[5] A site visit to this area on November 21, 1991 found a four-inch diameter iron pipe in the approximate location at which RFP utility drawings indicate a six-inch diameter vitrified clay pipe, originated from Building 887 should be daylighting.[6]

Physical/Chemical Description of Constituents Released

Each release consisted of 2,700 gallons of steam condensate from Building 881.[3,4]

It is surmised that Pond 7 received other routine discharges from the Building 881 outfall (see Comments).

Sampling of the sewage lift station outfall soils in 1971 identified activities of 1.05 and 0.30 and 0.30 disintegrations per minute per gram of soil.[7] These analyses are believed to represent gross alpha activity, but this is not specifically stated in the source document. It is further believed that these samples of soil would have been taken in the immediate vicinity of where Pond 7 had been located.

Responses to Operation or Occurrence

No documentation was found which detailed a response, other than limited sampling, to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the steam condensate released. However, this material probably flowed out of Pond 7 and entered the Woman Creek drainage.

Comments

Three small ponds (including Pond 7) and one large retention pond were constructed in March 1955 adjacent to or in the Woman Creek drainage.[1] The Woman Creek drainage is also known, since the early 1970s, as the C-Series drainage. These ponds were designated Pond 6 (PAC SW-196), Pond 7, Pond 8 (the original Pond 8, termed Pond 8-North in this discussion, PAC SE-1601.1), and Pond 9[2]. These ponds are believed to have been used to monitor flows in or entering Woman Creek. Pond 9 is currently designated Pond C-1 (see PAC SE-142.10 and PAC SE-142.11 for a detailed discussion of the C-Series drainage ponds). Pond 7 is believed to have been located on the north slope of the Woman Creek drainage, south of Building 881, off of the Woman Creek channel (see Figure SE-1 and Plate 3). Pond 7 is believed to not have been connected to or located in series with Pond 6 or Pond 8-North. Therefore, the contaminants in Pond 7 would not necessarily be found in Pond 6 or Pond 8-North. Pond 7 and Pond 8-North were located on a steeply sloped hillside immediately adjacent to an RFP patrol road.

It is surmised that Pond 7 received routine discharges from the Building 881 outfall. This outfall consisted of steam condensate, untreated sewage, and any other waste that may have entered the sanitary system of Building 881 (see PAC 800-106 for a detailed discussion of the Building 881 outfall).

Based on a review of engineering drawings, and on the pond descriptions,[1,2] Pond 7 was south of the Building 881 sewage lift station. Pond 8-North was south of the Building 881 cooling towers. Nevertheless, the two documented releases to Pond 7 consisted of steam condensate. These releases are believed to be due to the flushing of the process waste lines leading north from the Building 881 area with steam condensate following the transfer of acidic process waste from Building 881.[8] The process waste tanks for 881 were also located north of Pond 7's location near the sewage lift station. Steam condensate was probably routinely collected in one or more of the process waste tanks. The releases of steam condensate to Pond 7 occurred when the process waste line was inoperative[3,4] (when the normal method of disposal of this condensate was not possible), lending some credibility to this interpretation.

It is unclear when Pond 7 was abandoned, but after examining aerial photographs it appears that it was no longer active in October 1964. In addition, it appears that a new pond was constructed by October 1964 about 350 feet southeast of what is believed to have been the original Pond 8 location (Pond 8-North).[9] This newer pond, designated Pond 8-South (PAC SE-1601.2), was located immediately adjacent to Woman Creek. Based on review of aerial photographs, it appears that Pond 8-South served to collect both the flows that went to the old Pond 7 as well as the flows that went to Pond 8-North. It is known that the hillside in the general areas of Pond 7 and Pond 8-North has been unstable.[10] It is conjectured that Ponds 7 and 8-North were abandoned due to hillside instability, and were replaced by Pond 8-South which is located on flatter ground. Also evident in the 1964 photograph is a narrow east-west trending line, possibly a trench, 400 to 500 feet long located on the hillside near the former locations of Ponds 7 and 8-North.[9,11] Based upon a review of aerial photographs, drainages passed through the area in which the structure, or materials, causing the east-west trending line was located. This structure, or material, may or may not have impacted drainage from the hillside. The purpose of this structure or activity is unknown, but it is conjectured to be related to the hillside instability problems.

It is believed that the 1971 soil samples were collected in the immediate vicinity of where Pond 7 had been located. It is also believed that the 1977 discharge of water from a pipe south of Building 881 actually referred to the end of the pipe that should be just uphill of the location of Pond 7. Similarly, a small pond sampled in the 1987 remedial investigation activities for the 881 Hillside is probably also the location of Pond 7.

Although predating the existence of Pond 7, an overflow of the sewage lift station occurred in February 1955. This event caused elevated counts of fecal coliform bacteria at the plant boundary of that time (the

"cattle fence"); however, nothing above background for activity was identified.[12] This sewage lift station overflow could possibly have impacted soils that were later inundated with water from Pond 7. This overflow may also have, in some part, prompted the construction of Pond 7.

References

[1] 1601045
[2] 1601040
[3] 1601042
[4] 1601041
[5] 1500974
[6] 1601041
[7] 1500883
[8] 1503384
[9] 1502717
[10] Personal Communication, Richards, D.G., Retired Swinerton & Walberg Employee, May 16, 1992.
[11] 1502710
[12] 1601046

Other References of Interest

1600372
1501081
1601046

PAC REFERENCE NUMBER: SE-1601

IHSS Reference Number: Not Applicable

Unit Name: Pond 8 - Cooling Tower Discharge Releases
SE-1601.1 - Pond 8-North (Original Pond 8)
SE-1601.2 - Pond 8-South

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

Date(s) of Operation or Occurrence

SE-1601.1 - March 1955 - Prior to October 1964
SE-1601.2 - Prior to October 1964 - mid 1970s

Description of Operation or Occurrence

The original Pond 8 (Pond 8-North in this discussion) was constructed in March 1955.[1] It was located south of Building 881 dock area in the vicinity of the cooling tower condensate discharge pipe on the Woman Creek drainage.[1,2,3] Pond 8-North was designed to serve as a retention pond for cooling tower water discharges.[4]

Based on review of aerial photographs, Pond 7 and Pond 8-North appear to be out of use in October 1964, and a new pond is located slightly southeast of the Pond 8-North location. This new pond has been designated Pond 8-South (PAC SE-1601.2), and it appears to have collected flows that had previously gone to Pond 7 as well as flows that had gone to Pond 8-North.

Physical/Chemical Description of Constituents Released

No documentation was found which explicitly identifies Pond 8-North as the recipient of a release. However, as previously stated, Pond 8-North was built in the vicinity of the cooling tower condensate discharge pipe and was designed to retain cooling tower water discharges.[3,4] Furthermore, one reference states that Woman Creek receives Building 881 cooling tower blowdown.[5] Interviewees have further indicated that there was a constant, but small amount of overflow/blowdown from the Building 881 cooling towers in the past.[6] Another reference states that on December 21, 1977 a cleanout pipe for an overflow line from a cooling tower was found discharging water (Note: this reference is believed to postdate the existence of Pond 8-North).[7] Therefore, it is probable that Pond 8-North did receive cooling tower discharges. Prior to the late 1970s, RFP cooling tower effluent contained chromium-based biocides.

Responses to Operation or Occurrence

No documentation was found which detailed a response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released.

Comments

Three small retention ponds (including Pond 8-North) and one large retention pond were constructed in March 1955 adjacent to or on the Woman Creek drainage.[1] The Woman Creek drainage is also known

as the C-Series drainage. These ponds were designated Pond 6 (PAC SW-196), Pond 7 (PAC SE-1600), Pond 8 (Pond 8-North in this discussion), and Pond 9[2] and are believed to have been used to monitor flows in or entering Woman Creek. Pond 9 is currently designated Pond C-1 (see PAC SE-142.10 and PAC SE-142.11 for a detailed discussion of the C-Series drainage ponds). Pond 8-North is believed to have been located on the north slope of the Woman Creek drainage, south of Building 881, off of the Woman Creek channel (see Figure SE-1 and Plate 3). Pond 8-North is believed to not have been connected to or located in series with Pond 6 or Pond 7. Therefore, the contaminants in Pond 8-North would not necessarily be found in Pond 6 or Pond 7. Pond 7 and Pond 8-North were located on a steeply sloped hillside immediately adjacent to an RFP patrol road.

It is surmised that Pond 8-North received the overflow/blowdown that routinely exited the Building 881 cooling towers. Based on review of aerial photographs, a channel appears to be present leading from the area of the cooling towers to Pond 8-North.

It is unclear when Pond 8 was abandoned, but after examining aerial photographs it appears that it was no longer active in October 1964.[9,10] In addition, it appears that a new pond was constructed by October 1964 about 350 feet southeast of what is believed to have been the Pond 8-North location.[10] This new pond has been designated Pond 8-South for this discussion and was located immediately adjacent to Woman Creek. Based on review of aerial photographs, it appears that Pond 8-South served to collect both the flows that went to the old Pond 7 as well as the flows that went to Pond 8-North. In addition, it appears that the pond also collected water that would have flowed from the Building 881 footing drain. It is known that the hillside in the general areas of Pond 7 and Pond 8-North has been unstable.[11] It is conjectured that Pond 7 and Pond 8-North were abandoned due to hillside instability, and were replaced by Pond 8-South which is located on flatter ground. It is conjectured that Pond 8-South would have received cooling tower overflow/blowdown until the overflow was either re-routed to the sanitary sewer system or stopped altogether.

Also evident in the 1964 photograph is a narrow east-west trending line, possibly a trench, 400 to 500 feet long located on the hillside near the former locations of Pond 7 and Pond 8-North.[9,10] Based upon a review of aerial photographs, drainages passed through the area in which the structure, or materials, causing the east-west trending line was located. This structure, or material, may or may not have impacted drainage from the hillside. The purpose of this structure or activity is unknown, but it is conjectured to be related to the hillside instability problems.

References

[1] 1601045
[2] 1601040
[3] 1601047
[4] 1600372
[5] 1600558
[6] Personal Communication, Geer, J., Retired RFP Employee, May 12, 1992.
[7] 1500974
[8] 1503448
[9] 1502710
[10] 1502717
[11] Personal Communication, Richards, D.A., Retired Swinerton & Walberg Employee, May 16, 1992.

Other References of Interest

1601046

3.4 Southwest Buffer Zone

The Southwest (SW) Buffer Zone is the quadrant of the plant outside of the 400-acre manufacturing area, south of the Central Avenue and West of Eighth Street (Figure SW-1). The buffer zone was extended in 1974 with the DOE purchase of additional land. The gently sloping plateau is incised with deep gullies. Woman Creek, Smart Ditch, Smart 2 Ditch, the South Interceptor Ditch, McKay Ditch, and Upper Church Ditch are waterways which traverse the southwest quadrant. The West Access Road and the West Gate are located in this area as well. The raw water reservoir is located north of the West Access Road and receives raw water from Ralston Reservoir and the South Boulder Diversion Canal. An area within the RFP boundaries west of the West Spray Field and south of the West Access Road has been used for quarrying intermittently since the buffer zone was expanded in 1974. The quarry is operated by off-site mineral rights owners. There are no other permanent structures in the Southwest Buffer Zone. The following subsection contains detailed descriptions of PACs located in the Southwest Buffer Zone. These PACs are shown in Figure SW-1.

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PAC REFERENCE NUMBER: SW-115

IHSS Reference Number: 115, Operable Unit 5

Unit Name: Original Landfill

Approximate Location: N748,000; E2,082,000

Date(s) of Operation or Occurrence

1952 - 1968

Description of Operation or Occurrence

The original landfill is located south of the security-fenced area along the north slope of Woman Creek drainage, south of Building 460. It received general plant wastes and unknown nonradioactive hazardous chemical wastes. The volume of the landfill is approximately 2 million cubic feet. An evaporation/settling pond, Pond 6, located near the landfill, was used for the backflushing of sand filters from the Water Treatment Plant located north of the landfill.[1] Further discussion of Pond 6 is contained in PAC SW-196.

In October 1954, activities listed for the landfill include its use as a burning pit. Ashes from the plant incinerator, graphite, used caustic drums, and general trash were dumped in the burn pit. The discarded backwash water from the Water Treatment Plant passed through a drainage on the west side of the pit and flowed down to Woman Creek.[2] During some periods, the drainage was bermed to form Pond 6. Incinerator ash, for at least the first decade of plant operation, was derived from the burning of contaminated waste from Building 444 in addition to other combustible plant wastes (PAC SW-135.5). No documentation was found which detailed the duration of the burning pit function of the landfill.

Approximately 60 kilograms of depleted uranium were inadvertently burned in the landfill on about May 1, 1965. The material was shipped onto RFP in a pallet configuration with other items loaded on the pallet without adequate packaging information.[1] The loaded pallet was discarded from Building 991 as unusable.[1]

On July 23, 1979, contractors grading a road southwest of Building 444 outside the perimeter fence inadvertently uncovered a portion of the landfill.[3] A source of depleted uranium was exposed.[4]

Seepage emerging from the original landfill after a major rainstorm in July 1986 was traced to an outfall pipe from the Building 460 footing drains. The slopes of the landfill were unstable and sloughing occurred as a result of the incident. The hillside materials were washed into the South Interceptor Ditch. A containment embankment was constructed to prevent flow into Woman Creek.[5]

Physical/Chemical Description of Constituents Released

In addition to depleted uranium, the landfill received waste materials with unknown concentrations of polychlorinated biphenyls (PCBs) in the 1960s. The material consisted of no-carbon-required (NCR) paper, transformer and vacuum pump clean-up paper and rags, and small capacitors and fluorescent light ballasts.[6]

Responses to Operation or Occurrence

Two drums of uranium oxide and soil, residual from the burning in 1965, were recovered from the landfill. It was estimated that approximately 70 percent of the burned material was recovered. Further use of the impacted area of the landfill was subsequently avoided.[1]

In response to the July 1979 incident, a survey was performed by Radiation Monitoring. Three locations of depleted uranium were identified.[3] One box of contaminated soil was removed.[4]

No documentation was found which detailed the last date of waste disposal at the landfill. Operations probably ceased by August 17, 1968, when the Present Landfill began operation. A 1985 survey of the RFP recommended a review of EPA standards to determine the necessity of bringing the abandoned landfill into compliance with EPA standards for emissions, warning signs, and fencing.[7] No documentation was found regarding the implementation of this recommendation.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released. This IHSS is being studied in accordance with the IAG schedule for OU5. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 3, 1994.

Comments

In a 1973 report entitled "History of Incineration and Landfill Operations, Rocky Flats Plant," there is no mention of the original landfill. It states that from 1952 to August 1968, all combustible noncontaminated waste was incinerated in Facility 219 (PAC SW-133.5). All noncombustible noncontaminated trash and ashes from the incinerator were dumped adjacent to the incinerator and covered with dirt. By 1967, the incinerator had deteriorated and a survey was performed for a replacement method of waste disposal. At that time, the Present Landfill (PAC NW-114) was sited and operation began in August 1968.[8]

The loaction of the landfill has been enlarged from the location identified on the IAG map based on review of aerial photographs and several sites visits. The landfill was extended further to the south.

The original landfill is often referenced as the "plant dump."

References

[1] 1500447
[2] 1600597
[3] 1600224
[4] 1600223
[5] 1502735
[6] 1700117
[7] 1600826
[8] 1500454

Other References of Interest

1501057
1700111
1700183
1500887

PAC REFERENCE NUMBER: SW-133.1 - SW-133.4

IHSS Reference Number: 133.1 - 133.4, Operable Unit 5

Unit Name: Ash Pits 1-4

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

Date(s) of Operation or Occurrence

1959 - 1968

Description of Operation or Occurrence

In 1970, four burial sites were located south of the incinerator area. The trenches were used for disposal of ash from the incinerator which operated from 1952 to 1968 and are approximately 150 to 200 feet long, 12 feet wide, 10 feet deep, and covered with 3 feet of earth. They were staked with steel fence posts and mapped.[5]

Combustible noncontaminated waste ash and noncombustible noncontaminated trash from various sources at the site were disposed of in pits and covered with soil.[1] There was a dumpster for incinerator ash disposal located below the incinerator.[2] Noncombustible trash (counting discs, broken glassware, and metal) has been noted in the dumpster.[3] A trench was documented as being designed eight feet deep with six feet of compacted ash and two feet of earth cover.[4]

The ash dump south of the plant was monitored in 1959. Activities of 4,000 counts per minute (cpm) alpha and 30 millirems per hour (mr/hr) beta were observed. The ashes were buried and subsequently ashes from the incinerator were to be buried in a trench.[6] It is unclear whether the ash dump refers to the area immediately around the incinerator or the original landfill (see Comments). In 1954, some incinerator ashes were dumped in the landfill near the water treatment plant outfall (PAC SW-115 and PAC SW-196).[7] Special air sampling of the plant incinerator was conducted in 1958 to address concerns of burning contaminated waste from Building 444 and Building 447.[8]

Physical/Chemical Description of Constituents Released

In September 1954, five samples of ashes resulting from the burning of Building 991 wastes were collected. The average value for the results was 4.5×10^7 dpm/kg of dry ash. The ashes were about 100 times higher in alpha activity than the usual ashes sampled from the incinerator.[9]

In 1956, special monitoring was performed during and after burning contaminated waste in the plant incinerator. Ash samples showed 1.9 grams of material (depleted uranium) per kilogram of ash. Smear surveys of the incinerator before and after burning showed no increase in contamination.[10] It was estimated that approximately 30,000 cubic feet of soil and ash are contained in the pits.[11]

Small quantities of depleted uranium-contaminated combustibles were burned along with the general combustible plant refuse. It was estimated that less than 100 grams of depleted uranium were involved.[1] A monthly ash sampling program was initiated in January 1962 and provided the weight of product (depleted uranium) per ton of ash. This information is detailed in the monthly History Reports by the Waste Disposal Co-Ordination Group. Values were on the order of one to eight kilograms of depleted uranium per ton of ash.

Responses to Operation or Occurrence

Routine sampling of the ash was documented from November 24, 1953, to December 9, 1954.[3] In 1970, the locations of Ash Pits I-1 through I-4 were marked in the field. The ashes in these trenches were evaluated and considered to present no problems unless disturbed and inhaled.[12]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released. This IHSS is being studied in accordance with the IAG schedule for OU5. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 3, 1994.

Comments

No information was found which specified operation initiation and completion dates for each of the Ash Pits I-1 through I-4. 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.[13,14] One reference documents that an unknown quantity of depleted uranium contaminated incinerator ashes were dumped within an area a few hundred feet southeast and southwest of the incinerator.[3] 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 if the contaminated ash was dumped in a pit or on the ground surface.[2] A pit was located southwest of the incinerator.[3]

Based on the RFP photographs, the locations of the four trenches are different from the IAG IHSS map locations. The trenches are marked with stakes in the field so their actual locations are believed to be known. Field reconnaissance confirmed the presence of many stakes, although the stakes are not of the same type (i.e., there are fence posts, unflagged wooden stakes, and flagged wooden stakes) and it can not be ascertained without surveying the locations of the stakes if they mark the actual trenches.

References	Other References of Interest
[1] 1500885	1500768
[2] 1500793	1500887
[3] 1500362	1500292
[4] 1500395	1500656
[5] 1500569	1501051
[6] 1600041	1500656
[7] 1600597	1600048
[8] 1600045	1700199
[9] 1600487	1501195
[10] 1600048	1600173
[11] 1501719	1700117
[12] 1501097	
[13] 1700831	
[14] 1700830	

PAC REFERENCE NUMBER: SW-133.5

IHSS Reference Number: 133.5, Operable Unit 5

Unit Name: Incinerator

Approximate Location: N747,500; E2,079,500

Date(s) of Operation or Occurrence

1952 - August 1968

Description of Operation or Occurrence

An incinerator (Facility 219 or Building 219) was located south of the west access road near the plant's original west boundary. The incinerator was used to burn office wastes.[1] Design and as-built drawings of the incinerator indicate it was 32 feet high.[2]

In 1960, it was necessary to reline the firebox and the stack with a plastic refractory. Between 1960 and 1967, the incinerator continued to deteriorate to the point that it was necessary to cease using the incinerator and dispose of trash in some other manner.[3] The Present Landfill (PAC NW-114) was constructed as a substitute for the incinerator and waste disposal in the Present Landfill began on August 14, 1968.

A review of aerial photographs reveals that the incinerator was present August 7, 1969 and removed by August 6, 1971.[4,5] No documentation was found indicating the dismantling and removal of the incinerator.

Physical/Chemical Description of Constituents Released

An estimated 100 grams of depleted uranium were burned with the general combustible wastes. Until 1959, the ashes and noncombustible material were placed around the incinerator and to the south near the concrete wash pad area. After 1959, they were placed in trenches to the south and southwest of the incinerator.[6] An unknown quantity of depleted uranium contaminated material was burned in the incinerator,[7] but it was estimated to contain at least 100 grams of depleted uranium.[1] 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.

Responses to Operation or Occurrence

Emission samples were taken during burning in September 1956. Smear surveys of the incinerator before and after burning of contaminated waste showed no increase in contamination.[8] Air sampling of the incinerator continued in 1958 during combustion of radioactively contaminated trash from Building 444 and Building 447; however, no results were available.[9] An "ash dump" south of the plant was monitored in May 1959 and found to contain up to 4,000 counts per minute (cpm) alpha activity and 20 millirems per hour (mr/hr) beta activity. The ashes were buried and subsequently ashes from the incinerator were to be buried in trenches.[6]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released. This IHSS is being studied in accordance with the IAG schedule for OU5. However, the information developed on this unit indicates the IHSS location presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 3, 1994.

Comments

Low angle oblique photographs of the incinerator area show fill material almost to the height of the top of the incinerator. The unvegetated fill material is clearly non-native soil, but it is unclear whether the fill material is ash. Uncertainty exists whether the ash was placed in the immediate area, thus building up to the level of the incinerator, or whether the fill material is some other material and the ash was placed into the original landfill (PAC SW-115), or if ash were placed both around the incinerator and in the original landfill.

Based on information generated for the HRR, the area of concern is greater than just the former location of the incinerator, as mapped in the IAG. Because the incinerator has been removed, it is the ground surface beneath and around the former incinerator location that is the PAC. Several documents make reference to incinerator ashes and noncombustible waste being deposited adjacent to the incinerator; therefore, the proposed PAC boundary is extended to include areas around the incinerator location that were disturbed, as indicated by aerial photograph interpretation and through a site visit with a former RFP employee.[10]

Refer to PACs SW-133.1 - SW-133.4 for additional related information.

References

[1] 1501999
[2] RFP Engineering Drawing Dow Number 1-4115-219, February 27, 1953.
[3] 1500401
[4] 1502711
[5] 1502713
[6] 1600041
[7] 1502735
[8] 1600048
[9] 1600045
[10] 1503380

Other References of Interest

1600488
1501097
1600339

PAC REFERENCE NUMBER: SW-133.6

IHSS Reference Number: 133.6, Operable Unit 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 on plant site was routinely washed from concrete trucks. In March 1979, Plant Services was requested to clean up debris from past cement truck washouts and that cement truck washouts be conducted at the landfill.[1] This area is adjacent to the former plant incinerator and a reference was made to ash being disposed of southwest of the incinerator,[2] which may be this area.

Physical/Chemical Description of Constituents Released

Potentially contaminated ash generated from the incinerator may have been deposited southwest of the incinerator (PAC SW-133.5) in the area of the concrete wash pad.[2] Ground disturbance in the area is obvious from aerial photographs beginning in 1953[3] and other RFP photos.[4] The concrete wash pad was a waste concrete disposal site;[5] however, concrete is not a hazardous waste.

Responses to Operation or Occurrence

No documentation was found which detailed responses to any activity related to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released. This IHSS is being studied in accordance with the IAG schedule for OU5. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 3, 1994.

Comments

The potential constituent of concern for this PAC is potentially contaminated incinerator ash which may have been disposed of in this location.

References

[1] 1700471
[2] 1601057
[3] 1502716
[4] 1700831
[5] 1500743

Other References of Interest

1502735

PAC REFERENCE NUMBER: SW-196

IHSS Reference Number: 196, Operable Unit 16

Unit Name: Water Treatment Plant Backwash Pond

Approximate Location: N748,000; E2,081,500

Date(s) of Operation or Occurrence

March 1955[1] - Prior to October 1964[2]

Description of Operation or Occurrence

The water treatment plant backwash pond, known as Pond 6, was located south of the water treatment plant (Building 124).[3] A July 1955 aerial photograph shows a pond on the north slope of the Woman Creek drainage approximately 800 feet south of Building 124.[4] The water treatment plant backwash discharge pipeline[5] is also apparent on this aerial photograph which suggests that this pond south of the access road was the backwash pond for the water treatment plant.

Pond 6 served as a retention pond to allow sampling of water treatment plant backwash water.[5] An indirect reference states that it was used as an "evaporation/settling pond."[6] Pond 6 was constructed between January and March 1955.[1,5,7] It is unclear when Pond 6 was abandoned. Aerial photographs suggest that it was no longer active in October 1964.[2] However, a 1974 reference suggests that Woman Creek continued to receive filter backwash discharges from the water treatment plant.[8]

An October 1954 reference indicates that discarded backwash water from the water treatment plant flowed through the west side of the "plant burning pit" (PAC SW-115) and continued down to Woman Creek.[9] It is possible that the Pond 6 location was the plant burning pit prior to this time. The plant burning pit was used for dumping, burning and discharging of miscellaneous waste (see Comments).

Physical/Chemical Description of Constituents Released

No documentation was found which specifically identifies Pond 6 as the location of a release. However, Pond 6 was built in the vicinity of the water treatment plant backwash discharge pipeline.[5] An indirect reference states that the pond was used for backflushing sand filters from the "old waste water treatment plant," which is inferred to be Building 124[6] even though it treated raw water and not waste water. It is therefore likely that Pond 6 received water treatment plant backwash water. The backwash water would have contained flocculants (aluminum sulfate or lime), residual chlorine, and suspended solids.[10] It is possible that the Pond 6 location was used prior to pond construction as the "plant burning pit" for dumping, burning, and discharging of miscellaneous waste (see Comments).

The effluent from the water treatment plant in 1953 was discontinuous and was made up of filter backwash, filter prewash, sludge blowdown, and other waste water from the treatment of raw water. It contained all of the silt, mud, and filterable solids removed from the raw water. The characteristics of raw water were seasonally variable and therefore, the characteristics of the backwash effluent was also variable. Chemical analysis of the water were made from November 1952 through June 1953.[11]

Responses to Operation or Occurrence

No documentation was found which detailed a response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released. This IHSS is being investigated in accordance with the IAG schedule for Operable Unit No. 16. The No Further Action Justification document for Operable Unit No. 16 is to be completed by July 30, 1992.

Comments

Four retention ponds were constructed in March 1955 on or adjacent to the Woman Creek drainage (C-Series drainage).[1] These ponds were designated Pond 6, Pond 7 (PAC SE-1600), Pond 8 (PAC SE-1601.1 and PAC SE-1601.2) and Pond 9.[3] Pond 9 is currently designated Pond C-1. The narrative for PAC SE-142.10 and PAC SE-142.11 provides a detailed discussion of the C-Series drainage ponds. These four ponds are believed to have been used to monitor flows within or entering Woman Creek. Pond 6 is the westernmost and farthest upgradient of the four ponds. Aerial photos indicate that Pond 6 was located on the north slope of the Woman Creek drainage rather than in the drainage itself.

It is possible that the Pond 6 location was originally the location of the "plant burning pit." The plant burning pit was used as a dump for ashes from the plant incinerator, graphite, used caustic drums, and general trash as early as October 1954.[9] The Pond 6 location may have originally been a natural depression that was a logical site for a burning pit and subsequent pond construction.

The CEARP Phase I document describes the water treatment plant backwash pond as an unlined pond on the south side of the water treatment plant building (Building 124). This pond reportedly was used in the early 1970s and was destroyed in the late 1970s when the canal system that reroutes surface water around RFP was constructed.[10] Because of the anonymity of CEARP interviewees, the basis of the CEARP information cannot be verified. However, no backwash holding pond appears to exist on the south side of Building 124 in aerial photos from 1969,[12,13] 1971,[14] or 1978.[15] No other prospective locations for this pond were identified on aerial photographs. It is believed that the CEARP interviewees were referring to Pond 6.

References

[1] 1601045
[2] 1502717
[3] 1601040
[4] 1502710
[5] 1601047
[6] 1502735
[7] 1601046
[8] 1600558
[9] 1600597
[10] 1501999
[11] 1700243
[12] 1800282
[13] 1800284
[14] 1502713
[15] 1502714

PAC REFERENCE NUMBER: SW-1700

IHSS Reference Number: Not Applicable

Unit Name: Fuel Spill into Woman Creek Drainage

Approximate Location: N747,000; E2,078,000

Date(s) of Operation or Occurrence

October 19, 1975

Description of Operation or Occurrence

An armored vehicle overturned into the Woman Creek Drainage in the vicinity of the concrete wash pad (PAC SW-133.6). The event occurred while the vehicle stalled on the steep hill south of the drainage. It rolled back into the drainage and overturned. Fuel spilled into the drainage.[1] This event is listed in the RFP Summary of Events (Appendix F).

Physical/Chemical Description of Constituents Released

It is unknown whether the fuel was diesel or gasoline. The volume of fuel that entered the drainage is also unknown.[1] At some time during the following week, an oil slick was visible on Woman Creek.[2]

Responses to Operation or Occurrence

The incident occurred on a Sunday and management personnel were informed of the event immediately. No documentation was found detailing clean-up activities. The vehicle was righted and removed from the area.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released.

Comments

The Woman Creek Drainage contains two ponds downstream of this location. Further information on environmental impacts associated with these ponds are included in the narratives for PAC SE-142.10 and PAC SE-142.11.

References

[1] Personal Communication, Hornbacher, D.D., Retired RFP Employee, November 18, 1991.
[2] 1500958

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PAC REFERENCE NUMBER: 000-101

IHSS Reference Number: 101, Operable Unit 4

Unit Name: Solar Evaporation Ponds

Approximate Location: N751,000; E2,085,000

Date(s) of Operation or Occurrence

The solar ponds have operated in varying configurations since December 1953 when waste was first sent to the original clay-lined solar pond.[1] This original clay-lined pond was supplemented and eventually replaced by other solar ponds. The first use of a solar pond typically began shortly after construction of the pond was completed. The dates of completion and last use of the various solar ponds are presented in Table 000-1.

Description of Operation or Occurrence

The solar ponds were used primarily for the disposal of low-level radioactive wastes contaminated with high concentrations of nitrate. Building 774, the process waste treatment plant, was designed primarily for the removal of radioactive contaminants and not the removal of nitrate. The solar ponds were also used for the disposal of other difficult to treat wastes. The design of the original solar pond is documented in Dow drawing 1-1454-207. It was estimated in late summer 1955 that Pond 2 would be incapable of holding the waste volumes expected to be generated through the winter months;[2] therefore, this pond was supplemented with an auxiliary pond in September 1955[3]. The auxiliary pond was built adjacent to the southeast corner of Pond 2. These two ponds shared a common corner with an overflow channel connecting the two ponds.[3] Water exceeding a certain level in Pond 2 would flow into Pond 2 Auxiliary.

Construction of the first lined pond (known at that time as Pond 2A, later designated Pond 207A) was prompted by the knowledge that nitrate contamination from the earthen ponds was moving off the RFP (on April 5, 1955 the effluent leaving the RFP boundary, at that time the cattle fence, contained 90 mg/l nitrate),[4] as well as the fact that Great Western Reservoir was going to be used as a human drinking water supply.[5] The first leakage of water from any of the solar ponds had been noted in June 1954 with the identification of a nitrate contaminated spring on the hillside north of the solar ponds.[6] The first lined pond was built of asphalt planking (asphalt impregnated wood approximately 1/2-inch thick[7]). This pond was constructed immediately to the east of the two earthen ponds. Dow Chemical drawing 1-3398-207 documents the relationship of the new lined pond with the pre-existing earthen ponds. All references in this document will henceforth use 207A to reference the first lined pond.

Following construction of the first lined pond (Pond 207A), the original pond and the auxiliary pond were allowed to dry. The original-clay lined pond had some additional clay added to its east side to prevent leakage, and the auxiliary pond was fully lined with clay.[8] These ponds were returned to service shortly after these lining activities took place. The clay-lined ponds were used routinely until June 1960.[9] After June 1960, routine use of the clay-lined ponds is not documented, although an additional release to Pond 2 was made in March 1963.[10] Photographs of Ponds 2, 2 Auxiliary, and 207A have been located which clearly show the three ponds and their physical relationship to each other.[11,12]

The next major change in operations at the solar ponds came with the creation of a third earthen pond in support of testing on oxidation of wastes. The third earthen cell was constructed in April 1959.[13] The existing references indicate that the three earthen cells were used in series and the effluent from these three

ponds was discharged to the sanitary wastewater treatment plant.[13] These tests were carried out over a few months, the late summer and early fall of 1959, and were ultimately unsuccessful.[14] The third earthen cell was constructed immediately east of the existing Pond 2, immediately west of 207A, and immediately north of Pond 2 Auxiliary.[15,16] The designation of this new pond was either Pond 2C or 2D, with the existing Pond 2 Auxiliary receiving the remaining designation.[17] It appears that the Pond 2 Auxiliary designation was no longer used.

Construction of the 207B solar ponds began on November 11, 1959.[18] These ponds are immediately east of Pond 207A and consist of three separate cells (North, Center, and South). During December 1959 construction activities, seepage was identified in the west side of the excavation near the east side of Pond 207A. A "covered drainage ditch" (later references to this device use the term drainage tile, this discussion will also use drainage tile) was installed to collect the seepage water and release it to the hill just north of the ponds.[19] Dow Chemical drawing 1-6217-207 documents the design and configuration of the asphalt plank-lined 207B solar ponds. Construction of the 207B solar ponds was fully completed on June 16, 1960.[10] The first placement of waste in the 207B ponds occurred on May 31, 1960 into a fully completed cell.[20] Upon use of the fully completed 207B ponds, leaks were almost immediately identified and the ponds were removed from service. The leakage from the ponds was attributed to the reaction of acid wastes seeping beneath the asphalt planking and reacting with marl soil to produce carbon dioxide gas. This gas then caused the asphalt floor of the ponds to lift, rupturing the seams.[10] A new lining and design for the 207B ponds was designed and submitted for bids. The bids received in November 1960 were too high, and so the new pond configuration was redesigned and re-bids were requested for just the south portion of the 207B ponds.[21] Repair and re-lining of the 207B-South solar pond were completed on November 29, 1960. The 207B-South cell was returned to service in December 1960.[22] Work on repair of 207B-North and Center was started in April 1961.[23] This work included the construction of a drainage tile immediately east of the 207B ponds that drained to the north. Difficulty was encountered in laying the asphalt on the bottom of 207B-North. It was found necessary to remove the asphalt planking in order to lay the asphalt concrete on the bottom.[24] The repairs to 207B-Center and North were completed on August 17, 1961. Pond 207B Center was returned to service on August 25, 1961, and 207B-North was returned to service on August 28, 1961.[25]

Work related to the relining and redesign of Pond 207A began in April 1963 with the removal of liquids and salts so that the liner could be accessed.[26] As Pond 207A was emptied salts and sands remaining in the pond were drummed for removal from the ponds. Tests were conducted to determine whether the asphalt planking to be removed from the pond would be suitable for burning. It was found that the asphalt planking would not support combustion on its own.[27] Removal of the asphalt planking and Pond 207A subgrade preparation was completed in September 1963.[28] Disposal of the asphalt planking took place in the East Trenches (PAC NE-111.1 - NE-111.8). Relining and redesign of Pond 207A continued through November 18, 1963.[29] Wastes were again placed in Pond 207A on May 28, 1964.[30]

Solar Pond 207C was constructed in 1970 primarily to allow the transfer of water from other solar ponds so that they could be repaired.[31] The design of Pond 207C included a leak detection pipe placed immediately beneath the solar pond and running from south to north where it drains into a leak detection sump. Solar Pond 207C has remained in constant service since the beginning of its use.

In the mid-1980s activities for solar pond cleanout began. The first step in these activities was to construct a building (Building 788) in which the solar pond sludge and Portland cement could be mixed to create "pondcrete." This building was constructed between solar ponds 207A and 207C. Solar pond sludge cleanout began in mid-1986. This activity along with the transfers of solar pond water to the Building 374 evaporator, have helped to remove both the sludges and the liquids form the solar ponds. At times however, problems with the cleanout effort have occurred. Examples of these problems include

pondcrete that has not hardened properly and flooding of some of the valve vaults used to help transfer solar pond water to Building 374 for evaporation.

An event related to solar ponds on August 7, 1989, required the filing of a RCRA Contingency Plan Implementation Report (Report Number 89-012). This event consisted of an overflow of contaminated water from the Interceptor Trench Pump House (ITPH) wet well. This overflow occurred because the circuit breakers supplying electricity to the pump motors were both tripped.[32] Additional details concerning this incident can be found in the "Response" section of this Pac narrative.

A second event at the solar ponds took place from March 14, 1990 to March 16, 1990 which also required the filing of a RCRA Contingency Plan Implementation Report (Report Number 90-003). This event consisted of transfer of contaminated groundwater and precipitation from Pond 207B-North into Pond 207A. This transfer was made due to the lack of freeboard in Pond 207B-North which presented a potential for overflow of the pond. The transfer was made with permission from CDH.[33]

Physical/Chemical Description of Constituents Released

The RFP solar ponds are often referred to in historical documents as the "high nitrate ponds." The most common characteristic of the wastes released to the solar ponds was high concentrations of nitrate. The solar ponds typically had untreated process waste placed in them, but on occasion treated process waste was also placed in the ponds. The RFP process waste treatment plant was designed to remove radioactive contamination of process wastes (and also achieved some removal of metals), but it was not designed to remove nitrate. The monthly history reports from the RFP waste group detailed the originating pond construction, quantity of water transferred, and activity present in the water released to the solar ponds. These history reports also stated which of the solar ponds received these waters. Only limited information was found on more detailed chemical analyses of the wastes released to the solar ponds. One of these references does provide a relatively complete characterization of Pond 207A waters from the fall of 1958.[34] The analyses available in this report cover activity of plutonium, activity of uranium, total solids, total nitrate, pH, specific gravity, aluminum, chromium (VI), fluoride, iron, magnesium, silicon dioxide, sulfate, total halides, and an extensive list of metals. There are also analytical results presented for a compound R_2O_3 which is described as "... the combined oxides denoted by R_2O_3 must include all those cations which are precipitated with ammonium hydroxide even in the presence of a large concentration of ammonium chloride."[34] Of particular note in this reference is the fact that the pH range reported was 0.87 to 0.97, with an average of 0.93. The pH reported for June of 1958 was 1.21.[34]

The monthly history reports of the waste group also mention when other materials were placed in the solar ponds or handled near the solar ponds. For instance, it is known that radioactively contaminated aluminum scrap was disposed in the solar ponds (see PAC 500-197),[35] as was alcohol for at least a short time in the 1950s.[36] Also, for a period of time, waste radiography solutions were drummed for disposal in the solar ponds;[37,38] and lithium scrap was sprayed with water for destruction of the lithium metal between the solar ponds.[39] For a period in late 1973 and early 1974, leachate collected from the RFP sanitary landfill was pumped to the solar ponds for disposal. It is also known that sewer sludge, cyanide wastes and acid wastes were disposed in the solar ponds for at least a portion of the time the solar ponds have been in use.[40] The handling of these materials was non-routine, and is not thought to have comprised a major portion of the waste materials placed in these ponds.

Data have also been generated from water collected from the drainage tile and from monitoring wells near the solar ponds. Interpretation of these data could also indicate some of the chemical constituents released by the solar ponds. A more detailed discussion of these response actions, and the types of data that are available, is given in the next section of this narrative.

In the more recent time frame, detailed analyses of solar pond water, solar pond sludge, and groundwater in the vicinity of the solar ponds have been conducted. The results of these analyses can be found in the RCRA closure plans for the solar ponds, the RFI/RI workplan for the solar ponds, and the groundwater monitoring reports that cover the solar ponds.

The volume of water that overflowed the ITPH wet well on August 7, 1989 was estimated at 50 to several hundred gallons. This water was analyzed and found to contain:

pH	7.3;
Total Dissolved Solids (TDS)	2.27 mg/l;
Gross Alpha	95 $\pm$ 38 pCi/l;
Nitrate	2,200 mg/l;
Chloride	114 mg/l;
Chloroform	3 micrograms per liter;
Carbon tetrachloride	3 micrograms per liter;
Trichloroethene	6 micrograms per liter; and
Tetrachloroethene	1 micrograms per liter.[32]

The water transferred in March 1990 from Pond 207B-North to Pond 207A consisted of contaminated groundwater and runoff.[33]

Responses to Operation or Occurrence

Relining and patching of the solar ponds are response activities to the possibility of leakage from the solar ponds. The relining and patching activities were conducted a number of times throughout the history of the solar ponds.[40]

After installation of the drainage tile (between Pond 207A and Pond 207B) in December 1960, analysis of the water flowing from that tile became a routine daily activity. The water was sampled on a daily basis for flow, temperature, total alpha activity, nitrate, and pH.[19] Typically, only gross alpha activity and flow rate were reported. Flow rates in the drainage tile were variable with flows of hundreds of gallons per hour not uncommon. The chemical characteristics of the water flowing out of the pipe also varied considerably, but at times the water had elevated levels of gross alpha activity (up to thousands of picocuries per liter). These analyses from samples of water from the drainage tile can indicate some of the chemical characteristics of the constituents released; however, the analytical parameters that were evaluated on water samples collected from the drainage tile are limited in scope. Similarly, the drainage tile immediately east of the 207B ponds installed in 1961 was also sampled for environmental analyses. The analytical data from this sampling was presented in the Solar Pond Closure Plan of 1988 under the title of Sump 1.[40]

During November 1960, six groundwater monitoring wells were installed near the 207B solar ponds.[41] The first chemical analysis of water collected from the groundwater sampling wells in January 1961 indicated that nitrate contamination was present in the groundwater in concentrations up to 800 mg/l.[42] Sampling of the six wells became a routine activity with data reported in the waste group's history reports. The analyses of water collected from these wells can indicate some of the chemical characteristics of constituents released from the solar ponds. Once again, however, the analytical parameters that were evaluated are limited in scope.

In addition to the activities discussed above, two sumps, six trenches, and french drains were constructed in the area north of the solar ponds to allow the collection and return of contaminated groundwater to the solar ponds. These actions were largely prompted by the RFP policy to keep waters in the A-series drainage below the State Public Health Service limit for nitrates in drinking water (10 mg/l).

Removal of Pond 2 Auxiliary

Pond 2 Auxiliary was removed in preparation for the construction of Building 779. Surveys of the pond 2 Auxiliary area soil indicated readings between 2,500 to 5,000 counts per minute (cpm). Clay samples of the pond had 75,000 d/m/kg which was described as 2-1/2 times soil background in the area. The proposed activity was to remove the clay lining to a depth of 6 inches. This material was to be disposed of by burial in dried sewage sludge trenches (PAC 900-109, PAC NE-110, PAC NE-111.1 - NE-111.8). The pond berms were to be leveled after removal of the clay liner.[43] No documentation confirming the fate of the soil has been found.

Removal of Pond 2 and Pond 2C or 2D

Pond 2 and the earthen pond immediately east of it (Pond 2C or 2D) was removed in preparation for construction of Pond 207C in 1970. The soils potentially impacted from operation of the two referenced earthen ponds were reworked and possibly were incorporated into the berm for Pond 207C.[40] No documentation has been found indicating that radiation surveys or soil removal and disposal operations were conducted.

Sumps and Trenches

The first two sumps were activated in April 1970. Sump Number 1 was installed at the north end of the drainage tile running along the east side of the 207B complex. Sump Number 1 returned water to 207B-North. Sump Number 2 was installed at the north end of the drainage tile located between solar ponds 207A and 207B. Water from this sump was returned to 207A. Trenches 1 and 2 were installed in October 1971, Trench 3 in September 1972, and Trenches 4 and 5 in April 1974.[44] Trench 6 was installed in July 1974. Trench 1 returned water to Sump 1. Trench 2 returned water to Sump 2. Trench 5 drained by gravity to Trench 4. Water from Trench 4 was pumped to Trench 3, and Trench 3 returned the water to Pond 207A. Trench 6 returned water directly to Pond 207A.[45] Figure 000-2 presents the final configuration of the sumps and trenches. These trenches and sumps were located where seepage and nitrate concentrations were greatest.[46]

The low end of the trenches and the sumps consisted of buried 55-gallon drums. Most of these drums were supplied with an electric pump and float system to automatically control the pumps. The trenches consisted of a shallow excavated trench backfilled with gravel to the soil surface. These trenches drained to the buried drums at the low end of the trenches. This design of the trenches allowed collection of both surface and subsurface flows.[47]

This trench system remained in operation until the early 1980s when it was replaced by a more extensive french drain system. The need for the more extensive french drain system was prompted by the construction of the Perimeter Security Zone (PSZ). The PSZ is now called the Protected Area (PA). Construction of the PSZ destroyed Trenches 3 and 6. The trenches and sumps that were not destroyed in PSZ-related construction were abandoned in-place by cutting their electrical power supply.[44]

Interceptor Trench Pump House System

The Interceptor Trench Pump House system was installed in 1980 and 1981 and is still in use. The pump station is identified by a number of names at the RFP, including: Main Sump, Main Nitrate Sump, Nitrate Sump, Solar Pond Sump, French Drain Sump, and others. In this report, the pump station and the french drain system will be referred to as the Interceptor Trench Pump House (ITPH). The ITPH system was designed primarily to collect subsurface water. Engineering drawings for the design of the ITPH system are the following Rockwell International drawings: 27550-033, 27550-040, 27550-050, 27550-200, 27550-201, and 27550-202. These drawings are as-built drawings. Records indicate that the ITPH system was built in April 1981.[48] Figure 000-3 presents the configuration of the ITPH system at that time. Although the ITPH system was much more extensive than the trench and sump system that it replaced, the ITPH system was extended shortly after construction of

the original parts of the ITPH system.[40] It was this extension of the system that was referred to as the "Interceptor Trench."

The ITPH system was extended due to concerns over the existence of groundwater seeps immediately north of the solar ponds. The extension of the ITPH system consisted of a new french drain that paralleled the old Patrol Road. This extension of the ITPH system was designed and built with gravel backfill from the drain to the surface so that it would collect both groundwater and surface water flow. This extension also provided for the collection of footing drain flows from Building 771 and 774, through a 4-inch diameter polyvinyl chloride (PVC) pipe.[49] Engineering drawings for the design of the ITPH system extension are Rockwell International drawings: 26637-01 and 26637-02. These as-built drawings indicate that the ITPH system extension was built between February and June 1982. Figure 000-4 presents the configuration of the ITPH system following its extension with the Interceptor Trench.

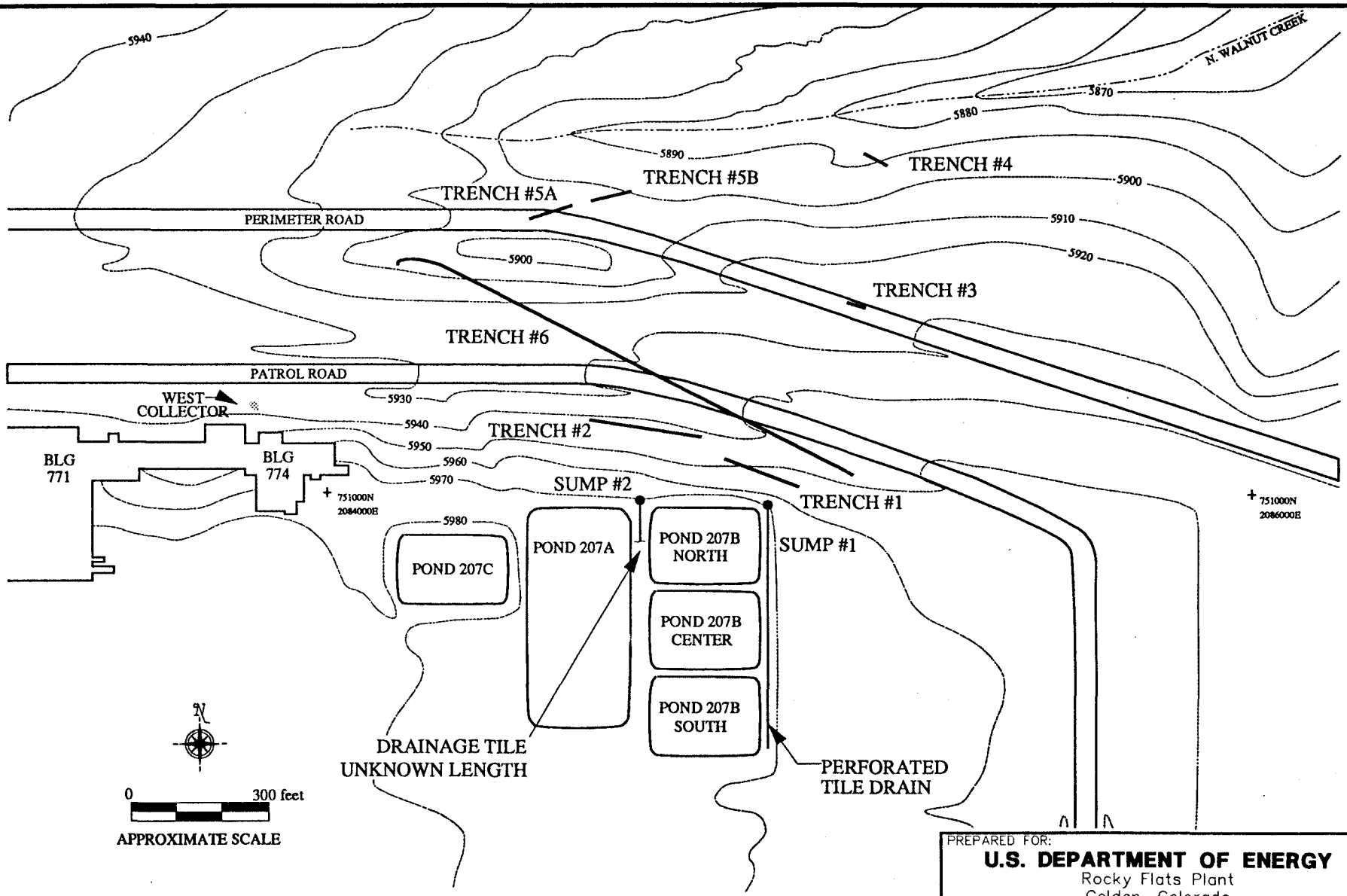
This system collects groundwater and surface water runoff (from the area immediately north of the solar ponds and south of the new PSZ perimeter patrol road) which drains by gravity to a pump station located near North Walnut Creek. The pump station consists of a wet well and a duplex installation of self-priming pumps. The ITPH pumps the collected incoming water to Pond 207B-North. Water from this pond is transferred to other solar ponds or force evaporated in Building 374.[40] Some of the water from 207B-North was spray irrigated in the West Spray Field (PAC 000-168).

Solar Pond Clean-Out

Solar pond clean-out is a response action to the presence of waste materials in the solar ponds and the presence of contamination in nearby soils, groundwater, and surface water. Some solar pond clean-out activities were conducted to allow re-lining activities to take place, such as the re-lining of 207A in the early 1960s. However, in most clean-outs conducted earlier than those given below, the waste materials were immediately re-introduced upon completion of the re-lining activities or repairs.

From fall 1976 to fall 1977, the 207B solar ponds were cleaned and decommissioned with respect to use for storage of process wastewater.[50,51] This clean-out was done in support of the water recycle program being implemented by the RFP. All three cells of the 207B pond were cleaned, but only 207B-South was relined. This relining was done with a hypalon liner. During these clean-out and re-lining activities, soils to the south, east and between the solar ponds were also removed in order to better clean the area.[52,53] Process waste was not re-introduced to the ponds. Since the clean-out activities, these ponds have been used for reverse osmosis plant brine, treated sanitary sewage effluent, and contaminated groundwater collected by the ITPH system.[40]

The clean-out of process waste sludge in the 207A solar pond began in 1986 with the completion of Building 788 - a pondcrete production building. The removal of the process waste and sludge from 207A was completed in 1988. In 1988 the final volume of sludge was removed from 207A and the final volume of water was transferred to the 207B solar ponds. The sludge was handled by combining the sludge with Portland cement, creating pondcrete. The pondcrete has been largely stored on plantsite since its generation, but some pondcrete has been shipped offsite for disposal. In March 1990, contaminated groundwater transferred to the 207B solar ponds from the ITPH was placed in Pond 207A in order to prevent the over-topping of the 207B solar ponds. All of the water present in 207A was removed during 1991 and evaporated at the Building 374 forced evaporator.



REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 000-2, 12/17/91, PROJECT NO. 506-10.

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 000-2

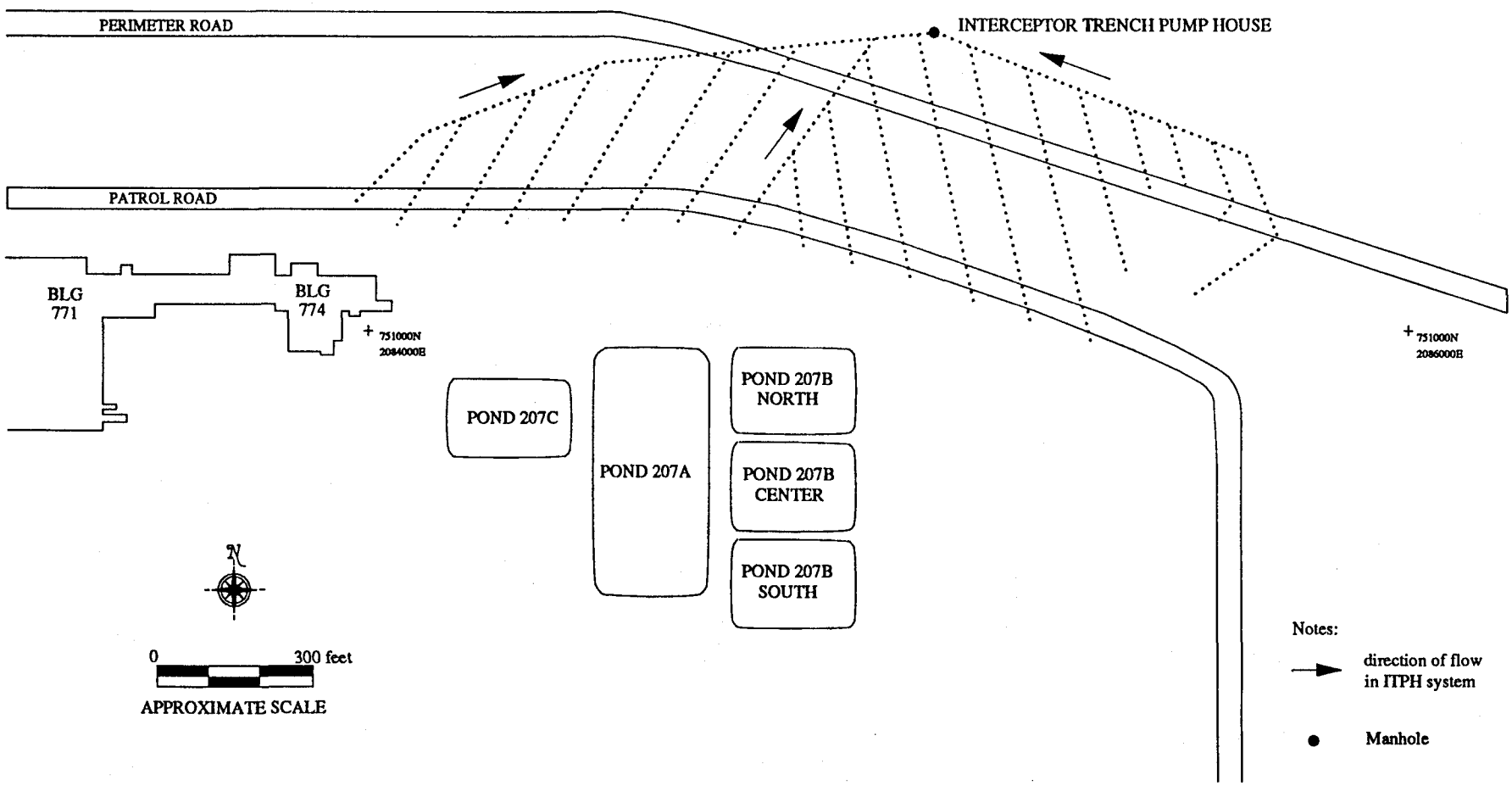
TITLE:

TRENCHES AND SUMPS

PROJ. NO.	304944	DWG. NO.	304944-A84
DESIGN BY	A. VIRGIL	CHECKED	FJB
DRAWN BY	A. VIRGIL	APPROVED	
DATE	12/19/91	SCALE	AS SHOWN

4944A34 12/19/91 1:35pm CAR

APPROXIMATE LOCATION OF ITPH DRAIN SYSTEM



REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 000-3, 12/17/91, PROJECT NO. 506-10.

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 000-3

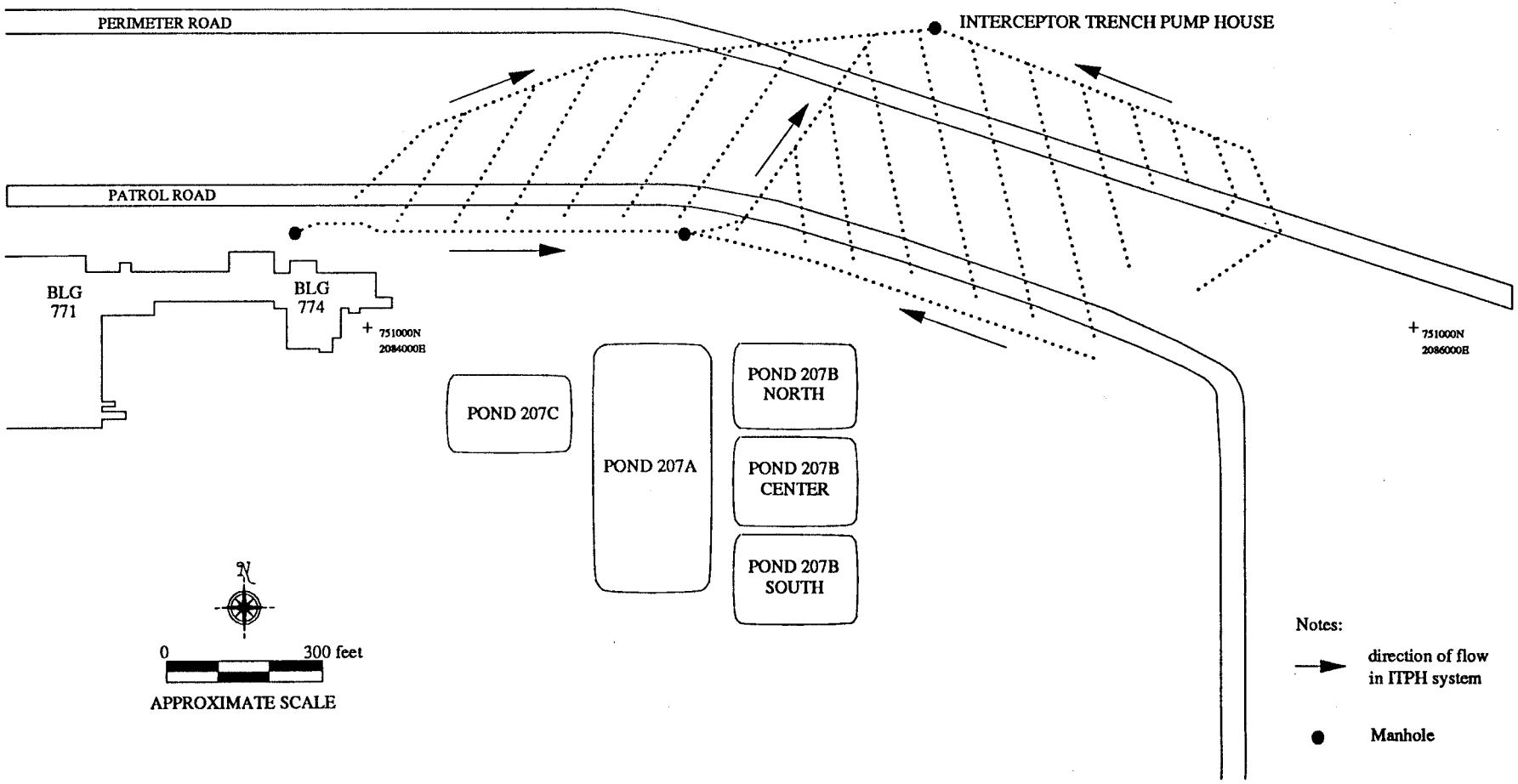
TITLE:

INTERCEPTOR TRENCH PUMP HOUSE SYSTEM

PROJ. NO.	304944	DWG. NO.	304944-A85
DESIGN BY	A. VIRGIL	CHECKED	FJB
DRAWN BY	A. VIRGIL	APPROVED	
DATE	12/19/91	SCALE	AS[illegible]WN

49144.35 12/19/91 1:40pm CAK

APPROXIMATE LOCATION OF FRENCH DRAIN SYSTEM



REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 000-4, 12/17/91, PROJECT NO. 506-10.

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 000-4

TITLE:
INTERCEPTOR TRENCH PUMP HOUSE SYSTEM EXTENSION

PROJ. NO.	304944	DWG. NO.	304944-A86
DESIGN BY	A. VIRGIL	CHECKED	FJB
DRAWN BY	A. VIRGIL	APPROVED	
DATE	12/19/91	SCALE	AS SHOWN

4944A86 12/19/91 1:42pm CAR

ITPH Overflow

The ITPH overflow of August 7, 1989 resulted in the filing of a RCRA Contingency Plan Implementation Report (Number 89-012).[32] In addition to the filing of this report, additional inspection and maintenance activities were to be implemented to prevent the reoccurrence of similar problems.

Valve Vault Flooding

The valve vault flooding of October 21, 1989 was related to the transfer of solar pond water to Building 374 for evaporation. The incident resulted in the filing of a RCRA Contingency Plan Implementation Report (Number 89-015). Solar pond water in this incident was entirely contained within the valve vaults with no environmental release. In addition to the report, piping repairs were made as well as piping upgrades.[54]

Piping of Contaminated Snowmelt

On March 10, 1990 it was discovered that approximately 1,440 gallons of domestic water and contaminated snowmelt was being pumped out of a containment berm to the nearby ground. In response to this incident a RCRA Contingency Plan Implementation Report (Number 90-002) was filed and controls over this type of activity were upgraded.[55]

Transfer of Water to 207A

For the March 1990 event involving transfer of water from the 207B solar ponds to the 207A solar pond, a RCRA Contingency Plan Implementation Report was filed (Number 90-003). Additionally, piping changes were made that allowed the transfer of water from the solar ponds to Building 374. The water transferred to 207A was to be evaporated in Building 374.[33]

Fate of Constituents Released to Environment

It is believed that most of the contaminants released from the solar ponds have contaminated soils and groundwater in the immediate vicinity of the solar ponds. It is known that in the past some of the contaminated groundwater and seepage reached North Walnut Creek and migrated offsite. However, this migration of contamination is believed to have largely been corrected first by the installation of the trenches and sumps and later by the installation of the ITPH system. Some older studies tried to estimate the inventory of nitrate contamination in the soils north and east of the solar ponds.[56] Extensive groundwater and soil sampling activities have been conducted since 1986 in order to better address the fate of contaminants released to the environment from the solar ponds. These sampling activities are discussed in the Solar Pond Closure Plans of July 1, 1988 and in the Solar Pond RFI/RI Work Plan.

The solar ponds will be studied in accordance with the IAG schedule for OU4. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by October 18, 1993.

Comments

A number of documents state that the routine use of the earthen solar ponds ceased upon completion of Pond 207A in 1956. This is not the case because the waste group's monthly reports clearly indicate routine discharges to Pond 2 (the original clay-lined solar pond) up to June 1960. An additional use of Pond 2 was made in March 1963.

In 1988, two distinctly different sets of engineering drawings were found that pertained to the 207B solar pond re-design that occurred in the 1960 and 1961 time-frame. Briefly, the difference between these two sets of engineering drawings related to whether or not underdrains would be constructed beneath the 207B solar ponds. The set of drawings indicating underdrains beneath the 207B solar ponds were undated but numbered 1-8080-207. One of the drawings that had no underdrains beneath the 207B ponds is numbered 16887-1. Physical evidence observed in the field was inconclusive in determining which of the two re-designs were built. Therefore, in fall 1988 one of the manholes on the drainage tile was cleaned out to determine if laterals connected with the manhole from the west. The existence of such laterals would have indicated that underdrains were probably present under the 207B solar ponds. No such laterals were found connecting with the manhole. It is now understood that the 1960 Pond 207B re-design for which the bids were too high was the design for which underdrains were required. The 207B re-design that was built did not have underdrains beneath the 207B ponds, but did have a drainage tile immediately east of the 207B solar ponds. This drainage tile drained to the north, and was eventually (in the 1970s) collected by Sump 1 and pumped to 207B-North. The sequence of events regarding re-design of the 207B solar ponds can be traced in the monthly history reports of the Waste Group at the RFP.

The installation of the sumps and trenches and later the ITPH system was a direct response to the seepage of contaminated water from the solar ponds. In addition, documentation exists stating that overspray from the solar ponds on windy days contaminated areas to the east with salts that were entrained with the water from the solar ponds. This partly accounts for the increase in the boundaries of the PAC to the east. The other reasons for changes in the boundaries of the solar pond PAC included the inclusion of the area in which solar pond 2-Auxiliary existed (to the west of the southwest corner of existing solar pond 207A), as well as accounting for the entire ITPH system (including the area where the Building 771 and Building 774 footing drains daylight, just east of the old Building 774 Condensate Receiving tanks, PAC 700-1108). For these reasons, the boundaries of this PAC are proposed to be enlarged to include the area impacted by the solar pond water.

TABLE 000-1
SOLAR POND DESIGNATIONS AND STATUS

Current Designation	Original Designation	Date Completed	Date of Last Recorded Use	Current Status
Original Clay-Lined Solar Pond	Pond 2	October 1953[57]	March 1963	Regraded in 1970, soils from pond possibly incorporated into berms for 207C[40]
Not Applicable*	Pond 2 Auxiliary**	September 1955[2]	June 1960	Removed in 1962 or 1963[43]
Not Applicable*	Either Pond 2C or Pond 2D	August 1959[17]	June 1960	Regraded in 1970, soils from pond possibly incorporated into berms for 207C[40]
Solar Pond 207A	Pond 2A	August 1956[58]	August 1991	Dry
Solar Pond 207B (this solar pond consists of three cells, North, Center, and South)	Pond 2B (this pond consists of three cells, North, Center, and South)	May 1960[20]	Still in use	Water (primarily contaminated groundwater from the ITPH) being removed from pond cells[40]
Solar Pond 207C	Solar Pond 207C	December 1970[59]	Still in use	Contains process waste

* This pond could be confused with the original clay-lined solar pond since it was of earthen construction only.

** This pond was also known by one of the two following designations: Pond 2C or Pond 2D. This pond was originally unlined, but was provided with a clay liner in February 1957.[9]

References

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PAC REFERENCE NUMBER: 000-121

IHSS Number: 121, Operable Unit 9

Unit Name: Original Process Waste Lines

Location: RFP Main Production Facility (Figure 000-5)

Date(s) of Operation or Occurrence

1952 - 1983 (approximate)

Description of Operation or Occurrence

Background Information

The Original Process Waste Lines (OPWL) are a network of tanks and underground pipelines constructed to transport and temporarily store aqueous chemical and radioactive process wastes from point of origin to on-site treatment and discharge points. The system handled process wastes from Building 123, Building 444, Building 707, Building 771, Building 776, Building 779, Building 865, Building 881, Building 883, and Building 889.[1] Minor amounts of waste from Building 122 and Building 441 were also handled.[2] These wastes were analyzed prior to transfer. Depending on the level of radioactivity and chemical composition, process wastes were routed to Building 774 for treatment, Pond B-2 (PAC NE-142.6), or the Solar Evaporation Ponds (PAC 000-101).[1] Process waste held in Pond B-2 was also pumped to Pond A-2 for storage during the mid-1970s.[3,4]

The OPWL was placed in service when the RFP began production activities in 1952.[1] Repairs and additions were made to the system through 1975.[2] The OPWL system was replaced beginning in 1975 by a double-contained, fully inspectable process waste system.[1] This new process waste system was completed in the summer of 1984.[5] Some tanks and pipelines from the OPWL were incorporated into the new process waste system and into the RFP exhaust plenum fire deluge system.[2]

As defined in the 1988 OPWL Closure Plan, the OPWL consists of approximately 35,000 feet of pipeline and 39 separate tank locations which house a total of 73 tanks. OPWL tanks and pipelines exist in RFP areas 100, 400, 500, 600, 700, 800, and 900, the Solar Evaporation Ponds, and the northeast buffer zone between the 900 Area and holding Pond B-2.[2]

Pipeline Network

OPWL pipelines vary in age, usage history, and construction.[1] The pipelines range from one to ten inches in diameter and are constructed of a variety of materials, including cast iron, stainless steel, vitrified clay, polyvinyl chloride, teflon, plastic and pyrex glass. They are buried in trenches averaging three feet wide and three to eight feet deep, and are bedded in sand and/or native soil backfill.[1,6] Approximately 13,000 feet of OPWL pipeline are located beneath buildings, and approximately 7,000 feet are beneath concrete or asphalt pavement. Roughly 13,000 feet, or more than half of the 22,000 feet not located beneath buildings, are located in areas highly congested with other active and inactive utility lines.[2]

Most OPWL pipelines which were not converted to the new process waste system are believed to have been abandoned in place. Pipelines beneath buildings were flushed with water until significant residues appeared to have been removed, then sealed at wall and floor penetrations with six to twelve inch plugs of "non-shrinking cement sealant". Small segments of pipelines within buildings (e.g., riser pipes) were removed.[2] The OPWL Closure Plan indicates that underground pipelines outside of buildings were abandoned in place without sealing

or decontamination;[2] however, other references indicate that most or all of the system was flushed, sealed, and left in place.[7,8] Portions of some of the pipelines have been removed during the installation of the new process waste system, or during other RFP construction activities. Most of the OPWL drained by gravity. Waste in selected lines was pumped under low pressure.[1] The service pressure of the pipelines when in use varied from approximately 20 to 50 pounds per square inch (psi).[9]

Tanks

The OPWL tanks were used for temporary storage of process waste at the point of origin prior to transfer, at the point of destination prior to treatment and/or disposal, and at intermediate points. The OPWL Closure Plan identifies 73 OPWL tanks at 39 separate locations.[2] A 1990 OPWL tank investigation indicated that five of these 39 tank locations are spurious; that is, they have never contained tanks or they contain tanks which have never been used for process waste handling and are not associated with the OPWL.[10]

The current status of OPWL tanks falls into the following categories:[10]

- Incorporated into the new process waste system as permitted hazardous and mixed radioactive waste tanks under the RCRA Part B Hazardous and Mixed Waste Operating Permit Applications for RFP;
- Incorporated into the new process waste system as 90-day transuranic mixed waste storage tanks under the RCRA Part B Transuranic (TRU) Mixed Waste Operating Permit Application for RFP;
- Incorporated into the RFP exhaust plenum fire deluge system as emergency temporary holding tanks for potentially contaminated fire water;
- In active use but not RCRA-permitted (includes floor sumps and foundation drainage sumps used for incidental spill control which discharge to the new process waste system);
- Physically removed; or,
- Abandoned in place.

A number of the tanks were cleaned and painted prior to abandonment or incorporation into the plenum deluge system.[1] The paint was intended as an alpha radiation barrier.[2]

Releases

Numerous accidental releases of process waste occurred during the operating history of the OPWL. Information and references found for the HRR on OPWL releases are summarized in Table 000-2. Included in this table are a leak testing program conducted on the OPWL pipelines in 1971,[9] and a 1976 inventory and historical data compilation on the pipelines.[1] Information gathered for the HRR indicates that OPWL releases occurred as a result of the following:

- Leakage of tank and pipeline fittings, including tank/pipeline connections, pipeline joints, elbows and reducers, junction boxes, and valves;
- Pipeline breakage due to construction activities, soil settling, and building foundation settling;
- Overflows of tanks and pipeline junction boxes and valve vaults; and,
- Tank and pipeline corrosion and deterioration.

Past OPWL studies and accounts of specific OPWL releases suggest that most OPWL pipeline leaks have occurred at structural features such as joints, elbows, and junctions between pipeline sections, rather than through deterioration of the pipeline segments.[1,9]

Although the entire OPWL network has been designated as IHSS 121, a number of other RFP IHSSs target known or suspected OPWL release sites. Table 000-3 lists these OPWL-related IHSSs.

Physical/Chemical Description of Constituents Released

The OPWL is known to have transported and stored various aqueous process wastes containing low-level radioactive materials, nitrates, caustics and acids. Small quantities of other liquids were also introduced to the system, including pickling liquor from foundry operations, medical decontamination fluids, miscellaneous laboratory wastes and laundry effluent.[2] Certain process waste streams also contained metals, volatile organic compounds (VOCs), oils and greases, and cleaning compounds. The composition of individual process waste streams handled by the OPWL varied widely, and some OPWL components were not exposed to all potential process waste compounds.[10]

Low-level radioactive aqueous wastes with high concentrations of nitrate were a primary OPWL waste stream. Radionuclides present in the wastes include Uranium-234 (U-234), U-235, U-238, Plutonium-239 (Pu-239) and Americium-241 (Am-241), with lesser amounts of Pu-240 and trace amounts of Pu-238, Pu-241, and Pu-242. Major VOCs used in RFP processes,and therefore likely present in process wastes, include 1,1,1 trichloroethane, trichloroethene, and carbon tetrachloride.[2]

A 1976 study of the OPWL indicates that the OPWL wastes contained the following primary constituents:[1]

- U-238;
- U-235;
- Plutonium;
- Nitrate;
- Acids;
- Bases; and,
- Hexavalent chromium.

Constituents also mentioned in the 1976 study are:[1]

- Chromium (other than hexavalent);
- Beryllium;
- Iron;
- Iodine;
- Phosphate; and,
- Tritium.

This study also provides analytical results for soil samples collected in 1976 from nine locations likely to have been affected by OPWL releases. These samples were analyzed for nitrate and Pu-239 only. Results suggested elevated nitrate concentrations in all samples and elevated Pu-239 activity in six of the nine samples.[1]

Documentation of known OPWL releases sometimes includes an estimate of the quantity of waste released. Available information is summarized by specific release in Table 000-2.

Responses to Operation or Occurrence

Table 000-2 summarizes documented responses to specific OPWL releases. The documents referenced in this table indicate that pipeline release locations often were excavated for assessment and repaired as necessary. In some instances, contaminated soil was removed from the release sites for disposal. Because radioactive contamination was of primary concern at these historical release sites, contaminated soil generally was identified using field radiation detection equipment rather than by sample analysis.

Documented OPWL tank releases were responded to in similar fashion. Surface releases sometimes were flushed with water until radiation readings were within an acceptable range. Contaminated soil and pavement were removed for disposal from some release sites. In 1971, wells were drilled around many OPWL tanks located adjacent to and exterior to buildings to monitor plutonium, pH, nitrate, and fluoride in groundwater.[11] No data have been found regarding groundwater analyses from these wells.

Fate of Constituents Released to Environment

The level of detail provided in documentation of known pipeline releases is not sufficient to define the lateral and vertical extent of the individual releases. Soil sampling data collected in 1976 suggests that measurable quantities of nitrate and Pu-239 can persist in subsurface soils affected by OPWL releases for years after the last known release to the soil has occurred.[1]

This IHSS is being studied in accordance with the Interagency Agreement (IAG) schedule for Operable Unit No. 9. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

Table 000-3 lists RFP IHSSs which target known or suspected OPWL release sites. The HRR contains individual descriptions of each of these IHSSs under the appropriate PAC numbers.

The OPWL is one of several interim status hazardous waste units for which RFP has submitted Closure Plans. The OPWL Closure Plan was prepared in 1986 and revised in 1988.[2] Under the IAG, the revised Closure Plan was incorporated in 1990 into a draft Phase I RFI/RI Work Plan.[10] This Work Plan is undergoing revision and is to be finalized in January 1992 under the IAG schedule for OU9.

At this writing, the OPWL is undergoing investigation to better define and characterize the unit. The 39 tank locations identified in the 1988 Closure Plan were reinvestigated in 1990 as part of the OPWL RFI/RI to identify gaps or discrepancies in available information. As a result of this investigation, the information on a number of OPWL tanks was revised.[10]

TABLE 000-2
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
		100 AREA
09/59	Building 122	Water levels in process waste tank at Building 122 indicated a possible leak. No surface contamination was found.[12]
06/60	Building 122	The process waste tank at Building 122 overflowed. No contamination was detected in the area.[13]
		300 AREA
09/71	Building 334	Four water or waste samples were collected after a leak in a Building 334 process waste line. Radiation levels in three of the samples ranged from 9.54 - 10.22 counts per minute.[14]
		400 AREA
05/29/53 - 06/01/53	Building 441	The 6,000-gallon process waste tank behind Building 441 overflowed 1,200 gallons of process waste from Building 123 and Building 441. The waste was contained in a collecting pit which housed the tank. The waste contained less than 1×10^{-8} grams of uranium per milliliter, which made it acceptable for discharge without treatment at the time.[15] This tank is targeted by PAC 400-122.
1960 - 1962(?)	North of Building 663 (near driveway)	A break in the line close to the driveway of Building 663 occurred around 1960 to 1962 when trucks backed over the shallow pipeline cover material. The leak was detected when waste bubbled to the ground surface. A small portion of the pipeline was replaced and no further leaks were reported. A soil sample collected in 1976 near this location showed: Pu-239 = 0.037 d/m/g; nitrate = 62 parts per million.[1]
06/66	North of Building 444	A process waste line north of Building 444 was broken during excavation of steam line trenches. Liquid released into the excavation was only slightly contaminated and presented no problems.[16]

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
1952 - 07/71	Several locations near Building 444	Leak testing of the process waste line between Building 883 and Building 441 and Building 444 detected leakage of 2.5 gallons per hour at 37 pounds per square inch gauge (psig). The following leaks were subsequently identified:[9] (1) In ditch north of Building 444 exclusion fence (excavated and repaired); (2) 8 ft. inside Building 444 exclusion fence (excavation revealed concrete casement--not repaired); (3) 6 ft. north of Building 444 (not repaired); (4) 30 ft. east of driveway south of Building 441 (two joints leaking--repaired); (5) South of transformer bank between Building 441 and Building 443 (excavated, repaired); (6) South of Building 443 (excavated, repaired); and, (7) South of tank 221 (excavated, repaired). Repairs to the line consisted of repacking joints. The line itself appeared to be intact.[1]
11/79	Building 443	A leak was found in a steam condensate line between Building 443 and a valve pit north of a gasoline storage tank. Analysis of the released water indicated 0.135 ppm of amines. The line was abandoned and the condensate rerouted.[17]
		500 AREA
1968 - 1982	Building 559	Leaks occurred from pyrex glass process waste lines beneath and around Building 559 which broke in numerous locations due to soil and building foundation settlement. These lines are targeted by PAC 500-159.
07/71	East of Building 559	Leak testing of the process waste line between Building 559 and the manhole east of Building 557 indicated no leaks.[9]
		600 AREA
07/71	North of Building 662	Leak testing of the process waste line between Building 883 and Building 441 and Building 444 detected leakage of 2.5 gallons per hour at 37 pounds per square inch gauge (psig). A leak was determined to exist north of Building 662 in the utility pole storage area. This leak was not excavated or repaired.[9]
		700 AREA
1952 - 1989	East of Building 774	Three underground concrete process waste tanks exist immediately southeast of Building 774. These tanks were installed in 1952 and taken out of service in 1989.[2] The three tanks are targeted by PAC 700-124 and PAC 700-125.

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
1952 - 1968	Beneath/adjacent to Building 707	A Building 881 process waste line ran diagonally to the northeast beneath Building 707, then to the north under Building 777. Leaks occurred at 45 degree elbow connections in this line which were corroded by acidic waste. A leak occurred in 12/58, when 1,350 gallons of waste were received at Building 774 out of a total 5,400 gallons sent from Building 881. The line was repaired and used for another ten years after this incident. In 1968, the line was abandoned. Most of the line probably was removed for construction of Building 707 and 777. A soil sample collected in 1976 at the southwest end of the diagonal pipeline segment (west of Building 707) showed: Pu-239 = 0.145 d/m/g; nitrate = 54 parts per million. A second sample collected at the northeast end of the diagonal pipeline segment (between Building 777 and Building 778) showed: Pu-239 = 0.485 d/m/g; nitrate = 148 parts per million.[1] The original valve vault no. 7 at the southwest end of the diagonal pipeline segment is targeted by PAC 700-123.2.
1952 - 1975	Between Building 883 and Building 707	The main process waste line between the 400 and 800 Areas and Building 774 leaked numerous times and required many repairs during its operational history.[1] This line is targeted by PAC 700-147.1.
1952 - 05/84	Building 728 (north of Building 771)	Two underground concrete process waste tanks exist at Building 728, immediately north of Building 771. These tanks were installed in 1952 and taken out of service in May 1984.[2] The two tanks are targeted by PAC 700-126.1 and PAC 700-126.2.
1955 - 1984	Building 730 (north of Building 776)	Four underground concrete laundry waste tanks exist at Building 730, immediately north of Building 776. These tanks were installed in 1955 and taken out of service in 1982 and 1984.[2] The four tanks are targeted by PAC 700-132.
09/55	Adjacent to Building 774	Soil samples were collected from various points throughout the excavation of a process waste line adjacent to 774.[18] It is not known whether the excavation was prompted by a release from the line.
03/56	Building 771 process waste line (location not specified)	Four soil samples were collected during digging near a Building 771 process waste line. The samples showed radiation ranging from 2.0×10^4 - 1.3×10^5 d/m/kg.[19]
06/56	Near Building 774	Process waste from a pipeline break near Building 774 was sampled and found to contain 1.08×10^{-5} microcuries per liter of radioactivity.[20]
12/56	South of Building 776	Monitoring was done by the Site Survey group during repair of a break in a process waste line south of Building 776. No personnel contamination was found.[21]

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
10/14/57	South of Building 774	The pipeline between Building 774 and the 200,000-gallon storage tank leaked from an improperly packed joint. The joint was excavated and repaired and the excavation backfilled.[22] The 200,000-gallon storage tank is Tank 207, an OPWL tank located between Building 774 and Building 777.[2] This pipeline may be targeted by PAC 700-127.
02/60	Near Building 777	The process waste line from Building 881 ruptured, releasing process waste in the construction area near Building 777.[23]
01/62	South of Building 777	Construction south of Building 777 necessitated relocation of a process waste line. During excavation of the line, a flange was broken, releasing liquid into the excavation. The break was repaired.[24]
11/63	Northwest of Building 777	A process waste line northwest of Building 777 was repaired after a leak developed in one of the flanged joints.[25]
11/63	Northeast of Building 777	While relocating a fire hydrant and pressure valves, radioactive contamination of approximately 50,000 d/m/l was discovered on the ground near the northeast corner of Building 777. Excavation revealed leaks in a stainless steel process waste line flange. Approximately 50 feet of the pipeline were exposed in the excavation. The flange was repaired, the fire hydrant and pressure valves were decontaminated, and the waste line was placed back in service almost immediately. Through 12/63, no other areas of contamination had been detected during construction of Building 779.[26]
11/63	Building 779	The process waste line between Building 774 and the process waste outfall below Building 995 was relocated and replaced with 10 inch tile pipe because of Building 779 construction.[25] No documentation was found which detailed releases related to this activity.
Unknown - 01/64	Solar Evaporation Ponds area	Defective flange joints and destruction of flange gaskets caused leaks in a process waste transfer line near the Solar Evaporation Ponds. The leaks typically remained undetected for some time because the pipeline was buried beneath the frost line.[27] This may be the pipeline targeted by PAC 700-149.
1969 - 1972	Beneath south wing of Building 774	Six underground concrete process waste tanks existed in the area immediately south of Building 774. These tanks were installed in 1969 and removed in 1972 during construction of a south wing to Building 774, which covers the former tank location. These tanks are targeted by PACs 700-146.1 - 146.6.

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
07/71	Various locations in 700 Area	Leak testing of process waste lines was conducted. No leaks were detected in pipelines between the following locations:[9] - the manhole east of Building 557 and the valve pit northeast of Building 707 (direct alpha readings of 2,000 counts per minute were detected inside a check valve and gasket); - the Building 707 process waste tanks and the valve pit northeast of Building 707; - the valve pit near Building 702 and the valve pit northeast of Building 707; - the valve pit near Building 702 and Building 774; and, - the valve pit near Building 702 and the valve pit west of Solar Evaporation Pond 207A.
07/71	Between Building 771 and the valve pit north of Tank 207	Leak testing of process waste lines was conducted. Leakage of 22 gallons per hour at 20 psig was detected in the line between Building 771 and the valve pit north of Tank 207. Valve leakage accounted for 7 gallons per hour. Further leakage was found:[9] - north of Building 771 and Building 774, where a new 3 inch line was connected to an older 6-inch line; - north of the valve pit north of Tank 207, west of propane tanks; and, - two feet north and ten feet north of the valve pit north of Tank 207. The primary leakage was from the junction between the 3 inch and 6 inch pipelines. The 3 inch steel line was replaced with a 3 inch stainless steel line in 1972. A soil sample collected in 1976 adjacent to the pipeline intersection showed: Pu-239 = 3.385 d/m/g; nitrate = 44 parts per million.[1]
07/71	Between Building 774 and the valve pit north of Tank 207	Leak testing of process waste lines was conducted. Leakage of 14 gallons per hour at 20 psig was detected in the 3 inch line between Building 774 and the valve pit north of Tank 207. Leakage of 45 gallons per hour at 20 psig was detected in the 4 inch line which parallels the 3 inch line. Accurate location of the leaks was not possible.[9] These lines were replaced in April 1982.[1] These pipelines may be targeted by PAC 700-127.
07/71	Between Building 776 and the valve pit north of Tank 207	Leak testing of process waste lines was conducted. Leakage of 25 gallons per hour at 20 psig was detected in the line between Building 776 and the valve pit north of Tank 207. Further tests indicated that the leakage originated from valves southwest of Tank 207. No leaks were detected along the pipeline itself.[9] A valve pit was constructed in May 1974 at the valves southwest of Tank 207. A soil sample collected in 1976 just northeast of the valve pit showed: Pu-239 = 0.05 d/m/g; nitrate = 105 parts per million.[1]

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
07/71	Between Building 779 and the valve pit north of Tank 207	Leak testing of process waste lines was conducted. Leakage rates in the line between Building 779 and the valve pit north of Tank 207 were consistent with leaking valves. No leaks were detected along the pipeline itself.[9]
07/71	Between the valve pit west of Solar Evaporation Pond 207A and the valve pit north of Tank 207	Leak testing of process waste lines was conducted. Leakage rates in the line between the valve pit west of Solar Evaporation Pond 207A and the valve pit north of Tank 207 were consistent with leaking valves. No leaks were detected along the pipeline itself.[9]
07/71	Between Solar Evaporation Pond 207B and the valve pit west of Solar Evaporation Pond 207A	Leak testing of process waste lines was conducted. Very low leakage was detected at 20 psig in two lines between Solar Evaporation Pond 207B and the valve pit west of Solar Evaporation Pond 207A. These lines are open to the atmosphere at the east end, and plugs necessary to conduct the leak test could not be kept in place. Direct alpha radiation of 200,000 counts per minute was detected in valves in these pipelines.[9]
08/71	Between Building 771 and Building 774	A concrete tunnel containing process waste lines was exposed during construction between Building 771 and Building 774. Three exposed cracks in the tunnel were found to be contaminated. The cracks were sealed and eight drums of soil contaminated with low levels of plutonium were removed.[28]
01/72	Between Building 771 and Building 774	A process waste line between Building 771 and Building 774 was broken during construction activities. Samples of the waste showed radioactivity of 1,000 pCi/l. Soil samples from the area were found to be slightly contaminated.[29]
07/73	Between Solar Evaporation Ponds and Building 774	A plastic line used to transfer wastes from the Solar Evaporation Ponds to Building 774 was broken. The line was repaired.[30] This may be the pipeline targeted by PAC 700-149.
08/73	Between Building 776 and Building 778	Twenty feet of drain line between Building 776 and the laundry were found to be contaminated. This line was to be removed.[31] The laundry referred to in this document was most likely Building 778 immediately south of Building 776.
02/75	Between Central Avenue and the pipeline expansion pit inside the Building 707 fenced area	During routine inspection of the process waste system, a leak was found between Central Avenue and the pipeline expansion pit inside the Building 707 fenced area. The leakage was contained inside the pit, with no evidence of contamination to the environment. The pipeline was temporarily repaired by sealing the end of the secondary containment pipe and allowing it to act as the primary carrier. Repair of the primary line was scheduled for March 1975.[32] This line is targeted by PAC 700-147.1.

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
09/23/75	Building 776 concrete holding tanks	A slight spill occurred during removal of contaminated process sludge from the underground concrete holding tanks near Building 776. The spill was cleaned up.[33] The tanks referred to in this document are believed to be the four underground concrete laundry waste tanks in Building 730, immediately north of Building 776.[2] These tanks are targeted by PAC 700-132.
07/76	East of valve pit north of Tank 207	A soil sample collected east of the valve pit north of Tank 207 showed: Pu-239 = 1.83 d/m/g; nitrate = 76 parts per million.[1]
07/76	Immediately east of Tank 207	A soil sample collected immediately east of Tank 207 showed: Pu-239 = 0.185 d/m/g; nitrate = 70 parts per million.[1]
12/15/77	North of Building 774	Water found seeping onto asphalt north of Building 774 was traced to a leak in a flange joint of a stainless steel process waste line. Repairs were scheduled to be completed on 12/16/77. Preliminary results from samples of the water were: Total alpha = 310 pCi/l; total beta = 160 pCi/l; pH = 7.9; nitrate as N = <1 part per million; americium = detectable.[34,35]
01/78	Building 771 process waste line (location not specified)	Results from samples of waste from a Building 771 process waste line break were: Alpha = 3,100 pCi/l; beta = 1,600 pCi/l; nitrate as N = <1 milligram per liter; pH = 7.9.[36] Three splits from a soil sample collected in the area of the break were also analyzed. Results were: Pu (dry weight) ranged from 1.99 to 5.3 d/m/g; Am ranged from 0.91 to 2.4 d/m/g; U-238 ranged from 2.61 to 4.93 parts per million; U-235 ranged from 0.014 to 0.024 part per million.[37]
04/11/78	Near Solar Evaporation Pond 207B	A process waste line at Solar Evaporation Pond 207B was broken during excavation of the line. A water sample was collected for analysis.[38] This may be the pipeline targeted by PAC 700-149.

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
07/21/80	Southeast of Building 774	A leak occurred in the three-inch underground line used to transfer treated process waste from Building 774 to the Solar Evaporation Ponds. The water reached the ground surface and flowed north across the unpaved access road to a boggy area north of Building 774 (PAC 700-1108). Field radiation measurements indicated that the flow did not go past the boggy area and enter Walnut Creek. The volume of the release was estimated at 1,000 gallons. Samples of the released waste showed: Total alpha = 2,500 pCi/l; gross beta = 4,000 pCi/l; nitrate = 10,000 mg/l; pH = 12. Excavation on 07/24/80 showed that flange bolts had loosened during the eight years the line had been in service. The flange was repaired, and the pipeline passed a tightness test. On 07/28/80, soil contaminated by the leak was excavated and removed. Air monitoring suggested that the release did not impact air quality in the area of the release. Vegetation killed by the release was to be replaced by reseeding if natural recovery did not occur by summer 1981.[39] This release is believed to be associated with PAC 700-149.
Unknown - 04/81	Beneath Building 771	A meeting was held to discuss process waste line deterioration beneath Building 771. It was decided that no action would be taken until the 1982 project to replace the process waste system as long as groundwater samples collected around Building 771 were acceptable.[40]
		800 AREA
04/57	Near Building 883	A sample from a line leak puddle near Building 883 showed 2.4 x 10^5 d/m/l. Samples of mud from the puddle showed 6.0 x 10^4 and 1.6 x 10^5 d/m/kg.[41]
02/61	Process sewer line from Building 881 (location not specified)	A break in a process sewer line from Building 881 released laundry water to the surface.[42] It is not known whether the pipeline involved was a sanitary sewer line or a process waste line.
Unknown - 03/71	Building 881 process waste and sanitary sewage lift station	A liquid waste overflow outfall for the Building 881 process and sanitary sewage lift station existed immediately south of the lift station. One overflow, involving ureal contaminated waste, was known to have occurred at this location.[43,44] May 1971 soil samples from the outfall area showed radioactivity of 0.3 and 1.05 d/m/g.[45]

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
07/71	Various locations in 800 Area	Leak testing of several process waste lines was conducted. The following was determined:[9] (1) No leaks were indicated in the line between Building 887 and the valve pit west of Building 884; (2) No leaks were indicated in the line between Building 883 and the valve pit west of Building 884; (3) No leaks were indicated in the line between Building 865 and the valve pit west of Building 884; and, (4) Leakage of 27 gallons per hour at 20 psig was detected in the pipeline between the manhole east of Building 557 and the valve pit west of Building 884. A leak was determined to exist north of the valve pit west of Building 883.
10/74	West side of Building 883	Samples of groundwater from excavations on the west side of Building 883 showed total long-lived alpha ranging from 14 to 37 pCi/l, nitrate ranging from 64 to 96 parts per million, and pH ranging from 7.7 to 8.2. The nitrate concentrations were attributed to process waste line leaks in the vicinity of the excavation.[46]
01/78	Near Building 865 guard post	A faulty vacuum breaker on a process waste line vent pipe resulted in release of several gallons of liquid over an area of approximately 16 square feet. The liquid contained predominantly depleted uranium activity. A FIDLER survey did not indicate any radiation readings above background levels. The day after the release, roughly three inches of moist gravel were removed as a precautionary measure.[47,48]
10/89	West of Building 886	The portable process waste tank at Building 886 was found to be dripping liquid from a flange joint. The tank was empty and had been awaiting disposal for several years. Residual liquid in the tank and soil near the tank were sampled for uranium analysis.[49] Analysis of the three soil samples indicated only naturally occurring uranium.[50]
		900 AREA
06/65	East of "G" Road and north of "A" Road	High nitrate concentrations in sanitary sewer system waste was attributed to infiltration of nitrate from soil surrounding the sanitary sewer lines. The source of the nitrate was determined to be leaks and breaks in the process waste line which paralleled the sanitary system. Soil samples from the area indicated nitrate concentrations exceeding 100 times the expected background concentration. Samples from the sewer line and manholes in the area confirmed that the nitrate infiltrated the sanitary system through imperfections in the sewer tile and manhole pits.[51,52]

TABLE 000-2 (continued)
SUMMARY OF KNOWN OPWL RELEASES

DATE(S)	LOCATION	DESCRIPTION
10/74	Between Building 991 and Building 995	High nitrate concentrations were found in a storm drain between Building 991 and the sanitary waste water treatment facility. It was believed that the nitrate leached out of nearby soil.[53] No indication of the source of the nitrate was found in available documents.
07/85	East of Protected Area and west of Building 995	An abandoned process waste line was uncovered and broken during excavation for the sanitary sewer system replacement project. Contamination was found and removed. Both ends of the broken pipe were plugged.[54]
BUFFER ZONE		
04/75	East of Building 995	A leak was found in the process waste line leading to pond B-2 just east of Building 995, where the line passed through a metal culvert buried under the outside perimeter fence road.[55] The leak was detected by excess water in the culvert.[1] The pipeline apparently was damaged by heavy earth moving equipment. The pipeline was repaired on 05/02/75 and returned to service on 05/05/75. Because contamination at the leak site was minimal, no soil removal was deemed necessary.[55]
UNKNOWN LOCATIONS		
09/55	Unknown	A leak and later break in the process waste line from the main production area to the process waste treatment plant (Building 774) required certain wastes to be released to the sanitary sewer system. Several sections of the process waste line were replaced before the line was restored to service.[56]
10/75	Unknown	Unauthorized digging for safeguards instrumentation ruptured a waste line.[57]
05/19/77	Unknown	Sludge samples taken in the "apricot pit" suggested that the process waste line and the outside jacket of the line were broken. Excavation was scheduled for 05/23/77.[58]

TABLE 000-3
RFP IHSSs TARGETING KNOWN OR SUSPECTED OPWL RELEASE SITES

IHSS NAME	IHSS NO.	PAC NO.	DESCRIPTION
Underground Concrete Tank(s)	122	400-122	Abandoned OPWL tanks behind Building 441
Valve Vault West of Building 707	123.2	700-123.2	Site of OPWL valve vault (Original Valve Vault #7) removed in March 1973
Radioactive Liquid Waste Storage Tanks	124	700-124	Three abandoned OPWL tanks east of Building 774; tank 66 (IHSS 124.2), tank 67 (IHSS 124.3), and tank 68 (IHSS 124.1)
Holding Tank	125	700-125	Tank 66 east of Building 774; same tank as IHSS 124.2
Out-of-Service Process Waste Tanks	126	700-126	Two abandoned OPWL tanks (IHSS 126.1 and IHSS 126.2) in process waste pit (Building 728) north of Building 771
Low-Level Radioactive Waste Leak	127	700-127	OPWL pipeline between Building 774 and Building 995 broken during construction activities near Building 774
Radioactive Site - 700 Area Site #4	132	700-132	Four abandoned OPWL tanks in laundry waste pit (Building 730) north of Building 776
Concrete Process Waste Tanks	146	700-146	Six removed OPWL tanks (IHSS 146.1 - 146.6) beneath the south wing of Building 774
Maas Area	147.1	700-147.1	Main OPWL pipelines from 400 and 800 Areas to Building 774; focuses on section north of Central Avenue which leaked numerous times
Effluent Pipe	149	700-149	OPWL pipeline between Building 774 and Solar Ponds which leaked due to gasket failure in July 1980
Radioactive Site - Building 559	159	500-159	Multiple releases from broken pyrex glass OPWL pipelines beneath and around Building 559

References

[1] 1600136
[2] 1503360
[3] 1600556
[4] 1600474
[5] 1500804
[6] 1503391
[7] 1500768
[8] 1501068
[9] 1600163
[10] 1503362
[11] 1600146
[12] 1600038
[13] 1600032
[14] 1500411
[15] 1600595
[16] 1600053
[17] 1501224
[18] 1500381
[19] 1600050
[20] 1600049
[21] 1600043
[22] 1600140
[23] 1600035
[24] 1700203
[25] 1600154
[26] 1600601
[27] 1700195
[28] 1500544
[29] 1500336
[30] 1500920
[31] 1600294
[32] 1500953
[33] 1500289
[34] 1500986
[35] 1500975
[36] 1500812
[37] 1500811
[38] 1700413
[39] 1600424
[40] 1501181
[41] 1600137
[42] 1600027
[43] 1500304
[44] 1501081
[45] 1500883
[46] 1500917
[47] 1500989
[48] 1501235
[49] 1600445
[50] 1600446
[51] 1600281
[52] 1500911
[53] 1500328
[54] 1501067
[55] 1500951
[56] 1600150
[57] 1500958
[58] 1600184

Other References of Interest

1700141
1600134
1500894
1500462
1500300
1500875
1600189
1600504

PAC REFERENCE NUMBER: 000-162

IHSS Reference Number: 162, Operable Unit 14

Unit Name: Radioactive Site - 700 Area Site #2

Approximate Location: N749,000; E2,083,500 - Along Eighth Street from about Building 881 to the south end of Building 771

Date(s) of Operation or Occurrence

1974(?)

Description of Operation or Occurrence

Only indirect information exists for the area referred to as Radioactive Site - 700 Area Site #2 (see Comments). This area is located along Eighth Street from about Building 881 to the south end of Building 771. According to the CEARP Phase 1 report, during 1974, monitoring activities of pavement on Eighth Street identified several radioactively contaminated spots.[1]

In January 1981, an excavation was conducted to find a process waste inner pipeline leak. The excavation was located along Eighth Street and Central Avenue near Building 881 (PIC 15). During the excavation, one total long lived alpha activity concentration from a portable air sampler at the excavation site was above the shut down level.[2] This may be indicative of residual contamination (see Comments).

It is possible that the contamination detected during these two episodes is the result of one or more of the occurrences related to other previously identified PACs (IHSSs) or newly identified PACs (see Comments).

Physical/Chemical Description of Constituents Released

No documentation was found which provided a detailed description of the constituents detected in 1974. It is known that radioactive contamination was detected.[1]

No documentation was found which provided a detailed description of the constituents detected in the January 1981 incident. It is known that one total long lived alpha activity concentration from an air sample was above the shut down level.[2]

Responses to Operation or Occurrence

According to the CEARP Phase 1 report, Eighth Street was paved over in response to the contamination detected in 1974.[1]

Operating personnel were requested to dampen the soil before backfilling excavated areas in response to the contamination detected in January 1981.[2]

Fate of Constituents Released to Environment

No direct documentation was found which detailed the fate of the constituents detected.

This IHSS is being studied in accordance with the IAG schedule for OU14. The IAG activities will include site investigations, site characterizations, and possible remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

Documentation of radioactive contamination was found associated with this PAC. However, documentation was not found which identifies a release of radioactive material associated with it.

In regard to the January 1981 excavation, if it is assumed that the process waste inner pipeline leak was contained and did not result in contamination in the vicinity of the excavation, the air sample datum is indicative of residual contamination.

The boundary of this PAC overlaps, or is in close proximity to, numerous other previously identified PACs (IHSSs) or newly identified PACs (see Plate 2 and Plate 3). There are at least 10 existing PACs (IHSSs), which involve radioactive contamination, that overlap or are in close proximity to this IHSS. These include the following: PAC 000-121, PAC 600-164.1 (see newly proposed location), PAC 800-164.3 (see newly proposed location), PAC 700-147.1, PAC 700-150.5, PAC 700-123.1, PAC 700-123.2, PAC 500-159, PAC 700-150.7, PAC 700-150.2 and PAC 700-139.1. It is probable that one or more of these PACs have caused contamination within this IHSS.

References

[1] 1501999
[2] 1501187

Other References of Interest

1501188
1502735

PAC REFERENCE NUMBER: 000-168

IHSS Reference Number: 168, Operable Unit 11

Unit Name: West Spray Field

Approximate Location: N749,000; E2,078,000

Date(s) of Operation or Occurrence

April 1982 - October 1985

Description of Operation or Occurrence

The West Spray Field was a land application unit designed to dispose of excess water from some of the Solar Evaporation Ponds (PAC 000-101). It is located west of the T130 trailers and north of the West Access Road. The West Spray Field will be closed as scheduled in the IAG. Additional information on the operation of this unit is provided in the Interim Status Closure Plan.

The area designated as the West Spray Field is approximately 105 undeveloped acres. The unit operated from April 1982 to October 1985. There were three areas of operation in the West Spray Field, signified as Areas 1, 2, and 3. The combined area of direct application is about 14 acres. Area 1 had a spray area of approximately 8.4 acres; Area 2 had approximately 2.5 acres; and Area 3 had approximately 3.2 acres.[1]

During operation, excess liquids from Solar Pond 207B-North and 207B-Center were pumped to the West Spray Field for application. Delivery of process wastes to the 207B solar ponds was discontinued in the late 1970s. Pond 207B-North received water from the interceptor trench system installed in 1980 to collect groundwater from the hillside north of the solar ponds. Because of elevated nitrate in the water contained in the 207B solar ponds since that time, runoff from the West Spray Field was retained in the A-series ponds and off-site migration of the water was prevented.[1] Liquids from 207B-Center were applied to all three application areas. The water present in 207B-Center consisted of treated sanitary effluent.[1]

Total monthly volumes of liquids applied to the West Spray Field are presented in the Phase I RFI/RI Work Plan. The maximum total application is 190 inches per unit area during the four years of operation.[1]

Several release incidents involving technical violations of the RFP NPDES Permit occurred during the operation of the West Spray Field. Any offsite release of water from a non-permitted discharge point is a technical violation of the permit. In June 1982, heavy rains and spray irrigation contributed to water collection in the West Diversion Ditch which flows into North Walnut Creek. The water was not sampled at that time but prompted future sampling and analyses for nitrate and radioactivity.[2] On January 7 and January 11, 1983, excess surface flow due to spray irrigation reached North Walnut Creek and Pond A-3.[3] Between October 22 and October 26, 1984, excessive runoff from the spray irrigation area flowed into McKay Ditch.

Physical/Chemical Description of Constituents Released

Liquids contained in Solar Evaporation Ponds 207B North or 207B Center were applied to the West Spray Field. The liquids were comprised of treated sanitary wastewater and collected groundwater. Water sprayed over the area was characterized by high nitrate concentrations, trace levels of volatile organic compounds, and elevated gross alpha and gross beta activity.[1] Spraying activities were performed routinely and as an example of application rates and nitrate contamination, on April 17 and 18, 1982, the nitrate as N concentration of the water was 55.8 milligrams per liter with an application rate of approximately 89,445 gallons per acre.[4]

Nitrate concentrations (nitrate as N) measured in Walnut Creek at Indiana Avenue in response to the excess surface flow due to the spraying on October 22 and 26, 1984 ranged from 2.5 to 10 milligrams per liter.[5,6]

Responses to Operation or Occurrence

The West Spray Field is a RCRA-regulated unit. Alluvial and bedrock groundwater wells have been installed in the area to monitor the impact the spraying activities have had on the groundwater. Samples have been collected and analyzed and are included in the Annual Groundwater Monitoring Report for RCRA-Regulated Units. In addition, a Draft Phase I RFI/RI Work Plan was developed in June 1990 to further characterize the contaminant sources and soil contamination from past application of waste waters. Complete characterization and possible remediation of the West Spray Fields will be performed in accordance with the IAG schedule.[1]

In August 1979, corrective actions were implemented to minimize the discharge of plant water containing tritium to the sanitary system because sanitary effluent was being sprayed in the buffer zone rather than discharged offsite.[7,8]

A draft environmental assessment for the spray field was written in February 1981.[9]

A trench was dug around the irrigation area in response to the October 22, 1984, incident. The purpose of the trench was to prevent future runoff from flowing into McKay Ditch.[5]

Fate of Constituents Released to Environment

Contaminants have been identified in the alluvial groundwater and soil in the West Spray Field area. Contaminants introduced into McKay Ditch were transported into Walnut Creek.[1]

This IHSS is being studied in accordance with the IAG schedule for OU11. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by February 22, 1995.

Comments

Additional information and analytical detail are available in the Phase I RFI/RI Work Plan for OU11, March 16, 1992, and the Closure Plan, November 28, 1986.

References

[1] 1503436
[2] 1700469
[3] 1700465
[4] 1700471
[5] 1501067
[6] 1501102
[7] 1501227
[8] 1600221
[9] 1502775

Other References of Interest

1700467
1700471
1501077
1600815
1501208

PAC REFERENCE NUMBER: 000-172

IHSS Reference Number: 172, Operable Unit 8

Unit Name: Central Avenue Waste Spill

approximate Location: N749,000; E2,084,000 - 903 drum storage area to west dock of Building 774 via Central Avenue and Sixth Street

Date(s) of Operation or Occurrence

June 11, 1968

Description of Operation or Occurrence

A drum being transported from the 903 drum storage area to Building 774 (some references denote the final destination as Building 771, see Comments) leaked, causing contamination to the roadways traveled. Four 55-gallon drums, one empty and three containing liquid waste material,[1] were transported by forklift truck from the 903 drum storage area to Central Avenue, west to Sixth Street, north to Building 774[2,3,4,5,6,7,8,9,10,11,12,13] (Building 771[1,14]), a distance of about 1.3 miles.[2,15] The drums were checked for integrity prior to movement and were again checked at the off-loading point. The latter examination revealed that some liquid dripped from the bung hole of one drum during transit.[2] Apparently the plastic spigot of one of the full drums had been unknowingly damaged during movement, which caused contaminated solution to splash onto the roads traveled.[1] Only the west and northbound lanes were affected.[10,14]

The drum leaked contaminated material at a rate of about one drop every three feet the length of Central Avenue to Sixth Street and down Sixth Street to Building 774.[6] Roadway alpha radioactivity contamination was measured up to 100,000 counts per minute (cpm).[2] One reference states that the incident resulted in radioactive contamination of approximately 140,000 disintegrations per minute (dpm) per 100 square centimeters on the west bound lane of Central Avenue to and along Sixth Street.[12] Furthermore, a 500 square foot area north of the west dock of Building 774 was found to be contaminated to a level of 50,000 cpm. The forklift was found to be contaminated to a level of 100,000 cpm.[5]

Physical/Chemical Description of Constituents Released

Some seemingly discrepant information was found regarding the actual composition of the liquid waste material. The descriptions found include contaminated perclene solution,[1] contaminated waste solvent,[2] solvent,[3] rinse,[4] contaminated material,[6] contaminated oil,[7] contaminated wash solution,[8] plutonium contaminated oils and oils with lathe coolant (consisting of 70 percent oil and 30 percent carbon tetrachloride),[13,14] radioactive waste oil,[15] and uranium oil[16] (see Comments for interpretation).

Responses to Operation or Occurrence

The contaminated areas of the road were promptly barricaded.[1] The route of the forklift truck was examined and monitored disclosing small spots of contaminated drippings on the road. Contaminated areas of the road were cleaned-up.[1] One source denotes cleanup as diluting the contamination to a safe level.[7] Another source states that the road was quickly washed down.[15] Another reference states that the road was washed and some of the washed surface material was placed in containers for subsequent disposal.[2] Another reference states that some low-level material was spread to the ditch on the west side of Central Avenue.[12] Some fixed contamination still remained after washing.[2] Following clean-up activities the affected roadway was sealcoated.[1,3,6,7,12] One reference states that the street was given a coat of gravel and sealcoat.[16]

The extent of the sealcoating is unclear. Sealcoating may have been placed only on the contaminated areas of the road[1,2] or the entire distance of the westbound traffic lane.[6]

The forklift truck was decontaminated and released.[5] Vehicles that had been on the road during the interval between movement of the drums and discovery of the leakage were surveyed and no contamination was detected.[2]

Four barrels of contaminated soil were removed from the contaminated 500 square foot area north of the west dock of Building 774.[5]

In July 1970, as an unrelated project, a section of asphalt between Eighth and Tenth Streets on Central Avenue was replaced. The old asphalt was monitored before and after removal with negative results.[17,18] This monitoring was performed, in part, as a response to this incident.

Fate of Constituents Released to Environment

Some contaminated asphalt is still in place although the degree and extent of contamination is unknown.[2,6] As stated above, no radioactive contamination was detected in the asphalt excavated between Eighth and Tenth Streets on Central Avenue.[17,18] This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigations, site characterizations, and possible remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

Conflicting information exists regarding the destination of the drums that were being transported from the 903 storage area. Twelve references indicate the drums were transported to Building 774,[2,3,4,5,6,7,8,9,10,11,12,13] whereas only two references indicate they were transported to Building 771.[1,14] In addition, a health physics report which documents the monitoring performed at the terminal destination point, shows that the monitoring was performed at the west dock of Building 774. This is also the area where 500 square feet of surface material was contaminated from the leaky drum.[5]

The constituents released are believed to be predominately oil with lesser amounts of carbon tetrachloride, perchloroethylene (also known as perclene), uranium, and possibly plutonium and other contaminants. In general, this description of the constituents released is consistent with descriptions presented in the Physical/Chemical Description of Constituents Released Section. However, one reference states that the last plutonium drums were transferred early in 1968 and the final uranium drums were transferred in the first part of June 1968. Furthermore, in response to the road contamination the road was not taken up, rather it was given a coat of gravel and sealcoat since the contamination was uranium and did not contain much activity.[16]

HRR information indicates that the contaminated roadway extends around the northwest side of Building 771[9,13] to the west dock of Building 774. Also, one reference document states that the exit route traveled from the 903 drum storage area to Central Avenue was from about the northwest corner of the storage area straight north to Central Avenue.[19] It is proposed that new boundaries be defined for this IHSS.

References

[1] 1500344
[2] 1600093
[3] 1500528
[4] 1600138

[5] 1501174
[6] 1600438
[7] 1500650
[8] 1600112
[9] 1502785
[10] 1501141
[11] 1700805
[12] 1601057
[13] 1503384
[14] 1502735
[15] 1500637
[16] 1503396
[17] 1500539
[18] 1600012
[19] Personal Communication, Dirocchi, J., Retired RFP Employee, December 12, 1991.

Other References of Interest

1700436

PAC REFERENCE NUMBER: 000-190

IHSS Reference Number: 190, Operable Unit 13

Unit Name: Caustic Leak

Approximate Location: N749,000; E2,082,000 - Steam plant (Building 443) catch basin to Pond B-1 via Central Avenue ditch and South Walnut Creek

Date(s) of Operation or Occurrence

December 3 and 4, 1978 and January 6, 1989

Description of Operation or Occurrence

On December 3 and 4, 1978 a bulk caustic storage tank leaked into its spill catch basin.[1] Due to operator error, a sodium hydroxide (NaOH) solution was subsequently released from the catch basin to the Central Avenue Ditch.[1,2,3,4] The sodium hydroxide solution flowed eastward down the Central Avenue Ditch and was diverted to South Walnut Creek and Pond B-1 for temporary containment.[1,2,4]

On January 6, 1989 caustic solution was released from the same Building 443 tank involved in the December 1978 incident, into its secondary containment (spill catch basin). The outlet pipe and valve on the tank deteriorated to the extent that the pipe disconnected from the tank. Due to cold weather, the caustic froze which prevented further leakage.[5]

Physical/Chemical Description of Constituents Released

The December 1978, incident involved about 1,000[3] to 1,500[1,2] gallons of caustic solution that was composed of 12.5 Normal NaOH (sodium hydroxide) also expressed as 50 percent NaOH.[3] This has been generically referred to as concentrated sodium hydroxide.[1,2,4]

The January 1989 incident involved about one to three gallons of concentrated caustic solution.[5]

Responses to Operation or Occurrence

In response to the December 1978 incident, immediate steps were taken to isolate the contamination, treat the contaminated runoff, and divert drainage from adjacent areas.[1,2,3,4,6,7,8]

These steps included the following:

- Divert 400 complex snow melt water across Central Avenue Ditch to the 700 area drainage;[2]
- Dam the upper Central Avenue Ditch above the B-Series ponds near the cattle fence;[2]
- Divert Building 995 sewage effluent to Pond 207B-South and retain Pond B-3 as a reserve pond;[2]
- Rope off the upper portion of the Central Avenue Ditch;[6]
- Pump Pond B-2 to Pond A-2 and hold Pond B-2 as a last resort catch pond;[2] and,
- Neutralize Pond B-1 by adding 1,400 pounds of alum and then pump this liquid to Pond 207B-North.[2,4]

Follow-up response activities to the December 1978 incident included:

- Neutralize the Central Avenue Ditch between Fifth and Tenth Streets by adding 5,000 pounds of alum;[7]
- Complete final sampling of Pond 207B-North on about January 19, 1978;[9]
- Monitor the pH of the ditch, and on March 23, 1979 the ditch was considered to be no longer a problem and runoff from ditch was allowed to be discharged offsite;[10,11]
- Planned to blend liquid in Pond 207B-North with sanitary water and process it through the sewage treatment plant. It will then be transferred to Pond 207B-South for processing through the reverse osmosis building and subsequent discharge offsite;[12]
- On about May 4, 1979, Pond 207B-North liquid was drained into Pond B-2;[13] and,
- On about June 29, 1979, the remaining liquid in Pond B-1 was declared environmentally acceptable and sprayed on the adjacent hillside.[14]

The tank leak was identified and all repairs were completed. Furthermore, the incident was reviewed with all Stationary Operating Engineers at the Central Steam Plant and they were directed to review all standard operating procedures on chemical handling and storage.[3] An incident report was prepared.[2]

In response to the January 1989 incident, the tank was temporarily repiped and emptied. The removed caustic was neutralized and transferred to Building 374 for treatment as a process waste.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released.

This IHSS is being studied in accordance with the IAG schedule for OU13. The IAG activities will include site investigations, site characterizations, and possible remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

No documentation was found to determine whether the action plan for treatment of the liquid in the reverse osmosis building was performed.

References

[1] 1600202
[2] 1501270
[3] 1501245
[4] 1600466
[5] 1600459
[6] 1501004
[7] 1501271
[8] 1501232
[9] Barker C.J., Rockwell International Internal Letter, "Highlights For Week Ending January 19, 1979 Environmental Analysis And Control," January 19, 1979.
[10] 1502741

[11] 1502740
[12] 1502738
[13] 1502739
[14] 1502737

Other References of Interest

1501999
1502735
1700141
1700805

PAC REFERENCE NUMBER: 000-192

IHSS Reference Number: 192, Operable Unit 16

Unit Name: Antifreeze Discharge

Approximate Location: N749,500; E2,084,000 - Building 708 floor drain to Pond B-1 via storm runoff collection system and South Walnut Creek.

Date(s) of Operation or Occurrence

December 2 or 3, 1980

Description of Operation or Occurrence

Approximately 155 gallons of antifreeze solution was discharged from a chiller unit into a floor drain in Building 708.[1,2,3] This floor drain discharges into a storm runoff collection system, which is composed of a buried culvert south of the building and runs eastward from Building 708 under the Building 750 parking lot and terminates at an open culvert just east of Tenth Street.[1] The storm runoff collection system discharges from the culvert into South Walnut Creek. The flow was contained by diversion into Pond B-1.[1,2]

Physical/Chemical Description of Constituents Released

The antifreeze solution contained 25 percent ethylene glycol in water.[1,2,3]

Responses to Operation or Occurrence

The flow was contained by diverting the storm water discharge into retention Pond B-1. Pond B-5 dam was closed and there was no off-site discharge of the liquid.[1,2] Follow-up samples were collected and analyzed from several locations. Based on visual observations of color and flow, it is believed that all of the spill was contained in Pond B-1.[1,2] Follow-up activities included flushing 5,000 gallons of water through the system into Pond B-1.[1] A report was prepared by Utilities personnel.[2]

Fate of Constituents Released to Environment

No direct documentation was found which detailed the fate of the ethylene glycol discharged to the environment. This IHSS is being studied in accordance with the IAG schedule for OU16. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate (see Comments). The Final No Further Action Justification Document for OU16 is to be completed by July 30, 1992.

Comments

HRR information indicates that the Building 708 floor drains discharge into a buried culvert south of the building. The delineation of this IHSS site boundary should start at the south side of Building 708 not at Building 709. It is proposed that IHSS 192 be enlarged to include Building 708 (PAC 000-192).

References

[1] 1501200
[2] 1600230
[3] 1501793

Other References of Interest

1500904
1501999
1502735
1700141

PAC REFERENCE NUMBER: 000-500

IHSS Number: Not Applicable

Unit Name: Sanitary Sewer System

Location: RFP Main Production Facility (Figure 000-6) (Note: this PAC is not shown on Plate 3).

Date(s) of Operation or Occurrence

1952 - Present

Description of Operation or Occurrence

Background Information

The RFP sanitary sewer system, shown in Figure 000-5, has been used for transport, storage, and treatment of sanitary waste since RFP began operations in 1952. Various drains, sinks, sumps, and latrines located in RFP buildings discharge to central collection lines which transport the waste to the sanitary sewage treatment plant (Building 995). RFP wastes which are incompatible with sanitary sewage treatment are designated process wastes and are handled in a separate system from sanitary wastes (see PAC 000-121, Original Process Waste Lines). In each RFP building which generates process waste, waste discharge points (drains, sinks, sumps, etc.) are designated as either sanitary waste or process waste receptacles, and are plumbed separately into the appropriate waste system. In some plant facilities, wastes are, or have historically been, collected and temporarily stored in tanks plumbed into both systems, and transferred to the appropriate system based on analytical results.

Discharges to the Sanitary Sewer System

RFP historically has discharged waste streams other than typical sanitary wastes to the sanitary sewer system. These discharges changed throughout the history of RFP in response to internal guidelines (in particular, USAEC guidelines in the early history of RFP) and, increasingly during the past two decades, to State and Federal regulations. Table 000-4 summarizes information compiled on waste streams known to have been discharged to the sanitary sewer system.

In addition to routine or planned sanitary sewer discharges, unplanned incidental discharges have occurred as a result of equipment failure, overflow or spillage of materials, or accidental discharge of process wastes into sanitary waste receptacles. In some cases, buildings plumbed into the sanitary system at the time of their construction have later added facilities or functions which generate process waste, and have discharged this waste into the sanitary sewer system for a period of time. Table 000-5 summarizes information compiled on incidental or accidental sanitary sewer discharges. Two major incidents involving the sanitary sewer system for which detailed documentation is available are discussed below.

An estimated 50 - 100 curies of tritium were inadvertently released from Building 779 to the sanitary sewer system in April and May 1973. The tritium originated from a shipment of scrap plutonium metal received at the RFP for reprocessing. During reprocessing activities in Building 779, the tritium was separated from the plutonium and became part of the aqueous reprocessing waste. This waste was stored in accumulation tanks in Building 779 which discharged either to the sanitary sewer system or the process waste system, depending upon analytical characterization of the waste. Because tritium was not expected in these wastes, it was not targeted by the pre-discharge analyses, and tritium-contaminated wastes which were otherwise suitable for sanitary sewer discharge were released into the sanitary sewer system. One release contained an estimated six curies of tritium

in 7,800 gallons of waste, and a second release contained an estimated 44 curies in 8,000 gallons of waste. These releases flowed to Building 995, and then discharged as sanitary system effluent to the B-series holding ponds and eventually off the RFP site.[1]

In late February 1989, chromic acid stored in Building 444 for use in plating operations overflowed tanks and a containment berm and entered the building's foundation drains. The spill collected in a sump which was automatically transferred by a sump pump into the sanitary sewer system. The spilled material was observed intermittently in Building 995 over the next two days, but was not identified as chromic acid until five days after it was first observed. Part of the spilled material was discharged in sanitary system effluent to the B-series ponds. An estimated 30 pounds of chromium were released to the sanitary sewer system.[2] This incident was documented in RCRA Contingency Plan Implementation Report 89-001.[3]

Releases from the Sanitary Sewer System

Treated effluent from Building 995 is discharged to the B-series holding ponds (PAC NE-142.5, PAC NE-142.6, PAC NE-142.7, PAC NE-142.8 and PAC NE-142.9). The narratives for these PACs contain detailed historical information on routine discharges of treated sanitary sewer effluent from Building 995. Sanitary system sludges containing low levels of radionuclides were historically disposed of onsite in burial trenches. The narrative for PAC NE-110 (Trench T-3) provides detailed information on these sludges. For purposes of the HRR, Building 995 is considered the geographical division between the sanitary sewer system and other RFP PACs potentially affected by sanitary sewer system effluents or by-products.

Very limited information was found which describes releases from the sanitary sewer system to the environment. The available information is summarized in other PAC narratives. PAC 700-144 (Sewer Line Break) and PAC 800-145 (Sanitary Waste Line) target releases from sanitary sewer lines which historically have handled laundry water containing low concentrations of radionuclides. PAC 900-141 (Sludge Dispersal) addresses wind dispersion of radioactively contaminated sanitary system sludges from drying beds near Building 995. PAC 100-604 (T130 Complex Sewer Line Breaks) targets sanitary sewer line leaks in 1990 at the T130 office trailer complex west of the main RFP production area.

Physical/Chemical Description of Constituents Released

Waste streams which historically have been discharged to the sanitary sewer system include laundry water, laboratory wastes, treated process waste effluents, photographic processing wastes,[4] miscellaneous waste chemicals,[5] and certain other waste streams according to the guidelines or regulations in existence at the particular time. Table 000-4 contains information regarding types and quantities of constituents released in these routine discharges.

A 1967 survey indicated that the sanitary sewer system total daily flow averaged 250,000 gallons, of which an average 21,000 gallons was laundry waste.[6] A 1973 investigation of plutonium releases to the sanitary sewer system indicated that 88 percent of the plutonium at that time originated from laundry waste.[7]

Photographic processing solutions were discharged to the sanitary sewer system according to the following discharge limits provided in a 1977 document: Tritium, 13,000 picocuries per liter (pCi/l); plutonium, 5 pCi/l; uranium, 10 pCi/l; and beryllium, 1.0 part per million.[4] This document also details federal regulations governing discharge of film processing wastes which also pertained to RFP photographic waste discharges. The quantities of photographic wastes involved are not provided.

Monthly estimates of total radioactivity discharged to the sanitary sewer system in Building 442 laundry wastes were summarized during the early history of the RFP in Site Survey Monthly Reports. A listing of these reports contained in the HRR files is provided in the references section below.

Responses to Operation or Occurrence

The narratives for PAC 900-141, PAC 700-144, PAC 800-145, and PAC 100-604 describe responses to these known releases from the sanitary sewer system. No other documentation was found on responses to sanitary sewer system releases.

A RCRA Contingency Plan Implementation Report (89-001) was prepared and submitted for the chromic acid release of February 1989.[8]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

See narratives for PAC 900-141, PAC 700-144, PAC 800-145, and PAC 100-604.

TABLE 000-4
HISTORICAL DISCHARGES TO SANITARY SEWER SYSTEM

Building	Date(s)	Description
123	August 1953	Laboratory wastes are rerouted from process waste system to sanitary sewer system.[9,10] Plumbing allows diversion of waste back to process system if necessary. Waste contains unspecified levels of nitrate from nitric acid and radioactivity from urinalysis specimens.[11]
	April 1965	Laboratory waste discharged to sanitary sewer system is found to contain high levels of nitrate (956 ppm).[12]
331	Unknown	Health Physics survey of old laboratory area in 331 shows radioactive contamination around footing drains plumbed into sanitary sewer system.[13]
442	August 1953 - Unknown	First indication that 442 laundry waste water was discharged to the sanitary sewer system.[10]
	February 1954	Daily composites of 442 laundry waste show that radioactivity levels in the waste vary widely from day to day.[14]
444	June 1981 - Unknown	Film processing bath water is temporarily rerouted for an unspecified period from process waste system to sanitary sewer system. Waste consists of approximately 60,000 gallons per month of 60% "treated water" and 40% water containing biodegradable film processing chemicals.[15]
	Unknown	1986 document indicates that elevator shaft sump and employee wash basins and showers are plumbed into sanitary sewer system. Small amounts of uranium oxide and beryllium fines can enter sanitary system through employee wash facilities. Temporary measure calls for replumbing of elevator shaft sump to process waste system.[16]
	Unknown - 1989	As a result of chromic acid release (see Description of Operation or Occurrence section above), foundation drain sumps are replumbed from sanitary sewer system to process waste system.[17]
559	Unknown	1979 document indicates that sanitary drain is being used for disposal of unspecified chemicals. It is recommended that drain either be plugged or replumbed to process waste system.[18,19]
705	Unknown	1978 document indicates that all drains in building are plumbed into the sanitary sewer system. Building 705 is used as a research and engineering facility for uranium, beryllium and chromium, and acids are also used.[20]

TABLE 000-4 (continued)
HISTORICAL DISCHARGES TO SANITARY SEWER SYSTEM

Building	Date(s)	Description
771	September 1953 - Unknown	771 laundry waste which exceeds the radioactivity limit for direct discharge to Walnut Creek is diluted with sanitary sewer system effluent in order to meet the limit.[21]
779	Unknown	1974 document indicates that radioactive aqueous waste from 779 waste tanks is pumped to sanitary sewer system if radiological and chemical analyses indicate waste does not exceed unspecified discharge limits.[1]
881	1952 - 1953	Initial discharge limit is set at 10,000 d/m/l alpha radioactivity. Plumbing allows diversion to process waste system if this limit is exceeded.[22,23,24]
	January 1954	Building 881 laundry waste are first discharged to the sanitary sewer system. Discharge limit is 8,500 d/m/l.[25]
	September 1955 - Unknown	Because the discharge limit for 881 laundry waste discharge to the sanitary sewer system was routinely being exceeded, the discharge limit was suspended on 01/16/56 for an indefinite period.[26]
	Unknown	1978 document indicates that sink on the designated process waste side of 881 is plumbed into sanitary sewer system. Sink was plugged as a result.[27]
883	Unknown	1986 document indicates that there are two restrooms in 883 where workers do not have to clean up or change clothes prior to use.[16]
991	Unknown	1966 document sets guidelines for sanitary sewer system disposal of unspecified acids, bases, and solvents used in 991. Up to 500 milliliters are acceptable for sanitary sewer system discharge.[28]

TABLE 000-5
ACCIDENTAL/INCIDENTAL DISCHARGES TO SANITARY SEWER SYSTEM

DATE	DESCRIPTION
Early 1953	Several discharges of oil to the sanitary sewer system resulted in discharge of improperly treated effluent from the sewage treatment plant.[29,30,31,32]
09/55	2,700 gallons of Building 881 laundry waste water containing alpha radioactivity in excess of the 8,500 d/m/l sanitary sewer discharge limit was discharged to the sanitary sewer system while leaks in the Building 881 process waste line were being repaired.[33]
01/19/59	A still in the Building 444 foundry area overflowed a large volume of coolant to the sanitary sewer system, killing the floc in the sanitary sewer aerators and allowing raw sewage to discharge from the sewage treatment plant for approximately three hours.[34,35]
Mid-1962	Several discharges of oil and hexavalent chromium waste to the sanitary sewer system were reported.[36]
08/08/62	Approximately 50-100 gallons of oil were discharged to the sanitary sewer system.[37]
06/26/63	An unknown quantity of solution containing hexavalent chromium was discharged to the sanitary sewer system. 5 ppm hexavalent chromium were detected in the primary settling tank at Building 995, and 0.6 ppm was measured in treated sewage effluent.[38]
12/12/63	An unknown quantity of solution containing hexavalent chromium was discharged to the sanitary sewer system. 20 ppm hexavalent chromium were detected in the primary settling tank at Building 995 on the afternoon of the incident, and 0.18 ppm was measured the following morning in treated sewage effluent.[39]
11/64	Contaminated wastes were released to the sanitary sewer system due to breaks and leaks in the process waste line serving Building 441, Building 444, Building 881, and Building 883. The wastes were analyzed for pH, radioactivity, fluoride, hexavalent chromium, and nitrate prior to discharge.[40]
09/11/70	A sulfuric acid spill entered the sanitary sewer system. As much as 1,800 parts per million sulfate were detected in treated sanitary effluent.[41]
Mid-1972	A contractor using silver paint in Building 444 poured paint residue into drains. The contractor was required to clean up the drains.[42] It is not specified whether the drains were connected to the sanitary sewer system or the process waste system.
02/03/78	An accidental release of unneutralized demineralization waste from the steam plant to the sanitary sewer system resulted in NPDES permit violations for total suspended solids, pH, and BOD_5.[43]

TABLE 000-5 (continued)
ACCIDENTAL/INCIDENTAL DISCHARGES TO SANITARY SEWER SYSTEM

DATE	DESCRIPTION
07/24/79	Approximately 35 pCi/l iodine-131 were detected in pond B-3 as a result of an RFP employee's medical treatment. The water was sprayed on the hillside above the pond.[44]
08/09/79	Elevated gross alpha and beta radiation was detected in Building 995 sewage influent. The source was determined to be iodine-131 from an RFP employee taking the iodine to correct a thyroid problem. The employee was instructed to collect all personal waste in sample bottles for disposal into the process waste system.[45]
08/17/79	Tritium at an activity of approximately 2,000 pCi/l was detected in sanitary sewer system effluent. The source was identified as routine steam plant boiler blowdown and as steam condensate from Building 771, Building 776 and Building 779 that was diverted around a leaking valve pit. The steam condensate originally was Solar Evaporation Pond water that was treated at Building 374 and used as boiler makeup. Approximately 1,000 gallons per hour of the steam condensate were being discharged to the sanitary sewer system in mid-August 1979. Repair of the leaking valve pit was scheduled for sometime after October 1, 1979.[46,47] It is not known how long the discharge continued.
11/26/80	An unknown yellow colored material, later identified as dye, was dumped into the sanitary sewer system from the Building 371 area. Treated effluent containing the dye was impounded in Pond B-1 and sampled for analysis.[48,49]
4th qtr 1980	An unspecified amount and type of paint were released to the sanitary sewer system from Building 374. The spill reportedly was "controlled" without causing environmental impact.[50]
04/11/89	An unspecified amount of nitric acid spilled outside Building 460 entered a storm drain which discharged to the South Interceptor Ditch. Field pH measurements were 6.9 at the storm drain outlet to the interceptor ditch and 2.0 in puddles outside Building 460.[51]
08/31/89	50 gallons of ethylene glycol in approximately 300 gallons of brine were disposed of in the sanitary sewer system. The sewage treatment plant operator was unaware that approval had been granted by Waste Compliance to dispose of the material through the sanitary system and notified the utilities main office when he smelled ethylene glycol in the sewage treatment plant.[52]
09/29/89	Low pH readings (approximately 4.5 - 5.5) were recorded in sanitary sewer system influent and effluent at Building 995. Possible causes included unknown acid discharge to sanitary sewer system or over-nitrification of routine wastes during treatment due to low sewage inflow. Low pH waste was impounded in pond B-1, sprinklers from pond B-3 were stopped, and discharges from pond B-5 were discontinued until laboratory analyses could be performed.[53]

TABLE 000-5 (continued)
ACCIDENTAL/INCIDENTAL DISCHARGES TO SANITARY SEWER SYSTEM

DATE	DESCRIPTION
10/25/89	The 204 scrubber in Building 444 overflowed an unspecified amount of liquid into the sanitary sewer system. The scrubber handled fumes from the 203 hoods, where nitric, hydrochloric, and fluosilicic acids were used in dissolving beryllium, titanium, and uranium. The liquid may also have run across a "mildly contaminated floor" before entering the sanitary sewer system. Flow of effluent from Building 995 to Pond B-3 was diverted to Pond B-1 and Pond B-2, and spray irrigation from Pond B-3 was discontinued. Analytical samples from Pond B-1, Pond B-2, and Pond B-3 were tested for gross alpha and beta radiation, nitrate, and metals. Samples from Pond B-1 and Pond B-2 showed high alpha and beta.[54] Pond B-3 analytical results were not provided.
03/19/90	A paint spill was detected at Building 995. Analysis of samples taken as a result of this spill showed that Building 374 probably was discharging volatile organic compounds to the sanitary sewer system.[55]
11/04/90	White influent was detected coming into Building 995. The influent was isolated in a holding basin until laboratory analysis could be performed.[56]

References

[1] 1600428
[2] 1501048
[3] 1800023
[4] 1500968
[5] 1700184
[6] 1600430
[7] 1500654
[8] 1800025
[9] 1600593
[10] 1601056
[11] 1600591
[12] 1600472
[13] 1700409
[14] 1600668
[15] 1500892
[16] 1501067
[17] 1600537
[18] 1700181
[19] 1501007
[20] 1500993
[21] 1601055
[22] 1600590
[23] 1600589
[24] 1601054
[25] 1501868
[26] 1600387
[27] 1501269
[28] 1500891
[29] 1600594
[30] 1500492
[31] 1500491
[32] 1500490
[33] 1601042
[34] 1600404
[35] 1601027
[36] 1600416
[37] 1600415
[38] 1500435
[39] 1600600
[40] 1700201
[41] 1500908
[42] 1500632
[43] 1500992
[44] 1501001
[45] 1501229
[46] 1501228
[47] 1700182
[48] 1501201
[49] 1600229
[50] 1500904
[51] 1501213
[52] 1501259
[53] 1501750
[54] 1501257
[55] 1500807
[56] 1501732

Other References of Interest

1500861

Site Survey Monthly Reports:

1600021
1600491
1600490
1600058
1600487
1600061
1600056
1600485
1600060
1500306
1501011
1600059
1600054
1600486
1600063
1600062
1600057

Building 444 Chromic Acid Spill:

1501723
1501125
1501722
1501725
1700137
1600555
1600545
1600536
1600535
1600534
1500280
1500279
1500278
1500277
1500276
1500275
1500281

PAC REFERENCE NUMBER: 000-501

IHSS Reference Number: Not Applicable

Unit Name: Roadway Spraying

Approximate Location: RFP Roadways

Date(s) of Operation or Occurrence

January 1974[1] (first documentation) - September 1983[2]

Description of Operation or Occurrence

Roadway spraying involved primarily waste oils, used as a dust suppressant, but included occurrences involving reverse osmosis brine solutions and footing drain water containing rhodamine WT dye. Some references cited a one-time conditionally approved project that occurred over a specified area. Other references lack any evidence of a conditional approval, end date, and/or specific target area for performing the prescribed activity. The following narrative is structured such that all documentation pertinent to waste oil roadway spraying is presented first. This discussion is followed by a discussion of the spraying of footing drain water containing rhodamine dye, and finally the reverse osmosis brine solution spraying discussion is presented.

Roadway spraying is first documented in January 1974, where two patrol roads near the 903 Pad (PAC 900-112) needed to be oiled as soon as possible to suppress resuspension of contaminants detected directly east of the pad at air monitoring Station S-8. The roadways targeted were inside the perimeter fence from Central Avenue south and west to a point due south of the west edge of the 903 Pad and outside the perimeter fence from Central Avenue south to Pond C-1.[1]

On April 5, 1977, approval was granted to use waste motor oil, drained from plant vehicles, on the main roads and construction areas around Building 371. This approval required that motor oil use near streams or other drainages be avoided until evidence can be provided to show that there was no pollution of drinking water systems.[3]

On May 5, 1981, a one-time authorization was granted to dispose all waste oil currently on hand, from equipment used in non-plutonium and non-uranium areas, by application to the landfill access road. This reference also states that application to other gravel roads would be considered for approval upon request.[4]

On October 14, 1982, approval was granted for the use of 120 liters of Number 2 diesel fuel on roads.[5] This diesel fuel was obtained from a tank spill on the north side of Building 371 and is discussed in detail in PAC 300-151.

On September 12, 1983, authorization for 1,200 gallons of Mobil Number 634 gear lubrication oil from a Building 883 rolling mill lube system was given for use on plant gravel roads.[2]

In early June 1979, Building 371 footing drain water containing rhodamine WT dye was distributed on buffer zone roads. This solution was the result of a preoperational footing drain tracer test.[6] This incident, and the disposition of additional footing drain water containing rhodamine WT dye derived from this incident, are discussed further in PAC NE-142.1 - PAC NE-142.4 and PAC 000-500.

From June 1979 through approximately the fall of 1979, conditional approval was granted to dispose of high salt content liquid from the reverse osmosis facility, Building 910, by spraying on approximately 7.6 miles of

designated buffer zone dirt roads.[7] A detailed location map showing the roads to be sprayed with the brine solution is included in reference 7.

Physical/Chemical Description of Constituents Released

Descriptions of waste oils range from unspecified[1] to Number 2 diesel fuel.[5] Other waste oil descriptions include waste motor oil drained from plant vehicles,[3] waste oils from equipment used in non-plutonium and non-uranium areas,[4] and Mobil Number 634 gear lubrication oil from a Building 883 rolling mill lube system.[2]

The rhodamine WT dye incident involved Building 371 footing drain water solution containing approximately 800 parts per billion (ppb) rhodamine dye.[6]

The brine solution is not thoroughly described in the references beyond stating it is high salt content water from the reverse osmosis facility, Building 910. Each truck load of the brine solution was to be analyzed for gross alpha activity, gross beta activity, and total dissolved solids. If gross alpha activity exceeded 40 picocuries per liter (pCi/l) and/or gross beta activity exceeded 50 pCi/l operations were to cease.[7,8] One reference noted that beta activity of approximately 150 pCi/l had been measured in brine from the reverse osmosis process.[8]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents sprayed on roadways.

Comments

One reference document stated that future dispositions of waste oil will be governed by a policy under preparation for the Health Safety and Environment (HS&E) manual;[4] therefore, it is assumed that subsequent to about 1981 RFP did have a standard policy governing waste oil roadway spraying.

Most of the location information presented in references 1,3,4, and 7 is very precise and confidently mapped and therefore is presented on Plate 3. Other location information found in reference documents 2,3,4,5, and 6 is too general and insufficient to be accurately mapped. Therefore, Plate 3 illustrates the target areas for some waste oil spraying (e.g., near the 903 Pad,[1] the main roads near Building 371 construction,[3] and the landfill access road[4]) and all of the reverse osmosis brine solution spraying.[7] Plate 3 does not show the location where waste oil spraying occurred on the "construction areas around Building 371,"[3] "other gravel roads,"[4,5] "on roads,"[5] and "on plant gravel roads."[2] In addition, Plate 3 does not show the location where rhodamine WT dye spraying occurred "on buffer zone roads."[6]

Although the earliest reference to waste oil roadway spraying is 1974, this may have been a common practice since RFP's inception. Also, it is believed that roadway spraying was confined to dirt roads, but roads that were once unpaved may now be paved.

References

[1] 1500927
[2] 1700171
[3] 1500833
[4] 1600836
[5] 1501069
[6] 1501230
[7] 1503364
[8] 1501227

Other References of Interest

1501999

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3.6 100 Area

The 100 Area is located in the west-central portion of RFP. It is bounded on the north, west and south by the RFP buffer zone and on the east by the 300 and 400 Areas. The majority of the buildings in the 100 Area are within a security fenced exclusion area. Some office buildings and a receiving warehouse are located west of the fenced area. The more important buildings in this area are as follows.

- Building 111 was placed in service in 1953. The building houses general offices, a print lithographic shop, a photography laboratory, a photocopying center, and an illustrations department. These areas use a variety of solvents, toners, inks, developers, and fixers as constituents in printing and developing processes.

- Buildings 115 and 116 are office buildings for DOE personnel.

- Building 121 contains Plant Protective Services offices and the plant dispatching service. The building also contains the facility for cleaning, repairing, and inspecting firearms. Weapons maintenance operations use rags, patches, solvents, and lubricants.

- Building 122 houses the emergency medical services for RFP. The x-ray development and personnel decontamination operations generate waste that includes developers, fixers, used bath water, washdown water, and contaminated materials resulting from decontamination of injured personnel.

- Building 123 was placed in service in 1953. This building houses the health physics laboratories which analyze water, urine, soil, air, nose swipes, fecal material, and filter samples for the presence of plutonium, americium, uranium, alpha radiation, beta radiation, gamma radiation, tritium, beryllium, and organics. Personnel radiation badges are counted and repaired here.

- Building 125 was placed in service in 1965. The building houses the laboratory that calibrates measuring instruments used at RFP. Hazardous wastes are generated when instruments are cleaned with solvent and wipes. Occasionally, mercury from broken thermometers is stored and shipped offsite for distillation.

- Building 126 was placed in service in 1969. This building contains sealed radioactive sources that are used for instrument calibration and dosimeter irradiation and calibration.

- Building 127 houses an emergency diesel power generator that provides emergency power to several buildings in the 100 Area.

- The Building 130 area contains office buildings and a central receiving warehouse.

The following subsection contains detailed descriptions of PACs located in the 100 Area. These PACs are shown in Figure 100-1.

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PAC REFERENCE NUMBER: 100-148

IHSS Number: 148, Operable Unit 13

Unit Name: Waste Leaks (IAG Name: Waste Spills)

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

Date(s) of Operation or Occurrence

No documentation was found which detailed the dates of occurrence. Building 123 was first occupied in 1953. However, it is believed that leaks of process waste could have occurred from the start of operations up to approximately 1975.

Description of Operation or Occurrence

Persons interviewed for the CEARP Phase 1 document indicated that several small spills of nitrate-bearing wastes occurred around the outside of Building 123. These wastes may have contained radionuclides.[1] Because of the anonymity of CEARP interviewees, the exact basis of the CEARP identification cannot be verified. No documentation was found which supported the occurrence of individual spills associated with some type of waste management practice outside of Building 123. Similarly, none of the people interviewed for this work plan had knowledge of such spills, nor could the interviewees identify a plausible reason or cause for such spills. The reason for this is that Building 123 has been serviced with a process waste collection system that has always allowed for the collection of process wastes (including nitrate bearing wastes) from very close to the point of generation. However, the interviewees were knowledgeable regarding the potential release of nitrate-bearing wastes from the original process waste pipeline buried beneath Building 123. This pipeline was a part of the original process waste lines, and was in use from the start of operations in Building 123 until the original process waste lines were replaced by the new process waste lines. The abandonment of the original process waste lines beneath Building 123 occurred no later than February 1975 when engineering drawings were completed that documented the abandonment of the original process waste system.[2] The original process waste lines were typically abandoned in-place.

Building 123 was constructed as a laboratory and was one of the first buildings at the Rocky Flats Plant (RFP). When constructed the building consisted of a north wing running east-west and an east wing running north-south. A west wing running north-south was added onto the west end of the north wing in the late 1960's (probably 1968) and an addition to the south end of the east wing was added in approximately 1972.[3] This building was serviced by a process waste line of four-inch diameter buried beneath the north and east wings of the building. The main process waste line drained from west to east in the north wing, and from north to south in the east wing. The pipe was sloped at 1%. A number of connections were made to this main pipe, some of which consisted of headers servicing a number of process waste drains in the building.[4] The pipe was probably constructed of a type of iron called "Duriron."[3] The original process waste line piping from Building 123 lead to an underground tank system behind Building 441 that collected wastes generated by both Buildings 123 and 441. From this tank system the process waste materials were pumped out for treatment in the process waste system.

The original process waste line drain was not double contained, and varied in depth beneath the floor of Building 123 from approximately one-half foot to three feet beneath the bottom of the concrete floor of the building. The line came out from beneath the south end of the east wing of the building, with an invert elevation of approximately 6032.5 feet.[4] It has been stated by recent interviewees that this line, being constructed of a type of iron, probably leaked considerable amounts of waste without personnel being aware of the leak.[3,5] The types of waste carried by the pipe consisted of laboratory wastes from analysis of urine, fecal and other bioassay

samples. Nitrates and low levels of radionuclides were associated with the wastes carried in the original process waste line.[3] The process waste lines that replaced the original process waste lines consisted of either double-contained or overhead lines.[3] Leakage from the new process waste lines is easily detected. The process waste line piping in the west wing, being newer, has never included the use of an iron pipe directly in contact with soils.

Physical/Chemical Description of Constituents Released

Building 123, the Health Physics Laboratory, generates low-level radioactive wastes as well as chemical wastes. The released materials were identified as nitrate wastes which may have contained radionuclides.[1] No documentation was found which detailed the nitrate concentration and activity levels of the wastes. However, based on available information it appears that any wastes released would have consisted of liquid process wastes from the laboratory operations in Building 123.

Responses to Operation or Occurrence

No documentation was found which detailed responses to this release.

Fate of Constituents Released to Environment

No documentation could be found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for Operable Unit No. 13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

The CEARP Phase 1 report stated that the radiometric survey did not identify areas above assumed background levels. The results of the radiometric survey do not support that statement since the survey was only capable of identifying extremely contaminated areas (500,000 - 1,000,000 pCi/g).[6,7]

Waste spills associated with this PAC occurred prior to the 1986 publication of the CEARP Phase 1 document. It is possible that leakage from the original process waste line under Building 123 was the event referred to by CEARP Phase 1 interviewees. The waste constituents potentially released are similar, and it is possible that releases from the original process waste line could be considered "outside Building 123." Several PACs are associated with Building 123 releases which have occurred since 1986 (see PAC 100-601, PAC 100-602, PAC 100-603, and PAC 100-611). Because of anonymity of CEARP interviewees, the basis of the CEARP identification cannot be verified.

The boundaries of this PAC are proposed to be modified to include the area beneath the building that may have been impacted by the process waste lines. Additions to the building were constructed since the building was first constructed. The boundaries are indicated on Plate 2 to include the original shape of the building.

References

[1] 1501999
[2] Dow Chemical, 1975, Drawing Number 27216-5, "Replace Process Waste Line, Removal Plan," As-Built, February 5.
[3] Bokowski, D.L., 1992, Personal Communication, RFP Employee, March 19.
[4] Austin Company, 1952, Drawing Number RF-23-100-B, "Plumbing and Service Piping, Roof Drains, Sanitary Drain, and Process Drain," February 23.

[5] 1503382
[6] 1503375
[7] 1503370

PAC REFERENCE NUMBER: 100-600

IHSS Reference Number: Not Applicable

Unit Name: Mercury Spill - Valve Vault 124-B, Building 124

Approximate Location: N748,500; E2,081,500

Date(s) of Operation or Occurrence

July 25, 1990

Description of Operation or Occurrence

While removing two water flow transmitters from Valve Vault 124-B, located about 50 feet south of Building 124, mercury leaked out of one transmitter that was inverted for removal.[1,2] About fifteen minutes after the transmitters were removed, mercury was found on the valve vault floor and on the ground. Although the majority of the spilled mercury was confined to a six foot square area on the concrete floor of the valve vault, some mercury was spilled on the ground and concrete outside the valve vault. The mercury spill outside of the valve vault occurred while one of the transmitters was carried approximately six feet to the corner of the valve vault surface cement apron.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of approximately 2.75 pounds of mercury.[1,2]

Responses to Operation or Occurrence

Upon notification the Shift Superintendent, Environmental Restoration, Health and Safety, Industrial Hygiene, and the Hazardous Materials Response (HAZMAT) Team responded immediately.[1,2] The immediate response activities included the following.

- Flow transmitters were secured and bagged to prevent further releases of mercury.[1,2]
- The area of contamination was secured and cordoned off.[1,2]
- The sump pump was turned off and lockout/tagout performed.[1]
- The HAZMAT Team attempted to remove the mercury from the valve vault floor using a vacuum system (proved ineffective).[1,2]
- The HAZMAT Team covered the mercury with sulfur and swept it off the ground.[1]
- The HAZMAT Team removed contaminated soil outside the valve vault.[2]
- Industrial Hygiene monitored the activities with a Jerome Model #411 Gold Film mercury analyzer.[1,2]
- A plastic cover was constructed over the area to prevent rain water from spreading the mercury.[2]

Additional follow-up response activities were conducted. The incident was reported to Colorado Department of Health, United States Environmental Protection Agency (EPA) National Response Center, Department of

Energy Headquarters, and the local EPA.[1] Also, RCRA Contingency Plan Implementation Report No. 90-007 was prepared.[2]

On July 27, 1990 an outside contractor conducted an emergency cleanup of the valve vault and the surrounding ground and concrete. The contractor vacuumed the mercury from the valve vault and excavated mercury contaminated soil on July 27. Following the cleanup, soil samples were collected and analyzed. Analysis indicated mercury concentrations above desired cleanup levels.[2,3] Excavation and sampling efforts were repeated three more times (considered Phase 1, Phase 2, and Phase 3) until the desired cleanup levels were achieved.[4,5,6] In addition to excavation activities, Phase 2 clean-up operations included the application of sodium thiosulfate, a mercury absorbent, to the valve vault floor, the cement floor within Building 222 (Building 222 houses Valve Vault 124-B) and south of the building. Following this activity, vacuuming was conducted.[6]

Also, internal RFP design review and inspection procedures were revised to prevent further occurrences of similar incidents.

Fate of Constituents Released to Environment

Phase 3 soil samples were analyzed using both the Toxicity Characteristic Leaching Procedure (TCLP) and an inorganic analysis for total metals. The results to these analyses are:

- TCLP analysis in milligrams per liter (mg/l) 0.001, 0.030, and 0.040;
- inorganic analysis for total metals in milligrams per kilogram (mg/kg) or parts per million (ppm) 3.0, 5.3, and 6.9.[5]

The acceptable TCLP level of mercury contamination in the soil was indicated to be 0.2 mg/l.[5]

Comments

None.

References

[1] 1500270
[2] 1700802
[3] 1500271
[4] 1500273
[5] 1500269
[6] 1500272

PAC REFERENCE NUMBER: 100-601

IHSS Number: Not Applicable

Unit Name: Building 123 Phosphoric Acid Spill

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

Date(s) of Operation or Occurrence

April 13, 1989[1]

Description of Operation or Occurrence

Two five-gallon plastic containers of phosphoric acid, which were among old chemicals awaiting disposal in a storage cabinet outside of Building 123, deteriorated and leaked part of their contents onto the ground.[1,2]

Physical/Chemical Description of Constituents Released

Approximately one gallon of 1,2 ethylhexyl phosphoric acid leaked from the two containers. At the time the release was detected, approximately one cup (8 ounces) of the acid was on the ground around the cabinet.[1,2]

Responses to Operation or Occurrence

The RFP RCRA Compliance Coordinator was notified.[2] Recommended actions included immediate disposal of the remaining phosphoric acid.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

None.

References

[1] 1500260
[2] 1600461

PAC REFERENCE NUMBER: 100-602

IHSS Number: Not Applicable

Unit Name: Building 123 Process Waste Line Break

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

Date(s) of Operation or Occurrence

April 13, 1989[1]

Description of Operation or Occurrence

Valve Vault 17, located on Cottonwood Avenue between Building 443 and Building 444, was found on April 13, 1989, to be flooded with approximately 1,200 gallons of aqueous waste. Subsequent investigation showed the source of the waste to be a break in the process waste line in Manhole 1, south of Building 123.[1,2,3,4,5] Leakage from the break had migrated into bedding material surrounding the pipe and ultimately reached Valve Vault 17 through either pipe bedding materials (i.e., soils)[1,2,3] or a PVC electrical conduit.[4] The release also migrated into a section of the abandoned original process waste line (OPWL) network (PAC 000-121).[1,2,4] Discharge of Building 123 process waste into the broken line was discontinued on April 18, 1989, five days after the release to Valve Vault 17 was first detected. The potentially affected area includes the process waste line between Manhole 2 and Valve Vault 18 (immediately south of Building 123), the process waste line between Valve Vault 18 and Valve Vault 17, soils around Valve Vault 18 and Valve Vault 17, and the OPWL pipeline between Manhole 2 and Manhole 3.[1,2,4] In July 1989, groundwater containing blue dye used several months earlier to trace the release was observed seeping into excavations around Valve Vault 18.[6,7] According to one report, the release may also have reached the storm sewer system.[8] Numerous detailed reports address these actions.

Physical/Chemical Description of Constituents Released

The release consisted of Building 123 process waste. During the five day period between detection of the release and diversion of Building 123 wastes from the broken line, the following materials likely were released to the environment, based on typical daily quantities of wastes discharged from Building 123:[2]

- 25 gallons urine;
- 12.5 gallons nitric acid (unknown concentration);
- 20 gallons hydrochloric acid (unknown concentration);
- 1.5 pounds ammonium thiocyanate;
- 1.0 pounds ammonium iodide; and,
- 2.5 gallons ammonium hydroxide (unknown concentration).

The above would be diluted in approximately 2,000 gallons of tap water.[2]

Minor amounts of naturally-occurring uranium were detected in soil and water samples collected after the release.[9] Alpha activity up to 140 picocuries/liter (pCi/l) was recorded in samples of the waste from Valve Vault 17.[1] One water sample from a manhole south of Building 123 also contained 8 percent ethylene glycol.[10]

Responses to Operation or Occurrence

Process waste discharge to the broken line was discontinued. Soil sampling was conducted to determine the source and extent of the release. A temporary aboveground line was installed, and a replacement underground line was planned for completion by June 1, 1989.[2,3,5] Because the affected areas were near existing IHSSs scheduled for investigation and remediation activities (see PAC 400-122 and PAC 100-148), no cleanup was initiated.[2,4] The release was documented in RCRA Contingency Plan Implementation Report No. 89-003[11] and in Rocky Flats Plant Internal Investigation Report (IIR) No. 89-55.[3]

Fate of Constituents Released to Environment

Water and soil samples collected for several weeks after the release indicated that contamination levels (nitrate, chloride, and pH) decreased steadily after the broken line was bypassed.[4]

Comments

None.

References

[1] 1500284
[2] 1500252
[3] 1500282
[4] 1500285
[5] 1500250
[6] 1500259
[7] 1500283
[8] 1501266
[9] 1500253
[10] 1500286
[11] 1800027

Other References of Interest

1500254
1500251
1500249
1600441
1500265
1501265

PAC REFERENCE NUMBER: 100-603

IHSS 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[1]

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 the waste to overflow into the broken line. Part of this waste leaked around the plastic bag and into the excavation.[1,2,3,4] 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.[3]

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.[3] The calculated maximum volume of the spill was 30 gallons.[1,3] 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.[3]

Fate of Constituents Released to Environment

Results from eleven samples collected shortly after the incident to evaluate the spread of contamination indicated that contamination was restricted to the excavation within eight feet of Building 123.[3,5]

Comments

None.

References

[1] 1500258
[2] 1500255
[3] 1500966
[4] 1500257
[5] 1500256

Other References of Interest

1500261
1501075
1500259

PAC REFERENCE NUMBER: 100-604

IHSS Number: Not Applicable

Unit Name: T130 Complex Sewer Line Leaks

Location: N748,500; E2,079,500

Date(s) of Operation or Occurrence

Late September - early October 1990[1]

Description of Operation or Occurrence

Sanitary sewer pipes serving Trailer T130A, Trailer T130B, Trailer T130C, and Trailer T130D in the T130 trailer complex were discovered to be leaking in numerous locations. The leaks were blamed on poor construction coupled with inadequate inspection during initial installation. Poor cold weather precautions were also identified as a likely cause, suggesting that the pipes froze and cracked.[1] The T130 complex was installed in 1989-1990 and is used solely as offices.

Physical/Chemical Description of Constituents Released

The material released from the sewage lines is not described in detail. No estimate is available of the amount of material released.[1]

Responses to Operation or Occurrence

Domestic water to the trailers was turned off. The EG&G Clean Water Group determined that the release did not require a report to the State of Colorado provided water systems were not reactivated until repairs were complete. A plumbing contractor repaired the pipes.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The released material is believed to have been typical sanitary sewage. Although references indicate that the leakage occurred in sewer lines serving Trailers T130A, T130B, T130C, and T130D, the precise locations of the leaks are not known. The location shown for this PAC on the 100 Area PAC location map (Figure 100-1) is the entire T130 trailer complex.

References

[1] 1500246

PAC REFERENCE NUMBER: 100-605

IHSS Number: Not Applicable

Unit Name: Building 115 Hydraulic Oil Spill

Location: N749,500; E2,081,500 (near Building 115)

Date(s) of Operation or Occurrence

Week ending May 23, 1989

Description of Operation or Occurrence

Hydraulic oil spilled near Building 115 when a forklift hydraulic line ruptured. Several nearby vehicles were sprayed with oil.[1,2] It is not known whether the oil spilled onto soil or pavement.

Physical/Chemical Description of Release

Approximately two gallons of hydraulic oil were released.[1,2]

Responses to Release

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No information was found which detailed the fate of the constituents released to the environment.

Comments

The precise location of the hydraulic oil leak is not known. The location shown on the 100 Area PAC location map (Figure 100-1) is based on the roadway configuration around Building 115 and should be considered very approximate.

References

[1] 1500817
[2] 1600442

PAC REFERENCE NUMBER: 100-606

IHSS Number: Not Applicable

Unit Name: Building 125 TCE Spill

Location: N749,000; E2,081,500 (south dock of Building 125)

Date(s) of Operation or Occurrence

Week ending January 13, 1989[1]

Description of Operation or Occurrence

A small spill of trichloroethylene (TCE) occurred just south of the Building 125 south dock. The spill originated from a faulty valve on a supply drum. The material spilled onto asphalt.[1]

Physical/Chemical Description of Constituents Released

Approximately one-half pint (8 ounces) of TCE was released to asphalt pavement at the location.[1]

Responses to Operation or Occurrence

The TCE supply drum was immediately righted to prevent further spillage. It was determined that the release did not constitute a reportable quantity for the EPA. The faulty valve was to be replaced as soon as possible.[1] It is not known if the valve was replaced.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

None.

References

[1] 1600459

PAC REFERENCE NUMBER: 100-607

IHSS Number: Not Applicable

Unit Name: Building 111 Transformer PCB Leak

Location: N749,500; E2,081,500 (inside Building 111)

Date(s) of Operation or Occurrence

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. The transformer held approximately 500 gallons of cooling oil which contained PCBs.[1] This transformer was first documented to be leaking onto the underlying gravel in February 1984.[2]

On January 30, 1986 the EPA conducted a survey of the RFP to determine compliance with Federal PCB regulations. The inspection identified a number of leaking transformers, including the Building 111 transformer.[3] Follow-up inspection by the RFP indicated that leaks originated at the transformer's tap changer and oil sample valve.[1]

Physical/Chemical Description of Constituents Released

An unknown amount of PCB-bearing cooling 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 parts per million of Aroclor 260, a commercial PCB formulation, in a paraffin-based mineral oil.[4]

Responses to Operation or Occurrence

Samples collected in early 1984 indicated that PCB levels in the cooling oil were below the EPA regulatory limit of 50 parts per million. No corrective actions were documented at this time.[2]

Available documents suggest that the Building 111 transformer was cleaned and repaired in August 1986.[3] Documentation suggests the transformer was scheduled for replacement in 1987 or 1988.[2] Residual stain on the transformer concrete pad was noted in January 1987, and it was suggested at this time that the pad be coated with sealant.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700070
[2] 1700080
[3] 1700000
[4] 1700081
[5] 1700004

Other References of Interest

1700076
1700115
1700122

PAC REFERENCE NUMBER: 100-608

IHSS Number: Not Applicable

Unit Name: Building 131 Transformer Leak

Location: N749,000; E2,080,000 (north of Building 131)

Date(s) of Operation or Occurrence

June 3, 1989[1]

Description of Operation or Occurrence

A pole-mounted electrical transformer located north of Building 131 leaked dielectric fluid (cooling oil) onto the ground beneath the pole. The oil contained PCBs.[1] The cause of the leak was not found in the documentation.

Physical/Chemical Description of Constituents Released

Approximately 0.25 gallons of oil leaked from the transformer. The oil had previously been tested and found to contain 19 parts per million PCBs, indicating that the spill involved approximately 0.0006 pounds of PCBs.[1]

Responses to Operation or Occurrence

Because the release involved less than the ten pound reportable quantity of PCBs and the material released contained less than the 50 parts per million PCB concentration regulated by EPA, no spill cleanup was initiated.[1] No documentation regarding repair or replacement of the transformer was found.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700132

PAC REFERENCE NUMBER: 100-609

IHSS Number: Not Applicable

Unit Name: Building 121 Security Incinerator

Location: N749,500; E2,081,500 (south of Building 121)

Date(s) of Operation or Occurrence

No documentation was found which detailed the dates of operation. It is known that the incinerator was operating in December 1980[3] and was still in existence in 1985.[2]

Description of Operation or Occurrence

A security incinerator located south of Building 121 was used for incineration of classified documents.[1] During some period in its operating history, the incinerator was used to burn No Carbon Required (NCR) type paper containing PCBs.[1] It is known that ash from the incinerator was being disposed of at the Present Landfill (PAC NW-114) in December 1980[3]. It is not known if this was standard practice throughout the incinerator's operating history.

Physical/Chemical Description of Constituents Released

According to one source, "tons" of NCR paper containing up to 10-20 percent PCBs were burned in the incinerator.[1] Dioxins and furans could potentially have been generated from incineration of this paper.[2]

Responses to Operation or Occurrence

RFP proposed in 1985 that two to four smear samples be collected from the incinerator and analyzed at an offsite laboratory for dioxins and furans. A second sampling phase also was proposed if warranted by the results of these samples.[1] It is not known if the smear samples were collected.

Fate of Constituents Released to Environment

No documentation was found detailing the release of contaminants from the operation of this incinerator.

Comments

None.

References

[1] 1700117
[2] 1700111
[3] 1600231

PAC REFERENCE NUMBER: 100-610

IHSS Reference Number: Not Applicable

Unit Name: Asbestos Release - Building 123

Approximate Location: N749,000; E2,081,500

Date(s) of Operation or Occurrence

February 9, 1987

Description of Operation or Occurrence

A truck traveling west on Cottonwood Avenue, enroute to Building 123, Door 5, hit overhead steam and air pipes while taking a right hand turn on a driveway south of Building 123 (see Comments for additional location details). The steam pipes were insulated with asbestos.[1] This incident involved disturbing approximately 12 linear feet of overhead pipe with asbestos insulation.[2,3,4]

Physical/Chemical Description of Constituents Released

The release consisted of asbestos.[1]

Responses to Operation or Occurrence

Upon notification, the Shift Superintendent, Security, Industrial Hygiene, Health Safety and Environment (HS&E) Area Representative, and Trucking and Labor arrived at the scene. Response activities included barricading Third Street and Cottonwood Avenue, wetting down the asbestos on the truck and surrounding ground, transporting the truck to Building 331 for further decontamination, and repair of the overhead pipes. Industrial Hygiene conducted air monitoring during the response activities.[1]

Follow-up response activities included driver instruction on the proper access route to Building 123, Door 5, plans to label the clearance of all steam pipes with roadways underneath, and plans to stencil the height of the vehicle on the dash boards of all trucks with van boxes.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the asbestos released to the environment.

Comments

According to a site visit conducted on December 11, 1991 the incident location is approximately 105 feet east of Third Street near the Building 123 driveway and Cottonwood Avenue intersection.[5]

References

[1] 1501833
[2] 1502590
[3] 1502588
[4] 1502589
[5] 1503394

PAC REFERENCE NUMBER: 100-611

IHSS Number: Not Applicable

Unit Name: Building 123 Scrubber Solution Spill

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

Date(s) of Operation or Occurrence

November 7, 1989[1]

Description of Operation or Occurrence

An inoperative pump in the Building 123 process waste transfer system caused the Building 123 scrubber system to overflow, spilling scrubbing solution into a bermed area outside of the building and into three pits beneath the floor of the building. Also, approximately five gallons of liquid were present in and around a nearby storm water drainage ditch which serves the Building 123 Parking Lot. It was speculated at first that this liquid may have leaked from the berm wall interface with the underlying asphalt. However, it was later concluded that this liquid was not associated with the incident (i.e., it was in the ditch prior to the incident). All of the spilled solution was contained within secondary containment structures, and none of the solution was believed to have impacted the environment.[1]

Under normal operating conditions, the scrubbing solution drains into the process waste system when the scrubbing process was completed. The source of the process waste pump problem was determined to be that the waste pump switches were in the wrong position as well as blockage of the influent valve by glass filtering wool from Building 123.[1]

Physical/Chemical Description of Constituents Released

The scrubbing solution consisted primarily of water which is used to scrub acid/salts used in Building 123. Acids used in Building 123 include nitric acid, hydrofluoric acid, and hydrochloric acid. Approximately 50 gallons were released to the bermed area, and several hundred gallons were contained in the three pits beneath the Building 123 floor. Analyses showed the solution in the bermed area to have a pH of 1.6, while the solution in the three pits had a pH of 6.0.[1]

The five gallons of liquid in the parking lot drainage ditch did not react when sodium bicarbonate was applied, indicating that it was not acidic and that it was not scrubbing solution.[1]

Responses to Operation or Occurrence

Normal scrubbing solution drainage was restored when the glass wool material was cleared and the inoperative process waste pump was restarted. A submersible pump was used to transfer the scrubbing solution from the bermed area to process waste drains in Building 123. Measures were proposed to prevent subsequent buildup of glass wool in the process waste system.[1] A RCRA Contingency Plan Implementation Report (89-019) was made on this incident.

Fate of Constituents Released to Environment

All spilled materials were contained and transferred into the Building 123 process waste system for eventual treatment at Building 374.[1]

Comments

None.

References

[1] 1700792

PAC REFERENCE NUMBER: 100-612

IHSS Reference Number: Not Applicable.

Unit Name: Battery Solution Spill - Building 119

Approximate Location: 2,081,000; 749,000

Date(s) of Operation or Occurrence

July 9, 1991

Description of Operation or Occurrence

On July 9, 1991, a nickel-cadmium battery fell from a pallet of used batteries onto the pavement adjacent to the southeast corner of Building 119. Approximately three quarts of battery solution spilled onto the pavement.[1]

Physical/Chemical Description of Constituents Released

Approximately three quarts of potassium hydroxide solution were released to the environment. Solution from another battery used in the same system was analyzed. The specific gravity and the pH of the solution analyzed was found to be 1.23 and 14, respectively. The analytical results for cadmium and chromium concentrations in the solution were found to be 4.9 mg/l and 7.2 mg/l, respectively. Arsenic was detected at a level of 3.9 mg/l and selenium at a level of 0.86 mg/l.[1]

Responses to Operation or Occurrence

Upon discovery of the spill, the battery was placed upright and the RFP Fire Department was notified. The Fire Department Hazardous Materials team responded, contained the spill, cordoned off the area, cleaned up the spill using Oil-Dri, and placed the residue in a drum for disposal. A sample of the battery solution was taken for laboratory analysis. RCRA Contingency Plan Implementation Report No. 91-004 was submitted to the CDH.[1]

Fate of Constituents Released to Environment

The spill was confined to the pavement area which prevented any migration to ground water or surface water. The spilled battery solution was cleaned from the pavement and placed in a drum for disposal. The drum containing the battery solution residue and clean-up supplies was to be transferred to RCRA Storage Unit #1 until shipment for offsite disposal.[1]

Comments

None.

References

[1] 1503405

3.7 300 Area

The 300 Area is located in the northwest corner of the Rocky Flats Plant. It is bounded to the west and north by the buffer zone, to the east by the 700 Area and the 500 Area, and to the south by the 100 Area and the 400 Area. Some of the buildings (including Building 371, Building 373, and Building 374) are located within the Protected Area (PA). The more important buildings in this area are as follows:

- Building 331 contains the vehicle maintenance garage and the Fire Department. At one time a small section of this building was used for research and development using depleted uranium.

- Building 333 is the paint shop which houses painting and related operations at the RFP. These operations require the use of materials such as latex, acrylic, epoxy, and oil-based paints, lacquers and varnishes and vinyl lettering. The majority of waste generated from these procedures include empty paint cans, waste thinner, mineral spirits and paint.

- Building 334 contains facilities for industrial maintenance activities such as electrical work, carpentry, sheet metal work, machining and welding. Scrap metal, wood and plastic are included in the wastes generated.

- Building 335 is used for fire extinguisher servicing and training. It was used in the past, and to some degree today, as a training center for the Fire Department.

- Building 367 is currently used as a storage shed for heaters and lights. It was used in the past as a storage building for waste cans, pesticides, fertilizers and other chemicals.

- Building 371 was put into use in 1981. It houses production support processes that include residue repackaging, an analytical laboratory, and standards preparation and inspection. The operation of dicesium hexachloroplutonate (DCHP) preparation also takes place in this building. This procedure produces a salt used for removing americium from site-return metal. Building 371 houses several maintenance shops for service of process and building equipment in Building 371 and Building 374. The building is undergoing major modifications and most processes are not in operation.

- Building 373 is a water cooling tower and pump house. Water is pumped from Building 371 and Building 374 for cooling. This procedure uses sulfuric acid, bleach, chlorine gas and other chemicals. The process generates sump sludge, coolant water, steam or water evaporation of coolant water, used oil from the pump house and blowdown.

- Building 374 was put into use in 1980. It is the main process water treatment facility at the RFP. Aqueous wastes are piped in from various buildings and are also received in containers. The four processes that take place in Building 374 are acid neutralization, radioactive decontamination, sludge solidification and saltcrete production. The results of these procedures are a transportable, approved solid waste, clarified water for use in cooling towers, sludges and saltcrete. A series of interconnected tanks separate relatively clean liquid effluent from radioactive solids. The treatment operations use chemical agents such as sodium hydroxide, potassium hydroxide, magnesium sulfate, calcium chloride and ferric sulfate.

The following subsection contains detailed descriptions of PACs located in the 300 Area. These PACs are shown in Figure 300-1.

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PAC REFERENCE NUMBER: 300-128

IHSS Reference Number: 128, Operable Unit 13

Unit Name: Oil Burn Pit No. 1

Approximate Location: N750,000; E2,082,000

Date(s) of Operation or Occurrence

August 18, 1956

Description of Operation or Occurrence

On August 18, 1956 an experiment was conducted that involved the burning of contaminated oil in an area referred to as the garage oil burning pit.[1] The barrels were dumped on the south side of a pit located north of Building 331 and ignited. At one point rocks were thrown into the oil to agitate the surface to facilitate burning.[2]

Prior to the burning, several high volume air samplers were started to obtain background data; however, not all the samplers were started at the same time and several were not started for approximately one hour after the fire had been initially ignited. The report also documents the refueling and failure of a generator that was powering many of the samplers.[2] One sampler was placed in the path of the "black plume" which was moving at a 30 degree angle rising to a height of 40 to 100 feet. The plume moved in the general direction of Building 123.[2]

On reference states that Building 335 was constructed over the area impacted by the activity;[3] however, based on the review of aerial photographs, it apears that Sage Avenue and the Sage Avenue Ditch are now over the area impacted by the activity.

Physical/Chemical Description of Constituents Released

The oil that was burned originated from Buildings 444 and 881.[4] The impacted area involves approximately 70 cubic feet of depleted uranium (U-238).[5]

Reports documenting the incident conflict as to the exact amount that was burned on that day. A Health Physics Report from 1956 which details the incident, indicates that six drums were dumped into the pit (an estimated 200 gallons).[2] Other reports state that 10 drums of waste oil were burned.[1,3,4,5,6]

Responses to Operation or Occurrence

Filters from air samplers monitoring the experiment yielded alpha radiation readings ranging from 0.1 disintegrations per minute per square meter (dpm/m^2) to 30 dpm/m^2. The low reading was taken from the roof of Building 123 and the high was taken approximately 60 feet south of the burning pit directly in the smoke plume.[2]

A direct survey was conducted of the soils and oil residue within the pit. Two spots along the south bank of the pit where the oil was dumped were found to have meter readings of 500 and 750 cpm alpha activity.[2] Soil samples were taken but the results area unknown.

After the burning operation, the residue was left in place and the pit backfilled.[6] It is not known when the backfilling took place. The residues were not removed prior to further construction in the area.[7]

Fate of Constituents Released to Environment

This site is located along the drainage of Walnut Creek. Any movement of constituents from this area would enter this drainage.

This IHSS is being studied in accordance with the IAG schedule of OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

Data from the air filters was analyzed and it was decided it was acceptable for "the remainder of the oil" to be disposed of in a similar manner. Subsequent burning occurred at Oil Burn Pit No. 2 (PAC 900-153) until 1965.[7]

This PAC overlaps with PAC 300-134, the lithium destruction site, and PAC 300-171, the solvent burning area, which are all located adjacent to Building 335. Two of the air samplers were located on a road 100 feet south of the pit.[2] A 1955 aerial photos displays a dirt road 200 feet north of Building 331 and a pondlike structure 100 feet north of the road which is likely to be these areas of concern.[8]

Several references refer to an oil burn pit "east of Gate 6." For a while in the late 1950s, there was a gate north of Building 115 and west of Building 331 and was believed to have been labelled Gate 6. The gate numbering system has changed many times in the past and for a different time period in the 1950s, Gate 6 may have been on the east side of the manufacturing area. Some of the references to the oil burning activities east of Gate 6 may have been to this PAC or to Oil Burn Pit #2 (PAC 900-153) or to a previously unidentified PAC.

References

[1] 1600371
[2] 1600375
[3] 1601057
[4] 1500793
[5] 1502735
[6] 1500460
[7] 1600463
[8] 1502710

Other References of Interest

1500304	1600810
1500324	1600810
1500750	1500401
1501999	1500761
1501720	1500888
1600097	1500901
1600173	1501719
1601037	1700805

PAC REFERENCE NUMBER: 300-134

IHSS Reference Number: 134, Operable Unit 13

Unit Name: 300-134.1 Metal Disposal Site North Area (IAG Name: Lithium Metal Destruction Site)
300-134.2 Reactive Metal Destruction Site South Area

Approximate Location: N750,000; E2,082,000

Date(s) of Operation or Occurrence

1963 - 1970

Description of Operation or Occurrence

Reactive metal disposal was conducted in two locations north of Building 331. The first site coincides with IHSS 134; however, the boundaries have been enlarged. Detailed review of aerial photographs indicate that part of the site is now covered by Sage Avenue.[1] The second site is located in the corner formed by the L-shape of Building 331. Part of the roof and adjacent parking lot are included.

North Site

It is proposed that the north site be identified as PAC 300-134.1. Many documents indicate that lithium was burned in this area; however, interviews with RFP Fire Department employees present during these activities contradict this. They indicated that although some small amounts of lithium may have been destroyed at this location, magnesium was the primary constituent of concern.[2] Inspection of EPA aerial photographs reveal the presence of two pond-like structures roughly 250 feet north of Building 331. The westernmost pond measures 30 by 40 feet and the eastern pond is 15 by 20 feet.[1] Documents depicting the operations describe various size ponds.

The area impacted by these activities lies to the north of Building 335. The site was originally located in a depression adjacent to the Walnut Creek drainage at a projection north of Building 331 and west of Building 553. Aerial photographs clearly indicate construction modifications that took place in this area that affected the drainage pattern of Walnut Creek.[1] The construction of Sage Avenue began in the late 1960s and ended in 1970 when paving was completed. It now covers part of PAC 300-134.1. The drainage was also affected by construction of Building 371 in the early 1970s. Building 335 was placed over the southern part of the site in this same time frame.[2]

RFP photographs taken in 1966 show the presence of a white residue coating the depression in which the metal destruction took place.[3,4,5,6,7] Other photos taken from a distance show a dense black cloud coming from this area.[8,9] It is not known if the smoke plume was the result of metal destruction or a grass fire which were often caused by the burning activities.[10]

It was discovered through an interview of a former RFP employee that graphite was buried nearby. The graphite was discovered during an excavation process at the intersection of Fourth Street and Sage Avenue.[11] The interviewee was uncertain as to why or when the excavation took place.

South Site

A proposed new site, to be identified as PAC 300-134.2, is not a IHSS designated by the IAG; however, the activities of the two sites are not easily differentiated since documentation conflicts with interviewee statements.

This second site in located adjacent to the north side of Building 331 and includes a portion of the roof and adjacent parking lot. It is in the L-shaped corner of the building and the parking lot to the north that RFP Fire Department personnel indicate that lithium destruction took place.[2] A map found in one reference also indicates that lithium destruction took place at a location midway between Building 331 and Building 335.[12]

Lithium was originally burned by placing on the ground and sprinkling it with water.[13] Sometimes magnesium chips or a flammable material such as gasoline were used as initiators. On October 13, 1966 a firemen was injured during lithium destruction activities.[10] The use of this location for disposal of lithium on the ground was discontinued after this incident;[14] however, destruction of lithium in drums at the 331 parking lot is documented as late as 1969.

On September 5, 1969 lithium was being dissolved inside a barrel when it exploded (Appendix F). Lithium was dispersed in the area of the 331 Parking Lot and onto the roof of Building 331. The building has since been reroofed several times. The incident occurred soon after the addition was built onto the east end of Building 331.[2]

Physical/Chemical Description of Constituents Released

Exact amounts of lithium that were destroyed in this area are not documented; however, it is known that by 1970 approximately 400 to 500 pounds of metallic lithium were destroyed and their residues buried.[15] These amounts are thought to be a combination of lithium destruction that took place at this destruction site and at another site in the southeast part of the plant (PAC 900-140). The waste lithium originated from Building 444 and Building 881 and was not radioactively contaminated.[13]

Other reactive metals such as sodium, calcium, and magnesium, and some solvent-type chemical compounds were also destroyed in one or both of these sites.[12] Disposal by burning was enhanced with magnesium chips and other flammable items such as gasoline, oily rags, or paper.[10]

An interview was conducted on December 4, 1991 with a former RFP employee. It was stated that during the excavation at the Building 335 intersection approximately five to six cubic yards of graphite was uncovered. The graphite took the form of solids, molds, and fines.[11]

Responses to Operation or Occurrence

Residues resulting from metal destruction were covered.[16] The corners may have been marked[17] but none were found on a site visit conducted November 11, 1991.[18] Building 335 was subsequently placed on near this location, Sage Avenue was constructed over it, and the location was also disturbed by construction of Building 374.

Lithium destruction took place north of Building 331 until 1966 when the fireman was injured by an explosion related to the destruction of lithium.[10] Lithium destruction took place at the southeast part of the plant following this incident.[19] No documentation was found that detailed any type of remediation at this site.

Fate of Constituents Released to Environment

This site is located along the drainage of Walnut Creek. Any movement of constituents from this area would enter this drainage.

This IHSS is being studied in accordance with the IAG schedule of OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

This PAC overlaps with PAC 300-128, the oil burning pit, and PAC 300-171, the solvent burning area, which are all located under or adjacent to Building 335.

References

[1] 1502717
[2] 1503383
[3] 1800166
[4] 1800164
[5] 1700917
[6] 1700916
[7] 1800159
[8] 1500164
[9] 1800165
[10] 1500374
[11] 1503379
[12] 1500887
[13] 1500915
[14] 1500296
[15] 1601057
[16] 1700805
[17] 1500761
[18] 1503392
[19] 1500906

Other References of Interest

1500749
1502735
1501999
1700918
1800166
1800167
1800168
1800169
1800170
1800171

PAC REFERENCE NUMBER: 300-135

IHSS Reference Number: 135, Operable Unit 8

Unit Name: Cooling Tower Blowdown

Approximate Location: N751,000; E2,083,000

Date(s) of Operation or Occurrence

1980 - 1982

Description of Operation or Occurrence

The first documented use of the Building 373 cooling tower pond was on June 12, 1981 when the cooling tower was cleaned and the slurry portion was pumped into a small retention pond. During the night, some of the water leaked through the dirt dike and gate valve and drained into Walnut Creek.[1]

It can be seen in aerial photographs that the cooling tower was present as early as 1978.[2] A June 1, 1980 photo indicates a pond-like structure north of Building 374.[3] Utility drawings support this as the location of the cooling tower retention pond, indicating a "holding pond" where Tank 808A and Tank 808B are now located.[4] The drawings indicate a sluice gate at the northeast corner of the pond with connecting culvert that extends from it in a northeasterly direction. It is possible that the leak mentioned above was able to flow through this culvert to North Walnut Creek.

Physical/Chemical Description of Constituents Released

Generally, a corrosion-inhibitor is added to the cooling water. Phosphate-containing compounds were used after the late 1970s; chromate was used prior to this.[5] Because the switch from chromates to phosphates occurred in the same time period as the initiation of activity at the Building 373 cooling tower, it is possible the chromates may have been present in the cooling water blowdown. Analysis of the water from the above incident resulted in no detectable quantities of phosphates.[1] It is possible that prior to use of the pond, effluent from the cooling tower may have contained tritium.[6] This reference does not state what the tritium source would be.

Responses to Operation or Occurrence

In December 1981, a new gate valve was installed to prevent leakage.[7] No documentation was found which detailed clean-up operations.

Fate of Constituents Released to Environment

Prior to 1980, water from the cooling tower (stated in the reference as being in Building 371-374) was allowed to drain into Walnut Creek. This was occurring as late as October 1979.[6]

This IHSS is being studied in accordance with the IAG schedule of OU8. However, the information developed on this unit for the study indicates that the IHSS location presented in the IAG is inaccurate. HRR information indicates that the pond was north of Building 374 at the turn in the asphalt road.

Comments

Interviewees for the CEARP Phase 1 document indicated that the retention pond was located to the south of Building 374, however no documents could be found to support this.[8] In addition, there are no cooling towers located to the south of Building 374. It is proposed that this PAC should be located near the cooling tower where aerial photographs and utility drawings indicate a pond.[6]

References

[1] 1501176
[2] 1502714
[3] 1502715
[4] 1502727
[5] 1503448
[6] 1600217
[7] 1700477
[8] 1501999

Other References of Interest

1700805
1502735
1501067

PAC REFERENCE NUMBER: 300-151

IHSS Reference Number: 151, Operable Unit 8

Unit Name: Tank 262 Fuel Oil Spills (IAG Name: Fuel Oil Leak)

Approximate Location: N751,000; E2,082,500

Date(s) of Operation or Occurrence

1981 - 1988

Description of Operation or Occurrence

Tank 262 is an 47,500 gallon underground tank located north of Building 371 and Building 374. It was installed in 1980 and is overlain by a 15 by 25 foot concrete pad.[1] The first documented spill was on August 12, 1981 when about 196 gallons of No. 2 diesel fuel were spilled on the ground north of Building 374.[2] The size of the spill was 30 by 35 feet.[1] A second spill released 50 gallons of diesel fuel in July 1982.[3] In October of the same year 120 liters were spilled.[4] While conducting a routine system circulation of Tank 262, another spill of 10 to 20 gallons occurred in September 1988 when a vent was left open.[5]

Physical/Chemical Description of Constituents Released

Spills were limited to Number 2 diesel fuel. An estimated 400 cubic yards of soil were affected by the 1981 spill.[6]

Responses to Operation or Occurrence

Reports from the 1981 incident indicated that cleanup would be initiated when the ground dried.[2] It is documented that cleanup of the saturated soil occurred adjacent to the tank surface foundation after the 1988 spill and that the State Oil Inspector was notified.[5] A site visit conducted for the Phase I RFI/RI indicted that only small areas of staining one to three feet in diameter remained around the pad, suggesting cleanup of the larger 1981 spill.[1]

Fate of Constituents Released to Environment

One reference stated that the 196-gallon diesel fuel spill did not reach a water course.[2] No environmental impact was expected from the 50 gallon spill.[3] Permission was given by Environmental Sciences to use the 120 liters of diesel on roads on plantsite (PAC 000-501).[4]

This IHSS is being studied in accordance with the IAG schedule of OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

Although the boundaries for IHSS 151 have not been changed for the HRR it should be clarified that the area of concern includes Tank 262 and adjacent soils.

References

[1] 1503448
[2] 1700484
[3] 1700467
[4] 1501069
[5] 1500823
[6] 1500769

Other References of Interest

1501999
1502735

PAC REFERENCE NUMBER: 300-156.1

IHSS Reference Number: 156.1, Operable Unit 14

Unit Name: Building 371 Parking Lot (IAG Name: Building 334 Parking Lot)

Approximate Location: N750,000; E2,082,500

Date(s) of Operation or Occurrence

1969(?) - February 1973

Description of Operation or Occurrence

In February 1973, concern was raised because a contaminated soil pile north of Building 334 was located in the construction area for Building 371.[1] Inspection of aerial photographs shows evidence of soil being placed in this area as early as 1969 from unknown activities.[2] In February 1973, the soil was moved to an area east of the cargo container field (PAC 900-165).[3]

Physical/Chemical Description of Constituents Released

Some of the soil stored behind Building 334 originated from construction of an addition to Building 774[1] or from the removal of underground holding tanks in an area adjacent to Building 774.[4] The source of at least some of the soil in this PAC is more completely discussed in the narrative for PAC 700-146. Soil samples were taken before the pile was removed from behind Building 334. Results ranged from 3 to 704 disintegration per minute per gram.[5] The volume is stated as 250 cubic yards at the time of removal from the 300 Area.[6]

An interview with a former employee on December 6, 1991 revealed that some of the soil may have originated from Building 707.[7]

Responses to Operation or Occurrence

The soil pile was removed from the 300 Area and placed in the east end of the cargo container field.[3] See PAC 900-165 for additional information regarding the new location to which this soil was moved. A former employee recalled that some of the soil may have been transported to north and west of Building 559 until the area was eventually leveled out.[7] This augments CEARP Interview Notes which states that the soil was spread out over the hillside southeast of where Building 374 is located.[8] The 371 Parking Lot now covers the area of the soil pile.

Fate of Constituents Released to Environment

No documentation could be found which detailed the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU14. However, the information developed on this unit for the study indicates that the IHSS location presented in the IAG is inaccurate. HRR information indicates that the contaminated soil was located south of Building 371 and is now covered by the 371 Parking Lot.

Comments

Interviewees for the CEARP Phase 1 document indicated that the soil pile was located under what is now the Building 334 parking lot.[9] No documentation could be found to substantiate this. It is assumed that this is the same unit because the origins of the soil pile seem to correlate. EPA aerial photographs also exhibit signs of a soil pile in the southeast corner of what is now Building 371.[2] The location of this site has been moved to include the Building 371 Parking Lot, not the Building 334 Parking Lot as indicated on the IAG map.

Reference

[1] 1500919
[2] 1502712
[3] 1500333
[4] 1500321
[5] 1600438
[6] 1500872
[7] 1503381
[8] 1500755
[9] 1501999

Other References of Interest

1502735
1700805

PAC REFERENCE NUMBER: 300-171

IHSS Reference Number: 171, Operable Unit 13

Unit Name: Fire Department Training Ground (IAG Name: Solvent Burning Ground)

Approximate Location: N750,000; E2,082,000

Date(s) of Operation or Occurrence

1969 to Present

Description of Operation or Occurrence

Building 335 has been used in the past, and still is to some degree, for training of fire department personnel. The original, preconstructed building was placed in an area north of Building 331 after the 1969 fire (PAC 700-150.7). Experiments took place to test heat and water effects on different types of materials, for example, filter plenums.[1] Filter plenum tests were conducted inside the building and provided smokey, cramped, firefighting experience.[2]

One incident of burning is on June 9, 1972 when steel beams were tested in a fire by burning diesel oil in an open pit.[3]

Other types of training included the use of a large cross-shaped pan or a smaller square pan into which diesel fuel was placed and ignited. Most of the fuel was burned during the process although some was allowed to remain in the pan and mix with rainwater. The mixture was then dumped onto the ground. An inspection was conducted on December 11, 1990 by RFP Clean Water Act Division personnel. The large cross-shaped pan was found to have holes in it and oil contaminated soil was present around the pans. The contamination was thought to have spread to a nearby catch basin (storm drain) where a oily sheen could be seen on the surface of the standing water. Running water in a nearby ditch had no visible sheen.[4]

The area is still used today for fire fighting training. This type of training is conducted by the use of a "tree" constructed of metal that allows propane to escape from the "branches" of the tree. A large quantity of water is used during this process that is allowed to flow into the storm drain.[1]

A site visit was conducted on November 21, 1991. The cross-shaped pan was present but covered. The water standing in the storm drain (catch basin) still had an oily sheen on the surface. There was no evidence of soil contamination. Building 335 had a visible black residue along the top of the large, east-facing door.[5]

Physical/Chemical Description of Constituents Released

When this area was first used for training purposes, magnesium chips coated with a water soluble material were burned. Diesel fuel was the main material that was used. Gasoline was utilized to ignite the diesel fuel.[1] The fire fighters may have also used waste solvents.[6]

Responses to Operation or Occurrence

No documentation was found, and interviewees were unaware of any type of soil removal prior to Construction of Building 335. No soil or air sampling was conducted to the knowledge of one RFP Fire Department employee.[1]

Fate of Constituents Released to Environment

No documentation could be found which detailed the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

The building is underlain by the lithium destruction site (PAC 300-134) and an oil burning pit (PAC 300-128). It is proposed that the boundaries of this IHSS be extended to the north to include the drainage south of Sage Avenue and to the west to encompass Building 335.

The catch basin that was observed on several occasions to have a sheen on the surface is connected by underground pipe to the bedding of an underground gasoline storage tank located approximately 250 feet south of the catch basin. The 18,000-gallon gasoline tank is set in a gravel bed and the pipe drains any accumulated water to prevent the tank from floating. The tank and catch basin were installed in 1979. The gasoline tank services the pumps behind the garage and fire station and is used by RFP vehicles. It is possible that the sheen observed on the surface of the water in the catch basin is residual from the gasoline tank and not the activities related to the fire training east of Building 335.

Reference

[1] 1503377
[2] 1500749
[3] 1700145
[4] 1500801
[5] 1503392
[6] 1502735

PAC REFERENCE NUMBER: 300-181

IHSS Reference Number: 181, Operable Unit 10

Unit Name: Building 334 Cargo Container Area

Approximate Location: N750,000; E2,082,500

Date(s) of Operation or Occurrence

Summer of 1984 - July 1986

Description of Operation or Occurrence

This storage area was located to the north Building 334 and consisted of one cargo container with an area of 160 square feet. Although it had the capacity to hold up to eighteen drums, the maximum number of drums stored in the container was seven. No berms surround the area but a collection pan was located in the bottom of the cargo container. The container and drums have been removed from this area.[1]

Physical/Chemical Description of Constituents Released

Wastes stored in the container included machine oils, solvents, machine coolants and possibly low-level radioactive wastes.[1]

Responses to Operation or Occurrence

While in use, the storage container was monitored weekly on the inside and outside.[1] No other documentation was found which detailed the response to this operation.

Fate of Constituents Released to Environment

No documentation of spills or leaks were found in relationship to this unit. According to the closure plan, there is no visual evidence of a release to the environment.[1]

This IHSS is being studied in accordance with the IAG schedule of OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

This unit is no longer to be closed under Interim Status. The 1988 Closure Plan has been superseded by the RFI/RI Report.

Reference

[1] 1502689
[2] 1502735

PAC REFERENCE NUMBER: 300-186

IHSS Reference Number: 186, Operable Unit 13

Unit Name: Valve Vaults 11, 12, and 13 (IAG Name: Valve Vault 12)

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

1985 - 1989

Description of Operation or Occurrence

Valve Vaults 11, 12, and 13 are located inline along the process waste line south of Building 374 and west of Building 552. Several incidents have occurred in one or more of these valve vaults resulting in the release of process waste to the environment. These valve vaults are connected by the process waste lines and the containment lines which surround the pipes. In addition to the double-contained lines, the process waste lines are equipped with leak-detection sensors.

The first incident related to these valve vaults for which documentation was found was on June 12, 1985. Contractors excavating a drainage ditch along the south side of the PA in the northeast corner of the Building 371 Parking Lot broke the outer containment of four lines and the inner line of the low-level transfer line near Valve Vault 13. Soon after it was broken, pumping began from the process waste tanks in Building 460 to Building 374 allowing liquid to be released from the inner pipe.[1]

In June 1986, corrosion of a one-inch diameter hole in a black iron flange which was connected to a stainless steel piping system caused a release of process waste into Valve Vault 13. The liquid in the vault was recirculated by the sump pump. The sensor alarm sounded but was not responded to until the next day.[2]

Leakage of the process waste line between Valve Vault 12 and Valve Vault 13 was reported on October 24, 1986.[3] The process waste lines are designed to provide a constant slope between adjacent valve vaults to allow any liquid in the containment pipe to flow into a vault and trigger an alarm. No alarm sounded when the release occurred and it was determined at the time the leakage occurred that the lines had been previously repaired and reworked in 1981 or 1982 and that they were not replaced in a manner that allowed drainage. (No documentation could be found as to why the lines were repaired or replaced.) Instead a trap was created, allowing saturation of the bedding material and soil around the pipe.[4]

On June 1, 1987, a radioactive leak was discovered near Valve Vault 13 when contamination was found in the culvert drain collection basin. The leak was found to be in the high-level transfer line between Building 374 and Valve Vault 13.[5]

On September 13, 1988 Valve Vault 12 was flooded with 1,700 gallons of high nitrate solution during transfer between Building 774 and Building 374. A connection at a tygon tube became separated which allowed the leak to occur.[6]

In October 1989, a significant amount of liquid was found in Valve Vault 11, Valve Vault 12, and Valve Vault 13. The alarms had sounded in the Building 231 Pump House, Pump Station #1 and Valve Vault 19 but upon inspection no problems were found at these locations. The inspection continued and resulted in the discovery of liquids in Vaults 11, 12, and 13.[7]

Physical/Chemical Description of Constituents Released

Details of the spill in 1985 indicated a pH of 5 and 6 on litmus paper with a laboratory analysis of 7.2. The process waste consisted of Oakite and distilled water. It was estimated at the time that 1,700 gallons of liquid were pumped but only about 4.4 gallons were spilled onto the ground.[1]

The June 1986 incident involved an acidic liquid waste which corroded the iron flange.[1] In October 1986, the soil surrounding the pipe was saturated with a yellow liquid. Monitoring of the area disclosed alpha, beta, and uranium-238 contamination of up to 1.7×10^5, 5×10^4, and 9×10^2 pCi/l, respectively.[4] There were no abnormal amounts of other commonly found elements.[4] Analytical results from water samples indicated the presence of uranium, americium, plutonium, total alpha activity and total beta activity.[8,9]

A radioactive acidic solution was released in the June 1987 incident. Analytical results from samples taken in the culvert drain collection basin showed 42,000 pCi/l gross alpha activity and 13,000 pCi/l gross beta activity. Direct counts on soil and the culvert were reported as "high".[5]

The liquid that leaked in 1989 was approximately 10,000 gallons of solar pond water with a pH of 7.5 to 8.0. Analytical results of radioactivity levels indicated 3,122 to 7,134 pCi/l gross alpha activity.[7]

Responses to Operation or Occurrence

The pipe was repaired after the 1985 incident. Investigation at that time revealed no radioactive contamination. In June 1986, the black iron flange was replaced with a stainless steel flange with no release of contamination.[2] These repairs were thought to have contributed to the leak found in 1987 because the repairs were not compatible with the original design.[5]

After the leak had been detected in October 1986, an area 30 by 100 feet was excavated to locate the leak in the process waste lines. The repairs were completed on November 13, 1986. A series of small cofferdams was built to contain surface and groundwater, the collected fluids were eventually removed by a tank truck and placed in Solar Pond 207A.[10] Approximately 24 waste boxes of uranium-contaminated sand and gravel were shipped offsite for low-level radioactive disposal.[11] Cleanup was completed on December 8, 1986 by reducing the radiation levels to slightly above background.[11,12] The area was backfilled.[10]

A document written in May 1989, indicated that the backfilling of an excavation at this valve vault would have to be delayed for over a year because of legalities in dealing with the contaminated waste.[13] This excavation may be due to the flooding incident in 1988.

In response to the culvert contamination in 1987, dikes were installed in the drain path to prohibit further draining. Liquids were drained from the transfer pipe and pumped to a mobile tanker. The culvert was taken out and soil was removed until both alpha and beta counts were below 250 cpm. A Work Order was submitted to install a leak-detection device but it is not known if this was complete. The high and low level transfer lines were to have been replaced with fibercast piping and the containment piping was repaired to the original design specifications.[5]

The supervisor of Building 374 ordered pumping to be stopped from Building 778 and Building 774 in response to the 1989 incident. The RCRA/CERCLA office was notified. The appropriate lockout/tagouts were provided on the valves in Valve Vault 12 and in the Building 231 Pump House. The liquid was removed and repairs to the line were completed by October 22, 1989. The line was flowtested successfully. A RCRA Contingency Plan Implementation Report (89-015) was prepared and submitted on this incident.[7]

Fate of Constituents Released to Environment

There is no information available regarding the fate of constituents released to the environment. In addition it is not clear how much process waste may have been released. This is particularly true because it is unknown when some of the leaks began. Although all the valve vaults are equipped with alarms to indicate the presence of liquids in the vault, the alarms were not triggered by this event because of the improper slope of the drain lines. In spite of the clean-up activities radiation levels were still above background when cleanup was completed.[12,14]

This IHSS is being studied in accordance with the IAG schedule of OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

This PAC has been extended to include Valve Vault 11 and Valve Vault 13 in addition to Valve Vault 12 because the leaks occurred between the vaults and liquid flowed along the pipes to one or more of the vaults. The leaks affected all of these vaults and were therefore combined in the same PAC.

Reference

[1] 1600436
[2] 1501067
[3] 1501211
[4] 1600435
[5] 1600449
[6] 1600068
[7] 1700788
[8] 1500896
[9] 1500895
[10] 1600477
[11] 1501106
[12] 1501105
[13] 1501817
[14] 1600828

PAC REFERENCE NUMBER: 300-188

IHSS Reference Number: 188, Operable Unit 8

Unit Name: Acid Leak

Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

1983

Description of Operation or Occurrence

The CEARP Phase 1 Report documents an acid leak from a drum. The leak reportedly occurred near the east gate of Building 374. The ground was unpaved at the time of this incident.[2]

Physical/Chemical Description of Constituents Released

The drum contained a mixture of nitric acid and hydrochloric acid. The amount would have been a maximum of 55 gallons.[1] It is likely that the mixture was a waste metal leaching solution originating from the 400 Area which suggests that it might have contained some trace heavy metals.[2]

Responses to Operation or Occurrence

No documentation was found which detailed a response to this occurrence.

Fate of Constituents Released to Environment

According to the CEARP Phase 1 document, no environmental hazard should remain.[1] This IHSS is being studied in accordance with the IAG schedule of OU8. However, the information developed on this unit for the study indicates that the IHSS location presented in the IAG is inaccurate. HRR information indicates that the site should be closer to Building 371 and Building 374.

Comments

There is a dock located in the southwest corner where Building 371 and Building 374 intersect. This is the area where this site should be located.[2] Plate 2 reflects the change from the IAG map which had this site located south of Building 374. The dock normally handles drums of this type and contains a sump capable of handling a spill of this size; therefore, the spill must have occurred on the ground next to the building.[2]

Reference

[1] 1501999
[2] 1503448

PAC REFERENCE NUMBER: 300-206

IHSS Reference Number: 206, Operable Unit 10

Unit Name: Inactive Hazardous Waste Tank D-836

Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

1975 - 1987[1]

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. It has been identified as a portion of Unit #42 in the RCRA Part B Permit Application. Specifically it was identified as Unit #42.14.[1] The tank can be seen in a 1980 RFP photograph, situated at the northwest corner of Building 371 near Door 5.[2] Specifications for Tank D-836 can be found in the RCRA 3004(u) document.

A spill of condensate water occurred on February 18, 1980 when a line from the evaporator to the tank was disconnected.[3]

Physical/Chemical Description of Constituents Released

The tank was used to hold off-specification Building 374 Product Water, i.e., water too high in conductivity. The spill in 1980 was found to contain low concentrations of tritium.[3]

Responses to Operation or Occurrence

No documentation was found which detailed a response to this occurrence.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule of OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

This unit is no longer to be closed under Interim Status. The 1988 Closure Plan has been superseded by the RFI/RI Report.

It is proposed that the location of IHSS 206 be moved to the area believed to be occupied by the tank. This area is different than the location indicated on the IAG map which had the site located north of Building 374.

Reference

[1] 1502735
[2] 1800342
[3] 1501223

PAC REFERENCE NUMBER: 300-212

IHSS Reference Number: 212, Operable Unit 15

Unit Name: Building 371 Drum Storage, Unit 63

Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

1980 - Present

Description of Operation or Occurrence

Unit 63 is located in Room 3420 of Building 371 and is used to store transuranic (TRU) mixed solid waste. The storage capacity is 950 55-gallon drums or 259 cubic yards of solid waste. However, because of the Settlement and Compliance Order of July 1, 1989, the maximum allowed number of drums is 668.[1] No processing is done in Room 3420. Drums are brought to Building 371 from various sources at the Rocky Flats Plant and stored in Room 3420. From there, they are sent to a staging area prior to shipment to a disposal facility.

Physical/Chemical Description of Constituents Released

Interviews with operations personnel indicate that a release has never occurred from any drum stored in Room 3420.[1] Some of the allowable constituents of the waste include transuranic waste, carbon tetrachloride, 1,1,1-Trichloroethane (1,1,1-TCA) and toluene.[1] The Interim Status Closure Plan provides a complete list of hazardous constituents.

Responses to Operation or Occurrence

Unit 63 is currently in use. No documentation was found which details a response to the operation.

Fate of Constituents Released to Environment

No documentation was found which detailed a release associated with Room 3420. Walls, floors and berms are all constructed of concrete with an epoxy finish and drums are placed on pallets to protect them from other liquids and allow for inspection.

This IHSS is being studied in accordance with the IAG schedule of OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

Closure Plan comments were received by DOE on May 1, 1990, and responded to, but these responses were never incorporated into the Closure Plan. The DOE has requested that this unit no longer be reviewed by the regulators since it was needed as part of the total maximum storage volume.[2]

References

[1] 1502700

PAC REFERENCE NUMBER: 300-700

IHSS Reference Number: Not Applicable

Unit Name: Scrap Roofing Disposal

Approximate Location: N750,000; E2,082,000

Date(s) of Operation or Occurrence

1955 - 1981

Description of Operation or Occurrence

During construction of the PSZ (now referred to as the PA) in March 1981, an old burial trench was discovered approximately 500 yards northwest of Building 371.[1] Other documents suggest a more westerly location.[2] The garage foreman in 1981 recalled seeing trash and other building material in an excavation as early as 1955 and also remembers covering the hole in 1968 after roofing material was added in 1965 through 1968.[3] A 1975 document states that valves, pipefittings, tire chains and other subcontractor material were buried "north of 331" and "north of the firebarn".[4]

Physical/Chemical Description of Constituents Released

Material that was uncovered in 1981 was primarily roofing material, styrofoam, asphalt and plastic sheeting.[1] The source of the roofing material is not known. One report cites dumping from 1965 to 1968 with the material originating from Buildings 776 and 883.[4] Another source states that it originated from Buildings 881 or 444 and was disposed of in the early 1970s.[1]

Responses to Operation or Occurrence

During the trench excavation and clean-up activities, the material was monitored with no detection of radioactivity on the material or in the trench.[2,7] The scrap was moved to the sanitary landfill.[2]

Fate of Constituents Released to Environment

Due to the limited documentation regarding disposal in the 1960s, it is unclear if any release to the environment occurred.

Comments

None.

References

[1] 1501184
[2] 1500765
[3] 1501181
[4] 1500886

PAC REFERENCE NUMBER: 300-701

IHSS Reference Number: Not Applicable

Unit Name: Sulfuric Acid Spill, Building 371

Approximate Location: N750,000; E2,082,500

Date(s) of Operation or Occurrence

December 20, 1989

Description of Operation or Occurrence

On December 20, 1989 a 55-gallon drum containing twenty gallons of sulfuric acid solution was found ruptured on Dock 9T on the east side of Building 371/374. The cause of the rupture was attributed to freezing and thawing of the contents during collection and transportation from the generation point to the 90-day accumulation point located at Dock 9T. Approximately half of the spilled solution flowed through Door 8 onto Dock 8 where it was contained in the sloped bermed area.[1]

Physical/Chemical Description of Constituents Released

Approximately nineteen of the twenty gallons of dilute sulfuric acid solution were spilled. The drum contained a composite of eight different containers which had a pH between 2 and 8 prior to being emptied into the drum. Analytical results of the liquid in the drum indicated a pH of 1.36.[1]

Responses to Operation or Occurrence

The solution was removed from the floor with a wet vacuum, the floor was washed and the wash water was removed with the wet vacuum. The solution was removed from the vacuum, sent to the process waste system through the process sump collection Tank D-85 via the Building 374 floor drain system. The gallon contained within the drum was transferred to another container and then processed.[1]

RCRA Contingency Plan Implementation Report No. 89-023 was submitted as per 6 CCR 1007-3, Part 265.56(j).

Fate of Constituents Released to Environment

The solution was contained on Dock 9T and the adjacent Dock 8. This reference states that "there was no actual or potential threat to human health and the environment".[1]

Comments

None.

References

[1] 1700796

PAC REFERENCE NUMBER: 300-702

IHSS Reference Number: Not Applicable

Unit Name: Pesticide Shed

Approximate Location: N750,500; E2,810,500

Date(s) of Operation or Occurrence

1952 - 1988

Description of Operation or Occurrence

Building 367 has been used to store pesticides and herbicides since 1952 when the first spillage is assumed to have occurred.[1] In 1988, large quantities were being stored there and the building showed signs of spills and leakage. There were no spill containment features; therefore, release of contaminations to a nearby drainage ditch may have been possible.[2]

Physical/Chemical Description of Constituents Released

Large quantities of pesticides and herbicides were stored and mixed in Building 367 from 1952 to 1988. Equipment and containers were cleaned and the rinsate water dumped onto the ground outside the building.[2]

Responses to Operation or Occurrence

In 1988, the unused chemicals were disposed of in an unknown location and the area around the building was cleaned up. Soil sampling was scheduled for the fall of 1988.[1] No documentation was found which verified that was ever completed.

Fate of Constituents Released to Environment

It was assumed at the time that these references were written that 90% of contaminated runoff from this area would be captured in the on-site drainage ponds.[1]

Comments

None.

References

[1] 1501068
[2] 1500768

PAC REFERENCE NUMBER: 300-703

IHSS Reference Number: Not Applicable

Unit Name: Building 331 North Area

Approximate Location: E2,082,000; N749,000

Date(s) of Operation or Occurrence

October 1970

Description of Operation or Occurrence

On October 7, 1970 preheated road oil vapors in a tar trailer ignited when they came in contact with the hot burners that had just been turned off. Vapors were directed against hot burners when the tar trailer lid was closed to transport preheated oil to the job site.[1] The hot oil was to be used on roads.

Physical/Chemical Description of Constituents Released

The constituents released were oil vapors and the residual of burned road oil.

Responses to Operation or Occurrence

The vapors fire was extinguished by the Fire Department with water and dry chemical.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1500315

PAC REFERENCE NUMBER: 300-704

IHSS Reference Number: Not Applicable

Unit Name: Roof Fire, Building 381

Approximate Location: E2,082,300; N750,500

Date(s) of Operation or Occurrence

October 1982[1]

Description of Operation or Occurrence

A small fire occurred on the roof of Building 381 while venting a leaking cylinder of fluorine. The fluorine attacked the iron vent pipe causing the release of smoke and vapor.[1]

Physical/Chemical Description of Constituents Released

Smoke and fluorine vapors were released.

Responses to Operation or Occurrence

No documentation was found which detailed response to the occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1501039

PAC REFERENCE NUMBER: 300-705

IHSS Reference Number: Not Applicable

Unit Name: Potassium Hydroxide Spill North of Building 374

Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

May 1989

Description of Operation or Occurrence

During this event, a small spill of potassium hydroxide occurred at the storage tank on the north side of Building 374. A small amount of the caustic mixed with rainwater in the containment berm.

Physical/Chemical Description of Constituents Released

The spill consisted of potassium hydroxide.

Responses to Operation or Occurrence

The leaking flange was repaired. The liquid was pumped back into the process waste stream.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1500820

PAC REFERENCE NUMBER: 300-706

IHSS Reference Number: Not Applicable

Unit Name: Evaporator Tanks North of Building 374

Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

May 24[1] or May 26[2], 1989

Description of Operation or Occurrence

While performing a pressure test of Tank 805, a leak occurred from a defective gasket.[2] Tank 805 is the fourth vapor body on the evaporator system which concentrates low-level mixed waste.[1] It is located north of Building 374 and has a 20,000 gallon capacity.[2]

The liquid spilled onto the plywood decking, leaked through the decking and dripped onto the concrete slab located roughly 22 feet below on the ground. The concrete pad slopes toward a sump embedded in sand in which the liquid was contained.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of approximately two gallons that had mixed with roughly sixty gallons of rainwater. The waste stream, which originated from various buildings on plantsite, typically involves a variety of chemicals, generally slightly basic, and salts. The waste was concentrated to a specific gravity of 1.3, in effect 35% solids. Analytical results of samples taken for the sump pit contain 25-50 mg/l nitrate, 0.1 mg/l total chromium, greater than 10.02 mg/l silver, 2 to 32 pCi/l gross alpha activity, and 1.03 pCi/l gross beta activity.[1]

Responses to Operation or Occurrence

Pressure was relieved on the tank and the test discontinued.[2] Radiation Monitoring smeared the area and did not find any contamination. Samples were of the liquid in the sump. The plywood was cleaned with soap, wipes and cotton towels. The concrete was washed with soap and water with all liquid contained in the sump. The liquid was pumped to Tank D-852 via the main process waste system. The saturated sand and all cleaning materials were bagged and treated as low-level mixed waste. The gasket was repaired and the tank placed back in service.[1]

RCRA Contingency Plan Implementation Report No. 89-005 was submitted as per 6 Colorado Code of Regulations (CRR) 1007-3, Part 265.56(j). A RCRA Contingency Plan Implementation Report (89-005) was prepared and submitted for this incident.[1]

Fate of Constituents Released to Environment

All materials that were contaminated were collected and treated as low-level mixed waste. The liquid contained within the sump was sent through Building 374's waste treatment system.[1]

Comments

None.

References

[1] 1800029
[2] 1501264

PAC REFERENCE NUMBER: 300-707

IHSS Reference Number: Not Applicable

Unit Name: Sanitizer Spill

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

October 31, 1985

Description of Operation or Occurrence

A tank from a truck owned by an off-site vendor leaked sanitizer on the shoulder of the road at Sixth Street and Sage Avenue.[1]

Physical/Chemical Description of Constituents Released

Approximately three gallons of sanitizer were spilled. The sanitizer consisted of a water and formaldehyde mixture.[1]

Responses to Operation or Occurrence

The tank of the truck was drained into buckets. The truck left site and was ordered to have the tank fixed before returning to RFP.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1600546

PAC REFERENCE NUMBER: 300-708

IHSS Reference Number: Not Applicable

Unit Name: Transformers North of Building 371

Approximate Location: N750,500; E2,082,500

Date(s) of Operation or Occurrence

Unknown - Present

Description of Operation or Occurrence

North of Building 371 are six transformers; 371-1, 371-2, 371-3, 371-4, 371-5, and 371-6. Transformers 371-7 and 371-8, located in Room 3581 of Building 371 have been included to provide information only, not to imply that they leaked. However, it was noted in one reference that the area outside Room 3581 had the potential to be contaminated by a transformer spill or fire.[1]

Transformer 371-1 had staining on the pad beneath the valve at the time this reference was written (1991) which indicates leakage. The transformers are all located within a rock-filled berm.[2]

Please see Appendix I for a table summarizing these transformer's characteristics.

Physical/Chemical Description of Constituents Released

Please see Appendix I for a complete description of the constituents released to the environment.

Responses to Operation or Occurrence

Please see Appendix I for a complete description of the constituents released to the environment.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700063
[2] 1503365

Other References of Interest

1700056
1700001

PAC REFERENCE NUMBER: 300-709

IHSS Reference Number: Not Applicable

Unit Name: Transformer Leak - 334-1

Approximate Location: N749,500; E2,082,500

Date(s) of Operation or Occurrence

1975 to 1986

Description of Operation or Occurrence

Transformer 334-1 is located on a concrete pad and surrounded by a concrete berm adjacent to the northwest side of Building 334. RFP Utilities records indicate the transformer has had several previous locations.[1] This 500 KVA transformer was manufactured in 1975.[2] In June 1986, Transformer 334-1 was reported as leaking.[3]

Physical/Chemical Description of Constituents Released

Transformer 334-1 contains 285 gallons of dielectric fluid.[4] The transformer contained mineral oil with 772 ppm PCBs prior to flushing in 1986.[3,5,6]

Responses to Operation or Occurrence

The dielectric fluid of transformer 334-1 was flushed in 1986.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

In November 1977, a transformer which had been drained was moved inside of Building 334 where the residual fluid was flushed.[7] Reference 7 does not indicate if the transformer moved into Building 334 for flushing was Transformer 334-1. Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References	Other References of Interest
[1] 1503365	1700026
[2] 1700063	1700083
[3] 1700074	1700084
[4] 1700129	
[5] 1700072	
[6] 1700027	
[7] 1700033	

PAC REFERENCE NUMBER: 300-710

IHSS Reference Number: Not Applicable

Unit Name: Gasoline Spill North of Building 331

Approximate Location: 2,082,000; 749,500

Date(s) of Operation or Occurrence

August 30, 1991

Description of Operation or Occurrence

On August 30, 1991, approximately 2 gallons of unleaded gasoline were spilled from the vent on a contractor's supply truck.[1]

Physical/Chemical Description of Constituents Released

The spilled material was unleaded gasoline.

Responses to Operation or Occurrence

The resultant waste, approximately 5 cubic feet, was packaged and transported to the Building 331 90-day accumulation area.[1] RCRA Contingency Plan Implementation Report No. 91-018 was submitted to the CDH.[1]

Fate of Constituents Released to Environment

The spill was contained and removed immediately to be managed as a RCRA-regulated hazardous waste for its benzene content.[1]

Comments

None.

References

[1] 1503416

3.8 400 Area

The 400 Area is located in the south central portion of the RFP. It is bounded to the south by the buffer zone, to the east by the 600 Area, to the west by the 100 Area, and to the north by the 300 Area. See Figure 400-1 for details on PAC locations within this area. Some of the buildings are within an inner security fenced seclusion area. The more important buildings in this area are as follows:

- Building 427 houses an emergency electrical generator that is used only in the rare event of a power failure.

- Building 428 houses the tank and pump system used to store and transfer aqueous wastes from Building 122 and Building 123 to Building 374 for waste treatment. The pump also transfers aqueous wastes from Building 444 to Building 374. The waste streams that enter the vault valve system associated with Building 428 include biological wastes, acids, bases, detergents and plating wastes.

- Building 440 was placed into service in 1971. Its original use was as a production control warehouse. For the past few years, it has been used as a modification center for DOE railroad cars and tractor trailer vehicles.

- Building 441 was placed into service in approximately 1953. Its original use was as a general analytical laboratory. In the mid-1960s, the laboratory facilities were removed and the building was converted to administrative offices.

- Building 442 was placed into service in 1953. It was originally used as laundry for the cleaning of clothing. The clothing was from the garage, general maintenance and Building 444. Clothing from Building 444 had the potential to be contaminated with low-levels of depleted uranium and beryllium. In approximately 1972, the laundry equipment was removed and the building was converted to its present use as a filter test facility. New High Efficiency Particulate Air (HEPA) filters used in building exhaust ventilation systems and respirator cartridges are tested and certified in the building.

- Building 443 was placed in service in 1953. This building houses the steam generation plant. Water is softened, deaerated and transferred to boilers to make steam for use in process heating and cleaning operations. The steam boilers are normally operated using natural gas. Number 6 diesel fuel is used as a backup fuel. This fuel is stored in two large tanks that are located about one block east of Building 443. Tanks containing sulfuric acid and sodium hydroxide are located on the east side of the building. These materials are used for boiler descaling and neutralization.

- Building 444 was placed into service in 1953. This building is used for the manufacturing of depleted uranium and beryllium components. The beryllium work began in approximately 1958. Also, some normal uranium fabrication was performed in the early years of Building 444 operation. Major processes conducted in the building include machining, welding and cleaning. There is also a foundry and a laboratory in which parts can be etched, electroplated and coated.

- Building 445 was placed into service in 1958. This building houses graphite- and steel-cutting operations. Graphite is also machined into molds in this building. Also, steel and other materials are stored in the building.

- Building 447 was placed into service in 1956. This building houses both assembly-related processes and waste-related processes. In Building 447, metal parts from Buildings 444 and 460

are cleaned, leak-tested, welded, and heat treated. The heat treatment process is designed to relieve stress and machining damage in the parts. In the past, a chip roaster was used to convert depleted uranium chips from Building 444 to uranium oxide.

- Building 453 was placed into service in 1973. This building is used for storage of new oils, grease, and other non-hazardous materials. The building was formerly a RCRA 90-day collection area for hazardous waste; however, it now houses only non-hazardous waste.

- Building 460 was placed into service in 1984. This building is used for the production of non-radioactive weapons components. The major activity performed in this building is the fabrication and assembly of stainless steel components. Activities also include cleaning and inspection.

The 400 Area also includes several support buildings that contain cooling towers and ventilation exhaust systems. The following section contains detailed descriptions of PACs located in the 400 Area.

PAC REFERENCE NUMBER: 400-116.1

IHSS Reference Number: 116.1, Operable Unit 12

Unit Name: West Loading Dock - Building 447 (IAG Name: West Loading Dock Area)

Approximate Location: N748,500; E2,082,000

Date(s) of Operation or Occurrence

1956 (Date Building 447 first occupied) - Present

Description of Operation or Occurrence

The west loading dock is located on the north side of Building 447 and is west of Building 444. Manufacturing operations conducted in both buildings deal mainly with beryllium and depleted and enriched uranium.[1] Drums containing non-radioactive solvents may have also been stored on the dock.[2] Building 453, located in the alcove formed by Buildings 447 and 444 (See Figure 400-2), was known to have stored oil (PAC 400-182). Spills and leaks may have impacted soil and groundwater beneath the dock.

Physical/Chemical Description of Constituents Released

No documentation was found detailing releases on the west loading dock itself; however, there is record of oil surfacing around Building 453 which is located just north of the dock.[3] There is a possibility that solvents were stored at this site as well as at the south loading dock.[2] Due to the nature of operations in Buildings 447 and 444, there may be infiltration of radioactive materials into the surrounding soils. Hydrocarbons may also be present in the soils due to leaks and spills.[2]

Responses to Operation or Occurrence

A sitewide radiometric survey was performed from 1977 through 1984. The purpose of the survey was to identify surface areas extremely contaminated with plutonium.[4] The area around Building 444 and Building 447 was surveyed in April and May 1984. Areas south of Building 447, and west of Building 447, and north of Building 453 were identified as areas which could not be surveyed due to high-level background radioactivity.[5,6]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

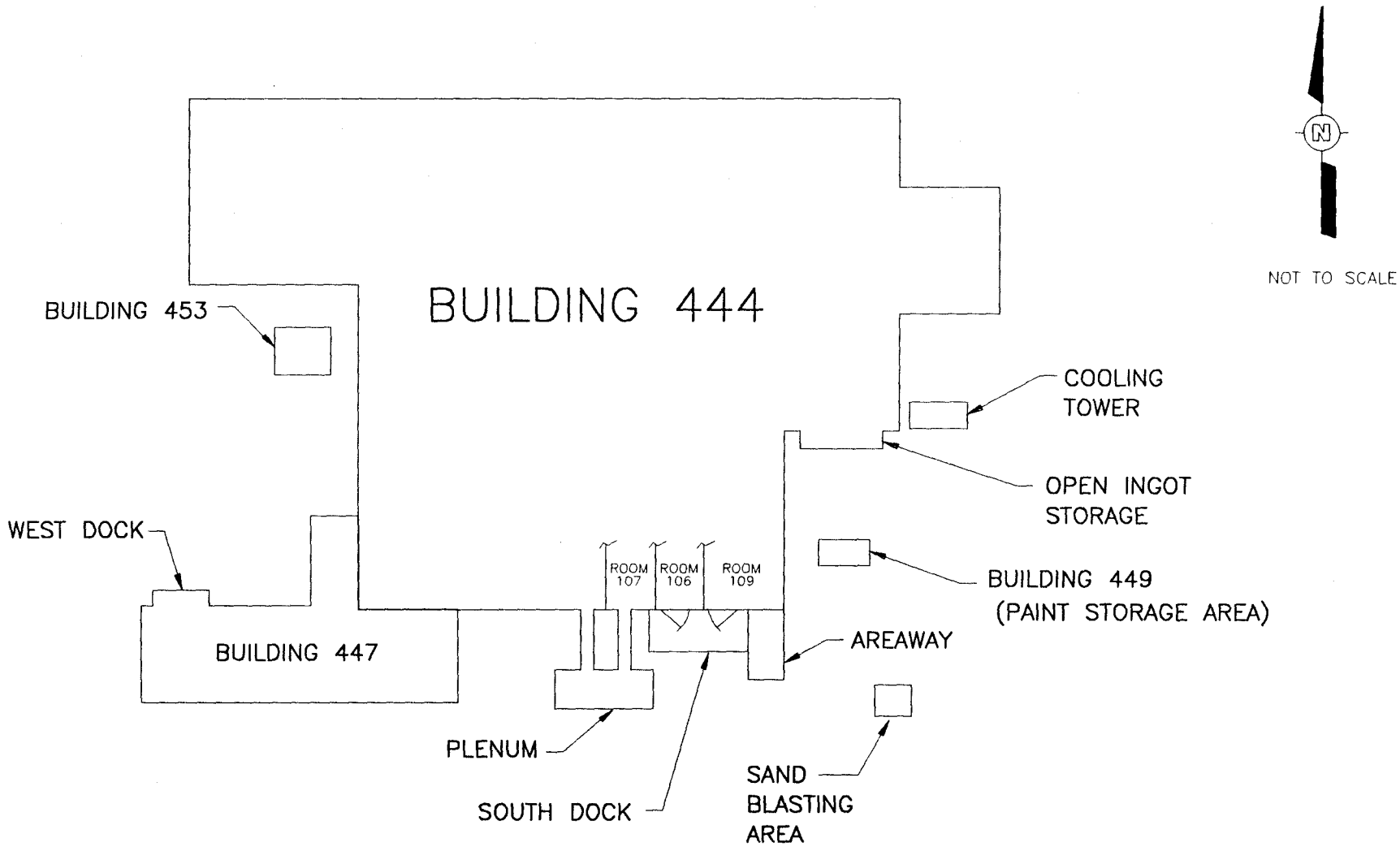
This IHSS is being studied in accordance with the IAG schedule of OU12. However, the information developed on this unit for the study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

The location of IHSS 116.1 presented in the IAG is nearly accurate. However, low-level, oblique photographs clearly show the dock along the north side of Building 447 extends farther to the west than shown in the IAG.[7,8,9] It is proposed that IHSS 116.1 (PAC 400-116.1) be extended further west to include the dock area shown in photographs.

References

[1] 1601057
[2] 1502735
[3] 1700460
[4] 1503375
[5] 1503373
[6] 1503372
[7] 1502537
[8] 1502538
[9] 1502539



REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 400-2, 12/17/91, PROJECT NO. 506-10.

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 400-2

TITLE:
BUILDINGS 447, 444 AND 453 LAYOUT

PROJ. NO.	304944	DWG. NO.	304944-A96	SHEET
DESIGN BY	A. VIRGIL	CHECKED		OF
DRAWN BY	A. VIRGIL	APPROVED		
DATE	5/13/92	SCALE	NOT TO SCALE	

4944A96 05/13/92 9:02am AWK

BACK OF FIGURE 400-2

PAC REFERENCE NUMBER: 400-116.2

IHSS Reference Number: 116.2, Operable Unit 12

Unit Name: South Loading Dock, Building 444 (IAG Name: South Loading Dock Area)

Approximate Location: N748,500; E2,082,500

Date(s) of Operation or Occurrence

1953 (date Building 444 first occupied) - Present

Description of Operation or Occurrence

The south loading dock is located on the south side of Building 444 and east of Building 447 (Figure 400-2). Many incidents have contributed to possible contamination in this area. In 1953, high winds blew the lids off drums stored there releasing uranium to the dock, sidewalks, and driveways.[1]

On August 30, 1954, while vacuuming in a centrifuge, the motor of a portable vacuum short circuited. When the chips in the vacuum receptacle ignited, the receptacle was taken to the dock (known then as Dock No. 2). To extinguish the fire, the bag's contents were transferred to a steel drum and Metal-X powder was added. The explosive nature of the burning material released "gross" amounts of airborne contamination to the outside atmosphere and covered the dock and the adjacent areaway with oxide. The areaway is the pit entrance to the basement that is used to store cyanide and graphite drums.[2]

In October 1955, a 55-gallon drum of perclene still bottoms and nitric acid stored on the dock leaked and sprayed its contents onto two workers who were in the areaway adjacent to the dock.[3]

Until 1970, chlorinated hydrocarbon solvents used to rinse beryllium parts were dumped on the ground outside Room 106 which opens to the dock.[4]

Physical/Chemical Description of Constituents Released

Constituents which may have contaminated the soils around the south dock include enriched and depleted uranium, beryllium and chlorinated hydrocarbon solvents.[1,2,3,4,5]

High winds in 1953 resulted in direct uranium activity readings as high as 7,500 dpm/100 cm^2 and smear readings with a maximum of 350 dpm.[1] In 1954, air count results during extinguishing operations were as high as 33,000% of the maximum permissible limit (MPL) average on the dock. Direct counts in the dock area were as high as 1,372 dpm.[2]

Analytical results of soil samples taken at two to four inches below ground surface indicated 350 to 1,000 micrograms of beryllium per gram of soil due to dumping of chlorinated hydrocarbon solvents. Normal concentrations are 0.01 to 2 micrograms per gram of soil.[4]

Responses to Operation or Occurrence

In 1953, the dock and sidewalks were cleaned and the driveway seal coated.[1] After the vacuum incident, the dock was cleaned but the pit had not been decontaminated at the time this reference was written.[2] There is no discussion of cleanup in the reference pertaining to the perclene drum leak in 1955; however, the leaks were plugged and the drum moved. The contents of the drum were transferred to a stainless steel drum and treated

with caustic.[3] Environmental Control was looking into possible removal of soils in this area, in 1975, but it is not known if this was accomplished.[6]

Environmental Control personnel conducted air sampling in the area of solvent dumping from June 20 through September 20, 1977.[5] The average concentration was 9.0×10^{-4} micrograms/m^3 which was 9% of the EPA standard. It was concluded that soil removal was not necessary.[5]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU12. However, the information developed on this unit for the study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

The IAG locates IHSS 116.2 as west of the plenum which is south of Building 444. Low-level oblique photographs clearly indicate that the dock is east of this plenum.[7] It is proposed that IHSS 116.2 (PAC 400-116.2) be reduced in size and relocated east of the plenum south of Building 444.

References

[1] 1601057
[2] 1700189
[3] 1500644
[4] 1500555
[5] 1600268
[6] 1500424
[7] 1500284

Other References of Interest

1500981
1500515
1500994
1600234
1500994

PAC REFERENCE NUMBER: 400-122

IHSS Reference Number: 122, Operable Unit 9

Unit Name: Underground Concrete Tanks

Approximate Location: N749,000; E2,082,000

Date(s) of Operation or Occurrence

1952[1] - June 1982[2]

Description of Operation or Occurrence

There are two interconnected underground tanks south of Building 441. Both tanks are concrete and each has a capacity of 3,000 gallons. The tanks were part of the original process waste line system and were used to handle the waste from Building 123 and Building 441 and possibly from Building 122 and Building 444.[1] Interviewees for the CEARP Phase 1 document mentioned that leaks may have occurred.[2] At times, the tanks have been known to fill with groundwater which has been pumped out and sent to waste treatment.[3]

The tanks were originally 60 feet south of Building 441. In 1966, the building was converted from a laboratory to an office building.[1] The Building 441 addition was constructed over a span of approximately 7.5 feet of the existing tank system. At this time, portions of the tank walls may have been removed to accommodate the construction of Building 441.

The tank system is comprised of two tanks. One of the tanks is constructed of concrete with a partial limestone lining and is located beneath the building. The other is a two-chambered tank that is located underground directly outside the building. The two-chambered tank received inflow from the limestone tanks and has a combined capacity of approximately 6,000 gallons. Because of the conversion of Building 441 activities, waste was no longer generated from this source; however, both tanks may have received waste from Building 123 as late as June 1966.[1]

Documentation was found for only one release from these tanks. On June 1, 1953, the tanks overflowed by approximately 1,200 gallons. The spill consisted of process waste from Building 123.[4]

Physical/Chemical Description of Constituents Released

The tanks have been known to have stored process waste from Buildings 441 and 123.[4] Nitrates and radionuclides would be present.[3] One reference describes the waste as having total dissolved solids ranging from 532 to 965 ppm and a pH that ranged from 7.15 to 5.85. Limestone was used to help control the acidic nature of the waste.[5]

Responses to Operation or Occurrence

In 1953, the system was modified to allow liquid wastes to be released directly to the sanitary system therefore reducing the amount of waste passing through these tanks.[6]

A telephone interview was conducted on November 14, 1991 with RFP Liquid Waste Operation personnel. It was stated that at the present time the limestone tank may contain groundwater seepage but that it is no longer pumped or checked.[7]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule of OU9 (based on an April 21, 1992 letter from CDH to DOE). However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

Because there are actually several tanks located in this area, it is proposed that the boundaries of IHSS 122 be redefined. Based on HRR information, the location presented in the IAG is too far east. The boundaries for IHSS 122 (PAC 400-122) should be extended into the southwest corner of Building 441 and incorporate Building 429.

PAC 400-122 is part of the OPWL network of tanks and pipelines (PAC 000-121).

References

[1] 1502757
[2] 1501999
[3] 1502735
[4] 1600595
[5] 1502799
[6] 1601056
[7] Personal Communication, McMenus,F., RFP Employee, November 14, 1991.

PAC REFERENCE NUMBER: 400-129

IHSS Reference Number: 129, Operable Unit 10

Unit Name: Oil Leak

Approximate Location: N749,000; E2,082,500

Date(s) of Operation or Occurrence

1952 - Present (Tanks #1 - #3; one of which was installed in 1967)
1967 - 1986 (Tank #4)

Description of Operation or Occurrence

There are four No. 6 fuel oil supply tanks located east of Building 443, two of which were installed in 1952 and two in 1967. They measure 11 by 20 feet and are buried under two feet of soil. They are known to have leaked or have been associated with spills since they were first installed. These tanks are used as local supply tanks to the Building 443 steam generator plant when natural gas is not available.[1] Table 400-1 lists the tanks and their usage.

TABLE 400-1
SUMMARY OF FUEL TANKS AT BUILDING 443

TANK NUMBER	TANK VOLUME	TANK CONTENTS
Tank #1 (northernmost)	18,000 gallons	No. 6 fuel oil[1]
Tank #2	18,000 gallons	No. 6 fuel oil[1]
Tank #3	9,000 gallons	No. 6 fuel oil[1]
Tank #4 (southernmost)	13,000 gallons	No. 6 fuel oil[1] No. 2 diesel oil (1970s)[2] Water/Compressor oil (1984-1986)[2]

From 1952 to 1967, fuel was transferred from the larger tanks south of Building 551 to tanker trucks which in turn transferred the fuel to the supply tanks. Small spills were noted during this process. This practice ceased when underground transfer lines were installed in 1967.[1]

In November 1977, a leak in the underground transfer line was discovered.[3] No documentation was found that details the quantity of oil released to the environment; however, the sewage treatment plant was able to recover 600 gallons of oil. Since 1983, aboveground transfer lines have been used.[1]

Contamination in the area became apparent on March 6, 1986 when compressor oil was found at the bottom of a four and a half foot deep post hole that was located in the vicinity of the tanks. Three days later, No. 6 fuel oil was discovered in another post hole.[4]

The 1987 Closure Plan for Tank #4 indicates that there was a leak in the top of Tank #4. The level indicator recorded no drops in the fuel level; however, there were increases in the level due to water seeping into the tank.[2]

On February 6, 1989, the level indicator in one of the tanks failed while it was being filled allowing about 500 gallons of No. 6 fuel oil to be released to the immediate area and to the street. However, it did not reach a water course.[5] Four days later, 50 more gallons were spilled because the valves were left open.[6] On July 29 and 30, 1989, 1,700 gallons were released to the environment.[7] No documentation was found which detailed the cause of this most recent spill.

Physical/Chemical Description of Constituents Released

Samples of the oil found in the post holes were analyzed. The primary constituent was No. 6 fuel oil with traces of No. 2 diesel oil.[1] Results indicated trace amounts of 1,1,1-TCA (trichloroethane).[3]

Responses to Operation or Occurrence

No documentation was found which detailed a response to the cracked transfer pipe in 1977. It was assumed that due to the viscosity of the oil it would not migrate underground.[2] In February 1989, the oil was left on the ground until the next day to let it solidify in the cold.[5] The State Oil Inspector was notified for the cases occurring in 1986 and 1989.[4,6,7]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule of OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

In 1970, a 1,500-gallon sulfuric acid spill occurred near Building 443 and was contained in a pit (PAC 400-187.2). A sodium hydroxide spill of approximately 1000 gallons was released from the steam plant catch basin to Central Avenue (PAC 000-190). Both instances have contributed to the contamination in the area.[1] The intent is to describe activities in the area that may have contributed to the TCA constituent found in oil samples.

References

[1] 1600466
[2] 1502699
[3] 1500987
[4] 1500744
[5] 1600458
[6] 1501808
[7] 1501261

PAC REFERENCE NUMBER: 400-136.1 - 400-136.2

IHSS Reference Number: 136.1 - 136.2, Operable Unit 12

Unit Name: 400-136.1 Cooling Tower Pond West of Building 444 (IAG Name: Cooling Tower Pond Northeast Corner of Building 460)
400-136.2 Cooling Tower Pond East of Building 444 (IAG Name: Cooling Tower Pond West of Building 460)

Approximate Location: N480,000; E2,082,000

Date(s) of Operation or Occurrence

1956 - 1969

Description of Operation or Occurrence

CEARP Phase 1 and RCRA 3004(u) both state that there were three cooling water ponds located in the vicinity of Building 444; however documentation was found during the HRR research which supports the location and the existence of only two ponds.[1,2]

One pond was excavated east of the Building 444 exclusion area fence and the railroad spur. It was utilized May 25, 26, and 27, 1956 by an outside contractor (Dowell) to collect the various solutions used during cleaning of the cooling tower.[3] In September 1956, when the liquid had evaporated and percolated away, the pond was backfilled.[4]

On December 2, 1958 cooling water from Building 447 was pumped to a surface ditch and allowed to flow across plant site. This reference describes a pond east of Building 444 that should have been utilized in this instance because it had been used in the past for drainages and flushing of the cooling tower.[5] It is possible that this document was referring to the pond used by Dowell in 1956.

Physical/Chemical Description of Constituents Released

The main purpose of these ponds was to hold cooling tower blowdown from Building 444 and Building 447. This liquid probably contained chromates since chromium was found during the cooling tower's dismantlement in 1975.[6] Hexavalent chromium was commonly used in cooling towers as a corrosion inhibitor until the early 1970s. One pond was used to catch solutions during a cleaning operation of the cooling tower.[3] Lithium may also have been destroyed by placement of the material in one of these ponds.[7] In addition, small amounts of depleted uranium may have been buried at this site.[1]

Responses to Operation or Occurrence

In 1956, liquids were allowed to evaporate and percolate into the soil; the pond was later backfilled.[3] No documentation of the response to other ponds was found.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU12. However, the information developed on this unit for the study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities

will include site investigations, site characterizations and possible site remediations. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

Every document found addressing the location of a cooling tower pond in the 400 Area describes it as being "due east of Building 444" or "east of the Building 444 exclusion fence."[3] Due to the lack of documentation found during the HRR research, locations given on Plate 2 are somewhat speculative.

HRR information indicates that possibly only two ponds existed. One pond to the west of Building 444 can be seen clearly in an aerial photograph taken in 1964.[8] It is located in the spot described in the IAG as PAC 400-136.3. It is proposed that this pond be renamed PAC 400-136.1.

A second pond may only be standing water located in the ditch west of Building 444 and immediately adjacent to the railroad tracks. This location best fits the description of the pond used during the Dowell operation. It is also close to the cooling tower which is immediately west of Building 444. It is proposed that this pond be designated PAC 400-136.2. The probable use of this area as a cooling tower blowdown pond is substantiated by an interview with a retired RFP employee.[9] Another interview conducted for this document indicated an oily sheen visible on the standing water.[10]

References

[1] 1501999
[2] 1502375
[3] 1600385
[4] 1600382
[5] 1600392
[6] 1500515
[7] 1601057
[8] 1502717
[9] 1503380
[10] 1503383

PAC REFERENCE NUMBER: 400-157.1

IHSS Reference Number: 157.1, Operable Unit 13

Unit Name: Radioactive Site North Area

Approximate Location: N749,200; E2,082,300

Date(s) of Operation or Occurrence

1953 - Unknown

Description of Operation or Occurrence

Building 442 was used as a laundry facility to clean contaminated clothing from 1953 until approximately 1972 when it was converted to a filter test laboratory. As early as September 1953, contamination associated with the handling and steaming of contaminated rags was observed in the soil around the building. A special survey conducted October 14, 1953 in the ditches north and west of Building 442 found maximum contamination of the soil to be 5×10^5 d/m/kg.[1] The diagram associated with this reference indicates barrels stored west of the building which may have contributed to the radioactivity in the area.

On March 11, 1954 standing water in a culvert 30 feet west of the building was sampled. The water was suspected to have come from snow melt which had drained from contaminated soil near Building 442.[2] No documentation was found which details the results of the sample analysis.

The Site Survey Annual Report for 1954 stated that soil sampling throughout the year had disclosed contamination ten times background in the ditches near Building 442. Building 441 and Building 442 showed consistent areas of significant contamination.[3]

In September 1959, a high count was determined on a smear sample from the Building 442 dock.[4]

In December 1963, rag-cleaning barrels stored near the building either leaked or spilled. The liquid drained east into the ditch on the northwest side of the building. Radioactivity was detected as far east as the east end of Building 551.[5] In 1964, the laundry was infiltrated with enriched uranium impregnated in clothes from Building 883.[5]

Physical/Chemical Description of Constituents Released

The laundry facility was responsible for the decontamination of clothing from manufacturing areas at RFP. Because of this, both radioactive and chemical materials including depleted uranium, enriched uranium, and beryllium may have contributed to the contamination around the building.[5] The rag-cleaning barrel release reportedly involved solvents and radioactive metal shavings.[6]

Responses to Operation or Occurrence

No documentation was found which detailed a response to the contaminated ditch areas outside of Building 442. However, it was decided that composite laundry water samples should be taken before the waste was discharged to the sewer.[3]

The contamination was cleaned in response to the high smear on the dock in October 1959.[3] Cleaning efforts followed the rag-cleaning barrel spill in 1963, and subsequent runoff reduced the concentrations in the area to low level.[5]

Prior to 1973, the ground areas around Building 442 were known to contain very low levels of uranium. Surface radioactivity was removed to background levels during the radiometric survey.[7]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

Construction of the Building 442 addition in the 1980s significantly increased the size of the building and disturbed the soil beneath the addition where the sampling in the 1950s may have been taken.

References

[1] 1600491
[2] 1500362
[3] 1600055
[4] 1600038
[5] 1601057
[6] 1502735
[7] 1501999

PAC REFERENCE NUMBER: 400-157.2

IHSS Reference Number: 157.2, Operable Unit 12

Unit Name: Radioactive Site South Area

Approximate Location: N748,700; E2,082,300

Date(s) of Operation or Occurrence

1953 - Present

Description of Operation or Occurrence

Building 444 was first occupied in 1953. Its function was mainly as a depleted uranium foundry, a carbon machining shop, and for beryllium fabrication. Prior to 1973, the soils surrounding Building 444, Building 447, Building 440, and Building 439 were known to contain low levels of uranium and chemical contamination.[1] Building 439 and Building 440 also had possible infiltration of hydraulic oil and carbon tetrachloride (CCl^4) originating from the uranium machine tool storage area.[1]

Several operations associated with Building 444 have contributed to contamination in the area. Probably the most significant contamination occurred near the south dock where solvents, used to rinse beryllium parts, were dumped onto the ground. Details of activities on this dock are described in the narrative for PAC 400-116.2. In March 1954, soil sampling revealed contamination twice background in a ditch south of Building 444 caused by washing the dock and apron.[2] Another reference states that sampling conducted in 1954 indicated soil activity levels three times that of background in a ditch south of Building 444.[3]

Storage in an open ingot storage area east of Building 444, a metal storage area to the south of the building, and a uranium machine tool storage area to the west undoubtedly resulted in low-level infiltration of the soil.[1,4] There have also been cooling tower ponds in the area that are described in PAC 400-136.

Numerous incidents are mentioned in documents found during the HRR search that indicate contamination releases to the area; however, most of them provide few details. The documented incidents include the following:

- In May 1960, a vacuum collector fire in Building 447 resulted in the release of approximately 44 microCuries of depleted uranium. The depleted uranium was deposited on the roof of the building.[4]

- One reference also mentions the need to cleanup the area around Building 444 but there is no indication of what was cleaned.[5]

- In December 1962, a uranium and beryllium release from Building 444 occurred through an unfiltered hood.[4]

- In June 1966, a process waste line broke to the north of Building 444.[4]

- On November 11, 1974 170 square feet of road south of Building 444 (probably Cedar Avenue) was contaminated when a barrel containing uranium chips was dropped during transfer.[6]

RFP photographs taken in 1978 show poor housekeeping in the area of Building 440. The area is littered with miscellaneous materials such as pallets, open paint cans, and machinery. There are also cargo containers located north of the building.[7,8]

On February 23, 1978 a fire in the air plenum south of Building 444 which services the beryllium machining operations in Room 107 (see Figure 400-2) resulted in the release of an estimated 14.5 grams of beryllium.[9] Details of this fire can be found in PAC 400-810.

An incident occurred on November 4, 1985 involving pressurization of a process line in Building 447. The pressure forced liquid through a floor drain and up the vent pipe onto the roof where it ran into the gutter and onto the ground below. Contamination levels were as high as 10,000 cpm beta activity.[10]

While transferring three drums across plant site on November 30, 1990 one barrel containing beryllium ingots somehow picked up some radioactivity. All areas were smeared along the path the barrels had been taken and other high smears (greater than 25 cpm/ft^2) were found just outside the beryllium machine shop (Building 444) at the exit/entrance door.[11]

Physical/Chemical Description of Constituents Released

The principal materials that have contributed to contamination in the area around Building 444 are depleted and enriched uranium, beryllium, chlorinated hydrocarbon solvents, hydraulic oil, and carbon tetrachloride. There may also be lithium and chromium in the sediments due to the presence of cooling tower ponds (PAC 400-136).

Responses to Operation or Occurrence

No documentation was found that indicated cleanup of any of the minor incidents with the exception of the cleanup in 1960, which had no associated incident.

There was a large cleanup attempt after the Building 444 plenum fire. Firemen responding to the alarm began spraying the exterior of the plenum with water where the paint had started to blister in addition to the area around the plenum to settle the contaminated dust. Temporary dams were established in the ditches south and east of the building and samples were taken of the firewater impounded there.[6] Laboratory analysis revealed 1.6 milligram/liter beryllium in the east ditch and 4.3 milligram/liter in the south ditch, respectively. This water was picked up and sent to Building 774 for processing.[12] Personnel who were in the building at the time of the fire were sent to Building 881 for showers. This water was retained until analytical results indicated that there was no beryllium present.

The process waste overflow was decontaminated to less than 250 cpm or else painted to contain the radioactivity. The drain that was involved was to have been relocated and a ball check valve installed on the vent pipe.[10]

The contaminated drum at the machine shop was wiped down to under to 25 cpm/ft^2 and the barrels were removed from the beryllium machine shop.[11]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU12. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediations. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

It is proposed that the western boundary of IHSS 157.2 be extended west to encompass the former uranium machine-tool storage area, south to include the northern portions of Building 440 and Building 439 and east in an arc that follows the railroad spur. The extension of the IHSS boundaries are intended to include other activities that took place in the general area that characterize this site (PAC 400-157.2).

Low-level oblique photographs taken in 1965 indicate drum storage west of Building 444 in a location that is now covered by Building 460. Similar photographs taken in 1969 indicate a drum storage area at the southeast corner of Building 444.[13] No documentation was found which describes what was stored in these drums; however, it is known that drums containing cyanide and graphite were stored in an area adjacent to the south dock.[14]

In this same area, very close to the railroad tracks, a small building can be seen in RFP photographs. The ground around this building is covered with a white substance that is related to sandblasting operations (PAC 400-807). Also, just west of Building 445 in the ditch near the railroad tracks, there is a pool of water which may have been one of the cooling water ponds (PAC 400-136.2).[15] No documentation was found that indicated that the liquid was contaminated.

This PAC includes contamination beneath Building 444, discussed in Section 3.14 of this report (Under Building Contamination).

References

[1] 1502735
[2] 1600489
[3] 1600055
[4] 1601057
[5] 1600406
[6] 1500525
[7] 1800322
[8] 1800323
[9] 1700191
[10] 1600551
[11] 1501737
[12] 1500850
[13] 1700829
[14] 1700189
[15] 1800284

Other References of Interest

1500849
1600266
1600267
1502568
1800339

PAC REFERENCE NUMBER: 400-182

IHSS Reference Number: 182, Operable Unit 10

Unit Name: Building 444/453 Drum Storage Area

Approximate Location: N748,700; E2,082,150

Date(s) of Operation or Occurrence

Prior to 1957 - Unknown

Description of Operation or Occurrence

In May 1957, it was noted that numerous barrels of depleted uranium oxide were being stored in the "backyard" of Building 444. The storage was not on a concrete slab and there was concern that the barrels would be subject to corrosion.[1]

For many years Building 453 was used as an oil storage area. In July 1983, high groundwater forced some of the residual oil that had been spilled over the years out of the ground. Several pools of oil formed adjacent to the building. At this time, 25 barrels of used oil awaiting disposal were being stored outside the building.[2]

Low-level oblique photographs taken in 1982 reveal heavy, dark staining around Building 453 and along the western side of Building 444.[3,4,5,6,7,8,9]

Physical/Chemical Description of Constituents Released

The waste stored in the "backyard of Building 444" in 1957 was depleted uranium oxide waste.[1]

No documentation was found which detailed what the oil that surfaced in July 1983 had been used for or if it was contaminated.[2] The building superintendent was advised to cleanup the area in 1983. As of July 22, 1983, the oil had not been cleaned up and the building superintendent had been was contacted a second time.[10]

Responses to Operation or Occurrence

A sitewide radiometric survey was performed from 1977 through 1984. The purpose of the survey was to identify surface areas extremely contaminated with plutonium.[11] The area around Building 453 was surveyed in may 1984. The area north of Building 453 was identified as being unable to be surveyed due to high-level background radioactivity.[12]

As of August 2, 1984, a contaminated area discovered by the Radiometric Survey Team, near Door 2 of Building 453, had not yet been reduced to background.[13]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU10. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

HRR information indicates that the location of IHSS 182 (PAC 400-182) presented in the IAG should be enlarged. Aerial photos show large amounts of staining that indicate that the area of concern should be enlarged. It is proposed that the north and east boundaries be extended to the edges of Building 444 and the south and west boundaries should extend outward approximately another 50 feet.

References

[1] 1600377
[2] 1700460
[3] 1502538
[4] 1502540
[5] 1502541
[6] 1502532
[7] 1502520
[8] 1502516
[9] 1700459
[10] 1500826
[11] 1503375
[12] 1503372
[13] 1502375

PAC REFERENCE NUMBER: 400-187

IHSS Reference Number: 187, Operable Unit 12

Unit Name: Sulfuric Acid Spill (IAG Name: Acid Leaks (2))

Approximate Location: N749,000; E2,082,000

Date(s) of Operation or Occurrence

September 3-12, 1970

Description of Operation or Occurrence

Approximately thirty feet east of Building 443 there is a 3,000-gallon tank that was used to store sulfuric acid. On September 11, 1970, a stream about 1/4 inch in diameter was found spraying out about four feet from the flange above the drain valve. About 1,500 gallons of the acid spilled from the tank and drained eastward, where the acid was captured in an earthen pit and neutralized with lime.[1] Figure 400-3 shows the path that the acid flowed, the pit areas, and the area where the containerized acid was temporarily stored.

The tank was salvaged from Building 881 where it had been stored an estimated eight to ten months after decontamination. At the time of installation, the drain line was equipped with a nonstandard valve and flange. The piping system was hydrostatically tested on July 2, 1970. The tank was filled with water and left for three weeks and was determined to have no leaks. After the water was drained from the tank, the valves and gaskets were changed.[1]

From the drain valve, a pipe extended to a 200-gallon mixing tank which sits over a 7000-gallon concrete, PVC-lined, neutralizing tank inside Building 443. The neutralizing tank which has a drain to the sanitary sewer system (Figure 400-4). Prior to filling the acid tank, it was verified that the tank was empty by opening all valves and noting that no drainage occurred to the mixing tank. The tank was filled with acid on September 3, 1970. During filling, it was discovered that the level indicator was not functioning which resulted in an overflow of approximately one half gallon of sulfuric acid. Another spill occurred when the transfer hose was removed and was allowed to drain onto the ground. Both spills were neutralized with caustic. The tank was then locked out.[1]

Physical/Chemical Description of Constituents Released

The September 1970 spill involved approximately 1,500 gallons of 94.1% sulfuric acid. Approximately 32,000 pounds of lime was added to neutralize the acid.[1]

Responses to Operation or Occurrence

After discovery of the leak, the Fire Department began spraying the tank and the surrounding area with water. High winds were carrying the acid and fumes to the south and east; therefore, this procedure was curtailed. Lime was added to neutralize the acid.[1]

It was decided to cut the lockout chain and allow the acid to drain to the mixing tank. The mixing tank was adapted with a flexible hose which would let the acid drain into the neutralizing tank inside Building443. By this time, the flange was spraying in all directions which required that a man be lowered from above by a boom to cut the chain. Approximately nine hours after the leak was detected, the tank was finally emptied.[1]

Because the tank was not equipped with secondary containment, the acid emanating from the flange drained through a culvert under Fifth Street and along a ditch south of Building 442. The acid continued to flow northward along a north-south ditch east of Building 442 and west to ponds that were constructed to contain the acid. One pond measured roughly 75 by 25 feet and the other was about 25 by 25 feet.[1]

On September 12, 1970 it was discovered that the neutralization tank was leaking into the sewer line and into the sewage treatment plant (Building 995). The acid was transferred from the neutralization tank to 24 polyethylene-lined barrels that were placed near the ponds (see Figure 400-3). The investigative report on this incident states that the drums were surrounded by a dike,[1] but photographs taken on September 14th contradict this statement.[2]

The drain valve on the neutralization tank had not been inspected since its installation in 1966. It probably leaked for several years. Dirt was found in the acid tank which may have contributed to the inadequate closure of the neutralization tank valve.[1]

No documentation was found which detailed the removal of contaminated soil. However, photographs indicate excavation and possible removal of soils immediately adjacent the tank. CEARP notes indicate that the area was covered.[3]

Fate of Constituents Released to Environment

It was common practice at RFP for acid spills to be neutralized with a caustic such as lime. The CEARP Phase 1 document considered that this procedure would create by-products that were benign and highly mobile and therefore no environmental hazard should remain.[4]

The sewage treatment plant and its effluent were monitored to assess the impact of the 1970 spill. On September 12, the pH of Building 995 influent was as low as 1.8. On September 13, the effluent had a pH of 2.2 with a sulfate concentration of 1120 ppm. Sampling at the B-Series pond indicated sulfate values below the 250 ppm maximum permissible level.[1]

This IHSS is being studied in accordance with the IAG schedule of OU12. However, the location of this unit was not defined in the IAG. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

It is proposed that the location of IHSS 187 be defined as east of Building 443, extending into an area now occupied by Building 452.

Assuming that the acid tank was filled to capacity (3,000 gallons), approximately 200 gallons of acid are unaccounted for in the description of the incident. Approximately 1,500 gallons are reported to have been released at the leaking flange directly to the ground. An additional 1,300 gallons were recovered from the neutralization tank. It is expected that the remaining 200 gallons leaked from the neutralization tank into the sanitary sewer system and caused the low pH discharge from the sanitary wastewater treatment plant (Building 995).

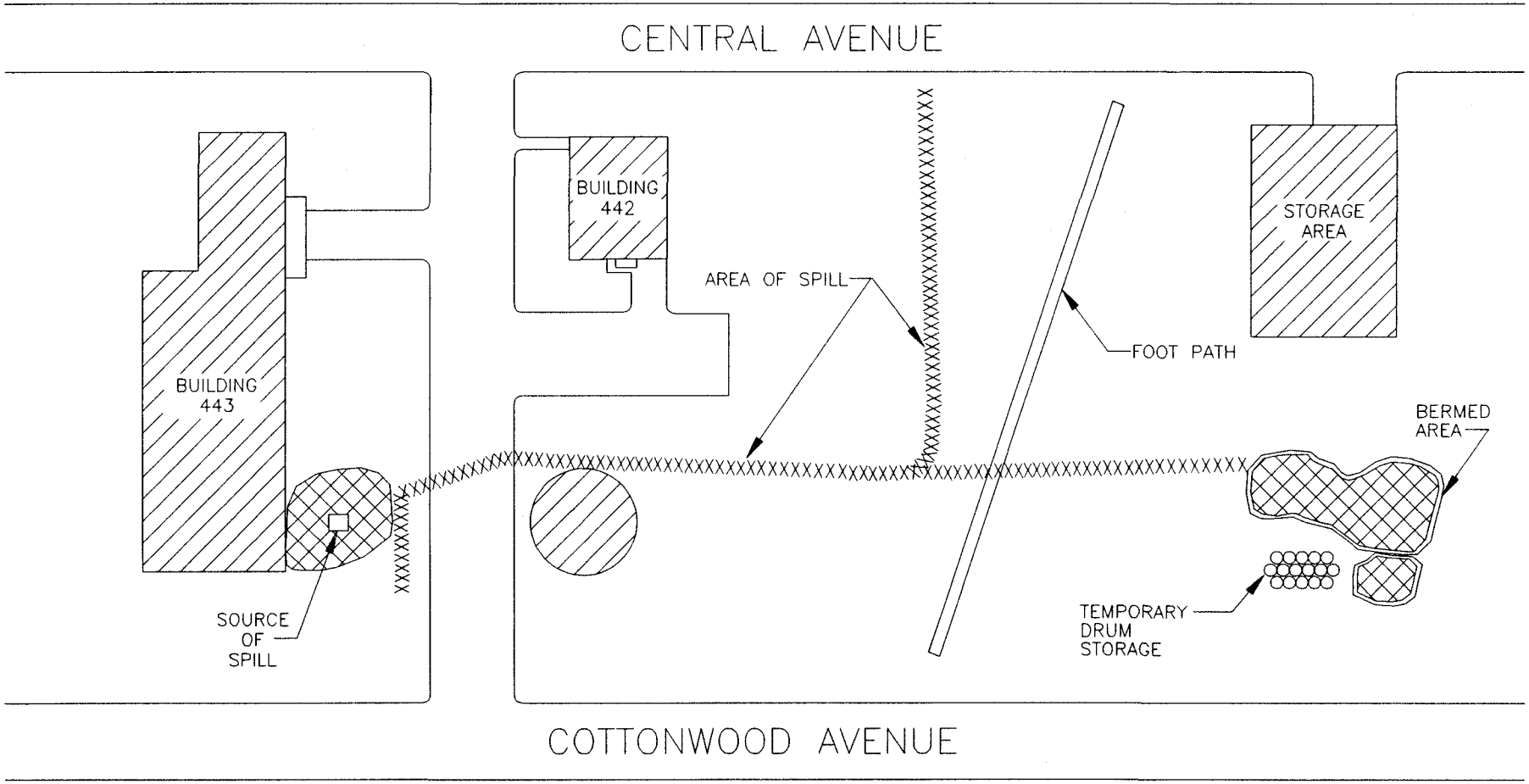
There are two acid spills addressed as PAC 400-187. The second spill is probably the same as a caustic acid spill discussed in detail as PAC 000-190.

References

[1] 1501786
[2] 1800257
1800258
1800259
1800260
[3] 1500760
[4] 1501999

Other References of Interest

1800261
1800262
1800263
1800264
1800265
1800266
1800267
1800268
1800269
1800270
1800271
1800286
1800287
1800288
1800289
1800290
1800291
1800292
1800923
1800294
1800295
1800596
1800297
1601057
1600466
1600176



NOT TO SCALE

REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 400-3, 12/17/91, PROJECT NO. 506-10.

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 400-3

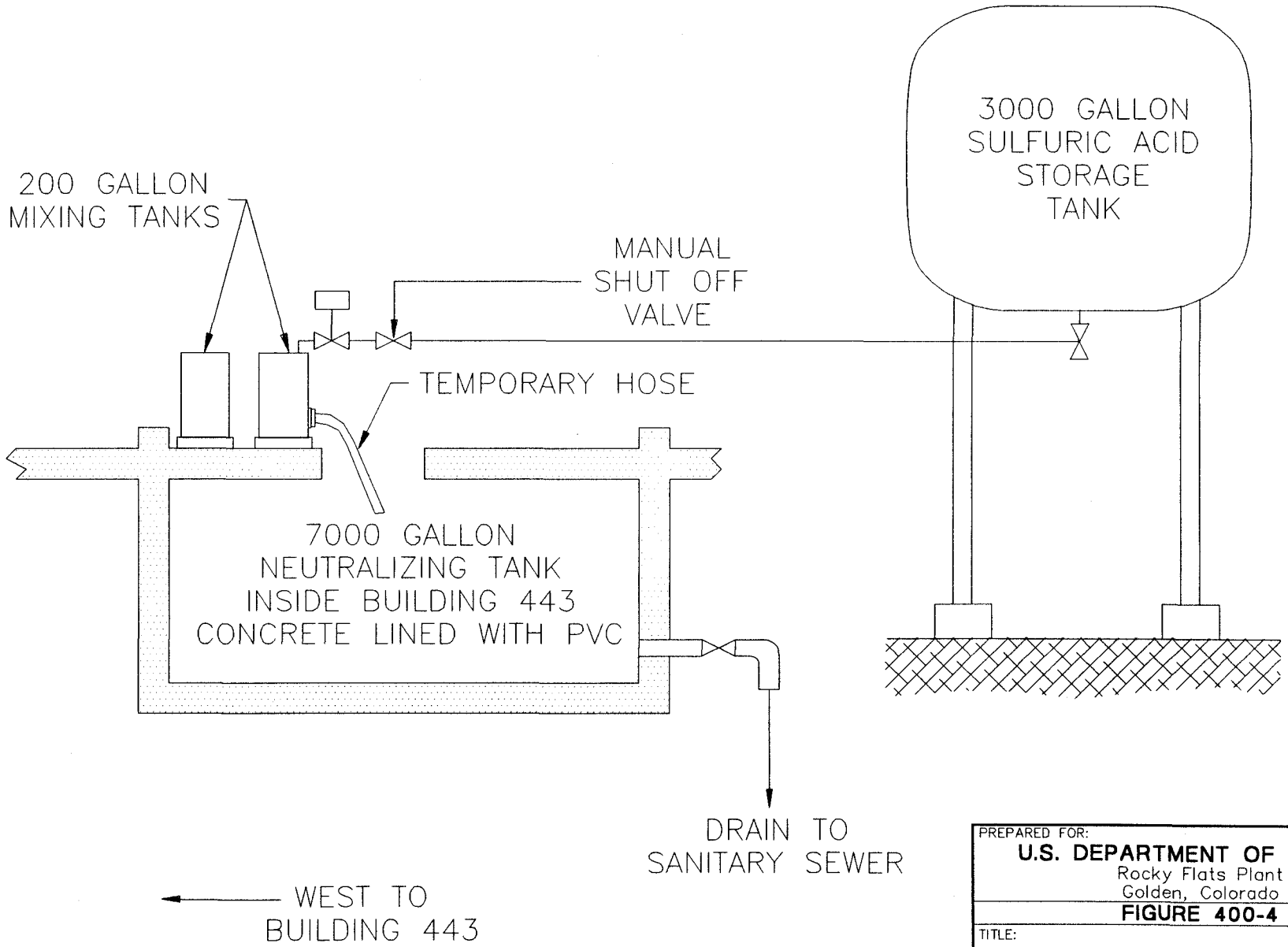
TITLE:

LOCATION OF SULFURIC ACID SPILL

PROJ. NO.	304944	DWG. NO.	304944-A95	SHEET
DESIGN BY	A. VIRGIL	CHECKED		OF
DRAWN BY	A. VIRGIL	APPROVED		
DATE	12/18/91	SCALE	AS SHOWN	

FLATS-AL 09/12/91 4:04pm AWK

BACK OF FIGURE 400-3



REFERENCE: DRAWING PROVIDED BY DOTY & ASSOCIATES, FIGURE NO. 400-4, 12/17/91, PROJECT NO. 506-10.

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 400-4

TITLE:
ACID PIPING SCHEMATIC

PROJ. NO.	304900	DWG. NO.	304944-A94	SHEET
DESIGN BY	A. VIRGIL	CHECKED		OF
DRAWN BY	A. VIRGIL	APPROVED		
DATE	12/18/91	SCALE	AS SHOWN	

4944A94 05/07/92 1430pm AWK

BACK OF FIGURE 400-4

PAC REFERENCE NUMBER: 400-191

IHSS Reference Number: 191, Operable Unit 13

Unit Name: Hydrogen Peroxide Spill

Approximate Location: N749,300; E2,082,200

Date(s) of Operation or Occurrence

April 1981

Description of Operation or Occurrence

In April 1981, two 55-gallon drums of hydrogen peroxide being transported by warehouse personnel fell off a pallet. One of the drums burst open and the hydrogen peroxide flowed into a culvert at the corner of Fifth Street and Central Avenue.[1]

Physical/Chemical Description of Constituents Released

The drums contained 35% hydrogen peroxide[2]

Responses to Operation or Occurrence

A hole was dug in the Central Avenue ditch east of Fifth Avenue and Fire Department personnel hosed down the area allowing the diluted hydrogen peroxide to drain into the hole. Barricades were erected around the area. The hole was refilled on April 23, 1981.[1] The area has been paved since the time of the spill.[3]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

It is likely that this site is the same site referenced in RCRA 3004(u) as IHSS 169 (PAC 500-169).[4] IHSS 169 and IHSS 191 are mapped in different locations, but no documentation was found that indicates that there were two separate incidents. It is proposed that IHSS 169 (PAC 500-169) be eliminated.

References

[1] 1501180
[2] 1700141
[3] 1502734
[4] 1502735

PAC REFERENCE NUMBER: 400-193

IHSS Reference Number: 193, Operable Unit 16

Unit Name: Steam Condensate Leak

Approximate Location: N749,100; E2,082,250

Date(s) of Operation or Occurrence

During the week ending November 30, 1979[1]

Description of Operation or Occurrence

A steam condensate line located between Building 443 and a valve pit north of a gasoline storage tank was found to be leaking.[1] The area between Building 443 and the valve pit is paved.[2]

Physical/Chemical Description of Constituents Released

The steam condensate was found to contain 0.135 milligrams/liter amines.[1]

Responses to Operation or Occurrence

The line was abandoned and rerouted by November 30, 1979.[1]

Fate of Constituents Released to Environment

No documentation was found that detailed that fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU16. The IAG activities will include site investigations and characterizations. The Final No Further Action Justification Documented will be completed by July 30, 1992.

Comments

None.

References

[1] 1501224
[2] 1502734

PAC REFERENCE NUMBER: 400-204

IHSS Reference Number: 204, Operable Unit 15

Unit Name: Original Uranium Chip Roaster

Approximate Location: N748,550; E2,082,050

Date(s) of Operation or Occurrence

1956 - 1988

Description of Operation or Occurrence

The original Uranium Chip Roaster is located in Rooms 32 and 502 of Building 447.[1] The unit is constructed of mild steel casing lined with alumina refractory brick. It is cylindrical with a diameter of 5 foot 6 inches and a height of 7 foot 4 inches.[2] The unit was identified as Unit No. 45 in the 1986 RCRA Part B Permit Application.[1]

Elemental uranium is pyrophoric which permits the roaster to oxidize the chips allowing safer storage and handling. The depleted uranium chips originated from the Building 444 production area and were usually coated with oils and coolants and are stored in 55-gallon drums prior to roasting. Also prior to roasting, the chips were washed with hot water to remove excess coatings.[2] The chips were fed into the top of the roaster at a rate of roughly three drums per day.[2] The chips ignited upon entry and were fed down the four tiers of the roaster which consisted of grates with rotating paddles. The paddles caused the chips to fall to successively lower tiers. The chips were completely oxidized when they reached the bottom where they were collected in a drum.[1,2] Gases created during this process passed through three High Efficiency Particulate Air (HEPA) filter banks, one in the roaster stack and two others in the main building plenum.[2]

An incident involving the roaster occurred in Room 32 of Building 447 on June 28, 1985. An operator had filled a barrel with hot oxide and, in replacing it with a new barrel, placed the thermally hot barrel next to some cardboard. About three hours later, the cardboard burst into flames setting off the sprinklers and fire alarm. The basement of the building flooded.[3]

Physical/Chemical Description of Constituents Released

The roaster was used for the thermal treatment of hazardous waste consisting of depleted uranium chips coated with freon TF and 1,1,1-trichloroethane.[2]

The fire on June 28, 1985 involved burning cardboard.[3]

Responses to Operation or Occurrence

The RFP Fire Department responded to the incident on June 28, 1985. The water in the basement was vacuumed up. All combustibles were removed from Room 32.[3]

Because of the operating temperatures of the roaster and the chemical and physical properties of freon TF and 1,1,1-trichloroethane, it is not expected that any residual waste remains in this unit.

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU15. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 4, 1995.

Comments

None.

References

[1] 1502735
[2] 1502696
[3] 1500241

PAC REFERENCE NUMBER: 400-205

IHSS Reference Number: 205, Operable Unit 10

Unit Name: Building 460 Sump No. 3 Acid Side

Approximate Location: N748,500; E2,081,900

Date(s) of Operation or Occurrence

1984 - Present

Description of Operation or Occurrence

Sump No. 3 was identified as Unit No. 40.13 in the 1986 RCRA Part B Operating Permit Application.[1] The sump was still used as of October 3, 1988 as a 90-day accumulation area. This fiberglass tank was located in the wall of Room 156B in Building 460 and was used as a staging area between acid wastes generated inside the building and two acid dumpsters located along the southeast corner of Building 460. In this same locale were two solvent dumpsters that operated in the same manner as the acid dumpsters.[2]

The capacity of each acid dumpster was 250 gallons with additional storage available in the acid sump. However, the two dumpsters were never used at the same time so the total acid stored was less than 250 gallons. As wastes were generated inside Building 460, they were transferred to the sump and on to one of the dumpsters by a permanent and dedicated piping system for acid only. When one dumpster needed emptying, the quick disconnect was switched to the other dumpster and the waste was either transported by trucking directly to Building 374 or Building 774 for treatment or it was moved by forklift to an adjacent bermed area where the acid was transferred to steel drums with poly-liners. These drums were then stored at the Building 460 Drum Storage Area.[2]

The dumpsters are constructed of 3/16" thick stainless steel and were checked weekly to see if they need emptying. They were contained within a concrete bermed area that measures 4 feet wide by 6 feet long and 12 inches deep. The bermed area had a capacity of 286 gallons. The acid side was adjacent to the solvent side but they were distinct and separated by a dividing berm which prohibits mixing. Each basin could be drained by removing a drain hole plug located 1-1/2" from the basin floor.[2]

On April 10, 1989, one of the dumpsters overfilled, releasing five to seven gallons of dilute nitric acid and nitrad waste to a storm drain.[3] A valve was opened to allow water, used in a cleaning operation, to drain to the outside tank. A drain hole had been drilled to allow rainwater to exit the bermed area; therefore, only eight to ten gallons were contained within the containment structure.[4]

Physical/Chemical Description of Constituents Released

Acids contained within this tank were a combination of nitric acid and nitrad (hydrofluoric acid and ammonium salts). After the spill in 1989, pH values at the Pond C-2 inlet and at the interceptor ditch below the large storm drain were 6.9.[4] Puddles outside Building 460 had a pH of 2.[5] A chemical buffer was used to neutralize the spill.[3] No documentation was found which describes the buffering agents used.

Responses to Operation or Occurrence

A lock was placed on the valve with the key accessible only to RFP supervisory personnel. The acceptable fill limit was decreased from 200 gallons to 150 gallons. The precipitation hole was plugged and the structure was not to be used again until new operating procedures were implemented.[3]

When it was discovered that the acid was running to the storm drain the Hazmat Team used containment logs and neutralized the area with a chemical buffer.[3] The integrity of the containment structure was to have reestablished. The cleaning system was shut down until the level alarm was fixed.[3] No documentation was found detailing the fate of the containment logs.

RCRA Contingency Plan Implementation Report No. 89-002 was submitted as required per 6 CCR 1007-3, Part 265.56(j).[3]

Fate of Constituents Released to Environment

The acid was allowed to flow through the storm drain and on to Pond C-2.[4] The acid was diluted by the natural mixing with snow on the ground; therefore, it was anticipated that there would be no environmental impact.[3]

This IHSS is being studied in accordance with the IAG schedule for OU10. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

None.

References

[1] 1502735
[2] 1502690
[3] 1800026
[4] 1501213

Other References of Interest

1600440
1600462
1501812

PAC REFERENCE NUMBER: 400-207

IHSS Reference Number: 207, Operable Unit 10

Unit Name: Inactive 444 Acid Dumpster

Approximate Location: N748,600; E2,082,650

Date(s) of Operation or Occurrence

1980 - 1987[1,2]

Description of Operation or Occurrence

There were two 500-gallon stainless steel acid dumpsters located outside of Building 444 on the east side used to store waste created inside the building. As the waste was generated, it was drained into a small free-standing metal sump tank and from there it was pumped to the dumpster. Although the total capacity would have been 1,000 gallons, only one dumpster was filled at a time. The dumpster receiving waste was placed within a berm with a capacity of 640 gallons. When the dumpster became full, it was removed with a fork lift and transported to either Building 374 or Building 774. An empty dumpster was then put within the berm to receive waste.[1,2]

The containment berm had interior dimensions of 9 feet by 9.5 feet by 1 foot and it is built of asphalt. It was still intact as of October 1988.[2]

In January, 1981, Radiation Monitoring found uranium contamination in the catch basin. The quick disconnect assembly had been replaced without a gasket allowing liquid to leak into the catch basin.[3]

Physical/Chemical Description of Constituents Released

The types of wastes stored in these containers consisted of acid waste from beryllium machining, electropolishing solution, and wastes from chemical milling. The raw milling acid was a mixture of 75% phosphoric acid, 3% sulfuric acid and chromium trioxide. Analytical results indicated that the acid waste contained significant amounts of cyanide, cadmium, chromium, lead, silver and arsenic and also contained detectable amounts of uranium, americium and tritium.[2]

The spill in 1981 consisted of uranium-contaminated process waste.[3]

Responses to Operation or Occurrence

The dumpsters and piping were decontaminated and moved to another processing area in 1987.[2] The process waste spill was cleaned up and a new gasket installed.[3] The dumpsters are no longer in place.

Fate of Constituents Released to Environment

No documentation was found which detailed a release to the environment in 1981. The spill was contained within the catch basin.[3]

This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

It is proposed that the boundaries of IHSS 207 (PAC 400-207) be moved north to include the area believed to be the location of the dumpster. The proposed location, as shown on Plate 2 and Figure 400-1, is along the east side of Building 444.

References

[1] 1502735
[2] 1502690
[3] 1501194

PAC REFERENCE NUMBER: 400-208

IHSS Reference Number: 208, Operable Unit 10

Unit Name: Inactive 444/447 Waste Storage Area

Approximate Location: N748,650; E2,082,100

Date(s) of Operation or Occurrence

1986 - 1987

Description of Operation or Occurrence

This area was used for a short time for hazardous waste storage in a 20 by 8 foot cargo container with secondary containment. The maximum volume of waste stored was 990 gallons. No documentation was found that indicates spills or leaks to soil in this area. The cargo container has been moved. This unit was identified as Unit No. 3 in the 1986 RCRA Part B Permit application.[1]

Physical/Chemical Description of Constituents Released

The typical wastes stored in the cargo container included a composite of nitric acid with silver, sodium fluoride solution, plating acids (hydrochloric acid, nitric acid, and hydrofluoric acid) with concentrated chromium plating solution, concentrated cadmium cyanide solution, nickel sulfate, and developer/fixer.[1]

Responses to Operation or Occurrence

No documentation was found that indicated releases to the environment in this area. The cargo container was moved to the Building 444/453 Drum Storage Area (PAC 400-182).[1]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

None.

References

[1] 1502735

PAC REFERENCE NUMBER: 400-800

IHSS Reference Number: Not Applicable

Unit Name: Transformer 443-1

Approximate Location: N749,500; E2,082,000

Date(s) of Operation or Occurrence

Unknown.

Description of Operation or Occurrence

Transformer 443-1 is located at the northeast corner of Building 443. The original transformer that was known to have leaked was replaced in 1987. It is presently located on a newly constructed pad that is several feet south of the older pad. There is a concrete berm at ground level surrounding both the old and new site. There is a second berm surrounding the new pad.[1]

EPA representatives conducted an inspection on June 30, 1987. They found a small leak of dielectric fluid on the exterior of the transformer. The stained area was thought to be fresh because an inspection five days earlier did not detect a leak.[4] There was no documentation found which indicated if this was the original transformer.

Physical/Chemical Description of Constituents Released

Smears taken from leaks around the top and bottom valves, level gauge, and from the bushings compartment revealed 10,964 ppm PCBs.[1,2]

Responses to Operation or Occurrence

The leaky transformer was removed in 1987.[1]

Fate of Constituents Released to Environment

No documentation was found that detailed the fate of constituents released to the environment.

Comments

Reference 1 indicates that the transformer is located at the northeast corner of Building 334 and describes Building 334 as the steam plant. The steam plant is actually Building 443 which coincides with the transformer number. Therefore, it is thought that the site is actually northeast of Building 443.

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700070
[3] 1700026
[4] 1700009

Other References of Interest

1700073

PAC REFERENCE NUMBER: 400-801

IHSS Reference Number: Not Applicable

Unit Name: Transformer, Roof of Building 447

Approximate Location: N748,500; E2,082,500

Date(s) of Operation or Occurrence

Unknown - 1987

Description of Operation or Occurrence

A transformer was located on the roof of Building 447. The pad may have had a berm around it at one time. It is believed to have leaked prior to its removal in 1987. Downspouts are located north of the transformer's former position which would have allowed PCB contaminated runoff to infiltrate soils adjacent to Building 447. A storm drain is situated roughly twenty feet from the building and may have also been contaminated.[1]

Physical/Chemical Description of Constituents Released

Smear samples taken in 1987, from the drain valve and the adjacent transformer wall revealed 120 and 194 micrograms of PCBs, respectively.[2]

Responses to Operation or Occurrence

In 1976, roofing material was removed from under the transformer due to possible leaks.[3] The transformer was removed in 1987.[1] It was recommended in 1987 that the area should be cleaned again unless it had already been cleaned three times, in which case no further action was required.[2]

Fate of Constituents Released to Environment

No documentation was found that detailed the fate of constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700006
[3] 1500580

PAC REFERENCE NUMBER: 400-802

IHSS Reference Number: Not Applicable

Unit Name: Storage Area, South of Building 334

Date(s) of Operation or Occurrence

1955 - 1969

Description of Operation or Occurrence

The storage area south of Building 334 was originally a metal or wooden structure built on a concrete slab.[1,2] A July 1955 aerial photograph indicates that the building had been removed but the remaining slab was not being used for storage.[3] The first documented usage of the storage area was reported on October 24, 1955 when 125 barrels of depleted uranium chips immersed in oil were stored there.[4,5] The drums developed leaks which contaminated the slab.[5] In October 1956, one or two leaking drums contaminated the slab to 537 dpm.[6] As of November 1956, ten to twenty drums were leaking.[7] On November 12, 1956, a 30-gallon overturned drum spilled contaminated oil onto the slab.[8]

The drums were completely removed and the slab cleaned as of November 28, 1956.[8] However, it was discovered that contamination had spread to equipment that was also stored there. The equipment was moved but the slab still had smears of up to 10,000 dpm.[9] Additional monitoring conducted in December 1956, revealed that the contamination was spreading due to weather conditions.[11,12] By January 1957, low- level radioactivity had extended to the fuel storage tank located south of Building 551 (PAC 600-152).[13]

Although documentation found indicates contaminated drums stored south of Building 334 were removed, photographs indicate storage of miscellaneous items continued at this site until 1969.[14, 15, 16, 17]

Physical/Chemical Description of Constituents Released

The first drums stored on the slab contained depleted uranium chips immersed in oil.[5] There were 125 30-gallon drums stored at the site until November 28, 1956.[8] Perchloroethylene was used on the slab for decontamination.[6]

No documentation was found that indicated the kinds of materials stored at the site after 1956 or if the materials were contaminated.

Responses to Operation or Occurrence

Cleanup was attempted in October 1956, when the drums were first found to be leaking. The "leakers" were placed in larger drums and contamination on the concrete slab was reduced from 537 dpm to 108 dpm using perchloroethylene.[6] The activity from the overturned drum was cleaned up and decontaminated to a "low level". The drums were moved to the "bull pen," located in part of the area covered by the 903 Pad (PAC 900-112), on the 15th and 16th of November 1956. The slab where the drums were stored was cleaned on November 28, 1956.[8]

Although the slab was cleaned where the drums were stored, the area around the contaminated equipment had not been cleaned as of the end of December 1956.[12] The equipment was moved to a production area on plant site. The loose oxide was removed and the area covered with plastic to prevent spreading of activity.[9] Smears up to 9,936 dpm were collected prior to vacuuming. Monitoring conducted on December 20, 1956 showed a maximum of 7,245 dpm on the slab.[10]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents that may have been released from this storage area.

Comments

None.

References

[1] 1502716
[2] 1600378
[3] 1502710
[4] 1600673
[5] 1600005
[6] 1600048
[7] 1600374
[8] 1600151
[9] 1600047
[10] 1600380
[11] 1600380
[12] 1600046
[13] 1600029
[14] 1502717
[15] 1502712
[16] 1800285
[17] 1800275
1700834

PAC REFERENCE NUMBER: 400-803

IHSS Reference Number: Not Applicable

Unit Name: Miscellaneous Dumping, Building 446 Storm Drain

Approximate Location: N749,000; E2,083,000

Date(s) of Operation or Occurrence

July 1972

Description of Operation or Occurrence

A contractor working on the roof of Building 444 was found dumping miscellaneous materials into the storm drain immediately west of Building 446. The mixture flowed along the open ditch south of Cottonwood Avenue to a point south of the fuel oil storage tanks where it passed beneath the street and ran northeastward to the extent of Seventh Avenue.[1]

Physical/Chemical Description of Constituents Released

The dumping consisted of silver paint and possibly other materials including oil and aluminum paint.[1,2]

Responses to Operation or Occurrence

The contractor was to have cleaned up the ditch and taken the residue to the landfill.[1]

Fate of Constituents Released to Environment

No documentation was found verifying whether or not the spilled material was removed from the storm drain.

Comments

None.

References

[1] 1700170
[2] 1500632

PAC REFERENCE NUMBER: 400-804

IHSS Reference Number: Not Applicable

Unit Name: Road North of Building 460

Approximate Location: N749,000; E2,082,000

Date(s) of Operation or Occurrence

June 11, 1957

Description of Operation or Occurrence

On June 11, 1957, a pallet box with four ingots of unknown composition fell from a truck. The road, which was north of Building 446, was damaged. After removal of the ingots the area was dry-vacuumed but monitoring was discontinued because of rain.[1] Photographs have been located that document this event.[2]

Physical/Chemical Description of Constituents Released

The contamination consisted of four ingots of unknown composition.[1]

Responses to Operation or Occurrence

The ingots were removed and the area dry vacuumed. The day after the incident direct counts up to 500 cpm and smears up to 104 dpm were obtained from the damaged area. These hot spots were covered with asphalt patching material.[1]

Fate of Constituents Released to Environment

No documentation was found that detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1600028
[2] 1503355

PAC REFERENCE NUMBER: 400-805

IHSS Reference Number: Not Applicable

Unit Name: Building 443 Tank #9 Leak

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

Date(s) of Operation or Occurrence

1990

Description of Operation or Occurrence

While conducting tightness tests on tanks within RFP, tank #9 located near the steam plant indicated a filler pipe leak. Fuel was found around the filler pipe area.[1]

Physical/Chemical Description of Constituents Released

The leak consisted of fuel.[1]

Responses to Operation or Occurrence

Maintenance personnel were to repair the leak by either tightening, repairing or replacing the filler pipe.[1]

Fate of Constituents Released to Environment

No documentation was found that detailed the fate of constituents to the environment.

Comments

None.

References

[1] 1501770

PAC REFERENCE NUMBER: 400-806

IHSS Reference Number: Not Applicable

Unit Name: Catalyst Spill, Building 440

Approximate Location: N748,000; E2,082,000

Date(s) of Operation or Occurrence

July 21, 1989

Description of Operation or Occurrence

Approximately five gallons of a catalyst leaked from a foam production tank located north of Building 440. The liquid flowed onto the pavement but was stopped before it could enter the storm drain. The leak was due to a small crack in the tygon tubing.[1]

Physical/Chemical Description of Constituents Released

The leak consisted of polymethylene polyphenylisocyanate which was determined not to be a hazardous material.[1]

Responses to Operation or Occurrence

The liquid was cleaned up with "oil dry" to absorb the spill and the residue was placed in hazardous material waste drums. It was determined that the event was not reportable. Precautions were taken to prevent further spills until the leak was repaired.[1]

Fate of Constituents Released to Environment

The chemical was contained on the asphalt and was not allowed to flow into the storm drain. No documentation was found which indicated the final disposition of the oil dry.

Comments

None.

References

[1] 1501761

PAC REFERENCE NUMBER: 400-807

IHSS Reference Number: Not Applicable

Unit Name: Sandblasting Area

Approximate Location: N748,000; E2,082,500

Date(s) of Operation or Occurrence

May - September, 1976

Description of Operation or Occurrence

No documentation could be found that details the dates that sandblasting began in the 400 Area. The first documented incident occurred in May 1976.[1] References state that sandblasting of ATMX railcars took place "north of Building 664",[1] "inside the fence east of 444"[2] and "east of Building 439".[3]

Physical/Chemical Description of Constituents Released

In September 1976, Industrial Hygiene personnel initiated the substitution of alumina grit for flint sand because of its lesser toxicity.[4]

Responses to Operation or Occurrence

Respirator protection was advised for personnel involved in this procedure.[2] Operations were to cease if wind carried the dust toward adjacent Building 439 or Building 440.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

The location of this site was determined by aerial photographs.[6] The photographs indicate that sandblasting may have occurred at this location as early as 1964.

References

[1] 1500521
[2] 1500582
[3] 1500522
[4] 1500583
[5] 1500523
[6] 1502717

PAC REFERENCE NUMBER: 400-808

IHSS Reference Number: Not Applicable.

Unit Name: Vacuum Pump Leak, Building 442

Approximate Location: N749,000; E2,082,500

Date(s) of Operation or Occurrence

March 6, 1991

Description of Operation or Occurrence

A release occurred from a vacuum pump system along the north side of Building 442. About one quart of oil contaminated an area roughly 18 inches by two feet was contaminated beneath the pump.[1]

Physical/Chemical Description of Constituents Released

The pump is used to test filter adequacy, a process that involves the use of Di-n-octyl phthalate (DOP). Initially, it was not known if the oil contained any DOP; therefore, soil samples were taken. TCLP analytical results indicated quantities of 1,1-dichloroethane, TCA, toluene, benzene, and chlorobenzene that were above the detection limit but were below the regulatory standard specified in 40 CFR 117-84-0. TCL analysis indicated the presence of hydrocarbons and a high concentration of bis(2-Ethylhexyl) phthalate which is commonly used in vacuum pump oil. Hydrocarbons were found in trace amounts.[1]

Responses to Operation or Occurrence

Repair of the pump was completed on March 6. Further investigation of the matter indicated that the vacuum pump may have been pulling DOP through the process line to the pump. This was discovered on March 8 at which time Filter Test Personnel were instructed to cover the area to prevent migration due to precipitation. Soil samples were taken on March 11, 1991. Cleanup was to have been completed on March 13. To insure the complete removal of contamination follow-up samples were taken on March 14. A work order was issued to provide a containment system.[1]

Based on analytical results, it was determined that the waste was not RCRA-regulated. Although bis(2-Ethylhexyl) phthalate is listed as a hazardous waste, it and the hydrocarbons are constituents of the oil and did not meet the standard of a discarded commercial chemical or off-specification chemical.[2]

RCRA Contingency Plan Implementation Report No. 91-003 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The material generated during the cleanup was stored in a RCRA-regulated satellite collection area while waiting analytical results.[1]

Comments

None.

References

[1] 1503403
[2] 1503404

PAC REFERENCE NUMBER: 400-809

IHSS Reference Number: Not Applicable.

Unit Name: Oil Leak, 446 Guard Post

Approximate Location: N749,000; E2,082,500

Date(s) of Operation or Occurrence

August 26, 1991

Description of Operation or Occurrence

A release of motor oil occurred in the motorcycle parking lot north of the 446 Guard Post. No motorcycles were present in the parking lot when the spill was discovered.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of one quart of motor oil. Approximately one cubic foot of contaminated material was generated during the cleanup.[1]

Responses to Operation or Occurrence

The HAZMAT team responded to the spill. The contaminated soil was cleaned up with absorbent material.[1] RCRA Contingency Plan Implementation Report No. 91-015 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The RCRA Contingency Plan Implementation Report states that there did not appear to be any threat to the environment. The material was packaged and marked according to RCRA regulatory requirements and transferred to 90-day accumulation area #331-1743.[1]

Comments

None.

References

[1]1503413

PAC REFERENCE NUMBER: 400-810

IHSS Reference Number: Not Applicable.

Unit Name: Beryllium Fire - Building 444

Approximate Location: N748,500; E2,082,000

Date(s) of Operation or Occurrence

February 23, 1978

Description of Operation or Occurrence

While welding on a small inlet duct of the beryllium air plenum that serves Building 444, a Swinerton and Walberg (S&W) employee noticed a fire on the face of the prefilters. He immediately informed another S&W employee who activated a manual fire alarm. The Fire Department was already responding to the automatic filter alarm. In approximately 15 minutes, the fire was extinguished.[1]

The exhaust fan automatically shutdown when the filter fire detection equipment was activated resulting in a negative pressure inside the building which caused smoke to back up into Room 107. An worker in the area noticed the smoke and activated a third alarm.[1]

Physical/Chemical Description of Constituents Released

Analytical results indicated that 14.5 grams of beryllium was released. This was the only EPA standard that was violated. (The EPA limit is 10 grams.) Beryllium levels in the fire water taken from the east and south impoundment were 1.6 mg/l and 4.3 mg/l, respectively. Analytical results from pond samples and the shower water impounded at Building 990 all indicated concentrations of beryllium less than 0.5 mg/l.[1]

Air sampling stations indicated beryllium concentrations ranging from 0.009 to 0.021 ugm/m^3. At the time of this incident OSHA's standard to eight hour time weighted average was 2.0 ugm/m^3. Samples taken along Highway 93 measured concentrations of 0.006 to 0.015 ugm/m^3 which can be compared to the EPA standard of 0.01 ugm/m^3 continuous exposure to the general public. RFP Environmental Sciences estimated that exposure time would have been only one half hour.[1]

Stack emission was monitored for uranium during the fire. Total long lived alpha was found to be 0.08 pCi/l and total uranium was 0.092 pCi/l. Total plant stack emission for February 1977 were 2.3 microcuries.[1]

Responses to Operation or Occurrence

Firemen responded to the fire by initially spraying the outside of the plenum where the paint had blistered. One team was able to extinguish the fire from inside the plenum. A fog nozzle was used which was thought to have "washed" any airborne particulate from the air.[1] Other areas around Building 444 were also sprayed down to control contamination.[2]

Fire water samples were taken from the impounded ditches south and east of Building 444. Water samples were also taken at Ponds A-3, B-3, C-1, and from the Building 881 shower water where some employees were bussed to take showers. Air samplers were set up to establish the amount of airborne contamination. Employees that were evacuating the building were monitored in an established control area.[1]

The roadway south of Building 444, where the fire water had flowed, was vacuumed and monitored for beryllium.[3] All smears were determined to have background levels.[1]

Fate of Constituents Released to Environment

Water from the ditches adjacent to Building 444 was picked up and sent to Building 774 for processing.[1,4] Shower water from Building 881 was impounded at the building's south holding basin.

Comments

None.

References

[1] 1500815
[2] 1600267
[3] 1600266
[4] 1500849

Other References of Interest

1501239

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3.9 500 Area

The 500 Area is located in the north-central portion of the RFP. It is bounded by the 700 Area on the north and east, the 600 Area on the south, and the 300 Area on the west. The buildings in northeast portion of the 500 Area are located within the PA (Protected Area). The more important buildings in this area are as follows:

- Building 528 was placed into service in 1968. This building is a temporary holding point for process wastes received from Building 559 Analytical Laboratory and Building 561 Plenum Building. The waste consists primarily of hydrochloric acid, nitric acid, sulfuric acid, potassium hydroxide, water, detergent, and low levels of other chemicals. The liquid wastes are held in tanks in Building 528 until being transferred to Building 374 for treatment.

- Building 551 was placed into service in 1953. This building houses a storage warehouse and a fabrication shop. The warehouse is a storage and inventory site for the RFP. The northern portion of the building was constructed in the mid-1960s, and has been used as a fabrication shop since 1990.

- Building 559 was placed into service in 1968 and is located within the PA. This building contains laboratory facilities used to perform analyses of samples from production processes and products from all areas at the RFP. Specific analytical techniques include mass spectrometry, residual gas analysis, gas chromatography, thermal analysis, x-ray fluorescence, infrared analysis, emissions spectroscopy, isotopic analysis, gamma ray spectroscopy, plutonium assay, carbon analysis, gallium analysis, uranium analysis, titration, specific ion electrode analysis, and raschig ring analysis. Analytical procedures performed on a non-routine basis include ion chromatography, plutonium oxide analysis, uranium analysis, and iron and silicon analysis in plutonium metal. Miscellaneous analyses, sample receiving and cutting, maintenance, utilities, and custodial operations are also conducted in this building.

The 500 area also includes several support buildings that contain transformers, electrical shops, cooling towers, ventilation exhaust systems and emergency generators.

The following subsection contains detailed descriptions of PACs located in the 500 Area. These PACs are shown in Figure 500-1.

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PAC REFERENCE NUMBER: 500-117.1

IHSS Reference Number: 117.1, Operable Unit 13

Unit Name: North Site Chemical Storage

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

Prior to September 1959[1] - Early 1970s[2]

Description of Operation or Occurrence

An area to the northeast of Building 551 was used as a general warehouse storage yard prior to September 1959 until the early 1970s.[1,2] In September 1959, routine monitoring of the aluminum scrap pile near Building 551 showed an occasional build-up of radioactive material.[1] In May 1963, uranium chips and turnings were discovered at this site in an aluminum scrap pile.[3,4] A similar incident involving 40 drums of contaminated aluminum scrap occurred in 1964.[4] In May 1964, 40 drums of contaminated aluminum scrap were dumped into the acid waste in Solar Evaporation Pond 207A (PAC 000-101).[3]

Physical/Chemical Description of Constituents Released

Forty drums of aluminum scrap metal contaminated with uranium chips and turnings were discovered in the storage yard.[3,4] In September 1959, an approximate one square foot area of the aluminum scrap pile near Building 551 showed a direct measurement of up to 20 mr/hr.[1]

Responses to Operation or Occurrence

The aluminum scrap pile near Building 551 was routinely monitored in September 1959 for radioactivity.[1] In the early 1970s, the material in the general warehouse storage yard was transferred to the Property Utilization and Disposal storage yard southwest of the present landfill (PAC NW-170).[2] No documentation was found which further detailed response to the occurrences.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

Reference 3 indicates the aluminum scrap was dumped into Pond 2A also known as Solar Evaporation Pond 207A (PAC 000-101).

References

[1] 1600038
[2] 1501255
[3] 1700204
[4] 1601057

Other References of Interest

1501999
1502644
1502735

PAC REFERENCE NUMBER: 500-117.2

IHSS Reference Number: 117.2, Operable Unit 13

Unit Name: Middle Site Chemical Storage

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

Prior to Approximately 1971[1] - Prior to September 1988[2]

Description of Operation or Occurrence

There have been minor leaks and spills in the chemical storage area east of Building 551.[3] An inspection in approximately 1971 revealed several drums which were leaking an oily substance.[1] On October 20, 1986, a 55-gallon drum of aluminum nitrate was punctured by a forklift east of Building 551. Most of the 55 gallons flowed out and across the roadway to the east (Seventh Street).[4]

Physical/Chemical Description of Constituents Released

Constituents released included acids, oils, soaps, solvents, and beryllium scrap metal.[1,3] The October 20, 1986 incident released aluminum nitrate.[4]

Responses to Operation or Occurrence

In the early 1970s, there was a recommendation made for the repacking of leaking drums in the storage area.[1] The chemical storage area to the east of Building 551 was covered with asphalt sometime during the 1970s.[5] The October 20, 1986, incident was controlled with no environmental damage.[4] No documentation was found which detailed further responses to occurrences at the chemical storage area east of Building 551.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

None.

References	Other References of Interest
[1] 1700396	1500296
[2] 1501255	1502633
[3] 1601057	1502644
[4] 1600552	1502735
[5] 1500768	

PAC REFERENCE NUMBER: 500-158

IHSS Reference Number: 158, Operable Unit 13

Unit Name: Radioactive Site - Building 551

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

September 1959[1] - 1970[2]

Description of Operation or Occurrence

There may be residual contamination from leakage of waste boxes loaded into railroad container cars in the area north of Building 551.[3] In September 1959, three containers measuring 6,000 to 40,000 cpm were held back from off-site shipment.[1] On June 7, 1961, isolated spots of contamination up to 8,000 cpm were found on the dock and in the helium storage area of Building 553.[4] Empty drums contaminated with uranium from off site were received at Building 551. In October 1962, spot checks of one load of about 220 drums indicated they were generally contaminated up to 1200 cpm on exteriors and up to 7,000 cpm on the interior surfaces.[5] In July 1963 and again in 1970, RFP received equipment and drums from off site which contained uranium above the acceptable level.[2]

Physical/Chemical Description of Constituents Released

Uranium is a constituent documented to have been released to the environment.[2]

Responses to Operation or Occurrence

Spots of contamination (found in June 1961) on the dock and in the helium storage area of Building 553 were cleaned.[4] In 1970, an entire shipment of 55-gallon drums was returned to the vendor.[2] No documentation was found which further detailed response to the occurrences at this site.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU13. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

The aluminum scrap pile incidents near Building 551 discussed in references 1 and 2 are included in the narrative for PAC 500-117.1.

References

[1] 1600038
[2] 1601057
[3] 1500755
[4] 1500483
[5] 1600022

Other References of Interest

1500514
1501108
1501999
1502735
1600026
1600237
1700805

PAC REFERENCE NUMBER: 500-159

IHSS Reference Number: 159, Operable Unit 9

Unit Name: Radioactive Site - Building 559

Approximate Location: N750,000; E2,083,500

Date(s) of Operation or Occurrence

March 1968[1] - May 1977[2]

Description of Operation or Occurrence

When Building 559 began operation in March 1968, the process waste system consisted of Pyrex glass lines beneath the building and adjacent support buildings.[1] Less than one year later, a break was discovered in the process waste line from the building to the pump house. In May 1972, the south half of the process waste line beneath Building 559 was discovered to be leaking.[3] Also in 1972, the rupture of the process waste line from Building 559 to the process waste tank valve pit caused soil contamination with activity of 4,500 pCi/g.[4] Reference 4 did not indicate the radioactive source element or the type of activity measured. The contamination decreased from the pit to the concrete pad along the south side of Building 559.

In May 1977, influx of contaminated ground water was discovered in the manhole adjacent to the southwest corner of Building 559. The contamination was believed to be residue from the 1972 occurrence. Also in May 1977, 4,600 gallons of contaminated water leaked into a process waste collection tank in Building 528. The water leaked through a drip leg of the double contained process waste lines and was fed by a broken 3-inch PVC process water supply line from Building 559 to Building 561.[1,2] Gross alpha in the water from the drip leg was measured at 160,000 pCi/l. It was concluded that the process water supply line, the process line and the shell of the process waste line were probably broken.[2]

Physical/Chemical Description of Constituents Released

The primary material of concern is process waste generated at Building 559. Typically, process waste consists of an aqueous solution with radioactive constituents.

Responses to Operation or Occurrence

In 1968 and 1972, contaminated soil from over and around the process waste line to the process waste tank pit was removed and shipped to Idaho for disposal as radioactive waste.[4,5,6] In 1968, the infiltrated soil removed for off-site disposal had a surface area of several hundred square feet. The soil contamination in 1968 resulted from leakage of the process waste line from Building 559 to the pump house. In 1972, a PVC pipe bypass of the pyrex line beneath the south half of Building 559 was installed and the remaining lines were static leak tested.[3] In May 1972, 82 drums of contaminated soil were removed from over and around the process waste line from Building 559 to the process waste tank pit south of the building.[4,5] The soil under the process waste line was not removed.[5] In May 1977, water samples were taken at the process tank building, the steam pit, Building 561 and the footing drain manhole south of Building 559. Also in May 1972, the pit building was decontaminated. In addition, Building 559 terminated the generation of process waste water and ground water was pumped from the footing drain manhole to the process waste holding tanks.[2] No documentation was found that indicated the duration for which process waste generation was terminated.

Fate of Constituents Released to Environment

In June 1973, following the analysis of core samples taken with a hand auger, it was concluded that the contamination from leakage of the process waste beneath Building 559 was contained beneath the building.[5]

No documentation was found which further detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to DOE). However, the information developed on this unit for this study indicates that the location for IHSS 159 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

It is proposed that the area of IHSS 159 presented in the IAG be reduced in the east-west direction and enlarged in the north-south direction. It is proposed that IHSS 159 be redefined as a 30 foot by 155 foot area and southeast of Building 559 and include the process waste tank pit beneath Building 528 (PAC 500-159)

References

[1] 1503448
[2] 1500864
[3] 1601057
[4] 1600582
[5] 1600438
[6] 1600134

Other References of Interest

1500578
1500585
1500590
1500608
1500642
1500741
1500762
1500831
1500863
1500920
1500970
1500979
1500980
1501188
1501999
1502735
1600089
1600163
1600243
1600475
1700805
1800160
1800161
1800162
1800163

PAC REFERENCE NUMBER: 500-169

IHSS Reference Number: 169, Operable Unit 13

Unit Name: Waste Drum Peroxide Burial

Approximate Location: N749,500; E2,083,000

Date(s) of Operation or Occurrence

April 1981[1]

Description of Operation or Occurrence

During the week ending April 24, 1981, warehouse personnel were transporting three 55-gallon drums of hydrogen peroxide when two of the drums fell off a pallet. One of the drums burst open and the peroxide drained into a culvert at the corner of Fifth and Central Avenues.[1] A second source states that in April 1981, a 55-gallon drum of 35% hydrogen peroxide solution spilled at the warehouse (no associated building number is given). The content of the drum leaked out and was flushed into a hole with water.[2] According to the RCRA 3004(u) Report, a 55-gallon drum of hydrogen peroxide was buried in the chemical storage area east of Building 551.[3] The location of this event is thought to be the same as that described in PAC 400-191 (see Comments).

Physical/Chemical Description of Constituents Released

A solution of 35% hydrogen peroxide (H_2O_2) was released to the environment.[1,2]

Responses to Operation or Occurrence

A hole was dug east of Fifth Avenue, in the Central Avenue Ditch, by Labor personnel and the Fire Department hosed down the area allowing the diluted peroxide to drain into the hole. The hole was refilled on April 23, 1981.[1]

Fate of Constituents Released to Environment

One document states that the diluted peroxide will decompose over a short period of time.[1] No documentation was found which further detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU13. However, the information developed on this unit for this study indicates that the location for IHSS 169 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

The incident described in references 1 and 2 is believed to be the same as the incident discussed as PAC 400-191. The 55-gallon drum of hydrogen peroxide reported in reference 3 to be buried in the chemical storage yard is suspect in that there was no documentation found which corroborates this report. It is proposed that IHSS 169 be eliminated.

References

[1] 1501180

[2] 1700141
[3] 1502735

PAC REFERENCE NUMBER: 500-197

IHSS Reference Number: 197, Operable Unit 16

Unit Name: Scrap Metal Sites - 500 Area

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

Approximately 1958[1,2] - Early 1960s[3]

Description of Operation or Occurrence

In approximately 1958, scrap metal components, mostly from the original plant construction program, were buried in trenches west of Building 559. Some of the buried material was recovered from process areas.[1,2,4] Another source states that the burial probably occurred in the early 1960s. The site was probably used by the Austin Company for disposal of construction debris during early building activities.[3]

Physical/Chemical Description of Constituents Released

Some of the scrap metal material recovered from the process areas and buried in the trenches could possibly have been radioactively contaminated.[1,2] There is a slight possibility that transformers containing PCBs were disposed of at this site.[3]

Responses to Operation or Occurrence

In 1981, excavation for the construction of the PSZ unearthed the scrap metal burial sites. The RFP remediated the site by complete excavation of the trenches and removal of the buried material to the sanitary landfill (PAC NW-114).[4,5,6,7] Another reference states that there was a second scrap metal burial site, located west of Building 559 and northwest of the first site, which was also unearthed at the time of the PSZ construction.[3]

Fate of Constituents Released to Environment

No radioactive contamination was detected in the material excavated from the scrap metal trenches.[4,5] This IHSS is being studied in accordance with the IAG schedule for OU16. However, the information developed on this unit for this study indicates that the location of IHSS 197 presented in the IAG is inaccurate. The Final No Further Action Justification Document for OU16 is to be completed by July 30, 1992.

Comments

Information presented in reference 3 indicates that the scrap metal burial site is of a larger extent than shown in the IAG. It is proposed that IHSS 197 be redefined to extend approximately 250 feet farther to the northwest (PAC 500-197).

References

[1] 1500887
[2] 1601057
[3] 1700805
[4] 1500765

[5] 1500905
[6] 1700482
[7] 1700483

Other References of Interest

1500980
1502550
1502608
1502609
1502610
1502611
1502612
1502613
1502614
1502615
1502616
1502617
1502618
1502619
1502620
1502621
1502622
1502623
1502624
1502625
1500890
1501999
1800352

PAC REFERENCE NUMBER: 500-900

IHSS Reference Number: Not Applicable.

Unit Name: Transformer Leak - 515/516

Approximate Location: N750,500; E2,083,000

Date(s) of Operation or Occurrence

January 1986[1,2]

Description of Operation or Occurrence

An EPA inspection on January 1986 found one of the transformers at the 515/516 substation to be leaking PCB containing oil from a valve and contaminating the underlying soil.[1,2] A leak at the 515/516 substation was included in a June 1986 penalty calculation for PCB violations.[4] In September 1986, Transformers 515 and 516 were reported as leaking.[5] In a September 1986 photograph, staining is visible on the concrete pad underlying the Transformer 516 drain valve.[6]

Physical/Chemical Description of Constituents Released

In approximately 1985, analytical results indicated the oil in Transformers 515 and 516 contained less than 50 ppm PCBs.[7] In October and November 1985, and in June 1986, it was reported that fluid in Transformers 515 and 516 contained 63 ppm and 65 ppm PCBs, respectively.[3,8,9] At the time of a January 1986 inspection, approximately nine square feet of soil underlying a valve at the 515/516 substation was found to be contaminated with PCB-containing oil.[2] In November 1986, smear samples taken at the valve and pad of Transformer 515 indicated 3.3 ppm and 2.5 ppm PCBs, respectively. Smear samples taken at the valve and pad of Transformer 516 indicated 3.0 ppm and 12.8 ppm PCBs, respectively.[10] Oil containing between 50 and 500 ppm PCBs was released to the environment.[1]

Responses to Operation or Occurrence

In January 1987, it was recommended that the concrete pad underlying Transformer 516 be coated with sealant.[11] In 1986, the fluid in Transformers 515 and 516 was flushed. Transformers 515 and 516 were scheduled for cleanup to take place on August 13, 1989.[12]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

References 1, 2, and 4 do not specify which of the transformers at substation 515/516 were leaking. Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700000
[2] 1700131
[3] 1700074

[4] 1700076
[5] 1700110
[6] 1502460
[7] 1700056
[8] 1700062
[9] 1700063
[10] 1700026
[11] 1700004
[12] 1700129

Other References of Interest

1503365
1502458
1502459
1700001
1700027
1700072
1700077
1700082
1700116
1700122
1700805

PAC REFERENCE NUMBER: 500-901

IHSS Reference Number: Not Applicable.

Unit Name: Transformer Leak - 555

Approximate Location: N749,500; E2,083,000

Date(s) of Operation or Occurrence

Prior to June 1986[1] - November 1986[2]

Description of Operation or Occurrence

In June 1986, Transformer 555 was reported as leaking.[1] In September 1986, Transformer 555 was again reported as leaking.[3]

Physical/Chemical Description of Constituents Released

Transformer 555 contained fluid with 55 ppm PCBs.[1,2,4,5] Smear samples taken at the Transformer 555 valve, wall, and pad indicated 3.9 ppm, 2.0 ppm, 6.2 ppm PCBs, respectively.[2]

Responses to Operation or Occurrence

In 1986, the fluid in Transformer 555 was flushed. Transformer 555 was scheduled for cleanup to take place on August 21, 1989.[6]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References	Other References of Interest
[1] 1700074	1503365
[2] 1700026	1502491
[3] 1700110	1502492
[4] 1700062	1700001
[5] 1700063	1700027
[6] 1700129	1700116

PAC REFERENCE NUMBER: 500-902

IHSS Reference Number: Not Applicable

Unit Name: Transformer Leak - 559

Approximate Location: N750,000; E2,084,500

Date(s) of Operation or Occurrence

Prior to 1987[1]

Description of Operation or Occurrence

Transformer 559-1 (559) is located on the east side of Building 559. This transformer leaked oil containing PCBs from a faulty valve prior to relocation and retro-filling in 1987.[1]

Physical/Chemical Description of Constituents Released

Transformer 559 contained 235 gallons of fluid.[2,3,4,5,6,7] In October and November 1985, it was reported that Transformer 559 contained PCB fluid exclusively (PCBs > 500 ppm).[8,9] In March 1989, it was reported that Transformer 559 contained fluid with 500,000 ppm PCBs. Oil containing PCBs was released from the transformer.[1]

Responses to Operation or Occurrence

In October 1986, Transformer 559 was scheduled for recleaning at the drain valve and at the case near the drain valve.[10] In 1987, the transformer was retro-filled and relocated on a new pad several feet to the south of its previous location. Concrete material was removed from the previous location of the transformer.[1] In March 1989, it was reported that Transformer 559 was replaced under the Environmental Hazards Elimination Project.[11] No documentation was found which details further response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed fate of the constituents released to the environment or the disposition of the concrete material from the removed transformer pad.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700054
[3] 1700072
[4] 1700082
[5] 1700083
[6] 1700084
[7] 1700085
[8] 1700062
[9] 1700063
[10] 1700077
[11] 1700129

Other References of Interest

1700026
1700053
1700057
1700068
1700086

PAC REFERENCE NUMBER: 500-903

IHSS Reference Number: Not Applicable

Unit Name: RCRA Storage Unit #1

Approximate Location: N749,500; E2,083,000

Date(s) of Operation or Occurrence

1988 - Present

Description of Operation or Occurrence

On June 21, 1988, a leak was discovered from a drum in the hazardous waste storage site cargo container.[1] On December 16, 1991, a release was discovered during a weekly inspection at RCRA Storage Unit #1. The release was completely contained within the secondary containment pan inside the cargo container.[2]

Physical/Chemical Description of Constituents Released

In the June 1988 incident, less than four fluid ounces of liquid containing between 59 ppm and 63 ppm PCBs was released into the cargo container.[1] In the December 1991 incident, approximately forty gallons of TRIM™SOL lubricant mixed with waste oil was released into the secondary containment pan.[2]

Responses to Operation or Occurrence

In response to the June 1988 incident, the leaking drum was placed into an overpack drum. The cleanup debris was placed into a waste drum.[1]

In response to the December 1991 release, the leaking drum was placed into an overpack drum. The liquid in the secondary containment pan and the liquid remaining in the leaking drum was pumped into a new drum. Absorbent was added to the empty drum. The secondary containment pan, rollers, and grating were cleaned.[2] RCRA Contingency Plan Implementation Report 91-035 describes this event.

Fate of Constituents Released to Environment

The December 1991 incident did not release any contaminant to the environment outside the cargo container.[1]

Comments

It is unclear if any contaminant was released to the outside environment in the June 1988 incident.

References

[1] 1700125
[2] 1503433

Other References of Interest

1502735

PAC REFERENCE NUMBER: 500-904

IHSS Reference Number: Not Applicable

Unit Name: Transformer Leak - 223-1/223-2

Approximate Location: N750,000; E2,083,000

Date(s) of Operation or Occurrence

Prior to 1987[1,3], February 1986[2]

Description of Operation or Occurrence

Transformers 223-1 and 223-2 are located north of Buildings 549. These transformers leaked small amounts of oil prior to 1987.[1] In February 1986, the valve, tapchanger, and bushings of Transformer 223-1 were reported leaking.[2] In January 1987, residual staining was noted on the concrete pad underlying Transformer 223-2.[3]

Physical/Chemical Description of Constituents Released

In approximately 1985, analytical results indicated the oil in Transformer 223-1 contained over 500 ppm PCBs and the oil in Transformer 223-2 contained less than 50 ppm PCBs.[4] In October and November 1985, it was reported that fluid in Transformers 223-1 and 223-2 contained 19,800 and 296 ppm PCBs, respectively.[5,6] In November 1986, a smear sample taken from the concrete underlying the drain valve of Transformer 223-1 indicated less than 50 micrograms of PCBs.[7] Oil containing less than 50 ppm PCBs was released from the transformers.[1]

Responses to Operation or Occurrence

In February 1986, the valve, tapchanger, and bushings of Transformer 223-1 were scheduled for repair.[2] In June 1986, several actions were recommended for planning and early implementation with respect to four transformers, including Transformer 223-1. The following actions were recommended: leaking fluid be contained and properly disposed; the transformers be expeditiously repaired or replaced; and, any associated contamination be satisfactorily decontaminated.[8] Also in June 1986, Transformer 223-1 was scheduled for fluid cleansing or exchange.[9] In January 1987, it was recommended that the concrete pad underlying Transformer 223-2 be coated with sealant.[3] In March 1989, it was reported that Transformer 223-1 was replaced under the Environmental Hazards Elimination Project. Transformer 223-2 was scheduled for cleanup to take place on August 18, 1989.[10] The transformers were retro-filled with non-PCB cooling oil in 1987.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700070
[3] 1700004
[4] 1700056
[5] 1700062
[6] 1700063
[7] 1700006
[8] 1700073
[9] 1700074
[10] 1700129

Other References of Interest

1700001
1700026
1700053
1700054
1700072
1700110

PAC REFERENCE NUMBER: 500-905

IHSS Reference Number: Not Applicable

Unit Name: Transformer Leak - 558-1

Approximate Location: N749,500; E2,083,000

Dates of Operation or Occurrence

Unknown - Present

Description of Operation or Occurrence

There is evidence of leakage on a valve on the northeast side of Transformer 558-1. The transformer is situated on a concrete pad, around which rock fill was placed. There is no berm around the transformer, which is still active.[1]

Physical/Chemical Description of Constituents Released

Dieletric fluid containing PCBs was potentially released.

Responses to Operation or Occurrence

No documentation was found which detailed a responses to this occurence.

Fate of Constituents Released to Environment

No documentation was found which details the fate of constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365

3.10 600 Area

The 600 Area is located in the south-central portion of the RFP. It is bounded to the south by the buffer zone, to the east by the 800 Area, to the west by the 400 Area and to the north by the 500 Area (see Figure 3.1). The more important buildings and features in this area are as follows.

- Two nitric acid tanks, the 218 Tanks, were built in 1953.
- Building 221, which began operation in 1952, and Building 224, which was constructed in 1973, are Number 6 diesel fuel oil storage tanks. The fuel is used as back-up fuel for the Building 443 steam plant.
- Building 444 Parking Lot is now a paved area but was previously used for storage of waste boxes and drums.
- Building 662 and Building 663 are currently used for electrical maintenance, offices and warehousing. The cement slab foundations of these buildings were used in earlier years for the staging of waste drums.
- Building 664 became operational in 1972. This building is used for the storage, staging, loading and shipping of radioactive wastes. Building 664 contains a fiberglass application operation and a Real Time Radiography unit.
- Building 668 is used for the inspection, labelling and numbering of new drums. These drums are distributed throughout the RFP for waste packaging.

The following subsection contains detailed descriptions of PACs located in the 600 Area. These PACs are shown in Figure 600-1.

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PAC REFERENCE NUMBER: 600-117.3

IHSS Reference Number: 117.3, Operable Unit 13

Unit Name: Chemical Storage - South Site

Approximate Location: N749,500; E2,083,000

Date(s) of Operation or Occurrence

Prior to 1965 - 1969

Description of Operation or Occurrence

Various RFP photographs indicate that the area southwest of the intersection of Central Avenue and Sage Street was used for storage from approximately 1964 until 1969. Presently, there are two Number 6 Fuel Oil tanks at the site. They consist of an 800,000-gallon capacity tank, Tank 221, which was built in 1955, and a 1,800,000-gallon capacity tank, Tank 224, which was built in 1973. Tank 221 is located west of Tank 224.

Low-level oblique RFP photographs show miscellaneous materials stored in the area around Tank 221 from at least 1965 to June 1969.[1,2,3,4] Wooden boxes are evident south and east of Tank 221 in 1965 and 1966.[1,2] It appears that drums were stored east of Tank 221 in 1966.[2] In 1969, wooden boxes, reportedly containing contaminated debris from the May 1969 fire in Building 776 and Building 777, are evident east of Tank 221.[5] By 1969, the boxes were no longer stored in this area.[3,4]

On May 4, 1965, a glovebox (H-22), which was being transferred from Building 776 to the south site chemical storage area, leaked highly contaminated oil along the last 400 feet of the route, near the intersection of A and G Roads,[6] which are now referred to as Central Avenue and 7th Street. The glovebox, which had been used for heat treating product material, was considered excess contaminated property and was being removed for disposal. Although the glovebox had been packaged in a plastic sheet-lined wooden waste box, the oil escaped from the box.[7] Approximately 2 to 3 liters of oil was released, contaminating Central Avenue, some ground at the storage area, a fork lift, a flatbed and a pick-up truck.[6]

The leaking oil affected a strip of pavement approximately 18 inches wide,[8] and approximately 900 square feet of earth.[9] The glovebox was placed on plastic sheeting at the corner of Seventh Street and Central Avenue until removal.[8]

On June 15, 1965, a leaking waste box was discovered in the "waste storage area south of 51." The box was returned to Building 881 for investigation and repackaging.[10] It is likely that the "area south of 51" was IHSS 117.3.

Physical/Chemical Description of Constituents Released

The oil released during the May 1965 incident contained plutonium,[11] and was considered to be highly contaminated. Oil spots on the road were monitored by alpha survey instruments and had measurements of greater than 100,000 cpm.[7]

No documentation was found regarding the constituents of the material leaking from the waste box in the June 1965 incident.

Responses to Operation or Occurrence

The asphalt contaminated by the May 1965 incident was removed, placed in lined barrels and buried in a sludge pit. The soil affected by the leaking glovebox was also removed and drummed, in preparation for offsite disposal.[7,9] Removal of the soil under the glovebox was completed on May 7, 1965.[12]

No documentation was found regarding cleanup following the June 1965 incident.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for Operable Unit 13. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

Storage of materials similar to those stored at the south site chemical storage area (PAC 600-117.3) also occurred south of Tank 221, in the Building 444 Parking Lot (see PAC 600-160).

It is believed that the referenced sludge pit in which the contaminated asphalt was buried is one of the sewage sludge disposal trenches (PAC NE-111.1 - NE-111.8).

Since the contaminated oil release in 1965 affected the pavement along the last 400 feet of the transport route, it is proposed that the boundaries for this IHSS be extended to include 400 feet of Central Avenue east of Seventh Street.

References	Other References of Interest
[1] 1800285	1500643
[2] 1502717	1500447
[3] 1800275	1600131
[4] 1700834	1501144
[5] 1502787	1600183
[6] 1500640	
[7] 1501193	
[8] 1601057	
[9] 1700450	
[10] 1501157	
[11] 1501782	
[12] 1501146	

PAC REFERENCE NUMBER: 600-120.1 - 600-120.2

IHSS Reference Number: 120.1 - 120.2, Operable Unit 12

Unit Name: Fiberglassing Areas North (120.1) and West (120.2) of Building 664

Approximate Location: N748,550; E2,082,750 North Area
N748,250; E2,082,650 West Area

Date(s) of Operation or Occurrence

1972 - 1979

Description of Operation or Occurrence

Fiberglassing of waste packing boxes occurred in the areas north and west of Building 664 during the 1970s. It is possible that residual chemical constituents are present resulting from the packaging activities.

Interviewees for CEARP indicated that a spill of polyester resin may have occurred west of Building 664 during the 1978/1979 time frame. Foam was sprayed on the ground, indicating that something was being contained. Interviewees also recalled fiberglass and epoxy components, as well as solvents, being spilled west of Building 664. Similar spills may have occurred north of Building 664.[1]

The Aerial Radiological Measurements System survey, conducted in 1977, detected elevated gamma-radiation and americium concentrations in the vicinity of these sites.[2,3,4,5] No documentation was found which provided an explanation for the origin of the elevated readings.

No documentation was found which detailed discrete occurrences in these areas.

Physical/Chemical Description of Constituents Released

Persons interviewed for the CEARP Phase 1 report indicated that the area may contain residue from spills of polyester resin, peroxide catalyst materials, and cleaning solvents.[6] Plutonium- and uranium-contaminated liquid and solid wastes staged in Building 664 are the likely residual constituents which led to the elevated radiation readings in 1977.[6]

Responses to Operation or Occurrence

No documentation was found which detailed responses to occurrences in these areas.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. These IHSSs are being studied in accordance with the IAG schedule for Operable Unit 12. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI is to be completed by September 15, 1994.

Comments

None.

References

[1] 1700805
[2] 1502626
[3] 1800253
[4] 1800254
[5] 1800255
[6] 1502735

Other References of Interest

1501999
1502665
1502666
1502630

PAC REFERENCE NUMBER: 600-152

IHSS Reference Number: 152, Operable Unit 13

Unit Name: Fuel Oil Tank 221 Spills

Approximate Location: N749,130; E2,082,760

Date(s) of Operation or Occurrence

1955 - present

Description of Operation or Occurrence

Tank 221 is an 800,000-gallon surface-mounted storage tank located east of Building 452. The tank began operation in 1955, and contains Number 6 fuel oil for use in the RFP central steam plant when natural gas is not available. Tank 224, which is located directly east of Tank 221, has a 1,800,000-gallon capacity and is used for the same purpose.

On January 29, 1971, 700 gallons of Number 6 fuel oil leaked from Tank 221. The fill line valve, which is used to transfer oil from transport trucks to the tank, had not been closed after use. Reportedly, the released oil was confined to ditches and an open field area east of the tank. Documentation on the incident indicates that this was the second incident of this nature in four weeks.[1] No documentation regarding the first incident was found.

A leak was discovered in the heater coil of one of the fuel oil tanks on April 4, 1975, when the pressure dropped below the head pressure of oil in the tank. The leak enabled oil to flow through the condensate drain line and into the diked area around the tank.[2] The specific tank was not documented.

During the week ending February 16, 1979, an estimated 400 gallons of Number 6 fuel oil was spilled during the filling of the Central Avenue storage tanks.[3] Neither the specific tank, nor details of the release, were documented.

During the week ending February 17, 1989, approximately 50 gallons of Number 6 fuel oil were released when the valve was left open. Reportedly, the oil did not enter a water course. Documentation on the incident indicates that this was the second spill of this nature in four days.[4] No details of the first incident were found.

Physical/Chemical Description of Constituents Released

Each release consisted of Number 6 fuel oil.

Responses to Operation or Occurrence

Following the January 1971 incident, ditches and ponds were dug to prevent further spread of contamination. The oil was then scraped up and disposed of in the landfill (PAC NW-114).[1]

Cleanup of the February 1971 incident was to be conducted,[3] however cleanup activity details were not documented. Possibilities for the destination of the waste included landfill disposal (PAC NW-114), off-site shipping, or reprocessing.[3]

Cleanup activities following the April 1975 leak were not documented, however the cost of lost oil and cleanup amounted to $4,680.[2]

There was no documentation found detailing a response to the 1989 oil spill.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for Operable Unit 13. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 11, 1995.

Comments

HRR information indicates that the release on January 29, 1971, impacted the area east of Tank 221. The area impacted by this release is not adequately illustrated in existing IHSS maps. The extent of the spill approached Seventh Street. Photographs taken on February 1, 1971, clearly show the flow path in the ditches south of Central Avenue as well as pools of fuel oil east of the tank, as a result of ditches dug to divert the flow.[1] It should be noted that the area east of Tank 221 is included in IHSS 117.3, and much of it now underlies Tank 224. Additionally, because of the uncertainty of the tank involved in the 1975 incident and the 1979 incidents, Tank 224 should also be included in IHSS 152. It is proposed that the boundaries defined for IHSS 152 be extended to include the Central Avenue Ditch from Tank 221 to Seventh Street, as well as Tank 224.

References

[1] 1501787
[2] 1500289
[3] 1600214
[4] 1600460

Other References of Interest

1502735
1700805
1501999
1501005

PAC REFERENCE NUMBER: 600-160

IHSS Reference Number: 160, Operable Unit 14

Unit Name: Radioactive Site - 444 Parking Lot

Approximate Location: N748,700; E2,083,000

Date(s) of Operation or Occurrence

Prior to 1959 - Present

Description of Operation or Occurrence

Releases of waste may have occurred in the storage area west of Seventh Street and south of Cottonwood Avenue (now the 444 Parking Lot). This area was used to store wastes prior to offsite disposal.[1] Aerial photographs taken in June 1965 and June 1969 show drums and boxes in the unpaved area west of Building 444.[2]

Two retired RFP employees interviewed for this report stated that the area now occupied by the 444 Parking Lot had been used for the storage of drummed and boxed waste. In particular, waste resulting from the May 1969 fire in Building 776 and Building 777.[3]

On May 24, 1971, two boxes leaked an unknown contaminated liquid onto the ground at the waste box storage yard. Approximately 1,000 square feet of ground were contaminated from 1,000 cpm to greater than 100,000 cpm.[4] The quantity of released liquid was not documented. Apparently the leaks were due to rain or melting snow entering the boxes. The boxes were returned to Building 777.[5]

An alpha probe survey was conducted during February 1973 on the storage yard east of Building 444, following the removal of some boxes. No contamination was detected.[6]

Physical/Chemical Description of Constituents Released

Uranium and plutonium contaminants, as well as oils and coolants, have been stored at the storage area in great quantity.[3]

Responses to Operation or Occurrence

In the early 1970s, surface soil was removed from this area; however, RFP personnel interviewed for CEARP Phase 1 mentioned that small amounts of plutonium may have remained.[1]

On June 16, 1971, decontamination activities at the waste box storage yard were completed.[7] It is likely that these activities were a result of the May 24, 1971 incident.

An alpha probe survey was made of the ground surfaces in the contaminated waste storage yard east of Building 444 in February 1973. The survey was done after all boxes had been removed. No contamination was detected.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for Operable Unit 14. However, the information developed

for this unit in this study indicates that the IHSS location presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

An area adjacent to Building 663, and east of Building 444 was fenced for storage purposes in January 1971.[9] This area was originally within the boundaries of IHSS 160. It is proposed that the boundary of IHSS 160 should be changed to include only the area which is now covered by 444 Parking Lot. The area around Building 663 and Building 662 will be included in PAC 600-1001.

References

[1] 1501999
[2] 1800285
[3] 1502787
[4] 1600010
[5] 1600068
[6] 1500549
[7] 1600009
[8] 1503375
[9] 1500570

Other References of Interest

1502735
1601057
1500596
1500597
1500598
1502632
1502670
1502668
1502669
1800197
1800196
1800195
1700805
1500521
1500618
1500541

PAC REFERENCE NUMBER: 600-161

IHSS Reference Number: 161, Operable Unit 14

Unit Name: Storage Site West of Building 664 (IAG Name: Radioactive Site - Building 664)

Approximate Location: N748,000; E2,082,500

Date(s) of Operation or Occurrence

1971 - Present

Description of Operation or Occurrence

Persons interviewed for the CEARP Phase 1 report indicated that the area west of Building 664 may contain low-level residual contamination from plutonium[1] and uranium resulting from punctured or leaking drums and boxes of solid and liquid wastes.[2] Building 664 was constructed in 1971 and is used to stage drummed and boxed waste prior to offsite shipment for disposal.

A review of aerial photographs revealed no apparent activity in the area prior to the construction of Building 664 in 1971. No records documenting discrete releases in this area were found.

Results of an aerial radiometric survey conducted in 1977 indicate an area of elevated americium and gamma activity concentrations centered around the area of the northwest corner of Building 664.[3,4,5,6]

In November 1988, a fork lift leaked hydraulic oil outside Building 664. The cause was the rupture of a one inch hose on the fork lift. The oil spread over the asphalt area and adjacent ground.[7]

Physical/Chemical Description of Constituents Released

Plutonium- and uranium- contaminated liquid and solid wastes staged in Building 664 are the likely residual constituents which led to the elevated radiation readings in 1977.[2]

The November 1988 incident resulted in the release of liquid hydraulic oil.[7]

Responses to Operation or Occurrence

Soil was reportedly removed from this area in the early 1970s.[1] No documentation was found which provides details of any soil remediation activities.

An oil-absorbent was spread over the oil that remained from the November 1988 incident.[7]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for Operable Unit 14. However, information gathered for the HRR indicate that the location for this IHSS is inaccurate (see Comments). The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

It appears that this area was not in routine use for staging prior to 1972. Therefore, the source of contamination in the soil said to have been removed in the early 1970s is unknown. It is possible that the soil removal took place just a year or two after the beginning of operations in 1972. This would explain the source of contamination as being residual contamination from the waste handling operations.

The IAG map locates this PAC south and west of Building 664; however, the events that may have contributed contamination to the environment took place in and around the building and in the location the building currently occupies. Therefore, the boundaries were relocated to include Building 664 and the area directly west of the building.

References

[1] 1501999
[2] 1502735
[3] 1502626
[4] 1800253
[5] 1800254
[6] 1800255
[7] 1600454

Other References of Interest

1502665

PAC REFERENCE NUMBER: 600-164.1

IHSS Reference Number: 164.1, Operable Unit 14

Unit Name: Radioactive Slab From Building 776 (IAG Name: Radioactive Site 800 Area Site No. 2 - Concrete Slab)

Approximate Location: N748,500; E2,083,500

Date(s) of Operation or Occurrence

September 1957

Description of Operation or Occurrence

After the 1957 fire in Building 776/777, a radioactively contaminated slab from the east wall of the building was placed in an area northwest of Building 881 for temporary storage.[1] The area impacted is now covered by the southeast corner of the Building 881 Parking Lot.

Physical/Chemical Description of Constituents Released

Several hundred square feet of ground surface were affected.[2] No documentation was found which detailed the constituents released to the environment. However, the concrete slab originated from Building 776 which is a plutonium manufacturing facility; therefore, it is likely that plutonium contaminated the slab.

Responses to Operation or Occurrence

The slab was reportedly broken up, removed, and the area was cleaned.[2]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied according to the IAG schedule of Operable Unit 14. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

One reference specifically describes the incident as being west of Eighth Street, not the area directly adjacent to Building 881. Therefore, it is proposed that new boundaries be defined for this IHSS. The IHSS should be located in the southeast section of the 600 Area, in the 881 Parking Lot.[1]

References	Other References of Interest
[1] 1502735	1501999
[2] 1601057	1500754
	1500886
	1500760

PAC REFERENCE NUMBER: 600-189

IHSS Reference Number: 189, Operable Unit 12

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

Approximate Location: N35,900; E19,600

Date(s) of Operation or Occurrence

1952 - present

Description of Operation or Occurrence

The 218 Acid Tanks, also known as the Building 218 Acid Farm, are located adjacent to the railroad tracks east of Building 444 and south of Cottonwood Avenue. The tanks have been used for the storage of nitric acid since 1952,[2] and are assigned the facility number 218. The tanks supply acid to Building 771 and Building 883.[2]

On October 27, 1982, brown gas and a brown cloud were observed coming from the Acid Tank Farm.[4] No documentation was found explaining the incident.

An overflow occurred on September 25, 1985, during a filling operation.[3] The quantity of acid released was not documented.

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 one gallon of acid was released to the ground surface.[2]

Physical/Chemical Description of Constituents Released

Raw 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.[3] The volume of the containers is unknown.

Following the June 1986 overflow incident, the Fire Department washed down, diluted and neutralized the acid with sodium bicarbonate.[2,3]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for Operable Unit 12. Prior to this study, this IHSS was never mapped (see Comments). The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

This IHSS was originally identified as Multiple Acid Spills, 800 Area. However, information from the CEARP source is vague. Interviewees for CEARP Phase 1 indicated that the "nitric acid receiving area (area 218) located north of Building 881" was the location of numerous small spills during acid transfer and operation. Other

interviewees for the same document indicated the nitric acid farm west of Building 881 was the location for spills which were rinsed off onto the ground. RCRA 3004(u) did not place IHSS 189 on a map but defined the IHSS as multiple acid spills north and west of Building 881.

It is proposed that PAC 600-189 be mapped in the location of the 218 Acid Tanks as indicated on Figure 600-1 and Plate 2.

It should be noted that, at one time, there were overhead acid lines between the 218 Tanks and the northwest side of Building 881. It is not unlikely that lines were hit by vehicular traffic at times causing acid to spill onto the ground. This may have been a source of the referenced releases identified in CEARP as north and west of Building 881.

References

[1] 1503391
[2] 1501829
[3] 1600552
[4] 1501040

Other References of Interest

1501999
1500755
1700805
1502663
1502664
1502734

PAC REFERENCE NUMBER: 600-1000

IHSS Reference Number: Not Applicable

Unit Name: Transformer Storage Outside Building 662

Approximate Location: N748,900; E2,083,500

Date(s) of Operation or Occurrence

Prior to August 1982 - After August 1986

Description of Operation or Occurrence

The first indication of transformer storage outside Building 662 is a photograph dated August 1982. There were approximately ten pole-mounted transformers located on the east side of the building.[1]

In 1983, a large PCB-containing transformer was stored in a catch basin outside Building 662 from June to October. On October 13, 1983, the transformer was shipped off-site for disposal.[2] Neither the condition of the transformer, nor the PCB-content of its oils, are known. It is also unknown whether storage in the catch basin was normal procedure, or if it was a unique occurrence.

On January 30, 1986, EPA inspected the RFP. Field inspections included an examination of the yard outside Building 662. At that time, there were 28 pole-mounted transformers being stored for reuse. During the inspection, one of the transformers was found to be leaking. The PCB content of the leaking oil was unknown at that time,[3] but was later determined to contain greater than 500 ppm PCBs.[4] Documentation of the inspection indicates that 10 of the 28 transformers were awaiting disposal rather than reuse, because of their age or condition.[3]

Physical/Chemical Description of Constituents Released

Cooling oil that contained greater than 500 milligrams per liter PCBs leaked from the transformer found during the 1986 inspection.[4]

Responses to Operation or Occurrence

Subsequent to the discovery of the leaking transformer, it was stated that if the analysis of the oil indicated that the transformer contained PCBs, it would be disposed of as PCB waste and the soil and pad would be cleaned up.[3] No documentation was found detailing actual cleanup activities.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

None.

References

[1] 1503356
[2] 1700108
[3] 1700066
[4] 1700000

PAC REFERENCE NUMBER: 600-1001

IHSS Reference Number: Not Applicable

Unit Name: Temporary Waste Storage Building 663

Approximate Location: N749,000; E2,083,000

Dates of Operation or Occurrence

May 1954 - 1971

Description of Operation or Occurrence

Two temporary buildings were constructed on concrete slabs by the Austin Construction Company for use during construction activities for the original plant construction in the early 1950s. These buildings were located where Building 662 and Building 663 presently are located. The wooden structures were removed prior to 1954, but the concrete slabs remained. The slabs from Buildings 662 and 663, as well as the area around them, were used for storage purposes.[1]

In April 1954, it was proposed that the Building 663 slab be used for temporary storage of non-combustible waste awaiting disposal.[1] It is believed from the research on the HRR that the slab is also known as the East Slab, as it is located both east of Building 334, which also had a storage slab, and Building 444, from where most of the waste stored at Building 663 came.

Storage operations began in May 1954, when 302 drums of graphite and 49 drums of liquid waste were placed on the Building 663 slab.[2] Waste coolant drums were also stored on the slab.[2,3] In November 1954, all of the drums were removed from the slab;[4] however, storage at the area later resumed.

The area was found to be an advantageous loading area,[3] and plans were made to convert the slab into a loading facility.[5] On May 25, 1955, approval was requested for the conversion of the slab east of the Building 663 slab, which is the current location of Building 662, to a loading facility.[6] The north end of the loading facility was reinforced and refinished with concrete in October 1958.[7]

On October 14, 1960, a waste storage building was erected upon the Building 663 slab. Accumulated drums of waste from the production buildings were moved to the building upon completion of construction.[8] In November 1962, drums and boxes of waste from Buildings 771 and 774 were moved to the west side of Building 663 for outside storage.[9]

Documented releases occurring at these storage areas include the following.

On November 16 and 17, 1954, 59 drums of contaminated wastes were moved from the concrete slab (Building 663) to the mound for burial (PAC 900-113). At this time, many drums were found to be in poor condition. Drums of liquid wastes, which had been placed at the storage area in April 1954, had corroded and developed leaks. The south side of the concrete slab was contaminated as a result of the pinhole leaks.[10]

On September 5, 1958, a drum containing highly contaminated coolant was punctured on the East Slab. As a result, the slab was contaminated up to greater than 100,000 cpm direct reading, and up to 20,000 cpm removable contamination.[11]

Routine smear surveys conducted at the East Slab in August 1959 indicated a maximum reading of 108 dpm, and an average reading of 16 dpm. The high reading was taken from a roped off area of the slab. Spot checks indicated direct readings of 100,000 cpm in this area.[12] No documentation was found which explained why the area was roped off.

Routine smear surveys conducted on the East Slab in March 1960 indicated a maximum reading of 1,734 dpm, and an average reading of 67 dpm. Also, 59 drums at the East Slab were surveyed, resulting in a maximum beta-gamma reading of 0.4 mr/hr.[13]

Also during March 1960, the lids of two waste drums from Building 883 came loose, resulting in contamination of approximately 2 square feet of slab, to 3,000 cpm, with solid material. Additionally, a waste drum from Building 881 was found to be leaking. Direct readings up to 300 cpm were found.[13]

During May 1960, 3 waste drums from Building 881 were found to be leaking. The drums were returned.[14]

During the month of May, 1960, corroding drums from Building 881 were of concern. Apparently, acidic waste material was being released from the corroded drums and contaminating the loading facility.[15]

Routine smear surveys conducted on the East Slab in June 1960 indicated a maximum reading of 126 dpm and an average reading of 21 dpm.[16]

During June, 1960, a drum from Building 881 leaked on the East Slab. The drum was returned, and no contamination was found on the slab.[16]

Routine smear surveys conducted on the East Slab in August 1961 indicated a maximum reading of 24 dpm, and an average reading of 6 dpm.[17]

During August 1961, leaking drums from Building 444 and Building 776 were monitored many times. No contamination was found.[17]

During loading operations on March 19, 1963, a leaking drum was discovered. The liquid was determined to be radioactive. The ground, forklift, and trailer were contaminated.[18] The contents of the drum and the quantity released were not documented.

On March 26, 1963, a leaking waste drum in the area outside of Building 663 resulted in the contamination of a fork lift, truck trailer, cross bar, lining in a truck trailer, the fork lift operator, a laborer and the ground.[18,19] Other documentation states that during loading operations in March 1963, 3 "leakers" were discovered. The trailers, 2 fork lifts, the work area and personal clothing were contaminated.[20] It is unknown whether these two reports discuss the same incident or two separate incidents. No documentation regarding the contents of the drums or the extent of ground contamination was found for either case.

A waste drum leak on September 17, 1963 contaminated a fork truck, panel truck and semi-trailer at Building 663.[21] No documentation was found which detailed the contents of the drum or release to the environment.

On January 12, 1990, there was a gasoline spill on the east side of Building 662. The gasoline was leaking from a truck. The problem was corrected.[22]

Physical/Chemical Description of Constituents Released

Constituents which may be present due to storage activities include oil, still bottoms, perclene, waste coolant, and solids. Gasoline was released during the January 1990 incident.

Response to Operation or Occurrence

At the time of the discovery of the leaking drums in 1954, one drum of still bottoms was placed in a 55-gallon drum. It was stated that the south end of the concrete slab would have to be decontaminated because of the leaks;[10] however, no documentation was found which detailed cleanup activities.

Subsequent to the release from the punctured coolant drum in 1958, the contents of the drum were pumped to another drum, and the area was cleaned "to a certain extent." Drums in the surrounding area were moved, and cleaned if contaminated. The last drum was moved on September 25, 1958. Access was restricted to the area, and it was stated that the area would be cleaned more thoroughly.[11] No documentation which details cleanup activities was found.

Following the March 1960 releases, the drums with the loosened lids were returned to Building 883 to be resealed, and the area was cleaned. The leaking drum from Building 881 was also returned, and the affected area was scrubbed and hosed off.[13]

In response to the leaking drums in May 1960, up to 3,000 dpm was removed by scrubbing.[14]

Decontamination of the loading facility took place during May 1960;[15] however, it is unknown whether this was due to the corroding acid waste drums, a previous incident, such as the March 1960 releases, or all of these incidents.

No contamination was found resulting from the leaking drum in June 1960.[16]

The leaking drums in August 1961 were returned to be drained and resealed. The leaks resulted in no detectable contamination.[17]

In response to the leaking drum discovered on March 19, 1963, the ground was covered with gravel, and the equipment was decontaminated. The leaking drum was returned to its origin, Building 771.[18]

Following the March 26, 1963 incident, or incidents, as the case may be, the contaminated drum and trailer lining were removed. The underlying floor of the trailer was "cold." The cross bar was decontaminated and the lining was replaced.[18] Decontamination and replacement costs were $1,841.[19]

The cost of decontamination following the September 1963 incident was $295.50.[21] Details of the decontamination activities were not documented.

No response, other than that the problem was "corrected," was documented following the 1990 gasoline release.[22]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

Photographs of the slab in 1959 clearly show significant cracks in the concrete and circular rings where drums had been stored. Photographs taken of the Building 663 floor during a site visit in December 1991 show similar cracks in the concrete as well as circular stains where drums had been stored. Building 663 is currently used for nonhazardous equipment storage.[23,24,25]

It is proposed that the boundaries for this PAC include Building 662, Building 663 and the fenced area immediately west of Building 663. The boundaries for PAC 600-160 are proposed to be redefined to include only the area which is now occupied by the Building 444 Parking Lot.

References	Other References of Interest
[1] 1600672	1500419
[2] 1501879	1502667
[3] 1600597	1502652
[4] 1500418	1502653
[5] 1601046	1502654
[6] 1600674	1502656
[7] 1600398	1502657
[8] 1600031	1502658
[9] 1700202	1502659
[10] 1600670	1502694
[11] 1501013	1502787
[12] 1600039	1600126
[13] 1600034	1600598
[14] 1501010	1601050
[15] 1600407	1600378
[16] 1600032	1500834
[17] 1600025	1600655
[18] 1600604	1700205
[19] 1500623	1700206
[20] 1501017	1501113
[21] 1500622	1500479
[22] 1700140	
[23] 1600402	
[24] 1502655	
[25] 1502651	

PAC REFERENCE NUMBER: 600-1002

IHSS Reference Number: Not Applicable

Unit Name: Transformer Storage - West of Building 666

Approximate Location: N748,500; E2,083,000

Dates of Operation or Occurrence

Unknown

Description of Operation or Occurrence

Unused and unusable transformers were stored on the concrete pad west of Building 666. Reportedly, transformers are also stored inside of Building 666 in a basin. Leaks and spills of transformer oils may have occurred at the site.[1]

Physical/Chemical Description of Constituents Released

PCBs are the potential constituent of concern.

Responses to Operation or Occurrence

No documentation was found which detailed a response. Transformer storage no longer takes place at the site.

Fate of Constituents Released to Environment

No documentation was found which details the fate of constituents released to the environment.

Comments

None.

References

[1] 1503365

PAC REFERENCE NUMBER: 600-1003

IHSS Reference Number: Not Applicable

Unit Name: Transformers North and South of 661-675 Substation

Approximate Location: N749,000; E2,083,000

Dates of Operation or Occurrence

Unknown - Present

Description of Operation or Occurrence

There is evidence of leakage on a valve on the north side of Transformer 661-1, which is located north of the 661-675 substation. The transformer is situated on a concrete pad, and is presently active. There is no berm around the transformer.[1]

Another transformer is located south of the 661-675 substation, identified as Transformer 675-1. There is no evidence that the transformer is leaking or has leaked in the past; however it is possible that leakage has occurred. The active transformer is situated on a concrete pad, around which rock fill was placed. There is no berm around the transformer.[1]

See Appendix I for a table summarizing transformer characteristics.

Physical/Chemical Description of Constituents Released

See Appendix I for a description of the constituents potentially released.

Responses to Operation or Occurrence

No documentation was found which detailed a response.

Fate of Constituents Released to Environment

No documentation was found which details the fate of constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365

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3.11 700 Area

The 700 Area is located in the north-central portion of the RFP. It is bounded on the north by the buffer zone, on the east by the Solar Evaporation Ponds, on the southeast by the 900 Area, on the south by the 800 Area, and on the west by the 500 Area (see Figure 3.1). 700 Area Buildings are contained within the PA (Protected Area). The more important buildings and features in this area are as follows.

- Building 701 was originally a carpentry and paint shop. Currently, this building is used for research and development of new waste treatment systems.

- Building 705 was placed into service in 1966. This building was originally used for ceramics research and development. Currently, this building is a research and development laboratory for vapor metal disposition.

- Building 707 was placed into service in 1970. This building is the main plutonium components production facility at the RFP. Plutonium metal is cast in a foundry, machined into parts, and assembled into weapons components.

- The Building 750 mixed hazardous storage area was established in the mid-1980s. Originally, an asphalt parking lot was used for open storage of pondcrete and saltcrete waste boxes. Later, five portable buildings were added for storage of these wastes.

- Building 771 was placed into service in 1953. This building was the original plutonium components production facility at the RFP. In 1957, the plutonium components production operations performed in Building 771 were transferred to Building 776 and Building 777. From 1957 to the present, Building 771 continued to be used for chemical recovery of plutonium and americium from manufacturing residues and scrap metal. Building 771 also contained a laundry.

- Building 774 was placed into service in 1953. This building is used for the treatment of high-level radioactive aqueous wastes, waste oils and non-radioactive waste photographic solutions. The low-level radioactive waste solutions produced from the original process waste collection system were transferred to the Solar Evaporation Ponds and/or were evaporated in an evaporator (approximately 1966 to 1980). Since 1980, the majority of this waste has been transferred to Building 374 for further processing.

- Building 776 was initially placed into service in 1957. This Building was used as a plutonium foundry (transferred from Building 771) until 1969. After a fire in 1969 in the building, the operation was transferred to Building 707. Currently, Building 776 houses pyrochemistry, waste reduction, a coatings laboratory, RFP Utilities, and preventive maintenance. Pyrochemistry processes metal and residues for recovery at RFP or offsite. Waste size reduction repacks transuranic, low-level, and mixed wastes for more efficient storage. The coatings laboratory develops coatings for a variety of substrates. Utilities and preventive maintenance service both Buildings 776 and 777.

- Building 777 was placed into service in 1957. This building was used for production of plutonium components (transferred from Building 771) until 1969. After a fire in 1969, these operations were transferred to Building 707. Currently, Building 777 is used for and/or has the capability for production processes that machine, assemble, disassemble, and etch metal weapons parts. Associated with these efforts are special weapons assembly projects and the production of plutonium briquettes for use in the foundry in Building 707. Destructive and non-destructive testing, weighing, and inspection of parts and materials are conducted in support of production processes. The

building also houses several production support laboratories, a tritium analysis laboratory, two organic solvent collection and filtration systems, and a decontamination laundry.

- Building 778 was placed into service in 1957. This building houses the plant's laundry facility for non-radioactive clothing along with personnel locker rooms and maintenance shops.

- Building 779 was placed into service in 1969. This building houses minor production and plutonium recovery operations, but is primarily a research and development facility. Some metal parts are assembled in this building and bulk plutonium residues are recovered in the hydride operations. The remainder of the operations conducted in Building 779 are research and development activities which include the following operations: pyrochemical technology, coatings, plutonium and non-plutonium physical metallurgy, chemical technology in support of plutonium recovery operations in Building 771, and product physical chemistry. The building also houses its own utilities, maintenance, custodial, and machine shop services as support for other operations.

- Building 788 is a pondcrete processing, repackaging, and reprocessing plant. This building is used to support the Solar Evaporation Pond clean-up project. Although Building 788 is geographically located in the 700 Area, it is addressed in the 000 Area of this report because the activities conducted in this area cross the arbitrary boundaries of several other areas designated for purposes of the HRR.

There are numerous other buildings located in the 700 Area. These are primarily support buildings such as cooling towers, emergency generator buildings, compressor buildings, and filter plenum buildings.

The following subsection contains detailed descriptions of PACs located in the 700 Area. These PACs are shown in Figure 700-1.

PAC REFERENCE NUMBER: 700-118.1

IHSS Reference Number: 118.1, Operable Unit 8

Unit Name: Multiple Solvent Spills West of Building 730

Approximate Location: N750,600; E2,083,750

Date(s) of Operation or Occurrence

Prior to 1970s[1,2] - June 18, 1981[2,3,4]

Description of Operation or Occurrence

A 5,000-gallon underground carbon tetrachloride storage tank was located adjacent to the west side of Building 730.[1,3] In the 1970s, tank overflows occurred during filling operations. Persons interviewed for the CEARP report recalled a spill of 100 to 200 gallons of trichloroethylene north of Building 776 prior to 1970. These persons did not recall any clean-up operations.[1,2,3] It has been postulated that this spill may have been carbon tetrachloride.[1,2]

On February 26, 1976, corroded piping leaked carbon tetrachloride into the tank's sump pit. A "considerable" quantity leaked and was subsequently pumped out of the pit onto the ground.[5] Another document indicates this leak was the result of a leaking valve.[6]

In March 1976, a small amount of leakage from the pipes in the tank pit was evident.[7] At that time, Health Sciences was continuing soil-gas monitoring beneath the end tank.[8] Industrial Hygiene reported air samples were typically averaging 10 mg/l carbon tetrachloride. During the month prior to April 15, 1976, the average concentration rose to near 2,000 mg/l. It was postulated that the tank or its associated pipes in the sump could have been releasing the carbon tetrachloride into the ground.[9]

On June 18, 1981, the tank failed, releasing carbon tetrachloride into the sump. The sump subsequently pumped some of the liquid out onto the ground surface. Temporary storage tanks were to be obtained to collect the liquid.[4] No documentation was found which details the actual use of the temporary storage tanks.

This underground tank had its long axis running north-south, with the south head of the tank exposed in a valve pit.[10] The north end of the tank was buried directly in soils. The base of the tank was located at an approximate elevation of 5978 feet (approximately 9.1 feet below grade) and the base of the valve pit was at an elevation of 5976.0 feet (approximately 10.25 feet below grade). The east side of the carbon tetrachloride tank valve pit was approximately 10.1 feet west of the exposed portion of the Building 730 pump house.[11]

The carbon tetrachloride tank was later removed, but no written documentation of this removal has yet been found.

Physical/Chemical Description of Constituents Released

The underground carbon tetrachloride tank was used to store raw carbon tetrachloride for use in plant operations. Trichloroethylene has also been described as the constituent released to the environment in the incident prior to 1970.[1,2,3] Other sources indicate carbon tetrachloride rather than trichloroethylene was released to the environment.[1,2]

Responses to Operation or Occurrence

Persons interviewed for CEARP recalled no mitigation efforts to control the spill prior to 1970.[1,2,3] No documentation was found which detailed response to spills which occurred during filling operations in the 1970s.

In the winter and spring of 1976, there were efforts to stop the leakage from the pipes.[5,6] Documentation was found which detailed the cleanup of spilled liquid, including that pumped onto the ground.

In February 1976, Industrial Hygiene showed interest in having the underground storage tank replaced with an above ground tank.[5] At this time, Health Sciences was monitoring a pipe installed below the end of the tank for airborne carbon tetrachloride and found no indications of problems with the tank itself.[6] No documentation was found which detailed response to high concentrations of carbon tetrachloride detected during April 1976 soil-gas monitoring.

The tank was removed following its failure in 1981.[4] One Building 776 employee present at the time of the tank's removal recalled that it appeared sound with no obvious leaks or significant corrosion.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location of IHSS presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

HRR information indicates that the tank was located adjacent to the west of Building 730. It has been proposed that IHSS 118.1 be redefined as a 20 by 40 foot area centered around the former tank location adjacent to the west of Building 730.[1] It is unclear if the release of trichloroethylene prior to 1970, detailed in references 1, 2 and 3, is related to the carbon tetrachloride tank.

References

[1] 1503448
[2] 1501999
[3] 1502735
[4] 1501176
[5] 1600235
[6] 1500558
[7] 1600233
[8] 1500559
[9] 1500520
[10] Dow Chemical, Drawing Number D-13492A, "C Plant, Building 76, 5,000 gallon Carbon Tetrachloride Tank, Plan View," May 20, 1963.
[11] Dow Chemical, Drawing Number D-13493A, "C Plant, Building 76, 5,000 gallon Carbon Tetrachloride Tank, Elevation View," May 20, 1963.

Other References of Interest

1500519
1500629

PAC REFERENCE NUMBER: 700-118.2

IHSS Reference Number: 118.2, Operable Unit 8

Unit Name: South End of Building 776 Solvent Spill (IAG Name: Multiple Solvent Spills South End of Building 776)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

June 1981[1]

Description of Operation or Occurrence

There is a 5,000-gallon aboveground carbon tetrachloride tank located within a bermed area between the north side of Building 707 and the alleyway south of Building 778.[2] In June 1981, the tank ruptured and leaked solvent onto the ground, contaminating the soil.[1]

Physical/Chemical Description of Constituents Released

An unknown amount of carbon tetrachloride was released to the environment.[1]

Responses to Operation or Occurrence

The tank and the area of the spill was cleaned up.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

It is unknown whether sampling and analysis was conducted to verify the complete removal of soil contamination.[1] This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location for IHSS 118.2 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

In discussing this site, the RCRA 3004(u) report states that there are a number of organic solvent tanks located inside the south end of Building 776 which overflowed in the 1970s.[3] The Draft RFI/RI Work Plan for Operable Unit No. 5 (now designated OU8) states that one of the organic solvent tanks inside the south end of Building 776 ruptured in June 1981. Carbon tetrachloride was released into a sump and some of the solvent was pumped out onto the ground.[1] This event was documented to have occurred to the north of Building 776 both in 1976 and again in 1981.[4,5] The occurrences associated with the carbon tetrachloride tank north of Building 776 are discussed as PAC 700-118.1. It is proposed that the indoor tank overflow incidents in Building 776 be discussed separately as indoor unplanned events.

Based on information found in documents reviewed for this study, it is proposed that the area of IHSS 118.2 presented in the IAG be reduced in size and relocated to the area of the aboveground carbon tetrachloride tank located adjacent to the north of Building 778 as described in the narrative above (PAC 700-118.2).

References

[1] 1501255
[2] 1503448
[3] 1502735
[4] 1600235
[5] 1501176

Other References of Interest

1500768
1501999

PAC REFERENCE NUMBER: 700-123.1

IHSS Reference Number: 123.1, Operable Unit 8

Unit Name: Valve Vault 7

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

April 4, 1983[1]

Description of Operation or Occurrence

Valve Vault 7 is located to the southwest of Building 707, adjacent to the north side of the PSZ inner fence. Valve Vault 7 controls the 800 Area main process waste line.[1]

On April 4, 1983, a check valve in Valve Vault 7 malfunctioned allowing process wastewater to backflow into the sump. The vault filled with process wastewater and overflowed. The high water level alarm system in Valve Vault 7 was apparently inoperative at the time of the overflow. The process wastewater drained into an adjacent storm runoff collection system ditch near Eighth Street and Sage Avenue and flowed east toward South Walnut Creek and the B-Series drainage ponds.[2,3] Runoff was noticed flowing across the former 750 Parking Lot, through the Building 991 normal runoff drainage.[2]

Physical/Chemical Description of Constituents Released

The release consisted of process wastewater from the 800 and 400 Areas which typically contains uranium, solvents, oils, beryllium, nitric acid, hydrochloric acid, and fluoride.[4]

Responses to Operation or Occurrence

The transfer of liquid waste from the holding tanks at Building 881 was discontinued after personnel verified that wastewater was flowing out of Valve Vault 7. Temporary dikes were constructed to contain the overflow.[2,3] A dam was constructed in the ditch east of the guard shack at Portal #1 and another dam was placed just west of Guard Shack 762.[2] Drainage from the area was diverted to Pond B-1.[2,3] Attempts were made to remove oil by using chemical absorbent bats.[3] Environmental samples were taken from the vault and other areas of concern. Water was pumped out of the vault and the containment dikes and transferred to Waste Processing by tanker truck. Snow melt water was retained in the ditch for several days and later transferred to Process Waste Storage. The malfunctioning check valve was repaired or replaced, the sump pump was replaced and repair of the electrical system was initiated. A new type of check valve was ordered for all the check valves in the waste transfer system.[2] The ditch along Sage Avenue between Valve Vault 7 and Ninth Street was cleaned of all visible contamination. The excavated material was stored for drying in the old Building 771 parking lot.[5]

Fate of Constituents Released to Environment

The runoff diversion activities were partially successful. Oil from the spill was visible in Pond B-1. A small amount of oil was observed in Pond B-4 and Pond B-5. All visible contamination was excavated from the ditch along Ninth Street.[2] No documentation was found which detailed the complete removal of release constituents from the site. Analysis of water samples from Pond B-1 and Pond B-4 one week following the incident indicated no abnormal concentration of oil, nitrate, pH, or radioactivity.[2] Evaluation of data for Pond B-5, the only pond that discharged off site, indicated no presence of material from the spill.[2,5] As of April 15, 1983, Pond

B-5 water was to have been held for about two weeks before being released to Great Western Reservoir.[5] One reference indicated the environmental impact was negligible.[2]

This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location of IHSS 123.1 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

PAC 700-150.5 references the preceding discussion. This unit is part of the New Process Waste Line system. Based on information found in documents reviewed for the HRR, it is proposed that the boundaries defining IHSS 123.1 presented in the IAG be relocated approximately 380 feet to the south and enlarged to extend to the storm runoff collection system ditch along Sage Avenue to Eighth Street and continue to the extent of Pond B-1 (PAC 700-123.1)

One reference states that operating personnel surmise that Valve Vault 7 was partially filled before the overflow was observed on April 4, 1983. In addition, the intrusion of groundwater from leaky conduits was a recurring problem.[2] It is conceivable that if groundwater were able to flow into the valve vault, process waste liquid would have been able to breach the valve vault undetected without overflowing the valve vault, causing environmental contamination.

It is possible that the spilled process waste liquid flowed along the same storm runoff collection system route that the Antifreeze Discharge (PAC 000-192) traversed en route to the B-Series Ponds.

References

[1] 1503448
[2] 1500237
[3] 1700464
[4] 1500755
[5] 1700463

Other References of Interest

1501795
1501999
1502065
1502735

PAC REFERENCE NUMBER: 700-123.2

IHSS Reference Number: 123.2, Operable Unit 9

Unit Name: Valve Vault West of Building 707

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

December 1958[1]

Description of Operation or Occurrence

In December 1958, a leak occurred at a process waste line elbow in the valve vault located west of the present location of Building 707. Process waste followed the containment pipe and flowed into a ditch to the northeast of the present location of Building 707. Up to 4,050 gallons of process waste were released at the time of this occurrence. Leaks occurred in the elbow connections of the process waste line due to joint expansion following the introduction of steam condensate from Building 881. The elbow was repaired and the line remained in use for another 10 years.[1] In March 1973, this valve vault was replaced as part of an upgrading program for this section of the original process waste system. Interviewees for the CEARP report indicated that this vault overflowed a number of times prior to 1973.[2]

Physical/Chemical Description of Constituents Released

The liquid released contained uranium, solvents, oil, beryllium, nitric and hydrochloric acids, and fluoride.[3]

Responses to Operation or Occurrence

A soil sample collected at the valve vault west Building 707 in 1976 showed 54 milligrams/liter nitrate and 0.145 dpm plutonium.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

The original process waste line to the valve vault west of the present location of Building 707 serviced buildings such as Building 122, Building 123, Building 441, Building 444, Building 881, and Building 883.[1] These buildings handled both depleted and enriched uranium.

The narrative of PAC 700-150.5 references the preceding discussion. This unit is part of the OPWL system which is discussed as PAC 000-121.

References

[1] 1500802
[2] 1502735
[3] 1500755

Other References of Interest

1501999
1601057
1503448

PAC REFERENCE NUMBER: 700-124

IHSS Reference Number: 124.1 - 124.3, Operable Unit 9

Unit Name: 124.1 - 30,000-Gallon Tank (Tank #68)
124.2 - 14,000-Gallon Tank (Tank #66)
124.3 - 14,000-Gallon Tank (Tank #67)

Approximate Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

1953 - 1989

Description of Operation or Occurrence

The two 14,000-gallon tanks and a single 30,000-gallon tank are designated Tanks #66, #67 and #68, respectively. The three tanks are shown on RFP drawing #1-5392-74 as being east of Building 774 and immediately east of Tanks #30, 31, 32, 33, 34E and 34W which are discussed as PAC 700-146.[1]

In July 1981, Tank #66 overflowed, spilling an estimated 500 gallons of liquid waste.[1] A second source states that during the week ending July 17, 1981, about 3,300 gallons of process waste water overflowed a tank in Building 774 and about 50 gallons ran onto the asphalt driveway.[2] Another source states that this spill involved between 50 to 100 gallons of liquid which contaminated the ground to the east of Building 774.[3]

Tanks #66 and #67 are identical with the same size, same construction, age, and they share an internal wall.[4,5] Tank #67 is immediately south of Tank #66, and Tank #68 is located two feet south of Tank #67. Tank #68 was built in 1958.[6] The walls of all three tanks are approximately 10 inches thick reinforced concrete, although the exact dimensions of Tanks #66 and #67 are different from Tank #68.[4,5,6]

Physical/Chemical Description of Constituents Released

The released process waste water was high in nitrate and contaminated to about 40,000 dpm/l plutonium.[2] Another source states that the liquid released in the overflow incident was high in nitrate, contained plutonium and uranium, and was measured at approximately 30,000 dpm/l.[3] An analytical report of the process waste water released from the July 1981 Tank #66 spill indicated total alpha activity at 7.8×10^4 pCi/l, total beta activity at 4.6×10^4 pCi/l, nitrate at 5.6×10^3 mg/l, and a pH of 12.[7]

Responses to Operation or Occurrence

The area east of Building 774 was paved following the overflow of Tank #66 in 1981. The contamination may not have been removed prior to paving.[3] A sitewide radiometric survey was performed from 1977 to 1984. The purpose of the survey was to identify surface areas extremely contaminated with radioactivity (500,000 - 1,000,000 pCi/g).[8,9]

In September 1989, Tanks #66, #67, and #68 were taken out of service in compliance with closure regulations.[1] No documentation was found which further details response to the occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). However the information developed on this unit for this study indicate the location for this IHSS presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

Tanks #30, #31, #32, #33, #34E and #34W are discussed as PAC 700-146.

Tank #66 is also discussed as PAC 700-125. It has been proposed that IHSS 124 (PAC 700-124) and IHSS 125 (PAC 700-125) be redefined as a single IHSS encompassing Tanks #66, #67 and #68.[1]

Based on engineering drawings reviewed for this study, it is proposed that the area of IHSS 124.1 - 124.3 and 125 presented in the IAG be reduced in size and relocated to the northwest to include the area of the tanks.

References

[1] U.S. DOE, Draft Phase I RFI/RI Work Plan, Operable Unit No.5, July 23, 1990.
[2] 1700487
[3] 1500755
[4] The Austin Company, Drawing Number RF-74-S8B, "Conc. Holding Tanks," January, 1953.
[5] The Austin Company, Drawing Number RF-74-656-B, "Piping Plan & Details for New Waste Tanks," February, 1953.
[6] Dow Chemical, Drawing Number 1-5392-74, "C Plant, Building 74, Piping to and From 30,000 Gallon Holding Tank," January, 1958.
[7] 1500808
[8] 1503375
[9] 1503370

Other References of Interest

1500572
1501999
1502735
1601057

PAC REFERENCE NUMBER: 700-125

IHSS Reference Number: 125, Operable Unit 9

Unit Name: Holding Tank (Tank #66)

Approximate Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

1952 - 1989, and July 1981[1]

Description of Operation or Occurrence

The 14,000-gallon holding tank designated as Tank #66 is also discussed as PAC 700-124.2. In July 1981, Tank #66 overflowed, spilling an estimated 500 gallons of liquid waste.[1] A second source states that during the week ending July 17, 1981, about 3,300 gallons of process waste water overflowed a tank in Building 774 and about 50 gallons ran onto the asphalt driveway.[2] Another source states that this spill involved between 50 to 100 gallons of liquid which contaminated the ground to the east of Building 774.[3]

IHSS 125 is a 14,000-gallon reinforced concrete tank at the southeast corner of Building 774 and has a nominal capacity of 12,000 gallons. The tank was included in a 1953 engineering drawing but it is unclear when it was first placed into service. Liquid waste was transferred to or from the tank through pipes connected with the Building 774 treatment process. A manhole is located at the top of the tank. Four 3-inch diameter pipes enter Tank 66 from the north end of the west wall. Two inflow pipes enter 2 feet from the roof of the tank. One passes through Tank 66 and enters Tank 67. Two outlet pipes enter approximately 6 inches from the floor of the tank and one passes through into Tank 67. The elevation of the outlet pipe above the floor of Tank 66 allows approximately 1,000 gallons of liquid to remain in the tank.[5]

The walls of the tank are approximately 10 inches thick. The bottom elevation is approximately 5955 feet and the tank is approximately 8 feet high. The area occupied by the tank is 21.5 feet (east-west) by 11 feet (north-south). The floor of tank was at the same approximate height as the second floor of Building 774 and a short pipe tunnel connects the building with the tank. Ground elevation to the east of the tank is approximately 5962 feet.[5,6] The west side of Tanks 66 and 67 are 4 feet from the east sides of the concrete storage tanks (IHSS 146). A shed was constructed over Tanks 66 and 67 with bay doors at the east and west sides. The roof of the tanks serves as the floor to the shed.

The main function of Tanks 66 and 67 was to receive treated liquid decanted from the second-stage batch precipitation process in Building 774. According to personnel interviewed for the development of the closure plan, the tank floors were cleaned, sandblasted, and coated with eight coats of Amercoat No. 55 in 1956. Details regarding the processes that created waste that had been destined for the tanks are provided in the 1989 RCRA Closure Plan. These tanks were taken out of service in September 1989 because they did not meet the requirements for permitting standards.[7]

Physical/Chemical Description of Constituents Released

The released process waste water was high in nitrate and contaminated to about 40,000 dpm/l plutonium.[2] Another source states that the liquid released in the overflow incident was high in nitrate, contained plutonium and uranium, and was measured at approximately 30,000 dpm/l.[3] An analytical report of the process waste water released from the July 1981 Tank #66 spill indicated total alpha activity at 7.8×10^4 pCi/l, total beta activity at 4.6×10^4 pCi/l, nitrate at 5.6×10^3 mg/l, and a pH of 12.[4]

Responses to Operation or Occurrence

The area east of Building 774 was paved following the overflow of Tank #66 in 1981. The contamination may not have been removed prior to paving.[3] A sitewide radiometric survey was performed from 1977 to 1984. The purpose of the survey was to identify surface areas extremely contaminated with radioactivity (500,000 - 1,000,000).[8,9]

In September 1989, Tank #66 along with Tanks #67 and #68 were taken out of service in compliance with closure regulations.[1] No documentation was found which further details response to the occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

Tank #66 is discussed with Tanks #67 and #68 as PAC 700-124. It has been proposed that IHSS 124 (PAC 700-124) and IHSS 125 (PAC 700-125) be redefined as a single IHSS encompassing Tanks #66, #67 and #68.[1]

References

[1] 1503448
[2] 1700487
[3] 1500755
[4] 1500808
[5] The Austin Company, Drawing Number RF-74-656-B, "Piping Plan & Details for New Waste Tanks," February, 1953.
[6] The Austin Company, Drawing Number RF-74-S8B, "Conc. Holding Tanks," January, 1953.
[7] Rockwell International, "Resource Conservation and Recovery Act Closure Plan, Tanks T-40, T-66, T-67, T-68, Hazardous Waste Management Unit 55," September 29, 1989.
[8] 1503375
[9] 1503370

Other References of Interest

1500572
1501999
1502735
1601057

PAC REFERENCE NUMBER: 700-126.1 - 700-126.2

IHSS Reference Number: 126.1 - 126.2, Operable Unit 9

Unit Name: Westernmost Out-of-Service Process Waste Tank
Easternmost Out-of-Service Process Waste Tank

Approximate Location: N751,180; E2,083,700

Date(s) of Operation or Occurrence

Approximately 1953 - 1984 (period of operation of the process waste tanks).[1]

Description of Operation or Occurrence

The Westernmost and Easternmost out-of-service process waste tanks are housed in Building 728 below grade. Each of the tanks has an operating capacity of approximately 20,000 gallons and a maximum design capacity of 25,000 gallons. Since being taken out of service in 1984, the tanks have been converted to contain fire suppression deluge overflow for Building 771 plenums. The tanks leak, allowing groundwater to periodically flow into the tanks; the groundwater is then pumped into the process waste system.[2]

These tanks overflowed several times prior to 1956.[3] Information gathered during CEARP interviews suggest that the tanks may have leaked during use.[4]

Two out-of-service process waste tanks are located below Building 728. The tanks were built in 1952. Each reinforced concrete tank has a design capacity of 25,000 gallons and an approximate operating capacity of 20,000 gallons. The combined exterior tank dimensions are 33 feet 6 inches (east-west) by 23 feet 5 inches (north-south) and are 11 feet 8 inches high. The ceiling and wall thickness is 10 inches and the floor thickness is 1 foot. The tanks share the inner wall. The bottom elevation of the tanks' interior is at 5931 feet. The tanks were designed with a minimum cover of three feet of fill except for the area overlain by the building. The original design indicated that two pipes enter each tank from the south. The invert elevations of the pipes where they entered the tanks are 5939 and 5938 feet.[5] The volume of material that could remain in the tank below the level of the outlet pipe is unclear from the design drawings. The tanks had stored laundry water from the Building 771 laundry facility which ceased operations in the late 1950s. The tanks are sometimes referred to as laundry tanks.

The pumphouse (Building 728) is a concrete structure situated directly above the tanks with dimensions of 14 feet 10 inches (east-west) by 7 feet 10 inches (north-south) and is 7 feet 6 inches high. The south wall of the pumphouse is above the south wall of the tanks. It contains the manholes for access into the tanks and one sump pump for each tank as well as one sampling point into each tank. The pumphouse is partially underground so it does not appear as large as its dimensions indicate.[5]

Physical/Chemical Description of Constituents Released

Liquid process wastes that likely contained nitrate, plutonium, uranium, and various other organic and inorganic constituents were released to the environment.[2]

Responses to Operation or Occurrence

No documentation was found which detailed a response to a release from these tanks.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). However, the information developed on this unit for this study indicates that the location for IHSS 126 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

It is proposed that the boundaries presented in the IAG for IHSS 126.1 and IHSS 126.2 (PAC 700-126.1 and PAC 700-126.2) be redefined to encompass the tanks located in Building 728 which is north of Building 771. The size of the PAC has been decreased to correspond to the approximate dimensions of the tanks shown in engineering drawings. This unit is part of the OPWL system which is discussed as PAC 000-121.

References

[1] 1503448
[2] 1501999
[3] 1500755
[4] 1502735
[5] The Austin Company, Drawing Number RF-71-S20, "Holding Tanks," August 4, 1952.
[6] 1601057

Other References of Interest

1500338
1600050

PAC REFERENCE NUMBER: 700-127

IHSS Reference Number: 127, Operable Unit 9

Unit Name: Low-Level Radioactive Waste Leak

Approximate Location: N750,750; E2,084,200

Date(s) of Operation or Occurrence

October 1957[1] - 1971[2]

Description of Operation or Occurrence

Persons interviewed for CEARP recalled construction activities near Building 774 and west of Solar Evaporation Pond 207C resulting in the breakage of a low-level radioactive waste discharge line several times.[2,3] This line carried liquids from the process waste treatment facility (Building 774) to the sanitary wastewater treatment plant (Building 995).[3]

On October 14, 1957, a line that carried process waste between Building 774 and the 200,000-gallon waste holding tank (Tank 207) leaked at a joint. It was determined that the joint had not been properly packed during construction.[1]

Leakage was detected in 1971 when the waste line between Building 774 and Building 995 was pressure tested.[2]

Physical/Chemical Description of Constituents Released

The liquid waste that flowed in the line from Building 774 to Building 995 was high in nitrate and had small amounts of plutonium.[3]

The 200,000-gallon tank, Tank 207, was used at that time to store unprocessed liquid waste for later treatment in Building 774.[1]

Responses to Operation or Occurrence

By November 5, 1957, the joint discovered leaking the previous month was repaired and the excavation back-filled.[1]

In April 1982, following the detection of leakage in the waste line between Building 774 and Building 995, the leaking section of line was replaced.[2]

Fate of Constituents Released to Environment

The low-level waste line leaks may be masked by leaks from the Solar Evaporation Ponds.[3] A soil sample collected in 1976 from a depth of four feet beside the leak area, north of Tank 207 and south of Building 774, was analyzed and found to contain 76 mg/l nitrate and 1.83 dpm/g plutonium.[2]

This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

The location of IHSS 127 defined in the IAG does not correspond with the location of any process waste lines located on RFP utility drawings. Information gathered for the HRR indicates the location of the process waste line between Building 774 and Building 995 is about 70 feet west of the previously identified IAG location for IHSS 127. It has been proposed that the location of IHSS 127 be redefined to coincide with the location of the process waste line discussed as PAC 700-127.[3]

This unit is part of the OPWL system which is discussed as PAC 000-121.

References

[1] 1600140
[2] 1503448
[3] 1502735

Other References of Interest

1500755
1501999

PAC REFERENCE NUMBER: 700-131

IHSS Reference Number: 131, Operable Unit 14

Unit Name: Radioactive Site - 700 Area Site #1

Approximate Location: N 751,500; E 2,084,000

Date(s) of Operation or Occurrence

June 1964[1] and May 1969[2,3]

Description of Operation or Occurrence

As a result of an explosion in Building 776 in June 1964, an area of approximately 1,500 square feet of soil at the exit of the gas bottle dock was contaminated with plutonium; some areas had activities greater than 200,000 dpm/67cm^2.[1] A later account states that 40 square feet of soil north of Building 776 was contaminated with plutonium due to the June 1964 explosion incident.[4] An area 20 by 100 feet on the west end of the north side of Building 776 was radioactively contaminated during the course of firefighting activity in May 1969 (PAC 700-150.2).[2] Tracking by personnel around Door 17 of the dock area resulted from use of the door as a major access to the building at the time of the May 1969 fire.[3]

Physical/Chemical Description of Constituents Released

Plutonium was released to the environment.[1,4]

Responses to Operation or Occurrence

In June 1964, following the removal of spots of high level soil contamination, a seal coat of oil and about two inches of gravel were placed over the contaminated soil.[1] The area around Door 17 was paved twice and in the fall of 1971 the asphalt was removed and placed in barrels.[3] In November 1971, the paving of a gravel-covered contaminated area north of Building 776 compressor shed was pending.[5,6]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU14. However, the information developed on this unit for this study indicate that the location for IHSS 131 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

No documentation was found which detailed the final disposition of the asphalt removed from the site. The removed material could have been buried in trenches or moved to a fill area to the west of Building 881 (PAC 900-130), as was contaminated material removed from the west side of Building 776.[7,8]

A french drain which may have provided a pathway for migration of contamination from this site is discussed as PAC 700-1100.

Based on information from documents reviewed for this study, it is proposed that the area of IHSS 131 defined in the IAG be enlarged to extend to the northwest corner of Building 776 (PAC 700-131).

References

[1] 1600181
[2] 1501091
[3] 1500842
[4] 1600269
[5] 1500425
[6] 1500551
[7] 1501097
[8] 1500563

Other References of Interest

1500423
1500456
1500526
1500554
1500599
1500600
1500602
1500603
1500607
1500656
1500780
1500841
1500842
1500902
1501107
1501109
1501124
1501134
1501158
1501162
1501190
1501999
1502735
1600119
1600168
1600180
1600287
1600288
1600432
1600438
1600533
1601057
1700144

PAC REFERENCE NUMBER: 700-132

IHSS Reference Number: 132, Operable Unit 9

Unit Name: Radioactive Site - 700 Area - Site Number 4

Approximate Location: N750,700; E2,083,900

Date(s) of Operation or Occurrence

1956 - October 1984[1]

Description of Operation or Occurrence

The tanks referenced in the following discussion are located beneath Building 730. This building is between Building 771 and Building 776. Building 730 is approximately 150 feet south of Building 771 and 80 feet north of Building 776 as measured from RFP Utility drawings.[2] Documented incidents involving laundry tanks north of Building 776 and south of Building 771 are likely to have occurred at the tanks in Building 730.

Utilities personnel stated that they were unaware of infiltration of groundwater into the Building 730 tanks, but believed that leakage from these tanks was likely, based on the condition of the tanks.[1] Although reference 1 states that overfill of these laundry tanks was unlikely, personnel familiar with the tanks remember a number of incidents involving overfilling the tanks as well as other releases associated with these tanks.

On September 23, 1975, there was a slight spill onto the ground "near Building 776" during the removal of contaminated process waste sludge from the underground concrete holding tanks.[3] Another document reports the clean out of a waste tank "north of Building 776" caused contamination to the environment which included the contamination of a cement truck.[4]

On July 30, 1979, laundry tanks overflowed in the "new pit."[5]

There are four underground waste holding tanks located in the small structure identified as Building 730. They are designated as Tanks 776 A through D. They were built in approximately 1956,[6] and were taken out of service in the 1980s. They are now used as plenum deluge tanks.[7] The tanks would, therefore, normally be dry.

The tanks are concrete, and have a 26-foot depth. They are non-inspectable. The capacity of Tanks 776 A and B is 22,500 gallons each, and the capacity of Tanks 776 C and D is 4,500 gallons each. The dimensions of 776 A and B are 25'x 15'x 10' each, and those of 776 C and D are 5'x 15'x 10' each.[6] Tanks 776 A and B are laundry waste holding tanks, and Tanks 776 C and D are process waste holding tanks. If tanks C and D overflowed, the excess liquid could drain into tanks A and B, and vice versa.[8]
A pipe header at the tanks allowed alternatives of pumping the laundry water to the sanitary sewer system, the Solar Evaporation Ponds, or Building 774.[9]

Physical/Chemical Description of Constituents Released

Materials introduced to the environment from leaks in these tanks are mostly water with small amounts of detergent and radionuclides.[10]

The incident in September 1975 involved radioactively contaminated sludge that had accumulated in the tank.[4]

Six smear samples which were taken when the laundry tanks overflowed in the "new pit" in July 1979 had activities of less than 20 dpm.[10]

Responses to Operation or Occurrence

The September 1975 incident was cleaned up in an undescribed manner at a cost of $2,288.[4]

Six smear samples were taken when the laundry tanks overflowed in the "new pit" on July 30, 1979.[5]

The four tanks were removed from service as waste receiving tanks. The 4,500-gallon tanks were decommissioned from laundry service in December 1982 and the 22,500-gallon tanks were decommissioned from laundry service in October 1984.[1]

Reference documents suggest all four tanks have been cleaned, painted and converted to Building 771 plenum deluge tanks; the tanks may occasionally fill with groundwater.[1]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). However, the information developed on this unit for this study indicates that the location of IHSS 132 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

It is possible that the discrepancy regarding infiltration of groundwater into these tanks may be a misinterpretation. The two waste tanks north of Building 771 (the Building 728 tanks) were also used as laundry tanks in the past, and are also used for plenum deluge water currently. These tanks north of Building 771 are known to be subject to groundwater infiltration as discussed in PAC 700-126.

The laundry waste tanks housed in Building 730 are related to a sewer line overflow incident discussed as PAC 700-144. This unit is part of the OPWL system which is discussed as PAC 000-121.

References

[1] 1503448
[2] 1502706
[3] 1500289
[4] 1500319
[5] 1501153
[6] 1500802
[7] Personal Communication, Teel, R., RFP Employee, April 10, 1992.
[8] 1500368
[9] Personal Communication, Maas, M., Retired RFP Employee, April 10, 1992.
[10] 1501999

Other References of Interest

1500338
1500526

PAC REFERENCE NUMBER: 700-137

IHSS Reference Number: 137, Operable Unit 8

Unit Name: Cooling Tower Blowdown Buildings 712 and 713
(IAG Name: Cooling Tower Blowdown Building 774)

Approximate Location: N750,750; E2,084,150

Date(s) of Operation or Occurrence

Late 1950s - Present.[1]

Description of Operation or Occurrence

Building 712 and Building 713 are both cooling tower facilities associated with Building 776.[1] Interviewees for CEARP mentioned a release of cooling tower water south of Building 774 that flowed north into Walnut Creek. It is speculated that they were recalling a release from the Building 779 cooling tower in December 1976.[2] The Building 779 cooling towers are covered in greater detail in PAC 700-138.

The Building 776 cooling towers blowdown water is treated in the wastewater treatment plant. It is thought the blowdown water drains from the cooling towers through underground pipes outside the south ends of the buildings.[1]

A leak in a cooling tower within the PA was reported to have occurred between August 20 and September 6, 1990. A memorandum was sent to utilities personnel expressing the need to fix the leaks caused by corroded metal sides.[3] Contact with the author of the document has verified that the leak came from either Building 712 or Building 713. The leak has been estimated at a flow rate between 5 and 20 gallons per minute. The duration of the leak is unknown but could have occurred over several months prior to reporting.[4]

In the past, utilities workers have cleaned out the sump and scraped slime off the cooling tower slats. The material removed in these operations was placed on the ground immediately adjacent to the cooling towers. Similarly, the area immediately adjacent to the cooling towers can become wetted from the water used in the towers during windy conditions. Chromium had been used in the past as a biocide for cooling tower operations.[5]

Physical/Chemical Description of Constituents Released

The released water contained 50 mg/l total chromium.[2]

Responses to Operation or Occurrence

The release that occurred during the summer of 1990 was stopped after the memorandum was sent to utilities. No environmental cleanup occurred in response to this occurrence.[4]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

Reference 1 indicates the cooling tower blowdown pipes leave the towers on their south sides. These pipes are considered the most probable source of any blowdown water contamination around the cooling towers. It has been proposed that the boundaries of IHSS 137 be redefined to encompass the south ends of Building 712 and Building 713 (PAC 700-137). It has also been proposed to change the dimensions to a 50 by 120 foot area from the existing 50 by 150 foot area.[1] The proposed location for IHSS 137 (PAC 700-137) is approximately 150 feet to the south and 50 feet to the west of the location presented in the IAG.

References

[1] 1503448
[2] 1501999
[3] 1500799
[4] Personal Communication, Yashan, D., RFP Employee, October 21, 1991.
[5] Personal Communication, Koffer, J.P., RFP Employee, January 20, 1992.

Other References of Interest

1500755
1502735

PAC REFERENCE NUMBER: 700-138

IHSS Reference Number: 138, Operable Unit 8

Unit Name: Cooling Tower Blowdown Building 779

Approximate Location: N751,000; E2,084,500

Date(s) of Operation or Occurrence

December 8, 1976,[1] and December 8, 1990[2]

Description of Operation or Occurrence

On December 8, 1976, about 400 gallons of cooling tower water containing chromium and some radioactivity leaked into a storm drain near Building 779. The spilled water was believed to have flowed toward collection trench number 6 (PAC 000-101).[1] Utilities personnel at RFP recalled that the 1976 spill occurred when an underground cooling tower water line broke east of Building 779 and adjacent to the northwest of Building 727.[3] On December 8, 1990, an estimated 1,000 gallons of cooling tower water overflowed the Building 783, #2 cooling tower onto the ground.[2]

Physical/Chemical Description of Constituents Released

Cooling tower water released in the 1976 incident contained 50 ppm total chromium and approximately 3,000 d/m/l alpha activity.[1] The cooling tower water released in the 1990 incident was known to contain "Nalco 2826", an inorganic phosphate rust inhibitor.[2]

Responses to Operation or Occurrence

The cooling tower water released in the 1976 incident was analyzed. Trench number 6 and Pond A-3 were sampled.[1] The ruptured line was excavated and repaired. The cooling tower water line which ruptured in the incident was removed when the original cooling towers were replaced.[3]

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

The existing Building 779 cooling towers replaced the original cooling towers in the same location in 1982 or 1983.[3]

Reference 3 indicates that the area of the cooling tower water line break is of a smaller extent and located farther to the east than presented in the IAG as IHSS 138. In the IAG, IHSS 138 has been defined as a 75 by 75 foot area northeast of Building 779. It has been proposed that IHSS 138 be redefined as a 50 by 50 foot area northwest of Building 727 (PAC 700-138).[3]

References

[1] 1500973
[2] 1501735
[3] 1503448

Other References of Interest

1500978
1502735
1502760

PAC REFERENCE NUMBER: 700-139.1(N); 700-139.1(S)

IHSS Reference Number: 139.1, Operable Unit 8

Unit Name: Caustic/Acid Spills: Hydroxide Tank Area

Approximate Location: N750,800; E2,083,950 (KOH Tank);
N751,100; E2,084,150 (NaOH Tank);
N751,200; E2,084,150 (West Condensate Tank)

Date(s) of Operation or Occurrence

Approximately 1953[1] - Present[2]

Description of Operation or Occurrence

The potassium hydroxide (KOH) tank is located to the south of Building 771. This is an aboveground tank which has a capacity of 5,400 gallons and has been diked since some time before 1973.[3] There was an overfill of the potassium hydroxide tank south of Building 771 prior to 1973. As a result of this incident, it is likely that the caustic seeped through the soil and infiltrated beneath the building.[2] During the week ending May 5, 1978, a spill occurred at the caustic tank near Building 771. The spill occurred during a routine filling operation and was contained by the dike surrounding the tank.[4] This occurrence is believed to have involved the potassium hydroxide tank south of Building 771. On November 13, 1989, the potassium tank was overfilled. Approximately 5 gallons of liquid spilled into an earthen berm which surrounds the tank.[5]

The sodium hydroxide (NaOH) tank is located to the north of Building 774. This is an aboveground tank with a capacity of 6,500 gallons and has been diked since some time before 1973.[3] In April 1985, a pinhole leak was discovered in the piping from the sodium hydroxide tank near Building 774. Although the leak was inside Building 774, the caustic was found to have seeped along the pipe outside the building. In late April or early May of the same year, a small leak was discovered on a fitting for a thermocouple for this tank. The released caustic had solidified on the tank, never reaching the secondary containment. Caustic observed in the pit in this time frame was suggested to be the result of a poor sampling technique allowing the valve to drip. In October 1986, it was estimated that 80 to 100 gallons of sodium hydroxide were released over the history of the tank due to this problem.[6]

Interviews for the CEARP indicated small leaks and spills at the caustic receiving area north and south of Building 774.[1]

There is an additional area of concern related to the sodium hydroxide tank north of Building 774. There are two steel 8,000-gallon aboveground condensate receiving tanks located approximately 100 yards to the north of the sodium hydroxide tank. The two tanks are located on a concrete slab and have badly corroded bottoms. The tanks held "clean" condensate from an evaporative waste concentration system formerly used in Building 774. The condensate was tested for the absence of radioactive contamination and then released to the north or to the west of the tanks depending on the valve positions. The swampy area to the west of the tanks, where the condensate could be released was known as Bowman's Pond. See the narrative on PAC 700-1108 for more details regarding Bowman's Pond. The tanks have been out of service for condensate receiving since approximately 1980. The western condensate tank presently receives overflow and precipitation runoff from the bermed area surrounding the sodium hydroxide tank. The berm area directs flow through a pipe and into the western condensate receiving tank.[2]

On June 22, 1987, during a routine delivery transfer from a tanker truck to the Building 774 sodium hydroxide supply tank, approximately 100 gallons of the liquid caustic soda overflowed. The caustic which spilled inside the bermed area of the tank drained to the caustic catch tank (western condensate receiving tank). Approximately one to two gallons of caustic leaked out of the bermed area onto the roadway in front of Building 774.[7]

Some time around 1988, the sodium hydroxide tank north of Building 774 was overfilled.[2] No documentation was found which further detailed this event.

Physical/Chemical Description of Constituents Released

These tanks contained potassium hydroxide and sodium hydroxide.[1,2,3,4,6] The November 13, 1989 spill incident involved approximately 5 gallons of twelve molar potassium hydroxide solution.[5]

Responses to Operation or Occurrence

Interviewees for the CEARP indicated small leaks and spills from the hydroxide tanks were flushed with water to dilute the caustic and carry it away from the buildings and into the storm sewers.[1,2]

In response to the June 22, 1987 incident, the one or two gallons of sodium hydroxide were diluted and rinsed off the roadway immediately following the occurrence. A work order was initiated to repair and seal the cracks in the berm on the same day of the occurrence. Waste Operations Engineering submitted an Engineering Job Order to replace the deteriorating caustic catch tank T-108 (western condensate receiving tank). The accumulation of rain water and caustic in the caustic western condensate tank was sampled and it was determined to pump the solution to the sanitary sewer system or to Building 774 for processing, depending on the results of the sample analysis. The faulty gasket on the level indicator system of the caustic supply tank was replaced. It was determined to install a high-level alarm on the caustic supply tank.[7]

In response to the November 1989 overfill of the potassium hydroxide tank, approximately 100 pounds of "oil dry" were used to absorb the potassium hydroxide within the bermed area. Contaminated soil and "oil dry" were removed and placed into drums. The Fire Department HAZMAT team verified the contaminated area was adequately cleaned-up by taking soil samples and performing pH tests.[5] Additionally a RCRA Contingency Plan Implementation Report (89-020) was made on this incident.

There was no documentation found of response to the incidents in 1978 and 1988, nor was there documentation found of response to the leak in 1985 from Building 774.

Fate of Constituents Released to Environment

In the case of the overfill of the potassium hydroxide tank south of Building 771 prior to 1973, it is likely that the caustic seeped through the soil and infiltrated beneath the building.[2] No documentation was found which further detailed the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

HRR information indicates that the potassium hydroxide tank had been mislocated as IHSS 139 in the IAG. The location of the sodium hydroxide tank has not been defined on previous IHSS maps.

It has been proposed that PAC 700-139.1 be separated into two units, PAC 700-139.1(N) consisting of both the sodium hydroxide and condensate tanks and PAC 700-139.1(S) consisting of the potassium hydroxide tank. It has been proposed that PAC 700-139.1(N) be comprised of two discrete sites: a 25 by 25 foot area around the sodium hydroxide tank which is adjacent to the north wall of Building 774, and a 30 by 40 foot area centered around the west condensate receiving tank approximately 100 yards to the north of the sodium hydroxide tank. It has been proposed that PAC 700-139.1(S) consist of an "L"-shaped area 25 feet wide and 140 feet long that includes the potassium hydroxide tank which is southeast of Building 771 (immediately east of Building 714) and the line that transfers that hydroxide into Building 771.[2]

References

[1] 1501999
[2] 1503448
[3] 1601057
[4] 1501242
[5] 1700793
[6] 1501067
[7] 1501824

Other References of Interest

1502735

PAC REFERENCE NUMBER: 700-139.2

IHSS Reference Number: 139.2, Operable Unit 8

Unit Name: Caustic/Acid Spills: Hydrofluoric Acid Tank Area

Approximate Location: N750,800; E2,083,940

Date(s) of Operation or Occurrence

Prior to May 1971[1] - Present

Description of Operation or Occurrence

Two 1,200-gallon hydrofluoric (HF) acid supply tanks are located to the southwest of Building 771 in a small shed known as Building 714. Hydrofluoric acid has reportedly infiltrated the soil in the vicinity of the storage area.[2] Numerous small spills and leaks are reported to have occurred during routine filling and transfer operations. The hydrofluoric acid is delivered in portable tanks that replace the empty tanks, thus requiring no open transfer.[3] Actually, these "portable tanks" are sealed cylinders with a weight of approximately 1,300 pounds fully loaded.

In May 1971, a leak in a hydrogen fluoride connection outside Building 771 was reported. A small amount of vapor was released but no personnel exposures occurred.[1] No further details of this incident were presented in the reference.

Physical/Chemical Description of Constituents Released

Hydrofluoric acid is the constituent of concern.

Responses to Operation or Occurrence

No documentation was found which detailed responses to hydrofluoric acid incidents at this site.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location of IHSS 139.2 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

Information developed on this unit indicates that the HF tanks are located in Building 714. It has been proposed that the location of IHSS 139.2 be redefined to represent the location of the hydrofluoric acid storage shed, Building 714 (PAC 700-139.2).[2] Building 714 is 40 feet south and 10 feet east of the southeast corner of Building 771. This is approximately 350 feet south and 250 feet west of the location presented in the IAG as IHSS 139.2.

References

[1] 1600175
[2] 1503448
[3] 1601057

Other references of interest

1500581
1501826
1501827
1501999
1502735
Personal Communication, N.M. Daugherty, RFP Employee, October 21, 1991.

PAC REFERENCE NUMBER: 700-143

IHSS Reference Number: 143, Operable Unit 6

Unit Name: 771 Outfall (IAG Name: Old Outfall)

Approximate Location: N751,150; E2,083,525

Date(s) of Operation or Occurrence

1953 - 1965[1]

Description of Operation or Occurrence

When Building 771 went into operation in 1953, some waste liquids passed through a storm drain located north and west of the building and into North Walnut Creek. The main source was outfall from the Building 771 Laundry holding tanks. Other sources included the analytical laboratory and radiography sinks, the personnel decontamination room, and runoff from the roof of Building 771 and the ground areas.[1]

Liquid wastes in the laundry holding tanks were discharged to this drain if the plutonium concentration was below 3300 disintegration per minute per liter. Between mid-1953 and mid-1957, 4.5 million gallons of liquid was released containing a total of 2.23 mCi. In 1957, a waste line was completed which allowed an option of releasing these liquids to the Building 774 release below Building 995 (PAC NE-142). Due to equipment problems, periodic releases from the laundry holding tanks to the 771 outfall continued until 1965. During this period 430,000 gallons were released containing 0.25 mCi.[1]

The other release sources for the 771 Outfall went directly to the storm sewer and there is no documentation of the liquid quantity or quality.[1]

On April 9, 1958, it was noted that a decontamination sink was tied into a process waste drain that emptied into Walnut Creek north of Building 773.[3]

Water continuing to drain through the pipe and outfall undoubtedly contributed to the spread of contamination in to Walnut Creek.[4]

In May 1971, a sewer line break resulted in storage tanks overflowing through the 771 Outfall.[6]

During the week ending August 4, 1978, a hot spot approximately 875 square feet in size was found near a culvert northwest of the Building 771 parking lot.[7]

Physical/Chemical Description of Constituents Released

Plutonium contaminated wastewaters that also contained soaps and detergent which originated from the Building 771 laundry, analytical laboratory, and radiography areas[1] and a decontamination sink.[3]

Site Survey Monthly Reports from 1955 were obtained. They characterize the releases by reporting the monthly alpha activities in the waters released to the environment. The following is the alpha activity reported for the "71 Building to Walnut Creek" releases.

MONTH-1955	ACTIVITY (Curies)
January[8]	14×10^{-5}
February[9]	20×10^{-5}
March[10]	20×10^{-5}
April[11]	22×10^{-5}
June[12]	21.9×10^{-5}
July[13]	22.16×10^{-5}
August[14]	1.03×10^{-4}
September[15]	1.85×10^{-4}

In addition to the waters released from Building 771, a soil stabilizing solution was frequently applied during remedial activities in 1971. The stabilizer was a mixture of water, ethylene glycol, and Dowell J-197 soil stabilizer.[16]

Responses to Operation or Occurrence

As early as 1953, contamination at the outfall was measured at 17,400 dpm/g in the soil.[2] Contamination of the soil at the discharge was reported in May 1956 with the highest sample being 130 dpm/g gross alpha activity.[1]

In April 1958, instrument readings of up to 8,000 counts per minute were obtained on the rocks in the area.[3] In May 1958, contamination of the soil was reported to be as high as 2,000 dpm/g gross alpha activity.[1]

Discharges of laundry waste to the outfall ceased in 1965.[1] Remediation activities which followed are detailed below.

"Initial discovery" of the hot spot occurred in April 1970 with samples greater than 190,000 dpm/g plutonium.[4] The area was then subject to frequent soil sampling and some monitoring with direct counting instruments. The sampling continued throughout the remediation process. Soil samples ranged from 28,621 to 229,290 dpm/g plutonium on October 19, 1970 (prior to soil removal activities). On February 18, 1971, activities ranged from 47 to 4,437 dpm/g plutonium during soil removal.[17] Much more soil sampling data is available.[18,4,19,20]

Sampling in April 1970 also found 12 dpm/g gross alpha activity in the water draining through the effluent pipe.[1]

In August 1970, Health Physics Operations Group Technical and Construction reported that a 12-inch drain line used for the disposal of rain and underground water was found to be slightly contaminated where it drained into McKay Ditch. An investigation indicated that an overflow pipe from the laundry had been accidently piped into this line. The plumbing was corrected and contaminated soil and foliage was removed and barreled as Low Specific Activity (LSA) waste.[21]

In September 1970, approximately 75 cubic feet of contaminated soil was removed from the area.[4] Another document states that in September two 55-gallon drums of contaminated soil were removed.[1]

In the January 1971, the Health Physics Operations Group Technical and Construction Report stated that recent instrument surveys taken in the ditch indicated the prior removal of two barrels of soil and vegetation was insufficient.[22] The removal resumed in February 1971. As of February 18, 1971, there were no known open drain lines from the building to the outfall.[1]

A letter dated February 19, 1971 stated that, although it had been requested that the drain pipe to the outfall be capped, the capping would be withheld. This was because the water running out of it was not contaminated at that time and it was being checked daily by Health Physics.[23]

As of February 26, 1971, approximately 350 cubic feet of contaminated soil had been removed and barreled from an area of about 750 square feet. It was believed that no contamination had been spread by the wind because the outfall was in a depression about 20 feet deep at the bottom of a hill, the soil was constantly moist and the area was covered with grasses and cattails.[19]

The Health Physics Monthly Status Report for the month of February 1971 reported that 20 soil samples obtained from McKay Ditch indicated that the plutonium contamination was localized and did not travel downstream.[24]

In early March 1971, water collected from the effluent pipe at the outfall was analyzed and found to have gross activity of 9.60 pCi/l. A typical Rocky Flats water sample averaged about 40 pCi/l at the time.[25]

Operations during May 1971 consisted of transferring contaminated mud from 23 used drums to new drums with provisions to absorb any contained liquid. Digging was to be resumed as the weather improved and the mud dried.[6]

By August 31, 1971, the removal of soil was complete. It had started in February 1971 and resulted in 149 drums that were shipped as hot waste (presumably offsite but this was not specified in the documentation found). Cement was added to each drum before and after filling to absorb any contained liquid. The contaminated area was approximately 800 square feet with contamination being as deep as 3.5 feet in one small area. The maximum soil sample result was 39,000 dpm/g. Final survey of the area showed no direct alpha count greater that 250 c/m. Final soil sampling averaged 34 dpm/g with a maximum of 150 dpm/g.[26]

Clean up of the soil found in the culvert in August 1978 occurred during the summer of 1980. The removal was complete by July 18, 1980, resulting in nine boxes of contaminated soil. The removal was done to allow for the construction of the PSZ.[27]

The area that formally was the outfall culvert has been filled in with soil and is now a paved parking lot for building 771. Filling and parking lot construction occurred some time after the soil removal in 1980.[28]

Fate of Constituents Released to Environment

It was noted that the plutonium had penetrated the soil farther than had been expected. The soaps and detergents used in the laundry may have affected the transport of contamination or deposition of soils over the contamination may explain its position.[1]

This IHSS is being studied in accordance with the IAG schedule for OU6. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994.

Comments

The "drain line found" in August of 1970[21] appears to be the 771 Outfall but some of this information seems inconsistent with other documents.

The contamination found in 1978[7] is believed to be related to this IHSS.

It should be noted that the "maximum soil sample result" stated in reference 26 is significantly lower than those found in many other references.

References

[1] 1500445
[2] 1502735
[3] 1500477
[4] 1501064
[5] 1501133
[6] 1600068
[7] 1600205
[8] 1600056
[9] 1600057
[10] 1600058
[11] 1600059
[12] 1600060
[13] 1600061
[14] 1600062
[15] 1600063
[16] Personal Communication, Hornbacher, D.D., Retired RFP Employee, October 24, 1991.
[17] 1500346
[18] 1500538
[19] 1500651
[20] 1501061
[21] 1500567
[22] 1500570
[23] 1500445
[24] 1500571
[25] 1501060
[26] 1500836
[27] 1502736
[28] Personal Communication, D.D. Hornbacher, Retired RFP Employee, October 25, 1991.

Other References of Interest

1500303
1500304
1500325
1500338
1500346
1500362
1500427
1500451
1500540
1500541
1500776
1500836
1500864
1501062
1501999
1600001
1600008
1600010
1600070
1600118
1600122
1600159
1600175
1600179
1600652
1601057
1700388

PAC REFERENCE NUMBER: 700-144

IHSS Reference Number: 144, Operable Unit 8

Unit Name: Sewer Line Overflow (IAG Name: Sewer Line Break)

Approximate Location: N750,500; E2,084,000

Date(s) of Operation or Occurrence

June 7, 1972[1]

Description of Operation or Occurrence

On approximately June 1, 1972, a revision of a Building 776 radiography vault floor drain was completed. Apparently, previous transfers of laundry waste water from Tanks 776 A and B (located in Building 730) resulted in backflow into the vault. The revision to the floor drain, involving relocation of the drain pipe connection, would allow the waste to be transferred at higher pressures.[1] The increased pressure in the sanitary waste transfer line from laundry waste holding tanks 776A and 776B to the sanitary waste treatment plant (Building 995) pressurized the line, causing a toilet and sink in Building 701 to overflow. The pressurization of the sanitary waste transfer line also caused the failure of a patch in the line allowing the release of sanitary waste which contaminated a considerable amount of soil east of the holding tanks.[1] Another source indicates that pressurization of the transfer line caused sanitary waste to back-up and overflow at a clean-out plug. Maintenance personnel were working at the clean-out near Building 701 at the time the transfer line was pressurized.[2]

Interviewees for the CEARP report indicated there was a sewer line break between Building 779 and Building 777. The break was discovered when contamination was found in a restroom commode.[3]

A pipe header at the tanks located in Building 730 allowed alternatives of pumping the laundry water to the sanitary sewer system, the Solar Evaporation Ponds, or Building 774.[4] The tanks in Building 730 were taken out of use for laundry water in the 1980s, and are currently used as plenum deluge tanks.[5]

Physical/Chemical Description of Constituents Released

Radioactive laundry wastewater was released to the environment. Samples of sanitary waste backflow taken from the toilet bowl in Building 701 were analyzed and found to contain 136,000 pCi/l of total alpha-emitting radionuclides. High-level radioactive sediment from the laundry waste holding tanks was entrained when the sanitary waste transfer line was pressurized. The presence of black sludge was noted in the samples taken from the toilet bowl.[1]

Responses to Operation or Occurrence

Approximately 50 drums of contaminated soil were removed east of the holding tanks and shipped to an undescribed location.[1] It was determined that the pump line for the transfer of the laundry waste would be physically separated from the sanitary sewer line.[2]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU8. However, information developed on this unit

for this study indicates the location of IHSS 144 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

The sewer line break between Building 777 and Building 779 recounted by CEARP interviewees is suspect in that no documentation was found which corroborates this location. It is proposed that the location of IHSS 144 (PAC 700-144) be reduced and redefined to include the location of the clean-out plug overflow cited in reference 1 as east of Building 730. The location now shown for PAC 700-144 is based on the written descriptions of the release and a review of engineering drawings.

References

[1] 1500368
[2] 1500379
[3] 1500755
[4] Personal Communication, Maas, M., Retired RFP Employee, April 10, 1992.
[5] Personal Communication, Teel, R., RFP Employee, April 10, 1992.

Other References of Interest

1503448
1500368
1500379
1500406
1500507
1500548
1500609
1502735
1600621
1601057

PAC REFERENCE NUMBER: 700-146.1 - 700-146.6

IHSS Reference Number: 146.1-146.6, Operable Unit 9

Unit Name: Concrete Process Waste Tanks

Approximate Location: N751,000;E2,084,100

Date(s) of Operation or Occurrence

Prior to 1956 - 1972

Description of Operation or Occurrence

Six underground process waste holding tanks were located south of the original Building 774. Building 774, a liquid waste processing facility, has been modified several times since its construction in 1952. During the construction of a south addition in 1972, the tanks were removed. These tanks overflowed frequently.[1]

PAC 700-146 represents a six-chambered reinforced concrete structure south of Building 774. The chambers of the structure are referred to as Tanks 30, 31, 32, 33, 34W, and 34E. Tanks 30 and 33 have a 3,000-gallon capacity. The others have a 6,000-gallon capacity. The tanks were included in a 1952 engineering drawing but it is unclear when they were first placed into service. Liquid waste was transferred to or from the tanks through pipes connected with the original process waste lines (OPWL). Manholes were located at the top of each chamber. The walls of the tanks were approximately 10 inches thick. The bottom elevation was approximately 5955 feet and the tanks were 11'- 8" high. The area occupied by the tanks was 22.5 feet (east-west) by 32.5 feet (north-south). The floor of tanks were at the same approximate height as the second floor of Building 774. Ground elevation to the south of the tanks was approximately 5965 feet. The ground surface south of Building 774 slopes steeply to the north and levels out near the top of the tanks.[2,3] RFP drawing #1-5392-74 locates the six tanks immediately west of tanks #66, #67, and #68, discussed as PAC 700-124 and PAC 700-125.[4]

In October 1956, the process waste tanks at Building 774 overflowed resulting in minor environmental infiltration. In August 1957, some of the tanks leaked, resulting in minor environmental infiltration with levels up to 2,500 dpm/g that was cleaned up.[5] One of the overflows reportedly flowed down the east road toward North Walnut Creek.[6]

Minor leakage form the six tanks was suspected to have been the cause of contamination found in footing drain waters north of Building 774.[7]

Physical/Chemical Description of Constituents Released

The process waste stored in the tanks was an aqueous solution with plutonium, uranium, acids, and caustics.[1] Water from the Building 774 footing drains was as high as 500 dpm/l.[7] About 200 cubic yards of soil removed from around the tanks contained contamination levels up to 2,500 dpm/g gross alpha activity. Another 60 cubic yards of soil removed averaged about 250 dpm/g.[8]

Responses to Operation or Occurrence

Excavation for the Building 774 addition construction began in February 1972.[9] Contamination, resulting from the overflow of the tanks, was detected. At the time, the policy on waste disposal guidelines required soil samples in excess of 34 dpm/g plutonium activity be disposed of as contaminated waste. Radiometric monitoring procedures included an alpha survey meter evaluation of the site to be excavated. Readings in excess of 250

cpm required specific soil samples to be collected for further analysis. Soil contamination in the excavation was identified as slightly below the 34 dpm/g limit and by April 1972, 101 barrels of contaminated soil was reportedly shipped to Idaho Falls. It was estimated that 30 to 40 more barrels would follow.[10]

Demolition of the concrete tanks began on May 8 1972.[11] A wet saw cutting method was used for the removal of the tanks.[9] The disposition of the concrete is unknown. About 200 yards of contaminated soil was removed in 1972 at the time of decommissioning of the tanks and during construction of the south addition to Building 774.[4,8,12] The soil was piled north of Building 334 (PAC 300-156.1).[12,13] The soil was then moved to the east end of the Triangle Area by June 1973 (PAC 900-165).[8,13] Another 60 yards of the soil removed from around the tanks was buried under 3 foot of fill dirt east of Building 881 (PAC 900-130). This soil averaged about 250 dpm/g (PAC 900-130).[8]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

HRR information indicates that the tanks were located under what is now the south wing of Building 774. It has been proposed to relocate and resize IHSS 146 based on the locations of the tanks as shown in RFP drawing #1-5392-74. The new location is immediately west of tanks #66, #67, and #68. The location for this PAC in the IAG documents is currently too large and extends too far to the south and east. The size of the PAC has been decreased to correspond with the approximate dimensions of the tanks shown in engineering drawings, and to correspond with location at which the tanks had existed.

It is evident that references 4 and 6 misinterpreted reference 5, thus making the statements suspect regarding off-site disposal of contaminated soil and asphalt. Reference 5 makes this statement in regard to two separate incidents north of Building 771 on June 8, 1971, and July 2, 1971 (see PAC 700-150.1). The text of reference 5 is misleading as written but research confirms the situation as described above. Later text of reference 5 states that infiltration was cleaned up but that cannot be construed to imply removal of asphalt and soil for off-site disposal.

This unit is part of the Original Process Waste Line (OPWL) system which is discussed as PAC 000-121.

References

[1] 1501999
[2] The Austin Company, Drawing Number RF-74-S4-B, "Concrete Tunnel - Conc. Storage Tanks," June 27, 1952.
[3] Dow Chemical, Drawing Number 1-5392-74, "C Plant, Building 74, Piping to & From 30,000 Gallon Holding Tank," January 4, 1958.
[4] 1503448
[5] 1601057
[6] 1502735
[7] 1600119
[8] 1600438
[9] 1500576
[10] 1500321

[11] 1500577
[12] 1500919
[13] 1500333

Other References of Interest

1500359
1500572

PAC REFERENCE NUMBER: 700-147.1

IHSS Reference Number: 147.1, Operable Unit 9

Unit Name: Process Waste Line Leaks (IAG Name: Maas Area)

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

Date(s) of Operation or Occurrence

1955[1] - 1984[7]

Description of Operation or Occurrence

On September 27, 1955, a possible leak in the process waste line north of Building 881 was reported. Approximately one foot of process wastewater was present in a manhole.[1] In June 1959, monitoring and environmental samples showed low-level contamination along the process waste line from Building 881 to 774.[2] In February 1960, the process waste line from Building 881 ruptured, releasing waste in the construction area near Building 777.[3] On October 27, 1964, there was a break in the process waste line from Building 881 to Building 774.[4] In November 1964, contaminated liquid wastes were released into the sanitary sewer due to breaks and leaks in the process waste line from Building 441, Building 444, Building 881, and Building 883.[5] A May 1971 report stated that the transfer line from Building 444 and Building 881 to Building 774 had broken and leaked several times during the past twenty years. The leaks generally occurred east of Eighth Street and north of Central Avenue.[6] During the summer of 1984, the process waste line connecting Building 881 to Building 374 cracked. The break occurred about 150 yards south of the Guard Gate into the Building 777 complex.[7]

Physical/Chemical Description of Constituents Released

Groundwater samples taken from monitoring wells located at various points east of where breaks had occurred showed up to several hundred ppm nitrate.[6] Typical constituents of waste discharged into the process waste system include uranium, plutonium, beryllium, acids, and solvents.

Responses to Operation or Occurrence

In September 1955, a sample of process waste was taken from a manhole.[1] In October 1964, an excavation was made in the 776 Parking Lot. Process waste water was pumped into a ditch around the parking lot.[4] A May 1971 report states that nitrate migration in the soil from the leaking transfer line was traced by samples taken from shallow wells. After continued study, this portion of the nitrate in soil problem at the Rocky Flats Plant was considered to be minor.[6] In the summer of 1984, approximately two yards of contaminated soil were removed during the clean-up process.[7]

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

With the exception of reference 7, no documentation was found which delineated the exact location of the process waste line leaks relating to this IHSS.

This unit is part of the Original Process Waste Line (OPWL) system which is discussed as PAC 000-121.

References

[1] 1500381
[2] 1600040
[3] 1600035
[4] 1700441
[5] 1700201
[6] 1500757
[7] 1500755

Other References of Interest

1500341
1500917
1501185
1501187
1502735
1600062
1600169
1700200

PAC REFERENCE NUMBER: 700-149

IHSS Reference Number: 149, Operable Unit 9
149.1 - North Lines to Solar Ponds
149.2 - South Lines to Solar Ponds

Unit Name: Effluent Pipe

Approximate Location: N751,000; E2,084,200

Date(s) of Operation or Occurrence

1972 - 1980[1]

Description of Operation or Occurrence

In 1972, two 1.5-inch PVC pipes were installed to transfer wastes between Building 774 and the 207 Solar Evaporation Ponds. These lines were abandoned in place in 1980 after the vapor compression evaporator in Building 374 was constructed.[1]

Sometime during June or July of 1973, a contractor broke the plastic line that ran from the evaporation ponds to Building 774. Repairs were made and the water continued to be drawn to the ponds.[2]

In the late 1970s, a process waste line break southeast of Building 774 resulted in a release of liquid which flowed around to the front of the building.[1,3,4,5] Another, more detailed, document reports that on July 21, 1980, an eight year old process waste line was discovered leaking southeast of Building 774. Process waste water was observed seeping up in the soil on the south side of the road southeast of Building 774. The leaking process waste water flowed down slope and through a 30-foot culvert, along the east chain-link and under the fence at the corner. From this point, the liquid flowed under the unpaved access road into a boggy area, the 771/774 Footing Drain Pond, north of Building 774 (PAC 700-1108). The vegetation in the boggy area was damaged where the spilled liquid formed a pool. It was estimated that approximately 1,000 gallons had leaked from the process waste line.[6]

Physical/Chemical Description of Constituents Released

Low-level radioactive wastes containing caustics and acids were released to the environment.[1]

Analysis of the spilled water from the July 1980 incident showed 2,500 pCi/l total alpha activity, 4,000 pCi/l gross beta activity, and 10,000 mg/l nitrate and a pH of 12.[3]

Responses to Operation or Occurrence

Other than repair of the pipeline in 1973, documentation was not found for any other response to the occurrence of leakage from the pipeline.

The initial response to the July 1980 incident was to stop the flow through the waste line causing the leak to stop. When the soil dried, a FIDLER survey was conducted and verified that the flow did not go beyond the 771/774 Footing Drain Pond. On July 24, the broken waste line was excavated and the problem identified as a loose flange. Soil excavation began July 28, 1980, with radiation monitors checking the soil as it was excavated.[3]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. However, information developed in this report indicates that the location presented in the IAG documents do not correspond to the location of any pipeline carrying process waste. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

The Solar Evaporation Ponds are discussed as PAC 000-101. The Draft RFI/RI Work Plan for OU4 describes, in detail, past work on the solar ponds. Much of the area of IHSS 149 is covered by the area of monitoring and investigation for the Solar Evaporation Ponds.

It is believed that the available documents describe separate events that occurred on separate lines that lead to the Solar Ponds. Both 1.5 and 3-inch PVC lines are noted on utility drawings in this area. It has been proposed that the 700-149 be redefined as two separate areas that correspond to the locations of two separate sets of PVC lines that connect the solar ponds and Building 774.[7,8] The boundaries of the PAC have been redefined to include the entire length of the pipelines since the leaks may have occurred anywhere along the length of the lines.

Although remedial action has been documented for the area affected by the July 1980 incident, it is proposed that this area be included within the boundaries of IHSS 149. It is proposed that the area of IHSS 149 be enlarged to extend to the swampy area north of Building 774 (PAC-1108).

The stated materials of construction of both sets of waste lines differ in the utility drawings from one quadrant to the next. For each set of lines included in this PAC, the material of construction for the pipe changes from one quadrant of the utility drawings to the next. In the case of the 1.5-inch lines the utility drawings further west indicate the lines to be stainless steel whereas the utility drawings further east indicate the lines to be PVC. Conversely, the 3-inch lines are identified as PVC on the western utility drawing, and as steel on the eastern utility drawing.[7,8]

This unit is part of the Original Process Waste Line (OPWL) system which is discussed as PAC 000-121.

References	Other References of Interest
[1] 1503448	1500903
[2] 1500920	1500924
[3] 1500755	1500975
[4] 1501999	1500986
[5] 1502735	1501067
[6] 1600424	1501135
[7] 1502705	1501206
[8] 1502706	1501226
	1600227
	1600228
	1700141

PAC REFERENCE NUMBER: 700-150.1

IHSS Reference Number: 150.1, Operable Unit 8

Unit Name: Radioactive Site North of Building 771 (IAG Name: Radioactive Leak North of Building 771)

Approximate Location: N751,250; E2,083,750

Date(s) of Operation or Occurrence

September 1957 - 1974

Description of Operation or Occurrence

The north side of Building 771 has been paved since 1952. The drive along the north side of the building served as the main access road to Buildings 771 and 774. Building 771 was one of the original buildings and has had several additions built onto it since it was first constructed. The building's main function has been plutonium recovery. Building 770 was constructed sometime prior to 1964 and has its main entrance on the west side. The west and north sides were initially paved. The south side of the building is now paved as well. A grass-lined ditch is beyond the east side of the building. The area north of Building 770 was altered during construction of the Protected Area (PA) and a road, although it is not known if any soil was removed. A small prefabricated building used for storage is located west of Building 770. This building was present in 1969 photographs and has been used for equipment storage. No documentation was found relating any incidents of contamination to this small building.

Through the course of the heavy use this area north of Building 771 received, several unrelated incidents have occurred which impacted the area. Brief descriptions of these follow.

On September 11 and 12, 1957, a fire in Building 771 caused the HEPA filters in the plenum to be breached. An unknown amount of radioactivity was released, primarily north and southwest of the building.[1]

In September 1966, a leaking barrel containing washables was found to be the source of contamination west of Building 770 and on the east dock and ramp of Building 771. The contamination was spread when the leaking barrel was moved from west of Building 770 to the east dock of Building 771.[2]

In October 1967, contamination was again spread from Building 770 to the east dock of Building 771 during the transport of a leaking barrel containing contaminated washables.[3]

From approximately 1962 until approximately 1968, a 5,000-gallon stainless steel tank was located approximately 30 feet north of Building 771. The tank was on 6-foot legs and was approximately 8 feet in diameter. Two overhead pipes from Room 114 in Building 771 connected to the tank; one of which was a vacuum vent to control transfer in and out of the other. The tank was used in the Filtrate Recovery Ion Exchange system which concentrated plutonium and americium for recovery. Americium concentrated on an ion exchange column and was transferred at a predetermined concentration to the tank. The resulting liquid contained in the tank was a nitrate solution high in americium with some plutonium.[4]

In approximately 1968, a pinhole leak developed in the tank and dripped onto the slab foundation. The tank was temporarily sealed to mitigate the leak until the tank could be emptied through the processing of the contained solution. Once emptied, the tank was taken out of service and remained in place until it was moved to the size-reduction facility in Building 776 sometime shortly after. Once size-reduced, the tank was disposed of as radioactive waste. When the tank was removed to the size-reduction facility, the concrete slab was

decontaminated until the point where smear samples did not detect further removable radioactivity. Paint was applied to the concrete to secure the fixed radioactivity. The slab was moved to a ditch directly north of the area and buried (PAC 700-163.2). The area was paved sometime prior to June 1969.

On June 11, 1968, during the removal of drums from the 903 Pad, a drum leaked on the roadways as it was being transported from the 903 Pad to Building 774. The drum was a solvent drum or a rinse drum.[5,6] The forklift that carried the drum to Building 774 traveled across the north side of Building 771 and contaminated an area of Building 774.[7] This incident and other incidents impacting the RFP roadways are discussed as PAC 000-172.

A drum leak incident in July 1968 contaminated the concrete slab outside Building 771.[8]

On July 30, 1969, a proposal was made to store drums east of Building 770 prior to processing in Building 771. The drums had previously been stored east of the solar ponds in the triangle area (PAC 900-165). All barrels of waste from the 1969 fire were stacked in the paved area north of Building 771 for counting before shipment.[9]

A barrel leak in October 1964 resulted in contamination of the ground near the carpenter shack and Building 770. The east dock of Building 774 was also contaminated.[10]

On November 16, 1970 contamination leaked from a hole in the bottom of a barrel of ful-flo filters as it was being transported from the storage area east of the Solar Ponds to Building 771 for processing. The ground surface near the dock at Building 771, the truck and the cargo container in which the drum had been stored were contaminated. The drum was placed on the ground in the northeast corner of the fenced former car parking area. The workers monitored themselves after returning to the building and found their booties contaminated. It was noted that the drum did not have the required heavy duty drum liner.[10,11]

On March 9, 1971, a significant increase in the number of "hot waste" drums stored in the open, north of Building 771 was noted in a monthly status report. It was noted that ten more cargo containers had been ordered and that wastes being removed from existing cargo containers for incineration in 771 were replaced with other drums.[12] The number or drums in storage in this area was becoming problematic for the Health Physics Operations Group.

On June 8, 1971, a waste barrel leaked in the storage yard north of Building 771. The rigid liner and the plastic bag within the drum had been punctured allowing liquid to corrode the barrel.[13,14] A monthly status report for June 1971 states that approximately 1,000 drums were being stored on the asphalt slab north of Building 771 unprotected from the environment. These drums were awaiting recovery and/or shipment.[15]

On July 2, 1971, a waste drum was discovered to be leaking on the pad outside of Building 771.[16] The employee that discovered the spill tracked contamination around the area while retrieving a monitor. The leak was determined to be caused by nitric acid in the "non-line generated" waste. A subsequent rainstorm spread the contamination.[17,18,19]

In August 1972, a punctured scrap box stored inside Building 770 contaminated 3,600 square feet inside the building and 500 square feet outside. Levels of radioactivity ranged up to 200,000 dpm/cm^2. Removal of asphalt and soil for off-site disposal began immediately following the incident.[18] On September 15, 1972, a 55-gallon drum containing spent ion exchange residue leaked inside of Building 770 onto the concrete floor. Contamination was tracked between Building 771 and Building 770.[1,18,20]

Use of this area for storage of materials ceased in approximately 1974 when these storage operations were moved to Building 776. This change was due to environmental concerns related to the clean-up activities at the 903

storage area and the triangle storage area. Efforts were made site-wide in the early 1970s to move all radioactively contaminated materials to indoor storage.

Physical/Chemical Description of Constituents Released

The materials stored in this area (which would also represent the types of materials released in the various events) consisted primarily of residues as well as materials awaiting counting. The residues were destined for plutonium recovery in Building 771; whereas, the materials to be counted were awaiting shipment offsite. Materials were typically stored in drums on pallets or in cargo containers, although some boxed wastes were also present in this area.

A barrel leak in October 1964 resulted in contamination of the ground near the carpenter shack and Building 770. The east dock of Building 774 was also contaminated.[21]

Due to the barrel leak incident in September 1966, the area of the Building 771 east dock and ramp were contaminated up to 100,000 cpm. The ground west of Building 770 was contaminated up to 60,000 cpm.[2]

In the October 1967 barrel leak incident, contamination up to 100,000 cpm was spread from Building 770 to the east dock of Building 771.[3]

The June 11, 1968 drum leak incident resulted in the contamination of five-hundred square feet of ground surface north of the Building 771 west dock up to levels up to 50,000 cpm. Four barrels of soil were removed.[7]

One small area contaminated to 1500 cpm remained following the cleanup of the July 1968 drum leak incident.[8]

Between 115 and 200 square feet of asphalt was contaminated due to the June 8, 1971 waste barrel leak incident north of Building 771.[13,14]

The July 2, 1971 waste drum leak incident resulted the contamination of an area between 2,300 and 2,500 square feet in size. The contamination included both asphalt and gravel surfaces with levels ranging from 500 to 1,000,000 cpm.[17,19] Other documentation has the contamination from these two incidents in June and July 1971 ranging from 100,000 to 300,000 dpm/100cm^2 on the asphalt.[18]

The punctured scrap box incident in August 1972 resulted in the contamination of 500 square feet of ground surface outside of Building 770 to levels up to 200,000 dpm/cm^2.[18]

The September 1972 drum leak incident resulted in the tracking of contamination over 600 square feet at levels ranging from 5,000 to 100,000 cpm.[1,20]

Responses to Operation or Occurrence

In response to the contamination found in September 1966 due to a leaking barrel, the area west of Building 770 was roped off, the east dock of Building 771 was partially decontaminated, and the ramp was marked.[2]

The contaminated ground in front of Building 770 was covered with plastic in response to the October 1967 leaking drum. All other resulting contamination was cleaned up.[3]

In response to the leaking barrel transported to Building 774 in June 1968, four barrels of contaminated soil were removed from the area north of the west dock.[7]

The contamination resulting from the July 1968 drum leak incident was cleaned up with the exception of one small area which was covered with plastic.[8]

In October 1969, ground contaminated by a leaking barrel at Building 770 was removed and barreled.[22]

In response to the leaking barrel of ful-flow filters in November 1970, the area was decontaminated and the floor of the cargo container replaced.[8] In addition, the contaminated ground was cleaned up.[23]

In response to the June 1971 incident involving a leaking waste barrel in the storage yard north of Building 771, soil and approximately 200 square feet of asphalt were removed for off-site disposal.[18] Recommendation to lease cargo carriers to protect the drums was made to Manufacturing and Facilities Planning.[15]

In response to the leaking waste barrel in July 1971, strippable paint was applied to the spill area and the area over which the employee tracked contamination. The rain shower further spread the contamination.[17] The asphalt was removed to decontaminate the area.[16,19] Approximately 2,300 square feet of asphalt and an undetermined amount of soil were removed for off site disposal.[18] Arrangements were made following this incident to procure additional cargo carriers and utilize Building 776 for storage.[24]

Removal of asphalt and soil for off-site disposal began immediately following the August 1972 punctured scrap box incident.[18]

Decontamination activities occurred in response to the September 1972 leaking drum incident, but the reference is unclear what these activities were.[20]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

Information developed on this unit for this study indicates that the waste storage and handling also occurred west of Building 770. Photographs show that in March 1974 over 30 cargo containers were present immediately west of Building 770. The photographs also include close up shots of the base of a cargo container. Stains that appear to be from liquid leaking out of the container are visible on the base of the container and the ground.[25,26,27,28] It is proposed that the area of IHSS 150.1 presented in the IAG be slightly enlarged to include the area west of Building 770. The boundaries of the PAC have also been increased to include the areas up to the loading docks mentioned in the written documentation (the specific loading dock was not mentioned). This change is based on review of photographs of the area, review of the written documentation, and interviews with personnel familiar with the area.

References

[1] 1503448
[2] 1600858
[3] 1600865
[4] Personal Communication, Weaver, J.D., RFP Employee, April 9, 1992.

[5] 1500528
[6] 1600138
[7] 1501174
[8] 1600868
[9] 1600576
[10] 1500402
[11] 1500649
[12] 1600159
[13] 1600165
[14] 1500354
[15] 1500574
[16] 1600877
[17] 1600127
[18] 1601057
[19] 1500627
[20] 1600076
[21] 1600874
[22] 1600875
[23] 1600876
[24] 1600166
[25] 1800316
[26] 1800317
[27] 1800318
[28] 1800319

Other References of Interest

1500380
1500431
1500540
1500542
1500543
1500619
1500620
1501999
1502735
1600089
1600576
1600604
1600870
1800277

PAC REFERENCE NUMBER: 700-150.2

IHSS Reference Number: 150.2, Operable Unit 8

Unit Name: Radioactive Site West of Buildings 771 and 776 (IAG Name: Radioactive Leak West of Building 771)

Approximate Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

September 11, 1957[1] and May 11, 1969[4]

Description of Operation or Occurrence

On September 11, 1957, a fire was discovered in Room 108 of Building 771. Fires in the box exhaust booster filters and main filter plenum were discovered soon after. An explosion in the main exhaust duct probably contributed to the release of plutonium from the stack.[1] The September 1957 fire in Building 771 released radioactive contamination primarily north and southwest of the building.[2]

In September 1957, during firefighting and decontamination activities at Building 771, access to the main filter plenum was gained through a hatchway on the west side of the building. This activity was the main cause of the spread of contamination on the west side of Building 771 at the time of the September 1957 fire.[3]

On May 11, 1969, a fire occurred in Building 776-777. Plutonium was tracked outside of Building 776 by firefighting and support personnel and was detectable on the ground around the building.[4] The tracking of contamination was confined to an area of 20 by 100 feet adjacent to the west of the building.[5] Another source states that the contaminated area extended from the south wall of Building 778 to the north wall of the maintenance addition to Building 776 in a strip about 30 feet wide along the west wall of Building 776. Following the fire, rain carried the contamination into the soil.[6] Airborne contamination from the May 1969 fire was carried predominately to the west-southwest, the average wind direction at the time.[7] Contamination was found outside the building to a maximum of 200 feet following the fire.[8]

Physical/Chemical Description of Constituents Released

Soil and asphalt removed from the west side of Building 776 contained 7 dpm/g when analyzed in August 1969.[8] Contamination was from plutonium. In May 1971, a study of the steps, dock, and ramp areas on the west side of Building 776 showed radioactive contamination as high as 6,000 c/m.[9]

Responses to Operation or Occurrence

In June 1969, an estimated 320 tons of asphalt and soil contaminated by plutonium at the time of the May 1969 fire were removed and buried in trenches.[10] In December 1969, contaminated soil and asphalt were removed from behind Building 776 to fill an area to the east of Building 881 (PAC 900-130).[11] In May 1971, contaminated steps, dock and ramp areas on the west side of Building 776 were covered with an epoxy paint.[9] Areas of contamination outside Building 776 were covered with asphalt.[12] In June 1980, contaminated asphalt was removed from the west side of Building 776 and boxed as hot waste.[13]

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates the location of IHSS 150.2 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

It has been proposed that IHSS 150.2 be redefined as a 75 by 600 foot area west of Building 776 and Building 771 (PAC 700-150.2).[3] This area is approximately equivalent to that shown in the IAG IHSS map; however, this area differs from the extent of IHSS 150.2 described in the text of the IAG.[3]

References

[1] 1500772
[2] 1503448
[3] 1502769
[4] 1500423
[5] 1500326
[6] 1600288
[7] 1501124
[8] 1500536
[9] 1500305
[10] 1700399
[11] 1500563
[12] 1600119
[13] 1600225

Other References of Interest

1500347	1501092	1600292
1500351	1501099	1600432
1500456	1501107	1600476
1500578	1501109	1600533
1500562	1501123	1600583
1500563	1501771	1601057
1500656	1501772	
1500755	1501773	
1500778	1501774	
1500779	1501775	
1500780	1501776	
1500844	1501778	
1500845	1501781	
1500851	1501788	
1500902	1502735	
1501082	1600104	
1501083	1600168	
1501090	1600287	
1501091	1600291	

PAC REFERENCE NUMBER: 700-150.3

IHSS Reference Number: 150.3, Operable Unit 8

Unit Name: Radioactive Site Between Buildings 771 and 774 (IAG Name: Radioactive Leak Between Buildings 771 and 774)

Approximate Location: N750,950; E2,084,000

Date(s) of Operation or Occurrence

August, September, and December 1971, Late 1970s or Early 1980s

Description of Operation or Occurrence

During excavation for construction between Building 771 and Building 774, in August 1971, a cement tunnel containing process waste lines was exposed. Three cracks in the concrete walls were found to be contaminated.[1]

In September 1971, construction excavation resulted in the exposure of the tunnel between Buildings 771 and 774. The tunnel contained process waste lines and at one time had been used as an exhaust ventilation duct for Building 774.[2]

In December 1971 (or possibly early January 1972), construction activities in this area resulted in a broken process waste line. Samples of the water showed an activity of about 1,000 pCi/l. Soil samples from the area were found to be only slightly contaminated.[3]

Personnel recall an incident in this area in the late 1970s or early 1980s. A flange in a line separated releasing an unspecified amount of aqueous process waste that reached the surface.[4]

Physical/Chemical Description of Constituents Released

The August 1971 incident resulted in the release of plutonium contamination to the soil.[1]

The September 1971 incident resulted in 24 disintegrations per minute per gram contamination of soil.[2]

The incident involving a wastewater line in December 1971 released wastewater with an activity of about 1000 pCi/l. This resulted in slightly contaminated soil.[3] It is not clear if this is process, laundry, or sanitary wastewater.

The leak resulting from the separated flange would have released liquid waste containing low-levels of radionuclides as well as nitrate and other chemical contaminants.[4]

Responses to Operation or Occurrence

The August 1971 incident resulted in the sealing of the cracks that were contaminated and the removal of eight drums of soil. The soil removal was completed prior to September 8, 1971, the date of the referenced document.[1]

The September 1971 incident also resulted in sealing of the cracks and removal of eight drums of soil. The soil was removed for off-site disposal in January 1972.[2]

No response beyond soil and water sampling is mentioned regarding the wastewater line break in December 1971.

Personnel recalled that the area impacted by the leak from the loose flange was cleaned up.[4]

Fate of Constituents Released to Environment

No documents were found which detail the fate of the constituents released. This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

It is believed that the six underground process waste holding tanks at the present location of the south wing of Building 774 may have affected PAC 700-150.3.[4] These tanks were known to have leaked and overflowed. PAC 700-146 has more details on the history of these tanks.

References

[1] 1500544
[2] 1601057
[3] 1500922
[4] 1503448

Other References of Interest

1500552
1501999
1502735

PAC REFERENCE NUMBER: 700-150.4

IHSS Reference Number: 150.4, Operable Unit 8

Unit Name: Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

May 1969, 1980, and 1981

Description of Operation or Occurrence

Following the May 1969 fire, the tanks and pumps that handled the decontamination fluid were placed into the Building 750 courtyard. This area was later paved and used for parking lots. In 1980 and 1981, there were several leaks from the manholes in these parking lots. This area is suspected to have residual contamination.[1] Decontamination fluid storage tanks were located on the southeast side of Building 778 following the May 1969 fire. Since that time Building 778 has been extended the east.[2]

Physical/Chemical Description of Constituents Released

The probable contaminant in the area is plutonium.

Responses to Operation or Occurrence

No documentation was found which detailed response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU8. However, information developed on this unit for this study indicates the location for IHSS 150.4 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

It is proposed that the location of IHSS 150.4 be redefined as an area to the northwest of Building 750 (PAC 700-150.4)

References

[1] 1500755
[2] Personal Communication, Freiberg, K.J., Retired RFP Employee, December 6, 1991.

Other References of Interest

1503448
1502635

PAC REFERENCE NUMBER: 700-150.5

IHSS Reference Number: 150.5, Operable Unit 8

Unit Name: Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

1953 - 1983

Description of Operation or Occurrence

All documented leaks in the area west of Building 707 are related to the overflow of Valve Vault 7 (PAC 700-123.1) and an original process waste line valve vault removed from the area in March 1973 (PAC 700-123.2).[1]

Physical/Chemical Description of Constituents Released

The primary constituent released was process wastewater from the 800 and 400 Areas which may contain uranium, solvents, oils, beryllium, nitric acid, hydrochloric acid, and fluoride.[1]

Responses to Operation or Occurrence

The responses to overflow incidents of Valve Vault 7 and the original process waste line valve vault are discussed in PAC 700-123.1 and PAC 700-123.2, respectively.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

No documentation for occurrences at this site was found other than that relating to the overflows of Valve Vault 7 (PAC 700-123.1) and the original process waste line valve vault previously located west of Building 707 (PAC 700-123.2). It is proposed that this IHSS be deleted.

References

[1] 1500755

Other references of interest

1503448
1500237
1501795
1502735
1600261

PAC REFERENCE NUMBER: 700-150.6

IHSS Reference Number: 150.6, Operable Unit 8

Unit Name: Radioactive Site South of Building 779 (IAG Name: Radioactive Leak South of Building 779)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

June 1969[1]

Description of Operation or Occurrence

In June 1969, radioactive contamination occurred due to an improperly opened waste drum in Building 779 and was spread by pedestrian tracking to areas east and south of the building.[1]

Physical/Chemical Description of Constituents Released

The release consisted of radionuclides from radioactive waste. Contamination was measured at up to 50,000 dpm/100 cm^2 for gross alpha activity.

Responses to Operation or Occurrence

Contaminated soil was placed in barrels and removed for off-site disposal.[1]

Fate of Constituents Released to Environment

The incident which affected this site is also discussed in the narrative for PAC 700-150.8. No documentation was found which detailed the complete removal of contamination. This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

None.

References

[1] 1503448

PAC REFERENCE NUMBER: 700-150.7

IHSS Reference Number: 150.7, Operable Unit 8

Unit Name: Radioactive Site South of Building 776 (IAG Name: Radioactive Leak South of Building 776)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

May 11, 1969

Description of Operation or Occurrence

On May 11, 1969, a fire occurred in Building 776/777. Plutonium tracked outside of Building 776 by firefighting and support personnel was detectable on the ground around the building.[1] Following the fire rain carried the contamination into the soil.[2] The spread of contamination south of Building 776 can also be attributed to the rinsing down of the building with fire hoses.[3] Sand and gravel between Building 777 and Building 778 were also contaminated before the rain.[4] Airborne contamination from the May 1969 fire was carried predominately to the west-southwest, the average wind direction at the time.[5] Contamination was found outside the building to a maximum of 200 feet following the fire.[6]

Physical/Chemical Description of Constituents Released

Contamination was caused by plutonium released to the environment.

Responses to Operation or Occurrence

Oil and gravel were placed over the contaminated soil as a temporary measure following the May 1969 fire. The contaminated soil, oil, and gravel were removed on July 19, 1969. An asphalt roadway was completed in the area on July 22, 1969.[2] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU 8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994. Information reviewed for this study indicates that the location of this PAC as identified in the IAG documents is inaccurate.

Comments

No documentation was found which provides information on the final disposition of the soil, oil, and gravel removed from the site. The removed material could have been buried in trenches or moved to a fill area to the west of Building 881 with contaminated material removed from the west side of Building 776.[7,8] The boundaries of this site have been moved to the north approximately 90 feet to correspond with the area between Buildings 776/777 and Building 778 (as discussed in the incident descriptions). The boundaries for the IHSS presented in the IAG were too far to the south (being between Building 778 and 707).

References

[1] 1500423
[2] 1600291
[3] 1503381
[4] 1601168
[5] 1501124
[6] 1600288
[7] 1501097
[8] 1500563

Other References of Interest

1500347
1500451
1500456
1500600
1500601
1500780
1500902
1501107
1501164
1501744
1600119
1600168
1600286
1600287
1600292
1600294
1600432
1600583

PAC REFERENCE NUMBER: 700-150.8

IHSS Reference Number: 150.8, Operable Unit 8

Unit Name: Radioactive Site Northeast of Building 779 (IAG Name: Radioactive Leak Northeast of Building 779)

Approximate Location: N751,000; E2,084,500

Date(s) of Operation or Occurrence

June 1969

Description of Operation or Occurrence

In June 1969, an improperly opened waste drum in Building 779 radioactively contaminated areas inside and near the building. The contamination was spread by pedestrian tracking to the walkways east and south of the building (PAC 700-150.6) as well as the dock and adjacent ground.[1]

Physical/Chemical Description of Constituents Released

The release consisted of radionuclides from radioactive waste. Contamination was measured at up to 50,000 dpm/100 cm^2 for gross alpha activity.[1]

Responses to Operation or Occurrence

Contaminated soil was placed in barrels and removed for off-site disposal.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

Other documentation reviewed refers to the Building 779 storage yard located east of Building 779. The Building 779 storage yard is also known as the Triangle Area (PAC 900-165).

References

[1] 1503448

PAC REFERENCE NUMBER: 700-163.1

IHSS Reference Number: 163.1, Operable Unit 8

Unit Name: Radioactive Site - 700 Area Site #3 - Wash Area

Approximate Location: N751,150; E2,084,250

Date(s) of Operation or Occurrence

Unknown.

Description of Operation or Occurrence

CEARP Phase 1 interviewees indicated the area north of Building 774 was used to wash radioactively contaminated equipment. The wash water flowed onto the ground.[1] Building 774 personnel did not recall this area ever being used to wash equipment.[2]

Aerial photos from 1971 and 1969 show two areas east of this IHSS that were covered with mounds of soil. RFP personnel interviewed for CEARP did not recall these mounds.[2]

The eastern half of the area depicted as IHSS 163.1 is mostly flat and paved. The area was repaved in 1987 or 1988.[2]

Physical/Chemical Description of Constituents Released

Wash water from radioactively contaminated equipment would be expected to have low levels of radionuclides and may also have contained various organic and inorganic compounds.

Responses to Operation or Occurrence

A sitewide radiometric survey was performed from 1977 through 1984. The purpose of the survey was to identify areas extremely contaminated radioactive areas (500,000 - 1,000,000 pCi/g).[3,4]

Fate of Constituents Released to Environment

No radioactivity above background levels was indicated at this location by the radiological survey.[2,5]

This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

None.

References

[1] 1501999
[2] 1503448
[3] 1503375
[4] 1503370
[5] 1502735

PAC REFERENCE NUMBER: 700-163.2

IHSS Reference Number: 163.2, Operable Unit 8

Unit Name: Radioactive Site - 700 Area Site #3 - Buried Slab

Approximate Location: N751,400; E2,084,050

Date(s) of Operation or Occurrence

Prior to 1973[1]

Description of Operation or Occurrence

Burial of a concrete slab contaminated with direct count americium has been documented north of Building 771. According to this same source, the slab was later excavated and the contaminated portion cut away for off-site disposal.[1]

This americium-contaminated slab is believed to be buried in the area near Building T771A by the Perimeter Road. The slab is approximately 8 feet square and 10 inches thick. From approximately 1962 until approximately 1968, the slab served as a foundation for a 5,000-gallon stainless steel tank located approximately 30 feet north of Building 771. The tank was on 6-foot legs and was approximately 8 feet in diameter. Two overhead pipes from Room 114 in Building 771 connected to the tank; one of which was a vacuum vent to control transfer in and out of the other. The tank was used in the Filtrate Recovery Ion Exchange system which concentrated plutonium and americium for recovery. Americium concentrated on an ion exchange column and was transferred at a predetermined concentration to the tank. The resulting liquid contained in the tank was a nitrate solution high in americium with some plutonium.[2]

In approximately 1968, a pinhole leak developed in the tank and dripped onto the slab. The tank was temporarily sealed to mitigate the leak until the tank could be emptied through the processing of the contained solution. Once emptied, the tank was taken out of service and remained in place until it was taken to the size-reduction facility in Building 776 sometime shortly after. Once size-reduced, the tank was disposed of as radioactive waste. When the tank was removed to the size-reduction facility, the concrete slab was decontaminated until the point where smear samples did not detect further removable radioactivity. Paint was applied to the concrete to secure the fixed radioactivity. The slab was moved to a ditch directly north of the area and buried. The area was paved sometime prior to June 1969. In the mid 1970s, Building T771A, a prefabricated structure, was constructed in the same general area. Interviewees familiar with the tank and the buried pad did not recall any subsequent excavation of the slab.[2,3] The slab lies underground near or beneath the east end of T771A at a probable depth of less than ten feet.

An environmental summary report from 1973 does not indicate the incident in the summary of environmental incidents impacting the soil at the RFP; however, the report does have a notation of the slab on a map of the area north of Building 771. The report indicates an area farther to the north of the where the slab is believed to be buried and states that it was later excavated and the contaminated portion cut away for off-site disposal.[1] This is not believed to be the case. The location indicated on the map cannot be accurate because it is in an area that was paved several years before the slab became contaminated. As stated above, there has been no verification that the slab was subsequently excavated.

Physical/Chemical Description of Constituents Released

The concrete slab was contaminated with americium.[1]

Responses to Operation or Occurrence

As stated above, one source states that the contaminated portion of the slab was cut away for off-site disposal, but other sources do not believe that any portion of the pad was cut away for off-site disposal.

Fate of Constituents Released to the Environment

This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994. However, information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate.

Comments

This IHSS is related to the americium-bearing waste tanks north of Building 771. The waste tanks which are discussed as PAC 700-150.1 were located on the pad and were reported to have leaked. The new location for this buried slab is proposed to be in the immediate vicinity of Trailer T771A. This location is immediately north of where the americium tanks had been located, and was a low-lying area requiring fill prior to use. Interviewees familiar with the slab stated that it was buried in this location (directly north of the americium tank location).

References

[1] 1601057
[2] Personal Communication, Weaver, J.D., RFP Employee, April 9, 1992.
[3] Personal Communication, Barker, C.J., RFP Employee, April 9, 1992.

Other References of Interest

1502735

PAC REFERENCE NUMBER: 700-185

IHSS Reference Number: 185, Operable Unit 16

Unit Name: Solvent Spill

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 10, 1986[1,2,3]

Description of Operation or Occurrence

The fork of a forklift punctured a 55-gallon drum of trichloroethane on the southeast dock of Building 707, causing approximately 4 gallons of the solvent to leak onto the ground.[1,2,3]

Physical/Chemical Description of Constituents Released

The punctured drum contained trichloroethane.[1,2,3]

Responses to Operation or Occurrence

Four bags of absorbent were used to clean up the spill.[1,2,3] Material was cleaned up and placed in drums by the Fire Department and taken to Hazardous Storage.[3]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU16, Low Priority Sites. The Final No Further Action Justification Document for OU16 is to be completed by July 30, 1992.

Comments

None.

References

[1] 1500856
[2] 1501053
[3] 1501825

Other References of Interest

1502735

PAC REFERENCE NUMBER: 700-194

IHSS Reference Number: 194, Operable Unit 16

Unit Name: Steam Condensate Leak - 700 Area

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

September 26, 1979[1,2,3]

Description of Operation or Occurrence

A steam condensate line break occurred in the Building 707 area. The water from the line break flowed into the surface water drainage through Pond B-4 to Walnut Creek (PAC NE-142.5 - NE-142.9).[1,2,3]

Physical/Chemical Description of Constituents Released

The steam condensate contained tritium at approximately 1,000 pCi/l.[1,2,3]

Responses to Operation or Occurrence

On September 27, surface water drainage was diverted to Pond B-1 and the valve to Pond B-5 was closed.[1,2,3]

Fate of Constituents Released to Environment

Water samples from Pond B-4 ranged from less than or equal to 524 to approximately 926 pCi/l for tritium. Samples from Walnut Creek at Indiana showed 1,163 pCi/l for a 24 hour composite covering September 26, 1979 and approximately 700 pCi/l in a grab sample taken on September 27, 1979.[1,2]

This IHSS is being studied in accordance with the IAG schedule for OU16, Low Priority Sites. The Final No Further Action Justification Document for OU16 is to be completed by July 30, 1992.

Comments

None.

References

[1] 1501006
[2] 1501225
[3] 1600219

Other References of Interest

1502735

PAC REFERENCE NUMBER: 700-214

IHSS Reference Number: 214, Operable Unit 10

Unit Name: 750 Pad Pondcrete and Saltcrete Storage, Unit 25

Approximate Location: N750,000; E2,084,500

Date(s) of Operation or Occurrence

1986[1] - Present

Description of Operation or Occurrence

A ruptured pondcrete container was reported to Waste Operations on September 27, 1988.[1] Another box containing saltcrete failed at the 750 Pad on November 1, 1988, spilling approximately 40 pounds of saltcrete onto the asphalt surface.[2,3] Four saltcrete boxes split open, spilling material on June 21, 1989, and two additional boxes leaked about 8 pounds of saltcrete onto the 750 Pad on July 5, 1989.[4,5] Sampled run-off water from the 750 pondcrete storage area in early December 1988 showed nitrate peaks in response to precipitation events.[6] In the first week of December 1988, RFP guidelines for gross beta and nitrate continued to be exceeded in the run off from the 750 Pad.[7] On March 9, 1989, an employee working in Building T750D complained of having to "walk through pondcrete" to get to his office.[8] On April 6, 1989, box failure caused a pound of pondcrete to fall to the pad surface.[9] On July 24, 1989, one pound of pondcrete and one pint of liquid leaked from a box at the 750 Pad.[10]

Physical/Chemical Description of Constituents Released

Pondcrete consists of solidified low-level radioactive and hazardous waste extracted from the Solar Evaporation Ponds. Saltcrete consists of solidified low-level radioactive and hazardous waste extracted from process waste at Building 374 by distillation.

Responses to Operation or Occurrence

The ruptured pondcrete containers were repackaged.[1,4] The spilled pondcrete/saltcrete was cleaned from the pad surface and repackaged.[2,3,4,10] It was recommended to Waste Operations that an engineered containment for run-off water be constructed.[5] Portable buildings were constructed to prevent precipitation from coming in contact with the waste.

Fate of Constituents Released to Environment

Run-off water exceeding RFP guidelines for gross beta activity and nitrate flowed from the 750 Pad and into the storm water drainage system.[6,7] This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by March 30, 1998.

Comments

None.

References

[1] 1500824
[2] 1501186
[3] 1600454
[4] 1501197
[5] 1501198
[6] 1600457
[7] 1600456
[8] 1501810
[9] 1501811
[10] 1501762

Other References of Interest

1502735

PAC REFERENCE NUMBER: 700-215

IHSS Reference Number: 215, Operable Unit 9

Unit Name: Tank T-40, Unit 55.13

Approximate Location: N 751,000; E 2,084,000

Date(s) of Operation or Occurrence

1963 - September 1989

Description of Operation or Occurrence

The concrete mixed waste storage tank adjacent to Room 103 of Building 771 was constructed in 1963. The roof of the tank serves as the floor of Room 203.[1]

Physical/Chemical Description of Constituents Released

The tank held sludge from second stage precipitation of liquid process waste from Building 771. Also stored was effluent from a silver recovery unit in Building 774.[1]

Responses to Operation or Occurrence

Use of Tank T-40 ceased when the tank was replaced in September, 1989.[1] No documentation was found which details releases from this unit.

Fate of Constituents Released to Environment

No documentation was found which detailed a release of constituents from the tank. An interim status closure plan was prepared for the tank and submitted to the CDH and EPA on September 29, 1989.[1] This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report for OU9 is to be completed by September 6, 1994.

Comments

None.

References

[1] 1502734
[2] 1500755

PAC REFERENCE NUMBER: 700-1100

IHSS Reference Number: Not Applicable

Unit Name: French Drain North of Building 776/777

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

Prior to 1963 - After 1971[1]

Description of Operation or Occurrence

A french drain which was in use from about 1963 until at least 1972 leads north from Door 17T of Building 776, crosses the alleyway, then heads eastward where its effluent leaches into the soil.[1] Radioactive contamination in the area of this site is the result of the June 1964 explosion incident in Building 776.[2] The area was again contaminated at the time of the May 1969 fire in Building 776 (PAC 700-131). This drain may have provided a pathway for the migration of radioactive contamination.[1] Another source indicated the french drain leads north from Door 14T of Building 776.

Physical/Chemical Description of Constituents Released

Plutonium contamination present in the area of this site as a result of the 1964 and 1969 incidents was possibly redistributed below the ground surface although no surface expression was noted.[2]

Responses to Operation or Occurrence

No documentation was found which detailed response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The french drain could not be located on the RFP Utility Drawings.

The June 1964 explosion incident and the May 1969 fire, both in Building 776, are discussed as PAC 700-131.

References

[1] 1500842
[2] 1600181
[3] 1503381
[4] 1601057

Other References of Interest

1500607

PAC REFERENCE NUMBER: 700-1101

IHSS Reference Number: Not Applicable

Unit Name: Laundry Tank Overflow - Building 732

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

June 26, 1979

Description of Operation or Occurrence

A laundry wastewater tank west of Building 778 (Building 732) overflowed into the tank pit due to malfunctioning pumps.[1,2]

Physical/Chemical Description of Constituents Released

Laundry wastewater was released to the environment. Because of the nature of building activities, it is probable that this material may have been a low-level waste.

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

None.

References

[1] 1600185
[2] 1600192

Other References of Interest

1500805

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

January - November 1986

Description of Operation or Occurrence

Prior to 1987, Transformer 776-4 was located 100 feet west of the northwest corner of Building 776. The transformer pad at this location is positioned on an incline with drainage toward an access road 15 feet to the east.[1] In January 1986, leaking was observed from Transformer 776-4.[2] In February 1986, the transformer was leaking on the radiator and 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.[3] In June 1986, Transformer 776-4 was reported as leaking.[4] In an August 1986 photograph, staining is visible on the concrete pad underlying the transformer.[5] In August and September 1986, the transformer was again reported as leaking.[6,7] In November 1986, concrete under the transformer drain valve and soil at the south edge of the transformer pad was found to be contaminated with polychlorinated biphenyls (PCBs).[8]

Physical/Chemical Description of Constituents Released

In September 1976, the fluid in Transformer 776-4 had a PCB concentration of approximately five percent.[9] In November 1977, fluid in the transformer had a PCB concentration of approximately three percent.[10,11,12,13,14] In October 1985, Transformer 776-4 was reported to contained PCB fluid exclusively.[15] In November 1986, smear samples taken from the valve, wall, and pad of the transformer were found to contain 29.8 ppm, 5.0 ppm, and 417.5 ppm PCBs, respectively.[16] Also in November 1986, a smear sample taken from the concrete pad underlying the transformer drain valve was found to contain 498 micrograms PCBs. The soil at the bottom of a small excavation at the south edge of 776-4 pad measured 14,900 milligrams/liter PCBs.[8]

Responses to Operation or Occurrence

In September 1976, Transformer 776-4 was retro-filled with silicone oil.[9] In January 1986, the transformer was scheduled for replacement under the PCB Fire Hazard Elimination Project in fiscal year 1988.[17] In October 1986, the Transformer 776-4 case was scheduled for recleaning near the valve.[18] In November 1977, the transformer was retro-filled with silicone oil.[10,11,12,13,14] The transformer was removed for retro-filling and relocation several feet to the north in 1987. The transformer pad has been partially removed to a depth of four inches and has been surrounded with fill.[1] In March 1989, it was reported that Transformer 776-4 was replaced under the Environmental Hazards Elimination Project. Transformer 776-4 was scheduled for cleanup to take place on August 10, 1989.[19]

Fate of Constituents Released to Environment

No documentation was found which detailed the disposition of the concrete removed from the transformer pad or the fate of the constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700131
[3] 1700070
[4] 1700074
[5] 1502482
[6] 1700001
[7] 1700110
[8] 1700006
[9] 1500054
[10] 1700072
[11] 1700082
[12] 1700083
[13] 1700084
[14] 1700052
[15] 1700062
[16] 1700026
[17] 1700065
[18] 1700077
[19] 1700129

Other references of interest

1502478
1502479
1502480
1502481
1502483
1502484
1700053
1700057
1700063
1700068
1700076
1700085
1700122

PAC REFERENCE NUMBER: 700-1103

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformers - Building 707

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 1986 - Present

Description of Operation or Occurrence

Transformers 707-1 through 707-6 are located on the southeast quarter of the Building 707 roof.[1] Concrete under the 707-1 through 707-6 transformer drain valves was found to be contaminated with polychlorinated biphenyls (PCBs) in November 1986.[2] A leak was discovered from Transformer 707-1 in 1987 during routine maintenance when the transformer was found to be low on fluid. Visible evidence of leaks was discovered at the valve area and weld seams. Analysis of soil and superficial swipe samples confirmed the pad on the roof and the soil on the ground immediately east of Building 707 are contaminated with PCBs. The soil contamination is due to a downspout delivering rainwater from the roof in the area of Transformer 707-1 to the ground.[1]

Physical/Chemical Description of Constituents Released

Smears taken from the concrete under the drain valves of the transformers were analyzed in November 1986 and found to contain 135 g to 7,200 g of PCBs. [2] In March 1991, surface soil samples taken immediately east of Building 707 measured from 9.7 to 1600 milligrams/kilogram PCBs. Subsurface soil samples taken at depths between 1.0 to 1.5 feet in the same area measured from <1 mg/kg to 180 mg/kg.[1]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This site is currently being addressed by EG&G with the building structure to be cleaned up under Toxic Substance Control Act.[1]

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700006

Other references of interest

1502387
1502388
1502390
1502391
1502392
1502393
1502394
1502395
1502396
1502397
1502398
1502399
1700000
1700001
1700009
1700025
1700026
1700027
1700052
1700053
1700054
1700062
1700063
1700074
1700076
1700077
1700086
1700110
1700116
1700129
1700131
1700134

PAC REFERENCE NUMBER: 700-1104

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformer - Building 708

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 1986 - 1987

Description of Operation or Occurrence

In February 1987, concrete under the 708-1 transformer drain valve was found to be contaminated with polychlorinated biphenyls (PCBs).[1] Transformer 708-1 is located adjacent to the west side of Building 708. According to an interview with EG&G Utilities personnel, two of the four transformers located west of Building 708 leaked PCB containing oil prior to 1987.[2]

Physical/Chemical Description of Constituents Released

Smears taken from the concrete under the transformer drain valve were analyzed and found to contain 1,035 g and 3,750 g of PCBs. [1]

Responses to Operation or Occurrence

Four transformers were moved from this site and retro-filled in 1987. Rock and gravel fill was placed around the transformer pad west of Building 708.[2] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700006
[2] 1503365

PAC REFERENCE NUMBER: 700-1105

IHSS Reference Number: Not Applicable

Unit Name: Transformer Leak - 779-1/779-2

Approximate Location: N750,500; E2,084,500

Date(s) of Operation or Occurrence

Prior to June 1986

Description of Operation or Occurrence

Transformers 779-1 and 779-2 are located on the northeast side of Building 779. According to an interview with Utilities personnel, these transformers have leaked PCB containing oil prior to 1987.[1] In June 1986, Plant Power Engineering reported Transformers 779-1 and 779-2 to be PCB contaminated and leaking.[2]

Physical/Chemical Description of Constituents Released

Oil with PCBs was released from the transformers.[1,2]

Responses to Operation or Occurrence

In 1987, the transformers were retro-filled and then moved several feet east and north.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700073

Other References of Interest

1700001	1700068	1700129
1700025	1700072	1502472
1700026	1700074	1502473
1700027	1700077	1502474
1700053	1700083	1502475
1700054	1700084	1502476
1700057	1700085	
1700063	1700086	
1700065	1700110	

PAC REFERENCE NUMBER: 700-1106

IHSS Reference Number: Not Applicable

Unit Name: Process Waste Spill - Portal 1

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 1986

Description of Operation or Occurrence

Approximately 10 gallons of process wastewater spilled from a tank truck at the entrance to Portal 1. The truck was en route from the Valve Vault 12 leak area to Solar Pond 207A. The tank was overfilled and the liquid splashed out of the top manhole while the truck was driven around a corner.[1]

Physical/Chemical Description of Constituents Released

Process waste water from the Valve Vault 12 leak was released onto the street. Analysis of water samples taken from Valve Vault 12 and a related process waste line leak indicated the following values for total alpha, total beta, uranium, americium, and plutonium:[2,3]

TABLE 700-1
VALVE VAULT 12 WATER ANALYSIS

	DESCRIPTION	ANALYSIS (pCi/L)	RESULT
Sample Received: 10/31/86 Report Date: 11/14/86	Process Waste Line Leak Sample	Total Alpha	1.7×10^5
		Total Beta	4.9×10^4
		U-238	9.3×10^4
		Am-231	3.3×10^2
		Am-231 (rerun)	2.4×10^2
		Pu-239	0.0×10^3
		Pu-239 (rerun)	6.5×10^1
		Total U	1.1×10^5
Sample Received: 11/03/86 Report Date: 11/14/86	Valve Vault 12 Water Sample	Total Alpha	1.7×10^4
		Total Beta	1.1×10^4
		U-238	1.2×10^5

Responses to Operation or Occurrence

It was determined at the time of the spill that there was no radioactivity on the street.[1] No documentation was found which further detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Reference 1 indicates the tank truck was in route to Pond 204A. It is believed the author was referring to Solar Evaporation Pond 207A since Pond 204A does not exist. The Valve Vault 12 incident which relates to this occurrence is discussed as PAC 300-186.

References

[1] 1600812
[2] 1500895
[3] 1500896

PAC REFERENCE NUMBER: 700-1107

IHSS Reference Number: Not Applicable

Unit Name: Compressor Waste Oil Spill - Building 776

Approximate Location: N750,500; E2,084,000

Date(s) of Operation or Occurrence

June 10, 1986 and June 12, 1986

Description of Operation or Occurrence

On June 10, 1986, an open oil drum filled with water from the Building 776 Compressor House roof overflowed. One or two gallons of oil flowed onto the road and was carried past Building 776 by rainwater. The oil originated from a sump trench in the Compressor House.[1] On June 12, 1986, two to three gallons of compressor waste oil were spilled while transferring the oil from an overfilled drum. The spill occurred in the waste oil drum storage area north of Building 776 outside of Door 15T.[2]

Physical/Chemical Description of Constituents Released

Compressor House waste oil was released to the environment.[1,2]

Responses to Operation or Occurrence

In response to the June 10th incident, "Oil-Dry" was poured over the area to absorb the spilled oil. The compressor operator was instructed to have the "Oil-Dry" swept up, placed into a drum and disposed of in the Present Landfill (PAC NW-114).[1] No documentation was found which detailed the final disposition of the "Oil-Dry". Two bags of oil absorbent were used on the June 12th spill.[1] No documentation was found which further details responses to these occurrences.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

None.

References

[1] 1600548
[2] 1600550

PAC REFERENCE NUMBER: 700-1108

IHSS Reference Number: Not Applicable

Unit Name: 771/774 Footing Drain Pond

Approximate Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

Late 1950s - Present

Description of Operation or Occurrence

Footing drain flows from Building 771 and Building 774 both daylight in the general location of a small pond north of Building 774.[1]

Footing drains north of Building 774 carry liquid from the drain tiles around the foundation of that building.[2,3] The Building 774 footing drain previously discharged to the north of Building 774 toward Walnut Creek.[3]

Six underground process waste storage tanks, in use since the late 1950s were removed from south of Building 774 in 1972 (PAC 700-146).[3,4] Physical failure of process waste storage tanks has been one of the major contributors of chemical and radioactive contamination to the soil around Building 774.[5] It is suspected that some minor leakage from these tanks has seeped to the building footing drain tiles.[3,5,6]

On July 21, 1980, an eight-year-old process waste line was discovered leaking southeast of Building 774. Process waste water was observed seeping up in the soil on the south side of the road southeast of Building 774. The leaking process waste water flowed down slope and through a 30-foot culvert, along the est chain-link fence, and under the fence at the corner. From this point, the liquid flowed under the unpaved access road into a boggy area north of Building 774. The vegetation in the boggy area was damaged where the spilled liquid formed a pool. It was estimated that approximately 1,000 gallons had leaked from the process waste line.[7]

There are two steel 8,000-gallon aboveground condensate receiving tanks located adjacent to the southeast of the Building 771/774 footing drain outfall. The two tanks are located on a concrete slab and have badly corroded bottoms. The tanks held "clean" condensate from an evaporative waste concentration system formerly used in Building 774. The condensate was tested for the absence of radioactive contamination and then released into a swampy area to below the tanks. The tanks have been out of service as condensate receiving tanks since approximately 1980. The western condensate tank presently receives overflow and precipitation runoff from the bermed area surrounding the sodium hydroxide tank (PAC 700-139.1(N)). The bermed area directs flow through a pipe and into the western condensate receiving tank.[4] One June 22, 1987, and again sometime around 1988, the sodium hydroxide tank north of Building 774 was overfilled.[4,8] In the June 1987 incident, approximately 100 gallons of the liquid caustic soda overflowed. The caustic spilled inside the bermed area beneath the tank drained to the caustic catch tank (western condensate receiving tank).[8]

In the general area where the footing drains discussed above daylight, a storm drain from the area on the south side of Buildings 771 and 774 also daylight. Any releases to the soil surface in the area serviced by the storm drain (such as transformer spills) could be found in the area of this PAC.[9]

Physical/Chemical Description of Constituents Released

A March 1971 report states that water coming from the footing drains was as high as 500 dpm/l gross alpha activity.[2,10] Water samples taken from the Building 774 footing drain in April 1971 indicated 400 dpm/l plutonium and 800 parts per million nitrate.[11]

Analysis of the spilled water from the July 1980 incident showed 2,500 pCi/l total alpha activity, 4,000 pCi/l gross beta activity, 10,000 mg/l nitrate and a pH of 12.[3]

The western condensate receiving tank contained sodium hydroxide from the June 1987 overflow incident in which the caustic drained from the bermed area.[8]

Flow at the sump currently installed near the Building 771/774 footing drain outfall was estimated in September 1990. Measurements indicated the flow from this area to be on the order of 1.2 to 1.3 gpm. Between March 1988 and June 1990, water samples collected from the 771/774 Footing Drain Pond were analyzed and found to fall within the following ranges for the indicated analytes:

Nitrate/Nitrite	5.7 - 23.8 mg/l
Nitrate	76.7 - 105.4 mg/l
Gross Alpha Activity	0 - 83 pCi/l
Gross Beta Activity	7 - 46 pCi/l
Plutonium	0.01 - 0.24 pCi/l
Americium	0.0 - 0.23 pCi/l
pH	7.0 - 8.45.[1]

Similarly, in the summer of 1991 PCBs were identified in the vicinity of this PAC. It is believed that these PCBs originated from PAC 700-1112.[9]

Responses to Operation or Occurrence

In approximately 1975, a control structure was installed at the Building 771/774 footing drain outfall pond which consisted of a wet-well with a submersible pump. The pump would remove water from the area of the pond and pump the water to Solar Evaporation Pond 207C. This wet-well was connected to the solar pond Interceptor Trench Pump House (ITPH) system when the ITPH system was installed in 1981 (see PAC 000-101). Water from this wet-well sump now flows by gravity to the ITPH where it is pumped to Solar Pond 207B-North.[1]

The initial response to the July 1980 incident was to stop the flow through the waste line causing the leak to stop. When the soil dried, a FIDLER survey was conducted to determine the extent of resulting contamination. On July 24, 1980, the broken waste line was excavated and the problem identified as a loose flange.[3]

In response to the June 1987 incident, Waste Operations Engineering submitted an Engineering Job Order to replace the deteriorating caustic catch tank T-108 (western condensate receiving tank). The accumulation of the rain water and caustic in the western condensate tank was sampled and it was determined to pump the solution to the sanitary sewer system or to Building 774 for processing, depending on the results of the sample analysis.[8]

Fate of Constituents Released to Environment

Following the July 1980 incident, a FIDLER survey was conducted and verified that the flow of process waste water did not extend beyond the boggy area to the north of Building 771.[3]

From approximately 1975 to 1981, water was pumped from the wet-well installed at the 771/774 Footing Drain Pond to Solar Pond 207C. Following the installation of the ITPH system, the water from the wet-well was collected by the ITPH system and discharged to Solar Pond 207B-North.[1]

Comments

The 771/774 Footing Drain Pond is also referred to as Bowman's Pond in some documents.

References

[1] 1503441
[2] 1600119
[3] 1500755
[4] 1503448
[5] 1601057
[6] 1500833
[7] 1600424
[8] 1501824
[9] Personal Communication, J.P. Koffer, RFP Employee, January 20, 1992.
[10] 1501081
[11] 1500572

Other References of Interest

1500303
1500304
1500321
1500359
1500370
1500440
1500445
1500452
1500547
1500572
1500575
1500576
1500577
1500628
1500883
1500927
1500954
1500960
1501788
1600585
1600830
1700155

PAC REFERENCE NUMBER: 700-1109

IHSS Reference Number: Not Applicable

Unit Name: Uranium Incident - Building 778

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

June 2, 1988

Description of Operation or Occurrence

A piece of uranium metal was found on the ground near a dumpster between Building 778 and Building 729.

Physical/Chemical Description of Constituents Released

A depleted uranium disk one inch in diameter and one half inch high came in contact with the outside environment.

Responses to Operation or Occurrence

The piece of uranium was transported to Building 776 where it was determined to be depleted uranium. The piece of uranium was then transported to a Building 779 Nuclear Material Control custodian where it was stored in a 55-gallon drum. The site where the uranium was found was surveyed and found to have counts within the background level.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

On March 9, 1988, a piece of uranium was found in Room 107 of Building 779 in a desk (see Appendix F). It is conceivable that the piece of uranium which was found outside Building 779 is related to the piece of uranium found inside the building.

It is likely that no detectable radioactivity was released into the environment at the location the piece of depleted uranium was found.

References

[1] 1500831

Other References of Interest

1508321

PAC REFERENCE NUMBER: 700-1110

IHSS Reference Number: Not Applicable

Unit Name: Nickel Carbonyl Burial West of Building 771

Approximate Location: N751,000; E2,083,500

Date(s) of Operation or Occurrence

September 11, 1957[1] - June 18, 1957[2]

Description of Operation or Occurrence

On September 11, 1957, a fire occurred in Building 771. The fire soon spread to the box exhaust booster filters and the main filter plenum.[1] Canisters were stored in the anteroom outside the exhaust filter plenum of Building 771 at the time of the fire. During the fire seven nickel carbonyl cylinders were moved from the anteroom to a storage position in the Pipe Shop area. Fourteen nickel carbonyl cylinders were found in the exhaust filter plenum about twenty feet from the west end of the plenum. Several of these cylinders were found burning around the top. The burning cylinders were sprayed with water. The cylinders were loaded into waste barrels, four cylinders to each barrel, and the barrels were filled with vermiculite. The barrels were carted to the access shaft and lifted out with a crane. A burial pit was excavated to the north of the access shaft and the barrels were lifted from the access shaft to the burial pit. The drums were filled with water before the lids were replaced.[3]

Physical/Chemical Description of Constituents Released

Nickel carbonyl was the constituent released to the environment.

Responses to Operation or Occurrence

Four 55-gallon drums, one GI can with two cylinders, and six loose cylinders of nickel carbonyl were removed from the burial pit west of Building 771 to a pit east of the Solar Evaporation Ponds (PIC-48). Explosives charges were used to destructively vent the cylinders and ignite any residual gas.[2]

Fate of Constituents Released to Environment

No documentation was found which further details the fate of the constituents released to the environment.

Comments

None.

References	Other References of Interest
[1] 1500772	1500914
[2] 1600236	1601057
[3] 1501771	1600104
[4] 1500886	

PAC REFERENCE NUMBER: 700-1111

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformer - Building 750

Approximate Location: N750,000; E2,084,500

Date(s) of Operation or Occurrence

Prior to 1987[1]

Description of Operation or Occurrence

Transformer 750-1 is located on the northeast side of Building 750 approximately 80 feet from a cafeteria entrance.[1,3] In August 1985, the transformer serving Building 750 was reported as a potential PCB "exposure risk to food or feed."[3] The exposure risk was related to a small crack in the dike surrounding the transformer and the transformer's proximity to a cafeteria entrance.[2] According to interviews with RFP Utilities personnel, this transformer leaked dielectric fluid containing PCBs prior to 1987.[1]

Physical/Chemical Description of Constituents Released

It was reported that Transformer 750 contained 465 gallons of PCB fluid weighing 2,533 kilograms.[4,5,6,7,8,9] In October 1985, it was reported that Transformer 750 contained PCB fluid exclusively.[10] Oil containing PCBs was released from the transformer.[1]

Responses to Operation or Occurrence

In August 1985, it was recommended that the dike surrounding the transformer be sealed. In January 1986, it was anticipated that Transformer 750 would be removed and replaced under the fiscal year 1986 Environmental Hazards Elimination project.[11] In March 1989, it was reported that the transformer had been replaced under the Environmental Hazards Elimination Project.[12] In 1987, the transformer was retro-filled and relocated on a new pad several feet to the east of its previous location.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700060
[3] 1700059
[4] 1700063
[5] 1700072
[6] 1700082
[7] 1700083
[8] 1700085
[9] 1700084
[10] 1700062
[11] 1700065
[12] 1700129

Other References of Interest

1700053
1700054
1700057
1700068

PAC REFERENCE NUMBER: 700-1112

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformer - 776-5

Approximate Location: N750,000; E2,084,500

Date(s) of Operation or Occurrence

June 1986 to August 1989

Description of Operation or Occurrence

Transformer 776-5 is located west of Building 714. The 1500 KVA transformer was manufactured in 1969.[1] In June 1986, Transformer 776-5 was reported as leaking.[2]

Physical/Chemical Description of Constituents Released

The dielectric fluid of Transformer 776-5 contains 807 ppm PCBs.[2,3,4,5,6] Transformer 776-5 contains 305 gallons of dielectric fluid.[5] The same transformer has also been reported to contain 308 gallons of dielectric fluid.[1]

Responses to Operation or Occurrence

Transformer 776-5 was scheduled for cleanup to take place on August 12, 1989.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Transformer 776-5 may also be referred to as 714-1 due to its location indicated by reference 1 as west of Building 714. Transformer 714-1 is located 70 feet south of Building 771 on a concrete pad.[7]

Transformer 776-5 is also referred to as Transformer 771-3.[4] Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700063
[2] 1700074
[3] 1700062
[4] 1700027
[5] 1700129
[6] 1700072
[7] 1503365

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3.12 800 Area

The 800 Area is located in the southeast area of the RFP. It is bounded to the east by the 900 Area, the south by the southeast buffer zone, the west by the 600 Area and the north by the 700 Area. The buildings in this area are all located within a security fenced exclusion area. The more important buildings located within this area as are follows.

- Building 865 was placed into service in 1972. This building is used for material processing and development work which includes fabrication, processing and testing of metal parts. Depleted uranium and beryllium are processed in this building.

- Building 881 was placed into service in 1953. This building was an enriched uranium components production building. The building also contained a laundry, an analytical laboratory and facilities for chemically recovering enriched uranium from manufacturing wastes. In the mid-1960s, all enriched uranium manufacturing activities ceased and Building 881 was converted to a nonradioactive metals fabrication facility. This work involved mainly stainless steel component production activities. This activity began in approximately 1969. In 1984 this process was transferred to Building 460. Building 881 currently houses various technical support, analytical, plant support, and administrative functions. The General Chemistry Laboratory conducts analyses to determine chemical composition of or presence of impurities or hazardous substances in process wastes, surface waters or products from vendors. Other facilities include fabrication shops, research and development, computer systems, maintenance and utilities.

- Building 883 was put into service in 1957. At that time there were two parallel uranium fabrication operations that involved the use of presses, rolling mills and annealing furnaces. One operation was for enriched uranium fabrication and the other for depleted uranium fabrication. The enriched uranium work was discontinued in the mid-1960s. Beryllium ingots were also rolled into sheet material and acid etched in this building. Beryllium machining occurred in the building from the mid 1960s through mid 1970s. Currently, processes in Building 883 are mainly operations that prepare metals for additional processes in Building 883 and at RFP. Parts are cleaned, rolled, formed, swaged, sheared, bent, and grit blasted before they can be further used by machining and production processes.

- Building 886 was put into service in 1965. Building 886 contains the Critical Mass Laboratory where criticality experiments are performed. The building also houses offices and a small electronics/machine shop. Enriched uranium solutions and solid enriched uranium and plutonium metal have been used in this building.

- Building 889 was placed into services in 1966. Building 889 houses decontamination and waste reduction operations for wastes originating outside the PA. Wastes entering Building 889 include surplus equipment which may be decontaminated by steam cleaning for reuse on site or sale offsite. HEPA filters, combustible wastes, and not reusable equipment are compacted, placed in crates, and shipped offsite for disposal.

The 800 Area also includes an office building, a paint supply storage building and process and sanitary waste collection buildings.

The following subsection contains detailed descriptions of PACs located in the 800 Area. These PACs are shown in Figure 800-1.

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PAC REFERENCE NUMBER: 800-102

IHSS Reference Number: 102, Operable Unit 1

Unit Name: Oil Sludge Pit

Approximate Location: N747,500; E2,084,000

Date(s) of Operation or Occurrence

1958[1]

Description of Operation or Occurrence

In 1958, thirty to fifty drums of nonradioactive materials were dumped in a pit south of Building 881.[1] The site may be located south of the security fence on the hillside and the dimensions are estimated to be about 25 feet by 50 feet.[1] The Draft Phase III RFI/RI Work Plan locates it 500 feet south of Building 881 with dimensions of 40 feet by 70 feet. It also states that it is visible in 1955 aerial photographs.[2] The RCRA 3004(u) Report identifies the pit as being 180 feet south of the building and having dimensions of 50 feet by 80 feet.[3]

Physical/Chemical Description of Constituents Released

The pit was filled with material consisting of oil sludge from tank cleanouts.[1] It is not known if one tank was involved or several, although one of the tanks involved may have stored Number 6 fuel oil.[4] It is possible that the tanks are the underground storage tanks which are discussed in PAC 800-105.1 and PAC 800-105.2. No radioactivity was thought to be involved.[1]

Responses to Operation or Occurrence

The pit was backfilled when disposal operations ceased. The corners of the pit were marked;[1] however, on a site visit conducted November 21, 1991 no evidence could be found of such markings.[5]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents releases to the environment specifically related to this occurrences.

This IHSS is being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

No documentation was found which verifies the existence of this site. Interviews were conducted on November 11, 1991[6] and December 4, 1991[7] with RFP personnel who were employed at the time of the incident; however, they could not recall any such dumping.

It is likely that the visual evidence found in a 1955 aerial photograph which was discussed in the Draft Phase III RI/FS Work Plan was Pond 7 or Pond 8 as discussed in PAC SE-1600. The only documentation found restated information initiated in the Owen/Steward Report (reference 1501067). This report included a map which locates the pit as it has been drawn on Plate 2.

References

[1] 1500737
[2] 1502701
[3] 1502735
[4] 1500760
[5] 1503392
[6] 1503378
[7] 1503379

Other References of Interest

1600463
1500754
1501067
1501999
1502701

PAC REFERENCE NUMBER: 800-103

IHSS Reference Number: 103, Operable Unit 1

Unit Name: Chemical Burial

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

Date(s) of Operation or Occurrence

Unknown.

Description of Operation or Occurrence

There is an area south of Building 881 that was reportedly used to bury unknown chemicals.[1,2]

Physical/Chemical Description of Constituents Released

References state that "unknown" chemicals were buried.[1,2]

Responses to Operation or Occurrences

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

No documentation was found which verifies the existence of the site. Personnel who were employed by RFP during the time frame related to this site were interviewed. They could recall no such incidents of dumping as close to Building 881 as indicated on the IAG map.[3,4] It is possible that previous reports may have confused this site with Trench T-2 farther east (PAC 900-109). Trench T-2 is believed to have been used for the dumping of liquid chemicals. Because the existence of PAC 800-103 is questioned and is believed to be coincident with PAC 900-109, this PAC is not included on Plate 2 or Figure 800-1.

References	Other Reference of Interest
[1] 1503735	1500754
[2] 1501999	1700805
[3] 1503378	1502701
[4] 1503379	

PAC REFERENCE NUMBER: 800-104

IHSS Reference Number: 104, Operable Unit 1

Unit Name: Liquid Dumping

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

Date(s) of Operation or Occurrence

Prior to 1969[1]

Description of Operation or Occurrence

The CEARP Phase 1 report indicates that an area east of Building 881 was used for disposal of unknown liquids and drums. This report does not resolve the exact location of the pit or its dimensions.[1]

Physical/Chemical Description of Constituents Released

The types of liquids that were dumped here could not be determined from available documentation.

Responses to Operation or Occurrence

No documentation was found which indicated response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

No documentation was found which verifies the existence of the site. Personnel who were employed by RFP during the time frame related to this site were interviewed. They could recall no such incidents of dumping this close to Building 881.[3,4] They concluded the previous reports may have confused it with Trench T-2 farther east (PAC 900-109). Trench T-2 is believed to have been used for the dumping of liquid chemicals. Because the existence of PAC 800-104 is questioned and is believed to be coincident with PAC 900-109, this PAC is not included on Plate 2 or Figure 800-1.

References

[1] 1501999
[2] 1502701
[3] 1503378
[7] 1503379

PAC REFERENCE NUMBER: 800-105.1 - 800-105.2

IHSS Reference Number: 105.1 - 105.2, Operable Unit 1

Unit Name: Building 881 Westernmost and Easternmost Out-of-Service Fuel Tanks

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

Date(s) of Operation or Occurrence

1958 to 1976[1]

Description of Operation or Occurrence

Interviewees for the CEARP Phase 1 document mentioned that asbestos was placed in two underground, out-of-service tanks located south of Building 881. The tanks were later filled with concrete.[2]

Physical/Chemical Description of Constituents Released

The tanks were used to hold diesel fuel. They were later filled with concrete and asbestos.[2]

Responses to Operation or Occurrence

No documentation was found which detailed a response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents released to the environment. These IHSSs are being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

The 881 Hillside Oil Leak (PAC 800-107) may have been caused by leakage from these tanks. Surface drainage from this area is expected to flow towards Woman Creek or the South Interceptor Trench.

References

[1] 1502701
[2] 1501999

Other References of Interest

1502735
1500754
1700805

PAC REFERENCE NUMBER: 800-106

IHSS Reference Number: 106, Operable Unit 1

Unit Name: Outfall

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

Date(s) of Operation or Occurrence

Early 1950s - December, 1977 (Date of last documented discharge)[1]

Description of Operation or Occurrence

In the 1950s and 1960s the intermittent discharging of untreated sanitary waste took place in an area south of Building 881.[1,2] Although this practice was halted, the outfall continued to be used for discharges of cooling water blowdown into the late 1970s.[3] The outfall was originally described as a six-inch diameter vitrified clay pipe; however, a site visit conducted on November 21, 1991 revealed that the pipe is made of iron.[4] It originates from Building 887 and through water quality analysis was determined to be the clean-out pipe for an overflow line from Building 881 cooling tower.[5] Effluent was found discharging from this outfall onto the hillside on December 22, 1977.[3] No liquid was discharging from the pipe in 1991.[4]

Physical/Chemical Description of Constituents Released

Discharges occurring in the 1950s consisted of untreated sewage and any other waste that may have entered the sanitary system of Building 881. It is uncertain when these discharges began or ended.[1] In 1955, sampling revealed the presence of colon organisms and high bacteria counts in Woman Creek below Building 881 east to the cattle fence. Radioactivity was not found above background levels but bacterial counts at the outfall and at the cattle fence on Woman Creek were both high.[1] Sampling at the outfall in 1971 (known at that time as the sewage lift station) indicated activities of 1.05 and 0.30 dpm/g.[6]

The 881 Hillside Remedial Investigation Report Draft (July 1, 1987) indicated that there was a small pond below the outfall. (No pond was present in 1991.[4]) A sample taken from the pond on May 26, 1987 indicated plutonium and americium levels of 0.69 pCi/l and 0.18 pCi/l, respectively. No other hazardous substances were found in the sample.

Responses to Operation or Occurrence

Concern was raised about the outfall because the discharge was allowed to enter Woman Creek. Several small retention ponds were built in 1955 (PAC SE-1600, PAC SE-1601.1 and PAC SE-1601.2) and an interceptor ditch was built in 1979 which would carry the outfall water to Pond C-2 (PAC SE-142.10 and PAC SE-142.11).[7] Surface water samples have been taken at all of these locations in addition to ground water samples from monitoring wells in the vicinity in the course of recent work on OU1.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

Available information indicates that old Pond 7 (PAC SE-1600) was located at the end of the pipe corresponding to this PAC.

References

[1] 1600372
[2] 1601046
[3] 1500974
[4] 1503392
[5] 1502735
[6] 1500883
[7] 1503447

Other References of Interest

1501081
1500304
1600558
1501999
1700473
1700805
1600119

PAC REFERENCE NUMBER: 800-107

IHSS Reference Number: 107, Operable Unit 1

Unit Name: Building 881 Hillside Oil Leak (IAG Name: Hillside Oil Leak)

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

Date(s) of Operation or Occurrence

1973

Description of Operation or Occurrence

On May 29, 1973 oil was discovered flowing from the slope south of Building 881. An investigation was initiated to discover the source of the oil in order to stop the flow to Woman Creek. Oil was also found in a 60-inch diameter standpipe that was located just south of the security fence. The water on which the oil was floating was first traced back to a outfall culvert 300 feet south of the security fence which was later found to be the footing drain from Building 881.[1]

It was first thought that the oil was coming from leaks in two out-of-service storage tanks (PAC 800-105.1 and PAC 800-105.2) since the footing drain passes directly under the tanks. The tanks and lines were tested and no leaks were detected. The pipes that carry the oil from the tanks to the building's furnace lay within a concrete-lined trench which has a drain hole in it. It was postulated that oil spills occurring during the filling of the tanks flowed out the drainhole into the underlying gravel. After 20 years of usage an underground reservoir of waste oil developed to an extent that it started seeping out of the hillside.[1]

Physical/Chemical Description of Constituents Released

The tanks in question have since been filled with concrete and asbestos (PAC 800-105.1 and PAC 800-105.2). It is possible that the oil originated from these tanks. Another theory is that the oil may have originated from the oil sludge pit that is also located in this area (PAC 800-102).[3] Groundwater data indicated the presence of volatile organic compounds (VOCs) in monitoring wells along the hillside.[4] There have also been known releases and burial along this hillside including plutonium contaminated soil, multiple solvent spills, and other unknown chemicals.[2]

The 881 Hillside Remedial Investigation Report Draft (July 1, 1987) indicated that elevated levels of PCE (128 ppb) and TCE (14 ppb) were found in water samples taken from the north end of the skimming pond.

Responses to Operation or Occurrence

The underground fuel tanks and associated lines were leak tested with negative results. The oil was soaked up with straw which was later deposited in the present landfill (PAC NW-114). A concrete "skimming pond" was constructed to contain the oil flowing from the footing drain and an interceptor ditch was constructed to prevent to water from reaching Woman Creek. Groundwater monitoring wells were installed to identify the extent of contamination. Wells to the west have indicated the presence of volatile organic compounds and radionuclides.[1]

RFP photographs document soil removal from this site.

Fate of Constituents Released to Environment

Originally groundwater and surface water would flow directly to Woman Creek and be detained at Pond C-1 (PAC SE-142.10). After 1979, the drainage from the hillside was captured by the interceptor trench and carried to Pond C-2 (PAC SE-142.11).[6]

This IHSS is being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

None.

References

[1] 1501244
[2] 1501999
[3] 1500749
[4] 1500768
[5] 1800307
1800308
1800309
1800310
1800311
1800312
1800313
1800314
1800315
[6] 1503447

Other References of Interest

1502735
1601057
1700805
1502701

PAC REFERENCE NUMBER: 800-145

IHSS Reference Number: 145, Operable Unit 1

Unit Name: Sanitary Waste Line Leak

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

Date(s) of Operation or Occurrence

January 1981

Description of Operation or Occurrence

On January 21, 1981 the sanitary waste line was found to be leaking on the hillside south of Building 881.[1] From utility drawings it has been determined that the line in question is probably the 6-inch diameter, cast iron sanitary sewer line that originates at the Building 887 Lift Station.[2] This contradicts the RCRA 3004(u) document which stated that the line was a 4-inch cement-asbestos pipe. No documentation was found which indicates this type of pipe.[2]

Physical/Chemical Description of Constituents Released

The sanitary waste line was used from about 1969 to 1973 to transport radioactive laundry effluent.[3]

Responses to Operation or Occurrence

Liquid from the leak was contained by a dirt dike to prevent drainage to the South Interceptor Ditch and Woman Creek.[1,3] The waste line was repaired as of January 30, 1981.[4]

Fate of Constituents Released to Environment

No documentation was found which details the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule of OU1. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 4, 1993.

Comments

None.

References

[1] 1501188
[2] 1503391
[3] 1502735
[4] 1501187

Other References of Interest

1501999

PAC REFERENCE NUMBER: 800-147.2

IHSS Reference Number: 147.2, Operable Unit 12

Unit Name: Building 881 Conversion Activity Contamination (IAG Name: Owen Area)

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

Date(s) of Operation or Occurrence

1964 - 1966

Description of Operation or Occurrence

No documentation was found which detailed when items were first stored to the northeast of Building 881. Interviews with former RFP employees indicate that miscellaneous equipment was stored in this area such as lathe parts and rolling mill parts.[1] The equipment may have been stored there during the conversion activities that took place in Building 881 in 1964.[2]

Aerial photographs show items in this area as early as 1964[3] and again in 1966.[4] By 1969, the area had been covered by a parking lot.[4] The site is located about 250 feet east of Building 883 and 450 feet south of Central Avenue. It measures approximately 50 feet by 150 feet.[3]

Physical/Chemical Description of Constituents Released

Interviews with former RFP employees indicate that it was possible that some of this equipment may have been contaminated with beryllium and/or enriched or depleted uranium; however, the activity levels would not have been high.[1]

Responses to Operation or Occurrence

No documentation was found which details a response to this operation.

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU12. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterization, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 15, 1994.

Comments

No documentation could be found that indicates a release due to conversion activities in the location given in the IAG; therefore, it is proposed that the PAC location be moved to the storage area indicated in aerial photographs. HRR information indicates that the area should be located farther north and east of where it is located on the IAG IHSS map.

References

[1] 1503378
[2] 1500382
[3] 1502717
[4] 1502712

Other References of Interest

1501999
1601057
1502735

PAC REFERENCE NUMBER: 800-164.2

IHSS Reference Number: 164.2, Operable Unit 14

Unit Name: Radioactive Site 800 Area Site No. 2 Building 886 Spills

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

Date(s) of Operation or Occurrence

1965 - 1989

Description of Operation or Occurrence

Since the occupancy of Building 886 in 1965, the area has been a source of concern for possible soil infiltration.[1] The Summary of Events (Appendix F) indicates a contamination release on June 9, 1969. No details are given. On September 26, 1989 a 500 gallon stainless steel portable tank was found leaking a colorless liquid from its drain valve onto the concrete, creating a wet spot about 5 inches in diameter.[2]

Physical/Chemical Description of Constituents Released

Building 886 is a facility for Nuclear Safety Research and Development. The soil under and around the building is contaminated from uranium spills.[1,2]

Responses to Operation or Occurrence

A radiation monitoring survey resulted in direct counts of 650 counts per minute and 12 to 24 disintegrations per minute on a smear.[1,2] This was considered low level contamination. The valves were tightened, decontaminated, bagged and readied for shipment to Size Reduction Operations in Building 776.[3] The concrete was sealed with acrylic paint.[3] Soil samples indicated contamination from uranium.[4,5] Contamination was removed from the concrete.[2]

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU14; however, information gathered for the HRR indicated that the location may not be correct. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

It is proposed that the boundaries of this IHSS be enlarged to include the western portion of Building 886.

References

[1] 1601057
[2] 1501733
[3] 1501734
[4] 1501748
[5] 1600446

Other References of Interest

1502735
1600445
1700805

PAC REFERENCE NUMBER: 800-164.3

IHSS Reference Number: 164.3, Operable Unit 14

Unit Name: Radioactive Site 800 Area Site #2, Building 889 Storage Pad

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

Date(s) of Operation or Occurrence

1966 - Present

Description of Operation or Occurrence

Building 889 is a decontamination facility that was first occupied in 1969. A storage pad north of the building was used to store uranium-contaminated equipment and contaminated drums prior to decontamination.[1] The same document mentions an area to the west that was used for the same purpose. A radioactive survey supports the fact that there was contamination at this western location.[2]

Two incidents occurred at Building 889 which involve contaminated drums. On June 16, 1982, a waste drum spontaneously ignited and on July 20, 1984 a chip fire started in an improperly packed drum (see Appendix F). Another incident occurred in September 1983 when nine machine tools were stored outside waiting for decontamination. The plastic sheeting that was covering the equipment had blown off, possibly allowing contamination to spread.[3]

Building 884 was constructed in 1958 as a storage facility for Building 883. It is currently used as mixed waste storage building. In September 1966, drums were reported to be leaking in the drum storage area outside of this building. Approximately 700 square feet of soil and rocks were contaminated.[4] It is thought that this is referring to a storage area east of Building 884 which was used prior to the construction of Building 889.

Physical/Chemical Description of Constituents Released

Some drums that contained hazardous or nonhazardous environmentally safe waste were sent to Building 889 for decontamination and reuse.[5] The drum incidents in 1982 and 1984 involved uranium chip fires.

Responses to Operation or Occurrence

No contamination was reported to have been released when the drum caught fire in 1982. No documentation was found which detailed responses related to the incidents in 1983 or 1984.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU14. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is incomplete. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by May 23, 1995.

Comments

It is proposed that the boundaries of this PAC be extended west to include Building 884 and the contaminated area discovered by the Radiometric Survey and to the south to include Building 889.

The Radiometric Survey (1977 to 1984) was conducted to detect extremely contaminated areas, i.e. areas with FIDLER reading between 500,000 and 1,000,000 pCi/l plutonium.[6] No areas of highly contaminated areas were found in this area.

References

[1] 1601067
[2] 1700194
[3] 1700457
[4] 1600052
[5] 1501820
[6] 1503370

Other References of Interest

1502735
1500754
1700805
1503449

PAC REFERENCE NUMBER: 800-177

IHSS Reference Number: 177, Operable Unit 10

Unit Name: Building 885 Drum and Paint Storage (IAG Name: Building 885 Drum Storage Area)

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

Date(s) of Operation or Occurrence

1953 - Present

Description of Operation or Occurrence

The Building 885 Drum Storage Area was first used in 1953 when Building 881 was first occupied and continues today as a RCRA 90-day accumulation area. The storage area occupies two sections of Building 885 which is located south of Building 881. The western portion of the building is exposed to the north and the eastern section is exposed to the north and east. Between the two sections is a completely enclosed area that is used for paint storage. The two exposed regions measure approximately 20 by 10 feet. Both have concrete floors but there are no berms around the storage areas. Both sections have drums stored on pallets and are used as satellite collection stations.[1]

In 1972, the drain water from the sump that drains the floor of Building 885 was found to have a temperature of 150 degrees Fahrenheit. The cause of the elevated temperature is unknown as is the source and destination of the liquid.[3]

Building 885 has been known to have "poor housekeeping" conditions in the past. Paint cans and drums were stored haphazardly and rainwater was allowed to flow through the building. Any spilled organics would have been carried outside of the building.[2]

The Summary of Events (Appendix F) indicated the inadvertent dumping of radioactive contaminated oil sludge into an open top dumpster located at Building 885. It is not clear if their was a release to the environment.

Physical/Chemical Description of Constituents Released

Drums contain waste oil, waste paints, waste solvents, and low level radioactive waste. There have been no documented releases.[1]

Responses to Operation or Occurrence

This area was studied as part of the Remedial Investigation for the 881 Hillside. No volatile organics were detected in soils adjacent to this area. Housekeeping conditions were improved.[2]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

This IHSS is being studied in accordance with the IAG schedule of OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

The boundaries of this PAC were modified from the IAG map. The IAG map boundaries include most of the area south of Building 881 and north of the access road. The boundaries now reflect the area that is and has been used for drum and paint storage. There is no indication from the documents and photographs reviewed that storage of these materials took place within the area indicated in the IAG map boundaries for this PAC.

References

[1] 1502689
[2] 1501255
[3] 1500632

Other References of Interest

1502735
1700805

PAC REFERENCE NUMBER: 800-178

IHSS Reference Number: 178, Operable Unit 15

Unit Name: Building 881 Drum Storage Area

Approximate Location: N748,000; E2,083,000

Date(s) of Operation or Occurrence

1953 - Present[1]

Description of Operation or Occurrence

The Building 881 Drum Storage Area was first used in 1953 when Building 881 operations began and is currently used as a RCRA 90-day accumulation area. The storage area is in Room 165 and measures 5 feet by 5 feet. The maximum number of 55 gallon drums stored there is five. They are stored directly on the floor with no berms around the drums.[1]

Physical/Chemical Description of Constituents Released

The drums contain volatile organic compounds and possibly radioactive waste. There have been no documented releases.[1]

Responses to Operation or Occurrence

No documentation was found that indicates a release to the environment.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule of OU15. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI is to be completed by January 4, 1995.

Comments

This site was located in the IAG to include all of Building 881. It is proposed that the PAC boundaries be changed to include only Room 165.

References

[1] 1502735

Other Reference of Interest

1502735

PAC REFERENCE NUMBER: 800-179

IHSS Reference Number: 179, Operable Unit 15

Unit Name: Building 865 Drum Storage Area

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

Date(s) of Operation or Occurrence

1970 - Present[1]

Description of Operation or Occurrence

The Building 865 Drum Storage Area was first used in 1970 and is currently used as a RCRA 90-day accumulation area. The storage area is in Room 145 and measures 12 feet by 8 feet. The maximum number of 55 gallon drums stored there is ten. They are stored directly on a concrete floor with no berms or floor drains.[1]

Physical/Chemical Description of Constituents Released

The drums stored there today contain volatile organic compounds, beryllium, and radioactive waste. In the past, chlorinated solvents were also stored there. There have been no documented releases and, based on a visual inspection in November of 1986, there was no visual evidence of spills.[1]

Responses to Operation or Occurrence

No documentation was be found that details any response to this operation.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule of OU15. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI is to be completed by January 4, 1995.

Comments

The need for a 90-day accumulation point in this area is currently under review.[1] The site was located in the IAG to include all of Building 865. It is proposed that the PAC boundaries be changed to include only Room 145.

References

[1] 1502689

Other Reference of Interest

1502735

PAC REFERENCE NUMBER: 800-180

IHSS Reference Number: 180, Operable Unit 15

Unit Name: Building 883 Drum Storage Area

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

Date(s) of Operation or Occurrence

1981 - Present[1]

Description of Operation or Occurrence

The Building 865 Drum Storage Area was first used in 1981 and is currently used as a RCRA 90-day accumulation area. The storage area occupies Room 104 which measures 16 feet by 10 feet. The maximum number of 55 gallon drums stored there is thirty. They are stored directly on a concrete floor with no berms or floor drains.[1]

Physical/Chemical Description of Constituents Released

The drums stored there contain waste oils that are usually contaminated with solvents and uranium. Analytical results have indicated the presence of volatile organic compounds, 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.[1]

Responses to Operation or Occurrence

No documentation was found that details any response to this operation.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule of OU15. However, the information developed on this unit for this study indicates that the IHSS location presented in the IAG is inaccurate. The IAG activities will include site investigation, site characterization, and possible site remediation. The Final Phase I RFI/RI is to be completed by January 4, 1995.

Comments

The site was located in IAG to include all of Building 883. It is proposed that the PAC boundaries be changed to include only Room 104.

References

[1] 1502389

Other Reference of Interest

1502735

PAC REFERENCE NUMBER: 800-211

IHSS Reference Number: 211, Operable Unit 15

Unit Name: Building 881 Drum Storage, Unit 26

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

Date(s) of Operation or Occurrence

1981 - Present

Description of Operation or Occurrence

The Building 881 Drum Storage Area was first used in 1981 and is used today as a 90-day accumulation area. The storage area is in Room 266B which measures 20 feet by 10 feet. The concrete floor is sealed with epoxy paint and the concrete walls are sealed with a latex paint.[1]

Physical/Chemical Description of Constituents Released

Stored drums contain mainly laboratory process wastes. They consist of low level radioactive wastes including combustibles, metal and glass, and combustible hazardous wastes.[1]

Responses to Operation or Occurrence

No documentation was found that details any response to this operation.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule of OU15. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 4, 1995.

Comments

The site was located in IAG to include all of Building 881. It is proposed that the PAC boundaries be changed to include only Room 266B.

References

[1] 1502734

PAC REFERENCE NUMBER: 800-217

IHSS Reference Number: 217, Operable Unit 15

Unit Name: Building 881 Cyanide Bench Scale Treatment, Unit 32

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

Date(s) of Operation or Occurrence

1986 - September 1988

Description of Operation or Occurrence

Room 131C in Building 881 was a hazardous waste treatment facility. The bench scale treatment which occurred there involved the analysis of the laboratory wastes for cyanide content by using a cyanide still. Wastes from the analysis were collected in four liter polyethylene bottles that usually took about two months to fill. The contents of the bottles were reacted with sodium or calcium hypochlorite to oxidize the cyanide to cyanate. Once neutralization was complete, the contents of the bottle were poured down the process waste drain for transport to Building 374 for further treatment.[1]

Physical/Chemical Description of Constituents Released

The waste involved laboratory waste containing cyanide.[1] No documentation was found which indicated a release to the environment.

Responses to Operation or Occurrence

No documentation was found which detailed a response to this operation.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule of OU15; however, the information gathered for the HRR indicates that the location is misleading. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 4, 1995.

Comments

In is proposed that the boundary of this IHSS be changed to include only Room 131C.

The need for this unit ceased when operations changed.

References

[1] 1502734

Other References of Interest

1502691
1503449

PAC REFERENCE NUMBER: 800-1200

IHSS Reference Number: Not Applicable

Unit Name: Valve Vault 2

Approximate Location: N749,000; E2,084,000[1]

Date(s) of Operation or Occurrence

April 25, 1989

Description of Operation or Occurrence

During a routine inspection of Valve Vault 2 on April 25, 1989 liquid was discovered in the leak detection collection bottle.[2] The bottle was also leaking; therefore, the alarm was not sounded.[3] The leak was coming from the south process transfer line which consists of a three-inch PVC schedule-80 pipe inside a six-inch polyethylene chase pipe (containment pipe).[4] A pH check of the liquid indicated that the inner pipe, which originates from waste tanks in Building 883, was leaking.[4] Three discharges had occurred through this line since the vault was last inspected (March 14, 1989), at which time no leakage was apparent.[3]

Physical/Chemical Description of Constituents Released

Building 883 generates a process waste that is nitric acid and/or rinsate water contaminated with depleted uranium.[6] A pH check of the liquid showed a pH of 1-2.[2] The waste is partially neutralized with roughly equal amounts of a potassium hydroxide solution before it is discharged to Building 374 via Valve Vault 2.[6] Table 800-1 summarizes the maximum potential release to the environment and analytical results from samples taken during the three transfers prior to discovery of the leak.

TABLE 800-1
SUMMARY OF WASTE STREAM FROM BUILDING 883[6]

DATE	TOTAL ALPHA ACTIVITY (pCi/l)	pH	Be (ppm)	ESTIMATED MAXIMUM RELEASE (Gallons)
03/15/89	1.6×10^6	1.5	<0.1	5
03/16/89	3.9×10^7	3.2	<0.1	7 (> 1 lbs radionuclides)
04/13/89	1.7×10^5	14	<0.1	15 (> 100 lbs corrosives)

Responses to Operation or Occurrence

Upon detection of the leak, discharge valves from the waste tanks in Building 883 were closed and locked out. Plumbing changes took place within two days after the leak was detected to insure no more transfers were made through this line.[3] Hydrostatic testing of the inner line began on May 8, 1989 and continued through the month.[2] Removal of the inner line began in May 29 and continued through June 2. Salt encrustations were found at the elbow where the process waste line exits the nitrad pickling operation room.[3]

During the week of June 5-9, 1989 the secondary chase pipe was hydrostatically tested.[4] When it was found to be leaking, the line was inspected by electronic visual imaging on June 15, 1989 to locate the leak.[4] Soil sampling had not begun as of July 31, 1989.[4]

Because the release amounts exceed the reportable quantity, the event was reported to the National Response Center on June 15, 1989.[5] A RCRA Contingency Plan (Implementation Report No. 89-007) was submitted in compliance with 6 CCR 1007-3, Part 265.56(j).[6]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. No sampling had taken place at the time these references were written. It is not known to what extent the environment was affected. Surface drainage and ground water movement would be toward Woman Creek.

Comments

None.

References

[1] 1503391
[2] 1500265
[3] 1500262
[4] 1500264
[5] 1500263
[6] 1700780

Other References of Interest

1500817
1501754
1501755

PAC REFERENCE NUMBER: 800-1201

IHSS Reference Number: Not Applicable

Unit Name: Radioactive Site South of Building 883

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

Date(s) of Operation or Occurrence

1958 - 1981

Description of Operation or Occurrence

Contamination in the area between Buildings 883 and Building 881 is documented as early as 1958. After the plutonium fire in 1957, studies were initiated to determine the spread of contamination. This study was extended to research the impact of Rocky Flats Plant operations on the environment. One particular spot in the 800 area with significant plutonium contamination was located 500 feet east of the 881 Building road and 500 feet north of Building 881 (prior to construction of Building 883).[1]

In 1978, while conducting field surveys during excavation for a telephone line, readings above background were found about 30 feet south of Building 883.[2] Radiometric soil surveys found two other spots, one at the northwest corner of Building 889 and the other at the southeast corner of Building 865.[3]

Physical/Chemical Description of Constituents Released

In 1958, soil samples were taken at the northwest corner of Building 881 and 20 feet west of the building. Analysis indicated total activity of 4.5×10^4 d/m/kg and 1.5×10^5 d/m/kg, respectively, with some plutonium.[1] During the excavation in 1978, the soil samples were found to contain uranium-235.[2]

Responses to Operation or Occurrence

No documentation of cleanup activities was found in response to the 1958 incident. Removal of contaminated soil in two small areas near Building 883 was completed in April of 1981.[4] It is not known if these are the contaminated areas mentioned in 1978.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

No documentation was found which explained these hot spots.

References	Other Reference of Interest
[1] 1700390	1600204
[2] 1600206	1503434
[3] 1700194	1502698
[4] 1501181	1503435

PAC REFERENCE NUMBER: 800-1202

IHSS Reference Number: Not Applicable

Unit Name: Sulfuric Acid Spill, Building 883

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

Date(s) of Operation or Occurrence

October 21, 1985

Description of Operation or Occurrence

A battery fell from a fork lift or truck. Acid was spilled in the middle of the roadway outside Door #11 of Building 883.[1]

Physical/Chemical Description of Constituents Released

Approximately one quart to one-half gallon of sulfuric acid was spilled on the roadway.[1]

Responses to Operation or Occurrence

Sodium bicarbonate was applied to the spill and the area washed down. No radioactive contamination was involved.[1] The battery was disposed of in the present landfill (PAC NW-114).

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1600546

PAC REFERENCE NUMBER: 800-1203

IHSS Reference Number: Not Applicable

Unit Name: Sanitary Sewer Line Break Between Buildings 865 and 886

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

Date(s) of Operation or Occurrence

June 1982

Description of Operation or Occurrence

In June 1982, construction crews broke the sanitary sewer line between Building 865 and Building 886.[1]

Physical/Chemical Description of Constituents Released

An unknown quantity of sanitary sewage waste was released.

Responses to Operation or Occurrence

No documentation was found which indicated that the line was repaired or replaced.

Fate of Constituents Released to Environment

The sewage did not reach the Central Avenue ditch; therefore, it was considered at the time that no impact was made on the downstream ponds.[1]

Comments

None.

References

[1] 1700468

PAC REFERENCE NUMBER: 800-1204

IHSS Reference Number: Not Applicable

Unit Name: Building 866 Spills

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

Date(s) of Operation or Occurrence

1965 (Date of building occupancy) - Present

Description of Operation or Occurrence

Building 886 holds five process waste tanks that service Building 865 and Building 889. Contamination releases originating from the filling of the tanks have been documented.

January, 1978 - Vent Pipe Overflow

A faulty vacuum breaker for a process waste line vent pipe between Building 864 and Building 881 allowed liquid to be released to the environment.[1,2] Apparently gravel caused the vent line to stick open and approximately two gallons spilled onto the ground.[3] About sixteen square feet were affected near the 865 Guard Post.[1,2]

1984 - Tank overflow

A valve was left open while pumping decontamination water to a fill tank in Building 889. When the tank overfilled, the water ran to the sump pump and was then pumped to the process waste tanks in Building 865. These tanks also overfilled and the water passed up through the vent to the roof where it drained to the ground through the downspouts.[4] A similar incident occurred in 1983 but apparently the water ran into Building 866 instead of outside.[5]

1986 - Tank overflow

The filling of the process waste tanks in Building 866 resulted in an overflow of process waste through the roof vent and out the downspout releasing approximately 20 gallons to the ground. No contamination was found on the ground or in the building.[6]

Physical/Chemical Description of Constituents Released

In 1978, laboratory analysis of the liquid indicated 410,000 disintegrations per minute per liter alpha activity.[1,3] It consisted of predominately depleted uranium activity. FIDLER survey did not display anything above background readings.[1]

In 1984, water samples taken from the north and south ditch revealed 2.2×10^3 microgram/liter for total uranium and a maximum of 7.9×10^2 picocuries/liter (pCi/l) and 5.8×10^2 pCi/l for total beta activity and tritium, respectively.[4]

In 1986, the spill consisted of process waste. No contamination was found on the ground or in the building.[6]

Responses to Operation or Occurrence

In 1978, samples of the liquid were taken and radiation surveys were conducted. A portable air sampler was utilized and the day following the incident three inches of moist gravel were removed.[1]

In 1984, the drainage ditch west of Building 866 was dammed with gravel to contain the liquid. Mention is made of decontamination of the interior of Building 866 and Building 889 but radiation monitoring indicated no contamination. Surface gravel from the area of the overflow was supposed to have been removed and shipped as waste. Forty to forty-five gallons of liquid were vacuumed up and taken to Buildings 889 waste drains.[4]

In 1986, liquid level alarms were installed for each tank.[6]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents release to the environment.

Comments

None.

References

[1] 1501235
[2] 1500989
[3] 1600189
[4] 1600423
[5] 1600422
[6] 1501067

PAC REFERENCE NUMBER: 800-1205

IHSS Reference Number: Not Applicable

Unit Name: Building 881, East Dock

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

Date(s) of Operation or Occurrence

1953 (Date Building 881 occupied) - 1990[1]

Description of Operation or Occurrence

Building 881's east dock may be an area of potential concern due to the production activities that took place in the building until 1964. At this time the building was converted to a general support building. The CEARP Phase 1 Draft indicates that the dock may have been contaminated in February of 1960 but there is no mention of what caused the contamination.[2]

The only documented incident found occurred on January 7, 1990. A large puddle was found on the dock by fire department personnel. The Stationary Operating Engineer found the source to be the overflow from a condensate pan.[1]

Physical/Chemical Description of Constituents Released

The east dock may have been contaminated by uranium and plutonium in the 1960s.[2] It is documented that condensate was also spilled in the area.[1]

Responses to Operation or Occurrence

There is no mention of cleanup in 1960 or in 1990.

Fate of Constituents Released to Environment

No documentation was found which clearly indicated a direct release to the environment.

Comments

None.

References

[1] 1503367
[2] 1500754

PAC REFERENCE NUMBER: 800-1206

IHSS Reference Number: Not Applicable

Unit Name: Fire, Building 883

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

Date(s) of Operation or Occurrence

October, 27, 1982

Description of Operation or Occurrence

A contaminated trash container fire occurred in Building 883 due to grinding operations. Maintenance personnel placed the container outside the building and left it unattended. The Fire Department responded and spread the contents on the ground.[1]

Physical/Chemical Description of Constituents Released

No documentation was found which detailed constituents released, except that the container contained contaminated trash.[1]

Responses to Operation or Occurrence

The reference states that the Shift Superintendent was responsible for improper cleanup activities and that Health Physics would be following up on the incident with the proper department.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1501039

PAC REFERENCE NUMBER: 800-1207

IHSS Reference Number: Not Applicable

Unit Name: Transformer 883-4

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

Date(s) of Operation or Occurrence

1985 - 1987 or 1988[1]

Description of Operation or Occurrence

Transformer 833-4 is located at the southeast corner of Building 883. Utilities reported that it may have leaked prior to being retro-filled. The original pad was partially removed to make room for a new pad that was constructed several feet to the west. What remains of the old pad is now located in a rock filled area with its decomposed berm. After retro-filling, the transformer was placed on the new pad.[1] It is uncertain when these activities took place.

The transformer was inspected on November 7, 1985 and was found to leak.[2] Leakage was also found on January 30, 1986 by the EPA. An audit was conducted to determine RFP's compliance with the Toxic Substance Control Act and EPA regulations with respect to PCBs.[3] This transformer was on the list for cleanup and/or repair on February 11, 1986 due to leakage around the top and bottom valves and oil on the surface of the pad and the transformer itself.[4]

Physical/Chemical Description of Constituents Released

Transformer 883-4 was found to contain greater than 500 ppm PCBs.[3]

Responses to Operation or Occurrence

The site was not directly inspected by an EPA representative in 1986 but it was required that the transformer be removed or replaced by Fiscal Year 1987 or 1988.[3]

Fate of Constituents Released to Environment

The area drains to an access road approximately six feet from the old pad.[1]

Comments

There was no information to indicate that the spill drained to the access road.

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700068
[3] 1700000
[4] 1700070

Other Reference of Interest

1700076

PAC REFERENCE NUMBER: 800-1208

IHSS Reference Number: Not Applicable

Unit Name: Transformer 881-4

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

Date(s) of Operation or Occurrence

Unknown - 1987[1]

Description of Operation or Occurrence

Transformer 881-4 is located on the north side of Building 881. Utilities reported that it may have leaked prior to being retro-filled in 1987.[1] Visual inspection of the transformer on February 11, 1986 revealed a leak on the top and bottom valves, tap changer and pad.[2] Another document indicates that residual stains existed on the concrete in January, 1987.[3]

Presently, the transformer is located in a gravel filled berm with no indication of leakage. The previously mentioned concrete may exist beneath the gravel. There are no drains in the vicinity.[1]

Physical/Chemical Description of Constituents Released

Transformer 883-4 was found to contain 435 gallons of 110 ppm PCBs.[2]

Responses to Operation or Occurrence

The transformer was retro-filled in 1987.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365
[2] 1700070
[3] 1700004

PAC REFERENCE NUMBER: 800-1209

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformers, 800 Area

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

Date(s) of Operation or Occurrence

Unknown - 1991[1]

Description of Operation or Occurrence

Three transformers and a gear switch apparatus are located one hundred feet north of Building 883. Utilities personnel reported that all components within this complex may have leaked prior to being retro-filled in 1987.[1] All three transformers and the gear switch are currently active. Oil stains were visible at the valve of one of the transformers in a 1991 inspection.[1]

The area is bermed with rock and gravel placed inside and outside of the berm. There are no drains at this site.[1]

Physical/Chemical Description of Constituents Released

Utilities personnel suspect that PCBs may have leaked at this site.[1]

Responses to Operation or Occurrence

The units were retro-filled in 1987.[1]

Fate of Constituents Released to Environment

No documentation was found which indicated a release to the environment occurred at this site.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365

PAC REFERENCE NUMBER: 800-1210

IHSS Reference Number: Not Applicable

Unit Name: Transformers 865-1 and 865-2

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

Date(s) of Operation or Occurrence

Unknown - 1987[1]

Description of Operation or Occurrence

Transformers 865-1 and 865-2 are located north of Building 886 and west of Building 865. Utilities personnel indicate that they have leaked in the past. In 1987, the transformers were removed, retro-filled and placed on a new pad with berms, several feet to the north. The old pad was partially removed to make room for the new pad. It is unknown whether the old pad had berm containment features.[1]

Physical/Chemical Description of Constituents Released

The fact that these transformers were retro-filled indicates that PCBs may have been involved.

Responses to Operation or Occurrence

The transformers were removed from the old pad, retro-filled and placed on a new pad.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1503365

PAC REFERENCE NUMBER: 800-1211

IHSS Reference Number: Not Applicable

Unit Name: Capacitor Leak, Building 883

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

Date(s) of Operation or Occurrence

July 5, 1988

Description of Operation or Occurrence

A capacitor was found leaking at the south entrance of Building 883.[1]

Physical/Chemical Description of Constituents Released

The spill involved approximately one pint of oil. A smear sample revealed negative results for PCBs.[1]

Responses to Operation or Occurrence

A smear sample was taken from the concrete where the leak occurred. A glass bottle was placed under the leak and absorbent pads were put on the spill and the area was barricaded.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1700091

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3.13 900 Area

The 900 Area occupies the eastern third of the 400-acre manufacturing area. The northern portion is bounded on the west by the 700 Area and the southern portion is bounded on the west by the 800 Area. The north, east, and south are separated from the buffer zone by the RFP exclusion fence (Figure 900-1). Part of the 900 Area is contained within the PA. A significant feature in the 900 Area is the Solar Evaporation Ponds which are detailed in PAC 000-101. Drainage from the 900 Area is into North Walnut Creek, South Walnut Creek, and Woman Creek. The following paragraphs present brief descriptions of the significant buildings of the 900 Area.

- Building 910 was placed into service in 1979 as a reverse osmosis facility for the removal of chemically dissolved solids from sanitary effluent. Sanitary wastewater effluent was pumped from Building 995 to Solar Pond 207B-South for flow equalization prior to treatment in Building 910. Effluent from the reverse osmosis process was to be used for cooling tower make-up water but due to numerous problems and malfunctions, the efficiency of the system did not meet design criteria. The facility was effectively removed from service in 1984.

- Two open sludge drying beds (Building 228A and Building 228B) are adjacent to Building 910 and originally used to store brine from the reverse osmosis process. After the discontinuation of the reverse osmosis process, the beds were used for sludge from the Sanitary Treatment Plant, Building 995. The use of these beds for the storing and drying of sanitary sewage sludge continued until 1991.

- Building 964 was an open storage building used by various RFP support contractors since the mid 1960s. In the late 1980s, the building was modified for use as a RCRA permitted unit for the long-term storage of hazardous waste.

- Building 980 has been used by resident construction services since the late 1950s. Activities in the building include painting, vehicle and equipment maintenance, ironwork, and welding. The building also functions as a warehouse and staging area for other RFP projects.

- Building 991 was the first building to become active at the RFP in the spring of 1952. It was the original final assembly building. Plutonium, enriched uranium, depleted uranium, and components from other materials were assembled into the final products and stored for off-site shipment. Initially, the building served as a warehouse for storage of incoming materials. A series of four underground storage vaults connected by tunnels was used for storage (Building 996, Building 997, Building 998, and Building 999). Assembly operations in this building were discontinued in approximately 1958 when this operation was transferred to Building 777. Currently, Building 991 is used as a shipping and receiving building for various weapons components, assemblies, and other materials associated with weapons and/or plutonium metal production. Building 991 also houses nondestructive testing operations, a metallography laboratory, production control operations, and other support operations. Building 991 was initially referred to as the D Plant.

- Building 993 was placed into service in 1963 for use as explosive forming research and development. Explosive forming research and development was discontinued in the 1970s and the building is currently used for storage by the Protective Services Department.

- Building 995 was placed into service in 1952 as the sanitary sewage treatment facility for the RFP. Several buildings and structures are used to support the waste treatment operations. These include a clarifier, an aerator, a digester, and seven sludge drying beds. Significant construction improvements have been made since 1952 to meet the demand of the expanding facility.

Several other buildings and structures are located within the 900 Area. These are predominantly support buildings for emergency generators, exhaust plenums, and fire protection water storage. The southern portion of the 900 Area is currently used by environmental contractor trailers and cargo containers in association with environmental monitoring and remediation. A centralized RFP decontamination facility is located south and west of the 903 Pad and is used in part for outdoor storage of decontamination rinsate. In addition, there are other outdoor storage tanks and one lined pond for decontamination activities. No documentation was found related to releases of decontamination rinsate to the environment. Ongoing groundwater remediation activities associated with Operable Unit 1 are also in the south portion of the 900 Area.

The following subsection contains detailed descriptions of PACs located in the 900 Area. These PACs are shown on Figure 900-1.

PAC REFERENCE NUMBER: 900-108

IHSS Reference Number: 108, Operable Unit 2

Unit Name: Trench T-1

Approximate Location: N749,500; E2,086,000

Date(s) of Operation or Occurrence

November 1954 - December 1962

Description of Operation or Occurrence

Approximately 125 drums of depleted uranium chips and lathe coolant are buried in a trench approximately 200 feet long, 15 feet wide, and 5 feet deep.[1] The trench is located west of Gate 9 in the eastern side of the 400-acre manufacturing area of the plant. The drums are covered with 2 feet of soil and the corners of the trench are marked.

All of the drums buried in Trench T-1 were from Building 444. The length of the trench was extended in December 1955. Memoranda authorizing the use of the trench and the nature of its contents are detailed in a report entitled: A Summary of On Site Radioactive Waste Disposal, E.A. Putzier, April 22, 1970.[2]

At the time this material was buried, RFP policy permitted off-site uranium transportation in the form of uranium oxide. Because most of the uranium was contaminated with numerous inert materials, it would not readily oxidize, therefore preventing shipment. On-site burial was a suitable alternative at the time.[3]

A report from November 1954 described a procedure for placing 30-gallon drums of combustible material inside 55-gallon drums of graphite. Six of these drums were placed in a trench described as being located in the same area as Trench T-1.[4] It is unclear whether this was the burial method for all drums in the trench.

In October 1982, a metal drum was punctured during routine weed cutting. The drum was found to contain a mixture of water and oil. The liquid was pumped into a new drum and transferred to await disposal. The drum was to have been excavated and transferred to size reduction.[5] Another account of a 1982 event may describe the same or a similar incident involving two drums uncovered by weed cutting activities. One drum reportedly contained an oily sludge with 4.3 pCi/g plutonium and 1.2 microcuries per gram (Ci/g) uranium [6] (see Comments).

Physical/Chemical Description of Constituents Released

Approximately 25,000 kilograms of depleted uranium chips are contained in the 125 buried drums.

An inventory receipt records 38 drums disposed of in the trench from November 17, 1954 to June 1, 1956. Most of the records indicate the contents to be metal turnings and still bottoms (residue from a distillation process), although 10 drums contained cemented cyanide waste.[7] The drums of concreted cyanide were placed in the same trench as highly combustible waste from Building 444.[8] Copper alloy was also contained in some drums.[2]

Inventory lists indicating the number of drums of oil disposed of by on-site burning or burial and the origin of the drums are available from April 1954 through April 1966 with the exception of a gap from August 1957 through August 1958. Eighty-five of the 125 drums are documented in this record.[2]

Two drums of "special" wastes from Building 444 which were placed in the trench in 1955 were removed and returned to Building 444 in 1956 at the request of the Accountability Group.[9]

In 1958, authorization was granted for the additional disposal in the trench of over 15,000 pounds of depleted uranium chips from Building 444.[10] In 1962, authorization was given for the disposal of approximately 7,500 pounds of depleted uranium chips.[2] It is unclear whether this entire amount was buried in the trench or in the nearby mound (PAC 900-113).

Responses to Operation or Occurrence

A radiometric survey was performed in the area in October 1977 and identified four small hot spots ranging from 500 to 18,000 cpm of activity. The spots were marked and mapped.[11] A radiometric survey was performed in June 1980 identifying numerous hot spots suspected to be depleted uranium.[12] Two boxes of uranium-contaminated soil were removed from the southeast corner of the PSZ in the spring of 1982 during construction of the PSZ.[13] Monitoring wells were installed in October 1987.[14] In June 1980, a meeting was held with Waste Management and the Environmental Analysis Groups to develop a comprehensive plan for exploratory excavation of this trench.[15] Trench T-1 has not yet been remediated.[6]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

Conflicting information was found during this study regarding the potential contaminants in the trench. All references that mention the origin of the waste confirm that it was from Building 444 exclusively. It is believed from interviews with retired RFP employees that Building 444 processed uranium and not plutonium; yet, several references state that analytical results from the drum uncovered in 1982 indicated the presence of plutonium.[6,16]

There were many references (Environmental Analysis and Control Weekly Highlights from 1977 to 1982) which indicate the removal of contaminated soil from the area north of Central Avenue and west of the east gate. It is uncertain whether the soil became contaminated from the mound area (PAC 900-113), the oil burn pit (PAC 900-153), or this trench which were all in close proximity.

References

[1] 1502735
[2] 1500793
[3] 1500310
[4] 1600670
[5] 1700466
[6] 1601057
[7] 1600276
[8] 1601048
[9] 1600387
[10] 1600393
[11] 1502774
[12] 1502770
[13] 1501182
[14] 1500747
[15] 1502770
[16] 1500765

Other References of Interest

1500421
1501098

PAC REFERENCE NUMBER: 900-109

IHSS Reference Number: 109, Operable Unit 2

Unit Name: Trench T-2

Approximate Location: N748,500; E2,086,000

Date(s) of Operation or Occurrence

July 1954? - August 1968? (see Comments)

Description of Operation or Occurrence

The function of Trench T-2 was similar to that of the East Trenches (Trenches T-3 through T-11, PAC NE-110 and PAC NE-111) and there is no distinction made in their operation. No documentation was found which specifies when Trench T-2 received its first waste nor when its use was discontinued. All of these trenches received sewage sludge from the on-site sanitary treatment plant in addition to some crushed empty drums. Collectively, approximately 275,000 pounds of sanitary sewer sludge and 300 flattened empty drums are buried in the trenches. The trenches are 10 feet deep and covered with approximately 2 feet of soil.[1]

Authorization was given in July 1954 for the disposal of sludge in on-site trenches.[2] A threshold level of activity in the sludge when it was produced was the determination for on-site burial or off-site disposal.[3] Activity levels for sludge buried onsite were of the same order of magnitude as the upper limit criterion recommended for sludge that may be used for fertilizer.[4]

Physical/Chemical Description of Constituents Released

Sewage sludge was contaminated with uranium and plutonium. The radioactivity in the sludge ranged between 8.4×10^5 dpm/kg in August 1964 to 7.9×10^6 dpm/kg in June 1960, and contained a total alpha radioactivity on the order of 100 to 150 millicuries.[5] Trenches constructed in earlier years are expected to have mostly uranium contamination with an increasing plutonium fraction in trenches constructed in the later years.[6]

Flattened drums had surface residues of depleted uranium.[7] These drums may have held oils from Building 444, Building 881, and Building 883. The oils from Building 881 and Building 883 probably contained enriched uranium.[8]

A recommendation was made in September 1962 for the disposal of clay from the clay-lined solar pond in the dried sewage sludge trench.[9] It is not known which trench was active at that time.

Permission was granted by the Waste Disposal Co-Ordination group on December 15, 1964 to dump 2,400 gallons of liquid waste from Building 444 into the sewage sludge trench. The liquid waste was comprised of lathe coolant and water with other liquids. The average concentration was 150,000 disintegrations per minute per liter. The total activity was approximately 1.35×10^8 disintegrations per minute and approximately 1.35 kilograms of depleted uranium.[10]

Responses to Operation or Occurrence

Burial of sludge in the trenches ceased when the Present Landfill began operation in August 1968.[11]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released. This IHSS is being studied in accordance with the IAG schedule for OU2. However, the information gathered for this unit for this report indicate that previously identified potential constituents released to the environment are inaccurate (see Comments). The IAG activities will include site investigations, site characterizations, and site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

After a review of the information gathered for this project, it is believed that Trench T-2 was not used in the same manner as the East Trenches as indicated in RCRA 3004(u). Based on a review of historical documents, an evaluation of many historical photographs, and interviews with former RFP personnel who were directly involved with plant waste disposal activities, it is believed that Trench T-2 was used from approximately 1969 to 1971 for the disposal of nonradioactive liquid chemical wastes and that Trench T-2 was known as "Ryan's Pit." Specific reasons for this conclusion follow.

Previously, Trench T-2 was believed to have been used similarly to the East Trenches (T-3 through T-11) because of discussion in a 1970 document entitled "A Summary of On Site Radioactive Waste Disposal."[2] However, the discussion is rather vague: "There appears to be 7 locations used for sludge burial..." Later documents are based on reference 2 and there are no earlier documents which identify the location and activities of Trench T-2.

An evaluation of aerial and low-angle oblique photographs was made and included the years 1953, 1955, 1957, 1964, 1969, 1970, and 1971.[12] Activities involving on-site burial of sludge from the sanitary wastewater treatment plant occurred from July 1954 through August 1968. These photographs clearly indicate the existence of the East Trenches in various stages of development. Yet none of the photographs from 1953 through 1968 provides any indication of ground disturbances in the area of Trench T-2.

Furthermore, the photographs indicate the trench as being open in 1969 and 1970. The burial of sanitary wastewater treatment sludge on plantsite ceased by August 14, 1968 at which time sludge began to be disposed of in the Present Landfill (PAC NW-114).

Trench T-2 is different from the East Trenches in being isolated in the area south of the 903 storage area and inside the security fence. It is also somewhat smaller than any one of the trenches in the East Trench Area. The dimensions of Trench T-2 as recalled by a retired RFP employee are approximately 20 feet long, 10 feet wide, and 5 feet deep.[15] CEARP documents the dimensions of the East Trenches as 300 feet long, 50 feet wide, and 10 feet deep.

Instead, it is believed that Trench T-2 was used for the disposal of liquid waste between 1969 and 1971. Close-up photographs of the area are available from 1969, 1970, and 1971. In 1969 and 1970, there clearly is an open trench in the area south of the 903 Pad and in the general area as located in the 1970 report. The size of the trench is of a magnitude recalled by the retired RFP employee and not the dimension given in CEARP. In the May 1971 photograph, the trench is backfilled and graded, but still visible.

Several interviews conducted for this report provided information about the dumping of solvents in a trench in this area in the time period of the late 1960s and early 1970s. The trench was referred to as "Ryan's Pit" named for a member of the Waste Disposal Co-Ordination Group who was involved with solvent disposal. The operation of this trench, as recalled by interviewees, is as follows. After radiation screening identified the solvents as nonradioactive, the solvents were dumped in the trench as a method of disposal. The solvents were disposed of in small quantities. Solvents that may have been dumped included perchloroethylene, trichloroeth-

ane, and possibly carbon tetrachloride, though not as likely. These were the solvents typically used as the RFP at the time. Other chemicals which were dumped included paint thinner and small quantities of construction-related chemicals.[14,15] This description of the operation is consistent with the review of aerial photographs.

Other IHSSs identified in the area have conflicting or otherwise unclear descriptions in RCRA 3004(u). Adjacent areas, the West Scrap Metal Storage Area and the East Scrap Metal Storage Area (PAC 119.1 and PAC 119.2) were identified in 3004(u) as locations where solvent storage and spills occurred. Photographs and interviewee recollection corroborate the activity that occurred in these areas was the storage of scrap metal and not the storage of solvents. People interviewed for CEARP describe the dumping of solvents along the Southeast Perimeter Road. It is probable that the interviewees for CEARP were referring to Trench T-2 and not the scrap metal storage areas. Trench T-2 had accesses from the Southeast Perimeter Road and was located within a few hundred yards of it.

PAC 800-103 and PAC 800-104 were identified in 3004(u) as a Chemical Burial area and a Liquid Dumping area, respectively, with locations described in CEARP Phase 1 as being "east of Building 881." These areas were subsequently mapped on the IAG map as being directly east of the building. This could not be confirmed during the research for the HRR and it is probable that these activities actually took place in Trench T-2. CEARP Phase 1 indicates that an area east of Building 881 was used for the disposal of unknown liquids and drums into a pit which was located in an area of scrap metal and "junk" on the ground surface. This is consistent with the identification of Trench T-2 as the disposal area because the East Scrap Metal Storage Area (PAC 900-119.2) is immediately west of Trench T-2 and would have had scrap metal and "junk" on the ground surface. The narratives for PACs 800-103, 800-104, 900-119.1, and 900-119.2 provide further discussion of reasons for this hypothesis.

In conclusion, it is proposed that PAC 800-103 and PAC 800-104 be combined with this PAC and defined as PAC 900-109, Trench T-2 - Liquid Chemical Disposal Trench and the dates of operation be from approximately 1969 through approximately 1971.

References

[1] 1500898
[2] 1500793
[3] 1601048
[4] 1600370
[5] 1600173
[6] 1601057
[7] 1500292
[8] 1501098
[9] 1700445
[10] 1600414
[11] 1500793
[12] 1500716
1502710
[13] 1502642
1700834
1800275
1800272
1502643
[14] 1502788
[15] 1502785

Other References of Interest

1501100
1500887
1600810
1600122
1500768
1500357
1600371
1500765

PAC REFERENCE NUMBER: 900-112

IHSS Reference Number: 112, Operable Unit 2

Unit Name: 903 Pad

Approximate Location: N749,000; E2,086,000

Date(s) of Operation or Occurrence

1955 or 1958 - June 1968

Description of Operation or Occurrence

Drums were stored in the 903 Pad area since the summer of 1958 when drums from the "east pad" of Building 444 (PAC 600-1001) were found to be leaking. The contents of the drums were transferred to tight drums which were then placed in the 903 area.[2] A 1955 aerial photograph clearly shows some activity in the 903 storage area[1] although no supporting documentation was found which identifies the nature of this activity. Drums were leaking and rusting in storage at the 903 storage area in December 1959.[3] By November 1960, significant leaking was noted from the drums in storage; many drums became empty while in storage[4] (i.e., the contents had entirely leaked out). These drums were placed on pallets on the ground. These drums originated from the process buildings.

Beryllium-contaminated liquid waste, uranium-contaminated waste, and some unknown high-level contaminated solid waste were stored in the "back" area of the 903 Pad in a locked enclosure from February 1962 until at least June 1963. This waste was owned by Coors Porcelain Company and was stored under the agreement that Coors was responsible for transportation, unloading and loading, and competence of the drums.[5] Monthly accounts for the acceptance and removal of the waste are detailed in the History Reports of the Waste Disposal Co-Ordination Unit since the first shipment was received.

The first drum leaking in the storage area was identified in 1959[2] at which time a rust inhibitor (ethanolamine) was added to solvents when drums were filled.[6] In 1960, leakage from drums had contaminated areas under the drums and about ten feet from the drums.[7]

In August 1967, heavy rains resulted in the spread of plutonium contamination from the waste oil drums in the 903 area,[8] prompting the initiation of the closure of the area.

During the drum-removal activities in June 1968, one drum of contaminated waste was punctured en route to Building 774 for treatment. The leak resulted in approximately one drip every three feet down Central Avenue and Sixth Street. The road material was seal-coated.[9] The pathway has been defined in the IAG as IHSS 172 (PAC 000-172).

Physical/Chemical Description of Constituents Released

It has been estimated that approximately 150 grams of plutonium leaked into the soil with approximately 23 grams covered by the asphalt pad, 94 grams within the plant boundary, and 33 grams in soil outside of the boundary[10] (see Comments). In other units, approximately 4.38 curies of plutonium is under the asphalt pad and 4.25 curies spread over 2.72 square kilometers.[11] Some of the soil around the pad has been remediated (PAC 900-155).

By mid-1962, an area 5 feet by 25 feet had activity levels greater than 100,000 cpm. There were an estimated 1,500 drums in storage with several having rusted through and leaked empty.[12] An estimate of 50 to 60 percent of the drums in storage were "badly corroded" and a recommendation was made to dispose of them in the "very near future."[13]

Transfer of contaminated oil from the drum storage area was completed in May 1968. Contamination migrated due to wind and rain.[11] Approximately 50 of the drums in storage were empty, the contents having leaked entirely.

Responses to Operation or Occurrence

Monitoring of the area was done periodically. Contaminated areas around the leaking waste drums detected in 1964 were covered with fill dirt as a temporary measure.[14,15] Signs warning of contamination were then posted. In November 1964, fencing was placed around the drum storage area for rabbit control and to enclose the contaminated soil.[9] Air samplers at the east fence detected contamination following high winds.[16]

Soil and rocks contaminated by rainwater runoff from the fenced area (east and downgradient of the storage area) in August 1967 were shoveled up and deposited inside the fence. An attempt was made to regrade the surface to prevent a recurrence of the contamination spread.[8]

Building 903 was constructed in 1966 to filter and transfer contaminated oil from leaking drums.[6] The building was used to prefilter the oil from the drums in the 903 area which could not be safely moved to Building 774. Oil filtered in Building 903 was then transferred to Building 774 for final processing. The prefiltering process was considered too time consuming and the step was eliminated several months after it began.[17]

In November 1968, six contaminated holding tanks located outside of Building 903 and used in the filtering process were disconnected and crated for shipment as radioactive waste. The radioactively contaminated fence from around the 903 area was also shipped offsite as were two forklifts used in the drum transfer activity. Building 904 which had been adjacent to Building 903 was moved to a location east of the Fire Barn (Building 331). Building 903 was moved to a location immediately east of Building 666.[17]

Drum removal from the area began in January 1967 for drums that were in the storage area for six months or less.[9] In June 1968, the drums and pallets were cleared from the area and shipped offsite in waste boxes. The 100,000 square foot area was contaminated with activities ranging from 2,000 to 300,000 dpm per 100 square centimeters. Depth of contamination was to 8 inches or more, possibly up to 18 inches.[18,19,20] Vegetation was burned off the area in October 1968 in preparation for soil remediation.[21]

The soil in the area exhibiting the greatest contamination was covered with fill, a base course, soil sterilant, asphalt prime coat, and asphalt from July to November 1969. The area covered with asphalt was 146,150 square feet.[21] Four shallow wells were drilled in November 1969 for monitoring purposes.[17] Adjacent areas, specifically, but not limited to, the southeast, had high activity in surficial soils. The soil to the southeast that had the highest activity readings indicated by several surveys was removed and is part of PAC 900-155. Soil to the east was also impacted by the 903 storage area (PAC 900-213).

Modification to the topography in and around the 903 Pad area was completed in April 1971 to allow runoff to flow into Pond C-1 on Woman Creek.[22]

Additional wells and boreholes were installed in 1987 for subsequent monitoring of the groundwater and soil.[23] Monitoring in the alluvial groundwater system has indicated elevated values of trichloroethene, perchloroethene, and carbon tetrachloride. These elevated volatile organic compounds are detected approximately 600 feet southeast and 1,500 feet northeast of the 903 Pad. These constituents are typical of the materials contained in

the drums stored in the area but are also representative of contaminants associated with Trench No. 1 (PAC 900-108), the Mound Area (PAC 900-113), and Oil Burn Pit No. 2 (PAC 900-153). Certain inorganic constituents and radionuclides are detected above background values but do not comprise a well-defined plume of contamination.[24]

Fate of Constituents Released to Environment

It was determined in 1971 that the pad area presented no immediate public health hazard and that the plutonium contaminated soil under and around the pad would be removed eventually.[25]

This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Off-site areas potentially impacted by airborne plutonium as a result of this PAC will be studied in accordance with the IAG schedule for OU3. The IAG activities will include investigation, characterization, and possible remediation.

Comments

Aerial photographs indicate disturbed ground in the area occupying the east half of the current 903 Pad since 1955.[1] Complete monthly history reports from the Waste Disposal Unit for this period do not indicate any waste materials being stored in this area. It was not until March 1959 that the area east of the "bullpen" was graded for the temporary storage of contaminated liquids. Interviews with retired RFP employees confirmed that the area referred to as the bullpen is the precursor to the 903 storage area.[26,27]

Plutonium is the most frequently cited constituent of concern released to the environment. Most of the drums stored in the area came from Building 444 which processed uranium and not plutonium. Plutonium was processed in Building 776 and Building 777. Drums from these buildings were also stored in the area.

Conflicting values for the amount of plutonium and/or uranium released to the environment as a result of the 903 storage area were found during this study. Values of 85 to 94 grams of plutonium are frequently cited in the documents identified. It seems that this range of values was first calculated as the amount to have leaked out of the drums, that is, the total amount as a result of the 903 storage. Later documents use this range to apply only to what remains under the asphalt pad itself. This suggests that much more was released from the drums than initially stated and additional plutonium may have been dispersed by wind and rain out of the pad area into the buffer zone and beyond. Some derivations were determined mathematically and others based on estimation of the characteristics of the material contained in the drums. The reasons for this discrepancy are not clear. Therefore, the greater value, equally documented in the literature, is presented here but qualified with the discrepancy. Those references proceeded with an * specifically document the amount of plutonium released to the environment as a result of drum storage in the area.

An area of conflict arises as to how much plutonium is estimated to remain within the buffer zone (plant boundaries) and offsite. With the purchase of more land in 1975, the southeast boundary became expanded and more plutonium earlier included with the off-site value became included with the buffer zone totals. The impact this area has had on the environment is being studied as progress with the RFI/RI for OU2 continues.

References (* denotes specific reference to the amount of plutonium released from the drum storage)

[1] 1502710
[2] 1600042

[3] 1600037
[4] 1600031
[5] 1600400
[6] 1600002*
[7] 1600027
[8] 1600051
[9] 1600138
[10] 1500781*
[11] 1500641*
[12] 1500527
[13] 1600129
[14] 1600025
[15] 1600411
[16] 1600168
[17] 1500854*
[18] 1500399
[19] 1600139
[20] 1500355
[21] 1500486
[22] 1500573
[23] 1500747
[24] 1503363
[25] 1500304
[26] 1502787
[27] 1503382

Other References of Interest

1503439*	1501092
1500337	1501115
1500340	1600001
1500351	1600016
1500368*	1600034
1500385	1600089
1500446	1600098
1500482	1600138
1500531	1600167*
1500535	1600172
1500656	1600173
1500738*	1600396
1500753	1600409
1500793*	1600417
1500804	1600438*
1500852	1600533*
1500853*	1600583
1500878	1600810
1500894	1600811
1501013	1600941
1501045	1601054
1501046	1601057
1501068	1700165

PAC REFERENCE NUMBER: 900-113

IHSS Reference Number: 113, Operable Unit 2

Unit Name: Mound Area

Approximate Location: N749,500; E2,086,500

Date(s) of Operation or Occurrence

August 1954 - September 1958

Description of Operation or Occurrence

In April 1954, the mounding of contaminated combustible wastes from Building 444 was suggested as a method of disposal.[1] The mound was developed by digging a shallow trench, aligning drums in rows, and covering them with soil with the resulting burial site extending above initial ground level. RFP photographs[2] from April 21, 1954, show the mounding of the first 869[3] drums of contaminated wastes from Building 444. The drums had been shipped to the mound area between April 12, 1954, and April 21, 1954.[4] Several drums had pinhole leaks at the time of burial.[5,6]

Mounding activities continued until September 1958. Drums from Building 444, Building 888, Building 883, Building 771, and Building 776 were placed in the mound. Different sides of the mound were opened periodically for disposition of drums. After September 1958, additional drums were moved to the mound area but not placed in the mound. In July 1959, they were moved to the 903 Pad area which was becoming established as a drum storage area.[7] The burning of uranium-contaminated oil became an acceptable method of disposal in 1959 and mounding was discontinued.[8]

On February 9, 1959, one drum of liquid waste from Building 776 was punctured at the mound. Additionally, two trucks were contaminated to a level greater than 100,000 cpm and were cleaned at Building 774. One service department employee's shoes were contaminated as well and cleaned at Building 776.[9] One drum of liquid waste from Building 881 leaked at the mound in April 1960.[10]

During the construction of the PSZ in 1981, several areas of uranium-contaminated soil were detected in the mound area and removed.[11,12]

Physical/Chemical Description of Constituents Released

Contamination resulted from organic liquid wastes. Radioactive elements of the waste were in the forms of depleted uranium and enriched uranium, with some limited plutonium.[10] As a result of the punctured drum in February 1959, an unknown amount of soil in the mound area was contaminated to a level greater than 100,000 cpm.

The ground and pallets had levels of contamination greater than 100,000 cpm due to the liquid waste from Building 881 that leaked in April 1960. The area was roped off pending cleaning.[13] No documentation was found detailing the results of the cleaning effort.

Odors of solvents were detected by construction workers when they encountered groundwater in the mound area during construction of the PSZ.[14]

Responses to Operation or Occurrence

On August 26, 1954, soil samples were taken from a barrel burial site located southeast of Building 991.[15] Soil contaminated as a result of the punctured drum in February 1959 was removed to a level of 1,000 cpm. This contaminated soil was associated with the mound and not Trench No. 1 because the trench was not activated until November 1954.

On April 14, 1970, excavation of the mound began. All drums were removed by the end of May 1970. Approximately 10 percent of the drums were thought to have holes. No detectable alpha contamination was found in the soil at the time of removal. Solid material was shipped offsite for burial. Drums with liquids were sent to Building 774 for processing. Those that were leaking at the time of excavation were pumped into sound drums before processing in Building 774. Empty drums were boxed with absorbent material and shipped for off-site burial. No personnel or equipment contamination resulted from the excavation of the mound and no airborne contamination was detected. Soil from the excavation was graded and excess was placed in the Present Landfill. Four wells were drilled in the four corners of the mound area for groundwater monitoring.[7]

Fate of Constituents Released to Environment

At the time of initial mounding of drums, it was believed that any water leaching the material contained in the drums would have drained into the gully north of the mound because of the natural topographic slope. The gully also received sewage treatment plant effluent. Any activity not removed by the soil in the mound and then carried by water to the gully would have been diluted by the effluent and the retention ponds.[3] These retention ponds have been monitored since the beginning of plant operations. Migrating contaminants would have been detected prior to their off-site release. These retention ponds are detailed in PAC NE-142.5 - NE-142.9.

Groundwater monitoring reports indicate that groundwater in the vicinity of the Mound Area is contaminated with inorganics, radionuclides, and volatile organic compounds. These contaminants are not necessarily from the mound itself but are reflective of the materials buried in the mound. These same materials were buried in Trench No. 1 and burned in Oil Burning Pit No. 2 (PAC 900-153).[16]

This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

Many references document that the mound was no longer used for the burial of waste materials after 1959;[10,17] however, several documents indicate activities at the mound at later dates.[10,13] A request was made and approval was given in December 1962 for the burial of 14 drums of depleted uranium waste in the mound burial area.[10] No documentation was found stating that the burial occurred; yet, documents indicate that Trench T-1 (PAC 900-108), located adjacent to the mound, accepted these drums.[10] Therefore it is assumed that activities occurring at the mound after September 1958 related to storage activities and not burial.

The chemical characteristics of the materials stored in the mound and the materials stored on the 903 Pad (PAC 900-112) are similar and therefore, the impact that the mound area had on the environment may be difficult to differentiate from the impact of the 903 Pad area.

References

[1] 1600672
[2] 1700856
1500308
1700857
[3] 1600598
[4] 1600277
[5] 1600670
[6] 1601049
[7] 1500934
[8] 1500456
[9] 1600042
[10] 1500793
[11] 1501184
[12] 1501182
[13] 1600033
[14] 1501175
[15] 1500362
[16] 1500768
[17] 1501790

Other References of Interest

1500338
1500340
1500356
1500357
1500394
1500537
1500538
1500592
1500765
1500791
1500792
1500853
1500887
1501036
1501097
1501100
1600106
1600122
1600173
1600569
1600810
1601048

PAC REFERENCE NUMBER: 900-119.1

IHSS Reference Number: 119.1, Operable Unit 1

Unit Name: West Scrap Metal Storage Area (IAG Name: West Area Solvent Spill)

Approximate Location: N748,000; E2,085,000

Date(s) of Operation or Occurrence

September 1968 - November 1971

Description of Operation or Occurrence

This area was one of two sites used for scrap metal storage in the southeast portion of the 400-acre manufacturing area. PAC 900-119.1 was the western one located on a flat area just north of Southeast Perimeter Road. In September 1968, arrangements were made to move the scrap metal pile (PAC 900-119.2) from its location near the lithium disposal pit (PAC 900-140) to a new area 200 yards to the west in an attempt to limit traffic through the area.[1] Aerial photographs reveal the storage of material in piles and rows in both 1969 and 1970.[2] Some material may have been stored in drums. The scrap metal was stored for off-site contractors to bid on it for recycle.[3]

Physical/Chemical Description of Constituents Released

Pieces of scrap metal which came from various buildings on plantsite may have had residual oils and/or hydraulic coolants on them which could have dripped off into the soil.[1] Higher than normal air samples in November 1971 were attributed the bulldozing of the area during clean-up activities of the scrap metal. Three small hot spots were found during a routine radiometric survey in August 1981. The source was suspected to be uranium.[5]

Responses to Operation or Occurrence

The area south of the 903 Pad was cleaned up in December 1971 and disturbed soil was revegetated the following spring.[4,6] Groundwater samples collected from monitoring wells installed in the area in 1974 had anomalous concentrations of uranium and nitrate.[7] Additional test holes were drilled in April 1982 to attempt to locate buried materials which might have been contributing leachate into the well waters. No buried debris was located but several of the test holes were maintained as test sites for water samples during the three subsequent months.[8]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU1. The IAG activities will include site investigations, site characterizations, and site remediation. Interim Remedial Actions for OU1 are currently underway. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

CEARP Interview Notes reference areas south of the 903 Pad, south of Building 952, and east of Building 881 as areas which contained construction debris, scrap metal, paper, and other miscellaneous trash. The time frame

for this activity is from 1960 to 1961. No documentation was found which detailed activity in this area in this time period. An aerial photograph from 1964 does not indicate any ground disturbance in the area.[9]

This area was identified in RCRA 3004(u) as being used for solvent storage.[10] No documentation was found which supports this and retired RFP employees interviewed for this report disputed this area being used for solvent storage.[3,11] Scrap metal was stored in drums or on the ground. Areas were indicated with power poles to segregate types of scrap metal. Some of the scrap metal pieces may have been coated with solvents or other materials before being transported to this area.

Elevated concentrations of solvents in the groundwater, identified in monitoring wells located within the PAC boundary, may be from the residual solvents or oils on the scrap metal or from the adjacent liquid chemical disposal trench (PAC 900-109) which was used for the disposal of liquid chemicals, including solvents, into the ground.

References

[1] 1500529
[2] 1700834
1700832
1800272
[3] 1503378
[4] 1500552
[5] 1502771
[6] 1500545
[7] 1500765
[8] 1502786
[9] 1502717
[10] 1502735
[11] 1502773

Other References of Interest

1501999
1500743

PAC REFERENCE NUMBER: 900-119.2

IHSS Reference Number: 119.2, Operable Unit 1

Unit Name: East Scrap Metal Storage Area (IAG Name: East Area Solvent Spill)

Approximate Location: N748,000; E2,085,500

Date(s) of Operation or Occurrence

Approximately 1968 - Approximately November 1971

Description of Operation or Occurrence

This area was one of two sites used for scrap metal storage in the southeast portion of the 400-acre manufacturing area. PAC 900-119.2 was the eastern area located on a flat surface along Southeast Perimeter Road south of the 903 Pad. In September 1968, arrangements were made to move the scrap metal pile from its location near the lithium disposal pit to a new area 200 yards to the west (PAC 900-119.1) in an attempt to limit traffic through the area.[1] The area is located adjacent to the Hazardous Disposal Area (PAC 900-140) and it was felt at the time that uninformed users of the scrap metal storage area were unnecessarily endangering themselves due to the close proximity of the Hazardous Disposal Area.[2] The area was located 60 feet north and 50 feet west of the fence marking the Hazardous Disposal Area.[3] Aerial photographs reveal the storage of material in piles in both 1969 and 1970.[4] The scrap metal was stored for off-site contractors to bid on it for recycle.[1]

Physical/Chemical Description of Constituents Released

Pieces of scrap metal which came from various buildings on plantsite may have had residual oils and/or hydraulic coolants on them which could have dripped off into the soil.[2] Higher than normal air samples in November 1971 were attributed the bulldozing of the area during clean-up activities of the scrap metal.[5]

Responses to Operation or Occurrence

The area south of the 903 Pad was cleaned up in December 1971 and disturbed soil was revegetated the following spring.[6,7] Groundwater samples collected from monitoring wells installed in the area of PAC 900-119.1 in 1974 had anomalous concentrations of uranium and nitrate.[8] This area is downhill from PAC 900-119.2.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released. This IHSS is being studied in accordance with the IAG schedule for OU1. However, the information developed on this unit for this study indicates that the location of IHSS 119.2 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. Interim Remedial Actions for OU1 are currently underway. The Final Phase III RFI/RI Report is to be completed by January 4, 1993.

Comments

This area was identified in RCRA 3004(u) as being used for solvent storage.[9] No documentation could be found which supports this and retired RFP employees interviewed for this report disputed this area being used for solvent storage.[2,10]

CEARP Interview Notes reference areas south of the 903 Pad, south of Building 952, and east of Building 881 as areas which contained construction debris, scrap metal, paper, and other miscellaneous trash. The time frame for this activity is from 1960 to 1961. No documentation was found which detailed activity in this area in this time period. An aerial photograph from 1964 does not indicate any ground disturbance in the area.[11]

Scrap metal was stored in drums or on the ground. Areas were indicated with power poles to segregate types of scrap metal. Some of the scrap metal pieces may have been coated with solvents or other materials before being transported to this area.

Elevated concentrations of solvents in the groundwater, identified in monitoring wells located within the PAC boundary, may be from the residual solvents or oils on the scrap metal or from the adjacent liquid chemical disposal trench (PAC 900-109) which was used for the disposal of liquid chemicals, including solvents, into the ground.

References

[1] 1500529
[2] 1503380
[3] 1600238
[4] 1700834
1700832
1800272
[5] 1500552
[6] 1500545
[7] 1500531
[8] 1500765
[9] 1502735
[10] 1502773
[11] 1502717

Other References of Interest

1500755
1501999
1500754
1500743

PAC REFERENCE NUMBER: 900-130

IHSS Reference Number: 130, Operable Unit 1

Unit Name: Contaminated Soil Disposal Area East of Building 881 (IAG Name: Radioactive Site - 800 Area Site #1)

Approximate Location: N746,000; E2,085,000

Date(s) of Operation or Occurrence

1969 - 1972

Description of Operation or Occurrence

Approximately 320 tons of plutonium-contaminated soil and asphalt from the May 1969 fire in Building 776 was buried under one to two feet of fill. Some of this material, or additional material, was from Central Avenue between Eighth Street and Tenth Street. This amounts to about 250 cubic yards of material.[1]

In 1972, approximately 60 cubic yards of plutonium-infiltrated soil from the removal of concrete waste tanks near Building 774 (PAC 700-146) were placed in this same area and covered with 3 feet of soil.[1]

Physical/Chemical Description of Constituents Released:

The amount of plutonium activity in the 1969 fire debris was estimated at 7.4 dpm/g. The total long-lived alpha activity was estimated at less than 250 dpm/g.[1]

The 60 cubic yards buried in 1972 were contaminated with 250 cpm plutonium.[2]

Responses to Operation or Occurrence

Two to three feet of soil was placed over the debris after placement in the area. In 1972, approximately 10 cubic yards of potentially contaminated soil was placed over the area and covered with 3 feet of soil.[3]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU1. The IAG activities will include site investigations, site characterizations, and site remediation. Interim Remedial Actions for OU1 are currently underway. The Final Phase I RFI/RI Report is to be completed by January 4, 1993.

Comments

RCRA 3004(u) mentions without detail that unknown quantities of scrap metal were buried in this area as well. Documentation exists from the same time period indicating an old scrap metal storage area was being cleared of debris.[4,5] The location was given as south of 903 pad and east of Building 881. Aerial photographs[6,7] reflect what may be these areas in the location of PAC 900-119.1 and PAC 900-119.2. These areas were cleared of debris and the debris may have been disposed of in this contaminated asphalt area but no documentation was found which substantiates this.

A July 1966 photograph shows significant ground disturbance in this same area.[8] The area was used to store sand, gravel, and salt for road application.[9]

References

[1] 1502735
[2] 1600438
[3] 1501719
[4] 1500454
[5] 1500552
[6] 1800275
[7] 1800272
[8] 1502717
[9] 1503381

Other References of Interest

1500901
1600122
1500793

PAC REFERENCE NUMBER: 900-140

IHSS Reference Number: 140, Operable Unit 2

Unit Name: Hazardous Disposal Site (IAG Name: Reactive Metal Destruction Site)

Approximate Location: N748,500; E2,086,000

Date(s) of Operation or Occurrence

1956 - 1970

Description of Operation or Occurrence

An area in the southeast portion of the 400-acre manufacturing area was used for the destruction and disposal of reactive metals and other chemicals. Metallic lithium was destroyed on the ground in the 1950s and 1960s. The activity was described in 1967 as lithium waste being disposed of in a trench, moistened, and then covered with fill at the southeast corner of the site.[1] After the reaction, the residues were buried.[2] Unknown quantities of other reactive metals (sodium, calcium, and magnesium) and some solvents were also destroyed at this location.

The area was fenced to prevent unauthorized personnel from accessing the area. Signs along the fence indicated that the area was the Hazardous Disposal Site.[3]

Physical/Chemical Description of Constituents Released

Approximately 400 to 500 pounds of lithium were destroyed and the residues, primarily non-toxic lithium carbonate, buried.[2] It is believed that nine bottles of nickel carbonyl and one can of iron carbonyl were disposed of in this area in March 1969.[4] No documentation was found which further detailed specific constituents released.

Responses to Operation or Occurrence

Residues were buried in trenches.[2] No documentation was found which detailed soil sampling or remediation at this site.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

This area, identified as the southeast corner of the site, is located near the gas storage building (Building 952), which was moved into the area in 1967. Gases destroyed as an activity near Building 952 may have been performed in this area (PAC 900-183). Aerial photographs from 1969, 1970, and 1971 show ground disturbances in the area which may reflect the reported lithium destruction activities.[5]

References

[1] 1600239
[2] 1601057
[3] 1600238
[4] 1500907
[5] 1800275
1800272
1502643

Other References of Interest

1502735
1501999

PAC REFERENCE NUMBER: 900-141

IHSS Reference Number: 141, Operable Unit 6

Unit Name: Sludge Dispersal

Approximate Location: N750,500; E2,086,500

Date(s) of Operation or Occurrence

1952 - Present

Description of Operation or Occurrence

All material entering the sanitary sewer system is processed and one of the process byproducts is sludge. Sludge produced in the wastewater treatment plant (Building 995) is placed in a series of gravel- and sand-lined drying beds until the solid to liquid ratio is greater than 43 percent by weight and is considered suitable for packaging and shipment offsite for disposal. The configuration of the beds has changed several times since 1952 but they have been in regular operation. There have been many incidents of the sludge in the beds overflowing toward East Perimeter Road. Because the beds were open to the atmosphere, sludge was noted to have become airborne and dispersed. The predominant direction of airborne sludge dispersal is to the east. In addition, the low-level sludge in the drying beds comes in contact with underlying soil which is predominantly fill material overlying claystone.[1]

Wastes from the RFP sanitary sewer system enter the Building 995 treatment process which produces sludge. The chemical characteristics of the sludge are reflective of the chemistry of the waste in the sanitary sewer system. PAC 000-500 details routine and non-routine releases to the sanitary sewer system.

Several specific incidents have occurred when sludge overflowed from the drying beds or was dispersed by wind. A spill occurred on February 4, 1955, which extended to East Perimeter Road. The event occurred while sludge was being pumped from the digester to a drying bed.[2] On December 15, 1972, a plutonium-contaminated sludge spill occurred affecting the area from the sludge drying beds to East Perimeter Road.[3] In January 1982, sludge from three of the drying beds was blown out and dispersed during a windstorm.[4] On February 1, 1991, one of the sludge drying beds overflowed and sludge spilled down the hillside south of the drying beds to South Walnut Creek.[5]

Physical/Chemical Description of Constituents Released

The sludge from the February 1955 overflow was reported from analysis to have approximately 1.1×10^6 dpm/kg. The soil samples had an average contamination level of 3.1×10^5 dpm/kg.[3] The sludge which blew out of the sludge drying beds in January 1982 varied in radioactivity from near background to approximately 1.2×10^6 dpm/kg.[4]

Responses to Operation or Occurrence

Soil sampling of the area impacted by the February 1955 overflow was performed by collecting clay and gravel from the area.[2] The sludge which had spilled out of the beds was "largely" recovered.[2] An extensive surface soil sampling program was conducted in the sludge drying bed area in June 1955. The response to each documented overflow release has been to collect and dispose of the sludge.

The sludge from the December 1972 overflow was controlled with fill material which was drummed and shipped for off-site disposal. Airborne activity in subsequent months was monitored. In June 1973, air samples collected on East Perimeter Road were unusually high after the area had been disturbed by construction equipment preparing the road for re-asphalting. A report of the incident recommended that care should be exercised relating to dust-producing construction activities in the area.[3]

In July 1978, windblown sludge was identified as a long-standing problem and an investigation of using mesh cover for the beds followed.[6] In 1985, metal buildings were constructed around the beds to reduce windblown dispersal.[1]

Fate of Constituents Released to Environment

In July 1978, ambient air data indicated that the sludge drying beds were contributing a higher than normal concentration of plutonium in the air.[6] No documentation was found that further detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU6. However, the information developed on this unit for this study indicates that the location of IHSS 141 presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994. Additionally, the sludge drying bed area is being investigated in a separate action (see Comments).

Comments

The western boundary of this PAC is proposed to be extended to include the area of the sludge drying beds. The beds are not lined with an impermeable layer and excess liquid from the sludge comes in direct contact with the underlying soil. In 1952, there were three sludge drying beds. Expansion in 1962 removed the westernmost bed and added three additional beds. Digester Number 2 is on the area of the removed bed. In 1985, two additional beds were added east of the existing beds and buildings were constructed around all of the beds to reduce the dispersal of sludge by the wind. One of the beds added in 1985 was lined with concrete after its construction.[1,7] In view of the physical configuration of the beds, including the soil beneath Digester Number 2, the potential for contamination of the soil and groundwater beneath the beds is considered to be high. The constituents in the sludge while in the drying beds is the same as the constituents introduced to the area due to airborne dispersion. For these reasons, the boundaries for IHSS 141 presented in the IAG should be extended to include the area of the beds and include that area in the RFI/RI studies.

The impact the sludge drying beds have had on the environment is the subject of a study prompted by the March 1991 NPDES Federal Facilities Compliance Agreement. As a result, groundwater and vadose zone monitoring plans were developed and groundwater and soil water in the sludge drying bed area will be monitored.

References

[1] 1503359
[2] 1500381
[3] 1600007
[4] 1700474
[5] 1503357
[6] 1502698
[7] RFP Engineering Drawings D-13829-9, RF-95-Y1B and 28170-053.

Other References of Interest

1500312
1503445

PAC REFERENCE NUMBER: 900-153

IHSS Reference Number: 153, Operable Unit 2

Unit Name: Oil Burn Pit No. 2

Approximate Location: N749,500; E2,086,000

Date(s) of Operation or Occurrence

March 1957 - May 1965

Description of Operation or Occurrence

Drums containing oil contaminated with uranium were burned in an open pit located north of Central Avenue and southeast of Building 991. These activities took place adjacent to the Mound (PAC 900-113). The oil burn pit was actually two trenches excavated parallel to each other. The oil in the drums was dumped into the pit and ignited. Oil was burned at night so smoke would not cause alarm.[1] On the order of 80 drums of oil was burned in a typical month.[2] The drums were reused by the originating buildings until they were flattened and buried in trenches onsite (PAC NE-110 and PAC NE-111). An October 1960 study stated that organic liquids were stored due to the lack of proper facilities to burn the wastes.[3] In February 1961, a study performed by the Health Physics group assured the operators that open pit burning was safe.[4] A second oil burning pit was cut in November 1961[3] and may be a reference to the parallel trench.

Physical/Chemical Description of Constituents Released

The materials contained in the drums were coolant, still bottoms, and waste oils from Building 444 and Building 881. Attempts were made to burn only nonradioactively contaminated oils.[5] During a burning test in February 1961, a direct count value monitored from the test was three times as high as the value from the Building 881 stack on that day. This was considered acceptable because the burning occurred over a short period and would not materially add to the airborne activity released to the atmosphere.[6,7]

Contaminated water in the oil burning pit was a problem. Laboratory experiments reduced activity from 300,000 dpm/l to 12,000 dpm/l uranium activity.[8] Inconclusive results were obtained during the extraction of oil from water in the "old" oil burning pit.[9]

Responses to Operation or Occurrence

The oil burn residue and some flattened drums remaining in the oil burn pit were covered with fill.[1] Signs were posted in the area of the oil burn pit in May 1959 to warn of contamination.[10] Air monitoring by Health Physics was routinely performed. High volume air samples were taken during burning of oil on several occasions.[6,11]

The burning of oil was halted in June 1965 to be replaced by a more efficient method of disposal.[8] Approximately 240 boxes of soil were excavated in 1978 from Oil Burn Pit No. 2 and shipped offsite for disposal to remove the contaminated residues.[12,13,14] Clean-up criteria were based on radioactivity in the area and not solvent residuum. Approximately 10,000 cubic feet of depleted uranium residue were estimated to be present in the area.[12]

Fate of Constituents Released to Environment

A controlled burning experiment was performed in an open pit north of Building 331 (PAC 300-128) prior to the initiation of burning in Oil Pit No. 2. The results of this experiment, which focused on air emissions, were favorable in considering burning of uranium-contaminated oil in open pits as a disposal practice. The handling of the contaminated residue left was to be made after the oil had been burned.[15] Results are unknown.

This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

In many documents, the total number of drums burned in the pit is listed as 1,082. This number appears to have omissions, for example from the period of January 1961 through June 1961 during which time 228 drums were burned.[13] The retired RFP employees interviewed confirmed that oil burning activities were not halted between 1957 and 1961. Moreover, there are two references to oil actively being burned near Building 991 in 1959[6] and again in 1960.[11] None of the drums of oil burned between June 1957 and June 1961 was included in the derivation of 1,082 being burned. At least 272 drums of oil were burned in addition to the 1,082 mentioned in many of the documents.

References

[1] 1502787
[2] 1600282
[3] 1500793
[4] 1600405
[5] 1502785
[6] 1600193
[7] 1600410
[8] 1500412
[9] 1600413
[10] 1600041
[11] 1600033
[12] 1501719
[13] 1500804
[14] 1500765
[15] 1600375

Other References of Interest

1500464	1600149	1600390	1700206
1500888	1600173	1600391	
1501022	1600382	1700199	

PAC REFERENCE NUMBER: 900-154

IHSS Reference Number: 154, Operable Unit 2

Unit Name: Pallet Burn Site

Approximate Location: N749,500; E2,085,500

Date(s) of Operation or Occurrence

1965

Description of Operation or Occurrence

According to persons interviewed for CEARP Phase 1, wooden pallets were burned in the area southwest of Oil Burn Pit No. 2 (PAC 900-153).[1] No documentation was found which provided detail for this event.

Physical/Chemical Description of Constituents Released

No documentation was found which detailed the constituents released to the environment.

Responses to Operation or Occurrence

The site was "removed" in the 1970s.[1]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

The site was identified as being located in the area now occupied by the PA. The area would have been disturbed when the PSZ was constructed in 1980.

Retired RFP employees interviewed for this report, who were cognizant of the oil burning activities, did not know of any pallets burned in the area specified in CEARP Phase 1. Long-term employees with the RFP fire department indicate that the Department does not have records of pallets being burned north of Central Avenue as located in CEARP.

References

[1] 1502735

Other References of Interest

1501999
1500743

PAC REFERENCE NUMBER: 900-155

IHSS Reference Number: 155, Operable Unit 2

Unit Name: 903 Lip Area

Approximate Location: N749,000; E2,086,000

Date(s) of Operation or Occurrence

1964 - 1973

Description of Operation or Occurrence

Contamination from the 903 drum storage area was spread by wind and rain to adjacent soil. The adjacent area around the pad and extending to the Southeast Perimeter Road is referred to as the 903 Lip Area. PAC 900-112 describes the 903 Pad activities in detail. Soil southeast of the drum storage area was most strongly affected because of the prevailing wind direction and topography. During the construction of the asphalt pad over the main part of the storage area, the lip area was regraded and fill dirt placed over a wide area around the pad. The fill material became contaminated as well.[1]

Physical/Chemical Description of Constituents Released

Approximately 16 grams of plutonium-239 was distributed by wind and surface water runoff in an area exceeding 2,000 acres. In 1969, prior to the installation of the asphalt pad on the 903 storage area, it was estimated that 1.2 million square feet of soil onsite was contaminated above 500 dpm/g.[2]

Responses to Operation or Occurrence

Monitoring of the soil around the 903 drum storage area has occurred periodically since 1958. Ground surveys for alpha detection were performed in 1964 and revealed contamination in the soil south and east of the storage area.

In 1969, the area outside the storage area fence was graded and rocks and soil from this area were moved into the storage area in preparation for the asphalt pad construction.[3] In 1970, four inches of fill were placed on a 500 foot by 600 foot area to the east and south of the pad.[4] The area was sprayed with various chemicals to stabilize the soil.[5] On-site and off-site soil surveys were performed many times to characterize the radioactive contamination from the 903 area.[6,7,8] Most or all of the resuspended contamination was attributed to vehicular traffic on the East Perimeter Road.[9] High volume air samplers were installed east of the 124,000 square foot area southeast of the pad. Because of the close proximity to the 903 storage area, the area had the highest levels of contamination and was stabilized with chemicals to reduce contaminant resuspension.[9]

In 1973, an aerial radiological survey detected radioactive concentrations in the lip area that were higher than previously detected. These results (approximate total of 10,500 cubic feet) were confirmed by additional surveys. Based on these results, it was estimated that approximately 2,000 square meters of soil would be removed to a depth of 15 centimeters by hand shoveling into 55-gallon drums. The excavated soil was replaced with clean topsoil.[10] This was to take place in the summer of 1975 but because of lack of funding, soil removal was deferred to 1976. Efforts were taken to stabilize and revegetate the soil. In 1976, thirty-five 4 foot by 4 foot by 7 foot crates (approximately 4,000 cubic feet) of soil were removed from the highly contaminated hot spot

within the lip area. Removal of soil took place in a portable building equipped with a HEPA filter. This method was considered safe but inefficient in comparing time consumption to the amount of contaminated soil requiring removal.[11]

Soil removal activities were conducted again from June 28, 1978 through October 13, 1978. Heavy equipment was used to move the soil. Weekly reports from the Environmental Analysis and Control group detail the soil removal activities. All soil with contamination levels in excess of 2,000 cpm by FIDLER was removed to a level of 250 cpm. The area covered was estimate to be 43,000 square feet and a depth of approximately 9 inches. The soil was packaged and shipped to the Nevada Test Site.[12] In 1978, 1,448 waste crates were removed and shipped offsite.[11]

Fate of Constituents Released to Environment

In 1965, contamination was greatest to the southeast and east, which suggested a gradual southeastward movement of contaminants.[13] This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase II RFI/RI Report is to be completed by August 9, 1993.

Comments

The area immediately around and to the southeast of the pad to Southeast Perimeter Road are considered the 903 Lip Area. The spread of contamination from the 903 drum storage area is acknowledged to exist into the buffer zone beyond Southeast Perimeter Road but is not included in the Lip Area because it was determined that soil which was around the pad was affected the most.

References

[1] 1501065
[2] 1501099
[3] 1500854
[4] 1500656
[5] 1501045
[6] 1600064
[7] 1600429
[8] 1600007
[9] 1600530
[10] 1600527
[11] 1600419
[12] 1500784
[13] 1501092

Other References of Interest

1500350
1500647
1500674
1500738
1500750
1500756
1500758
1500768
1500837
1500854
1500859
1500951
1501058
1501064
1501256
1600082
1600203
1600439
1600525
1600526
1600532

PAC REFERENCE NUMBER: 900-165

IHSS Reference Number: 165, Operable Unit 6

Unit Name: Triangle Area

Approximate Location: N751,000; E2,086,000

Date(s) of Operation or Occurrence

1966 - 1975

Description of Operation or Occurrence

The triangle area is located east of the contractors storage yard which is east of the Solar Evaporation Ponds (PAC 000-101) and is bounded by Spruce Avenue and the Northeast Perimeter Road. The area is referred to by many different names including: solar pond storage yard, PU&D pond storage yard, and 779 storage yard.[1,2] Drums were first moved into the triangle area during the construction of a drum storage area north of Building 883. Drums with dilute nitric acid were stored directly on the ground for the winter of 1966/1967. The following spring, the drums were placed on wooden pallets. The drums were to have been double-lined with polyethylene bags. Rigid poly drum liners were used after 1970.[3] Storage was in drums on wooden pallets until 1971 when drums were stored in cargo containers. In 1973, an effort was initiated to transfer all plutonium scrap to indoor storage.[4]

In 1968, more than 6,000 drums were stored in the open field. High winds in the unprotected area blew over as many as 150 drums at a time. Drums containing fire waste from the May 1969 fire were stored in the triangle area until they could be counted at Building 771. Some fire waste was returned to the triangle area for storage after being counted.[3]

Radioactively contaminated salts from the solar ponds were often blown across the S&W Contractor Storage Yard (PAC 900-176) into the area and onto the drums.[5] The integrity of drums was damaged by collected condensation and from being blown over by wind. In 1969, approximately 292 drums were discovered to be leaking. About 200 square feet of soil received high-level contamination.[5]

In the summer of 1973, two drums containing incinerator ash heels leaked through the floor of the cargo container in which they were stored.[6]

In June 1973, 200 yards of plutonium-contaminated soil was temporarily stored in the east side of the triangle area. The soil came from the excavation of waste storage tanks near Building 774 (PAC 700-146).[7]

Physical/Chemical Description of Constituents Released

The contents of the drums stored in the area were recoverable plutonium-bearing wastes and residues.[3] Scrap material awaiting plutonium recovery was also stored in the triangle area. Examples of the types of scrap stored are graphite molds, crucibles, combustible wastes awaiting incineration, incinerator ash heels, crucible heels, and raschig rings. No sludges or oils were stored in the triangle area.[3] Some drums contained dilute nitric acid which contributed to the corrosion of the drums.[3]

Responses to Operation or Occurrence

In 1969, leaks and spills were detected. They were monitored and decontaminated according to the criteria used for spills in indoor processing areas. The leaking drums prompted the containment of the drums in cargo containers in 1973. In 1973, some of the cargo containers were noted to be leaking the contents of some drums. Recovered radioactive soil was shipped offsite. Additional soil contamination was discovered and eight drums of soil and palliative agents were shipped offsite.

Subsequent to the 1973 drum leak through the cargo container, all cargo containers were fiberglassed on the inside floors for added containment. Alpha surveys were performed when drums or cargo boxes were moved out of the area. The surveys were limited to the area where the drum or box had been. Alpha and gamma surveys of the entire area took place in August 1974. The first FIDLER survey was probably performed in September 1974[5] and continued until mid 1975. A survey performed during April 1975 indicated no new hot spots and no contaminated soil was removed.[5] Surveys have been performed periodically since then and areas of soil removed as appropriate.

In September 1973, the 200 yards of plutonium-contaminated soil were removed to the Present Landfill (PAC NW-114).[8]

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU6. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 7, 1994.

Comments

None.

References

[1] 1600087
[2] 1502785
[3] 1600576
[4] 1700167
[5] 1600086
[5] 1500951
[6] 1700387
[7] 1600438
[8] 1500866

Other References of Interest

1500333
1500532
1500533
1500541
1500618
1500646
1500649
1500783
1501128
1600000
1600010
1600011
1600068
1600145
1700402

PAC REFERENCE NUMBER: 900-173

IHSS Reference Number: 173, Operable Unit 8

Unit Name: South Dock Building 991 (IAG Name: Radioactive Site - 900 Area)

Approximate Location: N750,000; E2,085,500

Date(s) of Operation or Occurrence

1952 to Present

Description of Operation or Occurrence

Building 991 and the associated storage vaults (Building 996, Building 997, Building 998, and Building 999) are original plant structures. Incidents involving very small quantities of plutonium, uranium, and beryllium, have been noted in Building 991.[1] The "south dock" of Building 991 is located on the west side of the building and is a loading facility for the tunnels. Small spills have occurred in the area.[2,3] Small parts and equipment were washed in the dock area.[2] No documentation was found detailing releases to the environment.

Physical/Chemical Description of Constituents Released

According to CEARP Phase 1, routine surveys of the vaults have indicated that they are free of radioactive contamination, with the exception of tunnel 996 which might be slightly uranium infiltrated.[1] Final products containing plutonium and uranium were shipped from the dock. No raw products were involved in the operation of the building. Acetone, perchloroethene, and trichloroethane were the solvents used.[2] No documentation was found which details the constituents which may be present in the dock area.

Responses to Operation or Occurrence

No documentation was found which detailed responses to occurrences in the dock area.

Fate of Constituents Released to Environment

No documentation was found which details the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location of IHSS 173 presented in the IAG is inaccurate (see Comments). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

The IAG indicates the entire building and the area over the tunnels and vaults should be included in the IHSS primarily because of the age of the structures. The building and the vaults were used to assemble and store final products, which consisted of nickel-plated plutonium and not considered a radioactive threat, and there was no documentation found indicating any contamination. It is therefore proposed that this PAC be reduced in size to the south dock area only. Even though there was no documentation found indicating potential for contamination of this area, it is believed from interviews with retired RFP personnel involved with the activities of this area that the south dock would have a greater probability than the building or vaults of being potentially contaminated. The south half of the building was used for offices and the north half for laboratories and research. No documentation exists for the entire building being considered potentially contaminated.

References

[1] 1601057
[2] 1502777
[3] 1502787

Other References of Interest

1502735

PAC REFERENCE NUMBER: 900-175

IHSS Reference Number: 175, Operable Unit 10

Unit Name: Contractor Storage Facility

Approximate Location: N750,000; E2,085,000

Date(s) of Operation or Occurrence

1980 - Present

Description of Operation or Occurrence

The Swinerton and Walberg (S&W) contractor storage facility is located south of Building 980. The area was used for the storage of 55-gallon drums in a 25 foot by 25 foot area. These drums were placed directly on the ground. A 1 to 1-1/2 foot high berm was situated on the west, south, and east sides of the yard in which the storage facility was located.[1] No documentation was found identifying leaks or spills; although soil staining was noted in a March 1988 visual survey.[1] However, clean gravel has been brought in and the area regraded since the March 1988 inspection. The area is currently used for less than 90 day storage. Small quantities of hazardous waste are stored there and are managed in compliance with applicable RCRA regulations.[1]

Physical/Chemical Description of Constituents Released

The wastes stored in the drums were generated in the on-site contractors' maintenance and fabrication shops and typically came from vehicle maintenance and miscellaneous painting activities. Generally, the drums contained waste oils and thinners. No documentation was found which detailed constituents released to the environment.

Responses to Operation or Occurrence

No documentation was found which detailed responses to occurrences.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment. This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

The facility is for the use of DOE contractors and the contractor occupying the facility has changed through time. Swinerton and Walberg no longer use the S&W Contractor Storage Facility.

References	Other References of Interest
[1] 1502689	1502735

PAC REFERENCE NUMBER: 900-176

IHSS Reference Number: 176, Operable Unit 10

Unit Name: S&W Contractor Storage Yard

Approximate Location: N750,500; E2,085,500

Date(s) of Operation or Occurrence

1960 - Present

Description of Operation or Occurrence

The Swinerton and Walberg (S&W) Contractor Storage Yard is located to the east of 207B-Center and 207B-South Solar Evaporator Ponds (PAC 000-101) and to the west of the Triangle Area (PAC 900-165). There are two significant considerations which cause the contractor storage yard to be a potential area of concern. One is the wind-blown radioactive nitrate spray from the adjacent solar ponds.[1] The other is the hazardous nature of some of the contractor material stored in the yard.[2]

The area directly east of the solar ponds has received spray off the pond surfaces during high winds. Construction of the 207B series of solar ponds was completed in June 1960. The adjacent area east of these ponds became a contractor storage yard sometime after 1966 but before 1969. Most of the structures and equipment stored in the yard were affected by spray from the ponds.[3] High winds have blown low-level (102 dpm per 100 square centimeters) contamination and salts out of the solar ponds onto equipment stored in the S&W area. No significant alpha contamination has been found.[1,4]

The primary use of the yard has been the storage of contractor materials used for various projects at the RFP. The majority of the yard has been used for storage of surplus or raw materials awaiting contractor use in construction or maintenance projects. The storage of drums containing construction material which qualified as hazardous waste occurred in the area until 1985. Drums were placed directly on the ground or on wooden pallets. Building 964 is located in the area and is currently used for storage of hazardous waste.[5]

There has been visual evidence of spills or leakage in the storage yard. In August 1988, a fuel oil spill of unknown quantity occurred in the yard as a result of leaking portable heating unit. The quantity of fuel oil spilled was not reportable.[5]

Physical/Chemical Description of Constituents Released

The water in the solar ponds has historically contained elevated concentrations of nitrate and low-level concentrations of radioactivity as well as volatile organic compounds and inorganic components.

In general, the drums stored in the storage yard contained waste oils with some volatile organic compounds and metals. No other documentation was found which detailed the description of constituents released to the environment from the storage activities.

Responses to Operation or Occurrence

Alpha surveys were performed periodically to evaluate conditions surrounding the solar ponds due to wind-blown spray.

In response to the August 1988 fuel oil spill, the oil-soaked soil was excavated and transported to the Present Landfill (PAC NW-114).[2] All drums containing hazardous waste or constituents were removed by March 1988. The area is currently used to store equipment.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

The solar ponds are scheduled to be closed in accordance with the IAG. With the elimination of the solar ponds, contaminated spray will no longer affect the storage yard.

This storage yard is for the use of RFP contractors and the contractor occupying the facility has changed through time. Swinerton and Walberg no longer use the S&W Contractor Storage Yard.

References

[1] 1500533
[2] 1500821
[3] 1600087
[4] 1600086
[5] 1502689

Other References of Interest

1600037
1600011
1500553

PAC REFERENCE NUMBER: 900-183

IHSS Reference Number: 183, Operable Unit 2

Unit Name: Gas Detoxification Area

Approximate Location: N748,500; E2,086,000

Date(s) of Operation or Occurrence

Approximately 1963 - Approximately 1983

Description of Operation or Occurrence

Building 952 was constructed in 1963 as a Toxic Gas Storage Building. Industrial Hygiene managed the storage of gases. Since at least January 1967, bottles containing hazardous gases were transported from various buildings to Building 952 by firemen exercising extreme caution due to the nature of the gases. Typically, shipments consisted of one or two lecture-size gas bottles. Prior to January 1967, Plant Services personnel transported the bottles, often improperly.[1] No reported incidents were found. Gases were stored for up to five years prior to disposal.[2] Selected gases were detoxified at the site. The method of detoxification was selected based on the characteristics of the material.[3] Others were packed and shipped to off-site vendors for disposal.

Physical/Chemical Description of Constituents Released

No documentation was found which detailed any specific releases to the environment at this site.

Responses to Operation or Occurrence

Selected gases were detoxified using various commercial neutralization processes available at the time. Neutralization processes included reaction with water, acid, caustic, carbon, or air. Byproducts were disposed of as process wastes.[3] Upon completion of the neutralization process for each type of gas, the glassware used in the process was triple rinsed, crushed, and deposited in the present landfill.[4]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released. This IHSS is being studied in accordance with the IAG schedule for OU2. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by August 9, 1993.

Comments

This building is located within the 903 Lip Area (PAC 900-155) but not in the area of greatest soil contamination which was remediated in 1978. The bottles stored in the building and the floor of the building were found to be contaminated from being in the 903 Lip Area. Cleaning of the building was to be done when the contamination in the general area was controlled.[5] The Hazardous Disposal Area (PAC 900-140) site was located adjacent and to the southeast of the gas storage building.

References

[1] 1500476
[2] 1500475
[3] 1500832
[4] 1502735
[5] 1600238

Other References of Interest

1500470
1500471
1500534

PAC REFERENCE NUMBER: 900-184

IHSS Reference Number: 184, Operable Unit 8

Unit Name: Building 991 Steam Cleaning Area

Approximate Location: N750,000; E2,085,000

Date(s) of Operation or Occurrence

1953 - 1978

Description of Operation or Occurrence

Radioactively-contaminated equipment and drums may have been steam cleaned at a location near Building 992 southwest of Building 991. The effluent from the steam cleaning process was collected in a sump and entered the original process waste system.[1]

The EPA aerial photograph from August 6, 1971, indicates a darkened area along the dirt road from Building 992. The connection between the darkened area in the photograph and this IHSS in any is not known.[2]

Physical/Chemical Description of Constituents Released

No radioactive hot spots were detected in this area by a radiometric survey performed site-wide during the period 1977 through 1984.[3] This survey was intended to detect extremely contaminated areas of the plant site.[4]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this operation.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released. This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

None.

References

[1] 1502735
[2] 1502713
[3] 1503375
[4] 1503370

PAC REFERENCE NUMBER: 900-210

IHSS Reference Number: 210, Operable Unit 10

Unit Name: Building 980 Cargo Container, Unit 16

Approximate Location: N748,000; E2,085,000

Date(s) of Operation or Occurrence

1986 - May 1988

Description of Operation or Occurrence

Unit 16 is located southeast of Building 980 and was used for solid and liquid waste drum storage for oil, solvents, and paint waste. The steel cargo container met the requirements of 6 CCR 264.17 for hazardous waste storage. The area is being used as a RCRA 90-day accumulation area. A small area beside the cargo container was enclosed by rope and used for additional storage. Material stored was nonradioactive containerized hazardous waste including automotive oils, solvents, paints, paint thinner, grease, gasoline, diesel fuel, and paper and rags contaminated with oils. These wastes were generated in the Building 980 construction contractor work area.[1]

The cargo container had an inner catch basin. Steel drums were stored on roller-pallets and had three-foot aisle spacing. Periodic container inspection was performed.

Physical/Chemical Description of Constituents Released

No documentation was found of any specific releases of waste from the drums stored in the cargo container.

Responses to Operation or Occurrence

The cargo container is under interim status and is scheduled for closure in accordance with the IAG. All hazardous waste was removed from the unit by May 31, 1988.[1] The area is currently being used for storage.

Fate of Constituents Released to Environment

No documentation was found which details the fate of the constituents released. This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

None.

References	Other References of Interest
[1] 1502759	1502735 1502690

PAC REFERENCE NUMBER: 900-213

IHSS Reference Number: 213, Operable Unit 10

Unit Name: 904 Pad

Approximate Location: N750,000; E2,086,000

Date(s) of Operation or Occurrence

August 1987 - Present

Description of Operation or Occurrence

The 904 Pad is located west of the 903 Pad and south of Central Avenue. It was created in 1987 for the outdoor storage of various waste materials. The 904 Pad is used for storage of mixed solid waste, primarily consisting of pondcrete (the precipitate from the Solar Evaporation Pond process), saltcrete (the precipitate from the Building 774 evaporation process), sewage sludge, and miscellaneous materials in cargo containers. The asphalt pad occupies a 129,505 square foot rectangular area and is sloped at approximately 0.7 percent to the northeast. Improvements to the original design have included a six-inch asphalt berm and tent enclosures.

Boxes of pondcrete were stacked three high and arranged in groups of 72. Each group was covered with a plastic-lined canvas tarpaulin for weather protection (not completely weatherproof). A passageway was left between stacks for emergency access, inspection, and operations.[1] The triwalled boxes were designed for transportation and not long-term storage.

Several incidents have occurred on the pad but have not represented reportable quantities. In May,[2,3] July,[4,5] and September 1988, softened pondcrete spilled from triwall boxes. The amount of pondcrete that spilled onto the asphalt was small. In the May 1988 incident, approximately 0.25 cubic feet of pondcrete was spilled, affecting an area of 12 square feet.[1] Saltcrete spilled during two events in June-July 1989 and July-August 1989.[6]

In September 1990, a waste box and a pallet were identified as being radioactively contaminated. The box was on the pallet and located along the west wall of Tent 10.[7]

Prior to the construction of the tent enclosures, small amounts of leakage under the berm were routinely observed due to inadequate sealing of the berm to the existing asphalt pad. Additionally, the asphalt berms have overflowed with runoff during periods of heavy rainfall. Elevated levels of gross alpha activity, gross beta activity, and nitrate have been noted in the runoff.[8]

Physical/Chemical Description of Constituents Released

Pondcrete is characterized by high nitrate, low-level radiation, and traces of volatile organic compounds. Saltcrete is made from salts resulting from the Building 374 evaporator and contains a variety of materials.

Routine monitoring of runoff water from the 904 pad began in February 1988. In addition, soil samples from around the pad were also taken. It was concluded that it was not possible to collect samples for background plutonium and uranium values due to prior contamination (PAC 900-112).[9] Based on grab samples of water collected on and off the pad during a rain event that occurred on September 11, 1988, it was confirmed that low-level contamination was being lost off the pad when runoff water could not be contained and collected.[10] In December 1988, routine monitoring following precipitation events indicated that RFP guide values for gross beta activity and nitrate were often exceeded.[8]

Air monitoring was performed after several incidents in 1988. Data acquired indicated a maximum plutonium concentration of 2.5 x 10^{-4} picocuries per cubic meter of air for a period in May 1988. Additional data are available.[11]

Responses to Operation or Occurrence

Initially, the pad was intended to contain only solid wastes. The sludge-like consistency of the pondcrete which caused the spills prompted the construction of the six-inch berm. The berm was constructed to contain runoff, not as a spill containment structure.[1] Due to its inability to retain a 25-year, 24-hour storm, a mobile fuel tanker equipped with pumps was moved to the pad to collect water and transport it to Building 371 for treatment. Water overflow from the pad entered the B-series ponds in the South Walnut Creek drainage.[4] A tent enclosure was constructed over the entire pad in 1990.

After the release incidents, the area was surveyed by a Ludlum #12 alpha survey instrument to determine the area affected. The area was decontaminated with water which was vacuumed and transferred to the pondcrete processing area for disposal. Subsequent to the first incident, procedures were developed to prevent future incidents and identify appropriate action in response to an event.

Soil, water, and air were sampled regularly from the beginning of pad operations. It was established that fill material used to construct the facility was placed over native soil contaminated with radioactivity. The source of the radioactivity was attributed to the adjacent 903 Pad. "Background" soil samples were taken to evaluate nitrate concentrations which were not characteristic of the 903 Pad area. Portable air samples were set up on the pad following the May 1988 incident. Runoff was monitored after precipitation events.

In response to the September 1990 incident, radiation surveys were performed to determine the level of contamination. The affected box and pallet were bagged and placed in a permacon storage area. Additional smear samples were taken and revealed approximately 15 pallets with high activity levels. The pallets were bagged and placed in storage. Contaminated spots on the floor were decontaminated to the procedural level of less than 20 dpm.[11]

Two RCRA Contingency Implementation Plans (RCIP) were implemented in response to potential releases to the environment occurring at the 904 Pad. RCIP 88-001 was in response to the May 23, 1988 incident of deformed boxes of pondcrete.[3] RCIP 88-002 was in response to the July 22, 1988 incident of a deformed box.[5]

Fate of Constituents Released to Environment

The 904 Pad currently operates under RCRA Interim Status and is regulated appropriately. It will be closed according to the schedule in the IAG.

This IHSS is being studied in accordance with the IAG schedule for OU10. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by January 30, 1995.

Comments

None.

References

[1] 1500245
[2] 1500816

[3] 1800023
[4] 1600544
[5] 1800024
[6] 1501759
[7] 1501742
[8] 1600456
[9] 1500274
[10] 1500823
[11] 1600584

Other References of Interest

1500830
1600457

PAC REFERENCE NUMBER: 900-1300

IHSS Reference Number: Not Applicable

Unit Name: RO Plant Sludge Drying Beds

Approximate Location: N750,000; E2,085,000

Date(s) of Operation or Occurrence

1984 - 1991

Description of Operation or Occurrence

Two open sludge drying beds (Building 228A and Building 228B) are adjacent to Building 910 and were originally used to store and dry brine from the reverse osmosis (RO) process. After the discontinuation of the RO process, the beds were used to dry sludge from the Sanitary Treatment Plant, Building 995. The sludge is trucked from Building 995 to the Building 910 drying beds. The use of these beds for the storing and drying of sanitary sewage sludge continued until 1991. Sludge in the drying beds overlies a sand and gravel filter which is situated on native soil.[1]

Physical/Chemical Description of Constituents Released

Sludge from the sanitary treatment plant is treated as a low-level radioactive waste. Chemical composition of the sludge is monitored regularly.

Responses to Operation or Occurrence

No documentation was found which detailed responses to this operation.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

The impact the sludge drying beds have had on the environment is the subject of a study prompted by the March 1991 NPDES Federal Facilities Compliance Agreement. As a result, groundwater and vadose zone monitoring plans are being developed and groundwater and soil water in the sludge drying bed area will be monitored.

References

[1] RFP Engineering Drawing 27454-208.

Other References of Interest

1503359
1503445

PAC REFERENCE NUMBER: 900-1301

IHSS Reference Number: Not Appllicable

Unit Name: Building 991 Enclosed Area

Approximate Location: N750,000; E2,085,000

Date(s) of Operation or Occurrence

November 6, 1953 - Approximately 1968

Description of Operation or Occurrence

An enclosed area believed to be approximately 50 feet wide along the south side of Building 991 was used for storage of various radioactively contaminated waste and materials.[1] The earliest document found regarding this area indicated that in November 1953, 79 drums of concreted waste were stored. Monthly reports from the Waste Disposal Co-Ordination Group document that no drums were added to the area or taken away until January 1961 when the drums were moved to the mound (PAC 900-113).[2] It is believed that these drums were only stored at the mound (see Comments section in PAC 900-113) as opposed to buried in the mound. No documentation was found which detailed a release to the environment from these drums.

Other materials were in storage in the same general area. These materials included storage of shipping crates and carrying cases for assembled weapon components which may have been contaminated.[1] No documentation was found which detailed a release to the environment due to stored materials.

Physical/Chemical Description of Constituents Released

The 79 drums stored from 1953 to 1961 contained concreted wastes from Building 991. These wastes were contaminated with enriched and depleted uranium.[3]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this operation.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents to the environment.

Comments

This area is considered as a PAC because of the long term drum storage. The drums remained exposed to all weather conditions in this outdoor area for eight years. In addition, this area may have been used for the storage of other radioactive materials for which documentation was not found.[1] Finally, PAC 900-175 had boundaries defined in the IAG which included the area discussed here. PAC 900-175 is recommended to be reduced in size to include the south dock area. This is proposed as a new PAC instead of including it within the boundaries of PAC 900-175 because the nature of the materials stored is different.

References

[1] 1503381
[2] 1502778
[3] 1500793

PAC REFERENCE NUMBER: 900-1302

IHSS Reference Number: Not Appllicable

Unit Name: Gasoline Spill

Approximate Location: N748,500; E2,086,000

Date(s) of Operation or Occurrence

October 5, 1989

Description of Operation or Occurrence

A 55-gallon drum containing gasoline was discovered leaking in the contractor staging yard south of the 904 Pad.[1]

Physical/Chemical Description of Constituents Released

An estimated two gallons of gasoline sprayed into the air or leaked onto the ground.[1]

Responses to Operation or Occurrence

The Hazardous Materials Team responded and sealed the leak. A concrete containment berm was to be installed around the contractor's fuel storage facility as a result of this incident.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

None.

References

[1] 1600466

PAC REFERENCE NUMBER: 900-1303

IHSS Reference Number: Not Appllicable

Unit Name: Natural Gas Leak

Approximate Location: N748,000; E2,086,000

Date(s) of Operation or Occurrence

Prior to July 1961

Description of Operation or Occurrence

A gas leak in the pipeline to Building 995 and Building 991 occurred in July 1961.[1] Natural gas is piped between Building 995 and Building 991. The leak was apparently present for years and had permeated the ground under the pavement.[1] In April 1971, Utilities identified a major problem with corrosion in the pipeline near Building 991 due to inadequate pipe wrapping.[2]

Physical/Chemical Description of Constituents Released

Natural gas was released to the environment.[1]

Responses to Operation or Occurrence

The Pipe Shop repaired the pipe.[1] On-site contractors were given the task of replacing 400 feet of gas line near Building 991 in 1971.[2]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1600242
[2] 1600067

PAC REFERENCE NUMBER: 900-1304

IHSS Reference Number: Not Applicable

Unit Name: Chromic Acid Spill - Building 991

Approximate Location: N749,000; E2,085,500

Date(s) of Operation or Occurrence

April 22, 1989

Description of Operation or Occurrence

A portable 500-gallon receiving vessel located outside Building 991 overflowed during a transfer. The portable containers are not equipped with site gages or visible level indicators. The container was actively being used for the transferring of liquids generated in the building. The low-level alarm, indicating approaching capacity, was activated approximately one week prior to the incident. The high level alarm malfunctioned and did not activate.[1]

Physical/Chemical Description of Constituents Released

Several gallons of chromic acid laboratory waste from General Metallurgy spilled into a cement pit. The chemical constituents of the waste were not identified in the safety report. The RCRA/CERCLA representative reviewed the incident and determined that outside agency notification was not required and that the cement berm functioned properly.[1]

Responses to Operation or Occurrence

The event occurred on a Saturday and was reported the following Monday. Procedures were reviewed as a result of this incident and steps were taken to prevent its recurrence.[1]

Fate of Constituents Released to Environment

No chemical waste was apparently released because the cement berm functioned as designed. No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1501734

Other References of Interest

1501726

PAC REFERENCE NUMBER: 900-1305

IHSS Reference Number: Not Appllicable

Unit Name: Building 991 Roof

Approximate Location: N748,000; E2,085,500

Date(s) of Operation or Occurrence

July 1982

Description of Operation or Occurrence

The roof of Building 991 received a prime coating in July 1982.[1] Fumes from a spill entered an air intake conduit on the roof and affected the climate inside the building. The odor was observed by building occupants.[1]

Physical/Chemical Description of Constituents Released

Approximately five gallons of the primer Tremco Tremprime spilled in an area under the intake. The primer contained mineral spirits as a solvent.[1]

Responses to Operation or Occurrence

The primer was spread around and dried and the odor diminished.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

None.

References

[1] 1501042

PAC REFERENCE NUMBER: 900-1306

IHSS Reference Number: Not Appllicable

Unit Name: Transformers 991-1 and 991-2

Approximate Location: N748,000; E2,085,500

Date(s) of Operation or Occurrence

February 11, 1986

Description of Operation or Occurrence

Leaks were observed on pipe flanges, valves, gages, and bushing compartments of these transformers. Large amounts of oil were noted on the ground under the two transformers.[1]

Physical/Chemical Description of Constituents Released

The oil in Transformer 991-1 and Transformer 991-2 contained polychlorinated biphenyls (PCBs) at concentrations of 114 and 60 parts per million, respectively.[1]

Responses to Operation or Occurrence

The PCBs were to be cleaned up and the transformers repaired by an outside contractor.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700070

PAC REFERENCE NUMBER: 900-1307

IHSS Reference Number: Not Appllicable

Unit Name: Explosive Bonding Pit

Approximate Location: N748,000; E2,086,500

Date(s) of Operation or Occurrence

1965 - Approximately 1968

Description of Operation or Occurrence

Explosive bonding experiments were conducted at the explosive forming area near Building 993. At least seven events took place within a few days in March 1968 in an experiment to explosively bond together flat plates of stainless steel and uranium alloy. An experiment conducted on March 6, 1968, caused a piece of aluminum used in the experiment to be hurled a distance of 525 feet. The explosive consisted of 192 grams of 40 percent dynamite. The energy released from the dynamite drove the stainless steel plate into the radioactive material to form a bonded laminate.[1]

Other experiments of unknown nature took place in this general location for at least two and a half years. Until March 1968, experiments took place inside buried sand-filled 55-gallon drums. The explosive events took place below grade. Air shocks from the explosions were objectionable to Building 991 occupants until a pit was dug into a hillside near Building 993 to house the apparatus and mitigate air shocks. The 10 foot by 19 foot pit was approximately four feet deep.[1]

Physical/Chemical Description of Constituents Released

Uranium alloy and stainless steel were the materials used in the experiments.[1] No documentation was found which detailed the physical and chemical characteristics of the constituents if any released to the environment.

Responses to Operation or Occurrence

As a result of the incident of the aluminum being thrown from the pit, measures were to be evaluated to prevent malfunctions during experiments.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of constituents released to the environment.

Comments

Uranium alloy was involved in this process. This area is considered a PAC because of the radioactive nature of this material.

References

[1] 1501784

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3.14 Under Building Contamination

PAC Reference Number: See below

IHSS Reference Number: Not Applicable

Unit Name: Under Building Contamination (UBC)

The following buildings are proposed to be UBCs. The PAC reference number for these sites is UBC with the building number. For example, UBC-122 indicates that Building 122 is considered a Potential Area of Concern due to possible under building contamination.

Building 122 (UBC-122)
Building 123 (UBC-123)
Building 125 (UBC-125)
Building 331 (UBC-331)
Building 371 (UBC-371)
Building 374 (UBC-374)
Building 439 (UBC-439)
Building 440 (UBC-440)
Building 441 (UBC-441)
Building 442 (UBC-442)
Building 444 (UBC-444)
Building 447 (UBC-447)
Building 528 (UBC-528)
Building 559 (UBC-559)
Building 701 (UBC-701)
Building 707 (UBC-707)
Building 731 (UBC-731)
Building 770 (UBC-770)
Building 771 (UBC-771)
Building 774 (UBC-774)
Building 776 (UBC-776)
Building 777 (UBC-777)
Building 778 (UBC-778)
Building 779 (UBC-779)
Building 865 (UBC-865)
Building 881 (UBC-881)
Building 883 (UBC-883)
Building 886 (UBC-886)
Building 887 (UBC-887)
Building 889 (UBC-889)
Building 991 (UBC-991)

Approximate Location: RFP 400-acre manufacturing area (see Figure UBC-1)

Date(s) of Operation or Occurrence

Variable, but the range is from 1952 to present.

Description of Operation or Occurrence

Soil and/or groundwater beneath the identified buildings may have become contaminated because of the nature of the activities within these buildings. Numerous indoor unplanned events and routine operations may have led to under building contamination. These events are not all similar in nature or scope. Some of these unplanned events have involved extremely small spills of hazardous materials (such as that of a reagent bottle in a laboratory) while others have been major industrial accidents (such as the 1969 fire in Building 776 and Building 777). In addition to these identifiable events, there is also the possibility of routine operations contributing to under building contamination. For example, leaking process waste lines could contribute to under building contamination. Leakage from such lines is generally cleaned up upon its identification, but at times the affected environment is under a building and is not remediated. Tanks associated with these buildings may have leaked or may have been overfilled causing a release to the environment. Building sumps, floors, and foundation wall may have cracks or be otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

Some of the events that may have led to under building contamination are listed below. This list is not intended to be complete, it is rather intended to be representative of the types of events that have occurred which may have led to under building contamination.

Building	Description
122	This building houses the Medical Facility. Use of this building began in 1952. This building operated with a 55-gallon drum to receive liquid waste located immediately outside the building. Rusting of this drum and subsequent leakage resulted in some low-level infiltration of the soil under the building and the removal of a section of floor.[1]
123	This building houses the majority of the Health Physics operations. Use of this building began in 1953. Waste chemicals from the laboratory, such as a nitric acid mixed with ether incident in December 1953, were sometimes disposed of out the window during the early years of plant operation.[2] This activity could lead to the presence of nonradioactive pollutants under the building. The Health Physics Laboratory generates low-level radioactive liquid waste and chemical waste. Known or suspected underground waste line leakage has contributed some material to the soil beneath the building.[1]
371	This building houses the new Plutonium Recovery Facility. Use of this building began in 1981.

FIGURE UBC-1

BACK OF FIGURE UBC-1

Maintenance personnel discovered approximately fifty-five gallons of waste water on the floor of Room 2217 on August 2, 1989.[3] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-011).

A RCRA inspection of a 90-day accumulation area located in Room 3811 revealed that a metal 55-gallon drum containing dilute sulfuric acid solution had ruptured on December 20, 1989.[4] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-023).

374 This building houses a process waste treatment system. Limited use of this building began in the late 1970s.

A solution of 40% dissolved nitrate salt overflowed Tank D-883-B in Room 3809 on June 15, 1989, and ran into the process waste floor drains.[5] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-008).

Process solution filled a glove box in Room 3801, pushed out a window of the box, and approximately 50 gallons spilled onto the floor on November 23, 1989.[6] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-021).

Approximately 100 gallons of process waste solution leaked from a pump in Room 3810 and drained through a process floor drain on November 29, 1989.[7] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-022).

Approximately 500 gallons of pH 12.6 solution of hydroxide salt leaked from a tank in Room 4101, some ran through cracks in the concrete floor to a hallway beneath the room.[8] This incident occurred on May 16, 1990, and resulted in the filing of a RCRA Contingency Plan Implementation Report (90-004).

An operator error led to a spill of brine concentrate in Room 3809, the spill was rinsed down the process drains.[9] This incident occurred on September 18, 1990, and resulted in the filing of a RCRA Contingency Plan Implementation Report (90-008).

Due to an inoperative floor drain, 150 gallons of brine concentrate spilled onto the floor of Room 3810.[10] This incident occurred on October 4, 1990, and resulted in the filing of a RCRA Contingency Plan Implementation Report (90-009).

439,440, 444,447 These buildings house modification and machining facilities, which have, in the past, included materials such as uranium, beryllium, and lithium.

A May 1960 vacuum collector fire in Building 447 and a December 1962 uranium/beryllium release from Building 444 have impacted much of the 400 Area. Thus, Building 439, Building 440, Building 444, and Building 447 must be considered radioactively infiltrated to some degree, as should the footings and foundations of these buildings.[1]

442 This building is currently a filter test facility, but once had a decontamination laundry located in it. The first use of this building was in 1953.

The soil beneath the building is potentially affected by both radioactive and chemical materials including uranium, beryllium, and enriched uranium from the laundry operations. The soil in the vicinity of this building has also been affected by instances of radioactive release. In December 1963 rag cleaning barrels leaked or spilled. Liquid drained into the ditch on the northwest side of

the building. In 1964 the laundry was infiltrated by radioactively contaminated clothing from Building 883.[1]

444 This building houses general fabrication operations. These operations include machining, casting, and other related operations. Use of this building began in 1953.

The sewage treatment plant received a greenish substance which was tracked to Building 444 and an incident involving the overflow of a hazardous waste tank by chromic acid solution on February 22, 1989.[15] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-001).

It was discovered that the continuous flow fabric filter in Room 1 was overflowing. Low-level radioactively contaminated liquid spilled onto the floor in the area of the filter.[12] This incident occurred on July 7, 1989, and resulted in the filing of a RCRA Contingency Plan Implementation Report (89-010).

A 65 gallon spill of process waste water occurred in Room 1 at a temporary bypass for a filter.[13] This incident occurred on September 29, 1989, and resulted in the filing of a RCRA Contingency Plan Implementation Report (89-014).

Approximately 2,000 gallons of process waste water leaked from a fume scrubber tank in Room 204 on October 25, 1989.[14] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-017)

Water used in the suppression of a fire in Room 245 flooded the floor and several baths containing gold cyanide plating solution, sulfuric acid, hydrochloric acid, and nickel. The water then through floor drains and overflowed waste tanks in rooms 9, 10, and 11.[15] This incident occurred on May 21, 1990. A RCRA Contingency Plan Implementation Report (90-005) was filed on this incident.

559 This building houses the plutonium analytical laboratory. Use of this building began in 1968.

The Service Laboratory Facility was originally built with Pyrex glass waste lines in 1968. Less than a year after construction a break was discovered. In 1972, PVC pipe was installed as a replacement, Vertical core sections taken beneath the building confirmed some infiltration.[1]

In May 1977, water in the manhole south of Building 559 was found to contain plutonium contamination.[16]

701 Building 701 is a maintenance shop.

Process waste backed up into a stool and sink.[1]

707 This building houses general fabrication and assembly operations for plutonium. Use of this building began in 1972.

When Building 707 was being built, excavation of the area revealed that the process waste drain from Building 881 had badly corroded with resultant leaks.[17]

731 This building houses process waste tanks for Bulding 707.

On August 28, 1991 the process waste tanks overflowed 750 gallons of process waste to the secondary containment.[18] Although this single event should not have impacted the environment, over the course of operations of Building 707 the possibility exists that the soils near Building 731 have become infiltrated.

770 This building houses waste storage facilities. Use of this building began in 1965.

In August, 1972, a punctured scrap box and drum resulted in up to 200,000 dpm/100 square centimeters and around the building.[1]

771 This building has housed the primary plutonium and americium recovery operations. This building has also had various other operations housed in it. Use of this building began in 1953.

Trichloroethylene was used in October 1957 to clean and prepare concrete floors.[2]

A fire in 1957 resulted in some environmental infiltration along the edges of the building.[1]

A sewer line break in May 1968 at Building 771 resulted in a sewage lift station tank overflow with the release of low level radioactive and chemical materials to the Building 771 outfall.[1]

Construction excavation in September 1971 between Building 771 and Building 774 exposed tunnel which contains a process waste line. The exposed cracks in the tunnel were sealed and eight drums of soil were removed for off-site disposal in January 1972.[1]

During the routine inspection and servicing of Tank #469 in Room 149, plutonium contaminated nitric acid flowed from a port into a pen and onto the floor.[19] This incident occurred April 13, 1989, and resulted in the filing of a RCRA Contingency Plan Implementation Report (89-004).

774 This building houses a liquid process waste treatment system. Use of this building began in 1953.

In October 1956 a process waste tank overflowed. There was some minor environmental infiltration.[1]

In August 1957 leaking process waste tanks resulted in minor environmental infiltration.[1]

In May 1979 the original Building 774 footing drain was located. It had rusted through on the bottom side.[20]

In October 1975, during excavation for a new sump pump (SP-102-2) in Room 102, contaminated soil with over 1.5 M (1,500,000) disintegrations per minute was encountered.[21] A water sample collected on October 30, 1975, from the floor of Room 102 revealed 35,000 counts per minute.[22]

776 This building houses general plutonium fabrication and foundry operations. Use of this building began in 1957.

A fire on May 11, 1969 released plutonium to all of Building 776 and Building 777 and areas of Building 771, Building 778, and Building 779.[1]

In June 1964 a glove box explosion resulted in an extensive release of plutonium to the interior and exterior of the building.[1]

In October 1964 a tagged out valve was opened allowing contaminated carbon tetrachloride to overflow a lathe box and flow through a crack in the floor, contaminating the room below.[2]

On October 23, 1989, personnel in the Non-Destructive Analyses group noticed a liquid from the process waste tanks T-1A&B and T-2A&B on the floor and in the bermed area.[23] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-016).

779 This building houses general plutonium research and development activities. Use of this building began in 1965.

Building 779 was erected over the site of one of the original solar evaporation ponds. During excavation in September 1962, radioactive readings from 11-75 dpm/l were noted, and later, pools of water in these excavations reached levels of 150 dpm/l. The radioactive material involved was mostly uranium.[1]

In June 1969 an improperly opened waste drum resulted in the spread of radioactive material throughout the building and adjacent grounds.[1]

881 Building 881 currently houses primarily laboratory and office support operations. Various other operations have been conducted in this building such as uranium recovery, machining, and fabrication. Use of this building began in 1953.

Waste lines have been broken with probable infiltration of the soil.[1]

883 This building houses general rolling, forming, and forging operations. Use of this building began in 1957.

On October 27, 1989, process waste water was noted to be overflowing from a tank in Room 139, some of the water flowed under the wall.[24] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-018).

887 This building houses process waste and sanitary waste holding tanks. Use of this building began in 1953.

On September 21, 1989, a utility worker discovered that the process waste tanks had over-flowed on to the floor with excess water from the acid scrubbers in room 266.[25] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-013)

991 This building currently houses storage, non-destructive testing, and metallography operations. Various other operations have been conducted in this building in the past such as assembly of some parts, laboratory work, and shipping and receiving. (Although identified as UBC-991, this UBC is also considered to include the associated storage vaults - Building 996, Building 997, Building 998, and Building 999 - and is identified as such on the map).

It was stated that trace uranium and plutonium infiltration of soils under Building 991 was possible, although concentrations of uranium might be undetectable.[1] Also, according to CEARP Phase 1, routine surveys of the vaults associated with Building 991 have indicated that they are free of radioactive contamination, with the exception of tunnel 996 which might be slightly uranium infiltrated.[26]

In addition to the information available on specific events in or near buildings that may have led to under building contamination, there are also data that indicate the presence of contamination under buildings. These data were generated as a part of routine environmental monitoring, or generated in response to some specific activity or event. Footing drain and building sump data provide indications of possible under building contamination when some analytical parameters in the water from the footing or building sump are present in elevated concentrations. The water from footing drain and building sumps has historically been analyzed for total dissolved solids, conductivity, nitrate nitrogen, pH, gross alpha activity, gross beta activity, and tritium activity. Footing drains and building sumps for which elevated concentrations of some contaminant or indicator parameter have been noted at least once include: the number one Footing Drain (FD) for Building 371 (FD 371-1), FD 371-2, Building Sump (BS) 444-2, FD 516-1, FD 707-1, BS 707-2, BS 707-3, FD 771-1, FD 774-1, FD 779-1, and BS 887-1.[27,28] More recent analyses indicate that solvents are present in some footing drains and may be present in other footing drains.[29]

Additionally, pipes and other materials may remain with contamination present in them even though the use of the building has changed and that particular pipe may no longer be in use. For instance, Building 331 once handled uranium, and as late as 1977 uranium contamination was found in the building.[30,31]

Physical/Chemical Description of Constituents Released:

These soils may be contaminated with radionuclides, nitrate, solvents, acids, and bases. The most likely contaminants in soils beneath any particular building can be identified through knowledge of the operations conducted in that building and the raw and waste materials associated with those operations. The contaminants suspected under a building should be based on the overall history of the building, not just the current operations. For instance, Building 331 is currently a vehicle maintenance and repair garage and may therefore be expected to have solvents and oil present in soils beneath the building. However, in the past portions of the building were used for uranium operations so that uranium contaminated soils may also be present under the building.[30,31]

Responses to Operation or Occurrence:

A number of RCRA Contingency Plan Implementation Reports have been made in response to inside building events that could contribute to under building contamination. These RCRA Contingency Plan Implementation Reports are numbered in a manner that gives the year and a sequential number for the RCRA Contingency Plan Implementation Reports of that year. The RCRA Contingency Plan Implementation Reports addressing indoor building events are: 89-001, 89-004, 89-008, 89-010, 89-011, 89-013, 89-014, 89-016, 89-017, 89-018, 89-021, 89-022, 89-023, 90-004, 90-005, 90-008, 90-009, and 91-016.

Inside building events have largely been cleaned-up or otherwise addressed without noticeable impacts on the outdoor environment. However, due to the long time frame, history of operations, and difficulty in detecting soil contamination beneath buildings, the soils beneath a number of buildings should clearly be considered PACs.

Fate of Constituents Released to Environment:

No documentation was found detailing the fate of constituents released to the environment.

Comments:

For the purposes of this document the buildings listed under Unit Name have been added to the list of PACs. Some are already addressed as separate PACs. Further information on the drains and underground waste lines can be found in Water Quality Data For Foundations And Building Sumps (Document #1600830).

References:

[1] 1601057
[2] 1600065
[3] 1700784
[4] 1700796
[5] 1700781
[6] 1700794
[7] 1700795
[8] 1700799
[9] 1700803
[10] 1700804
[11] 1800023
[12] 1700783
[13] 1700787
[14] 1700790
[15] 1700800
[16] 1500863
[17] 1600169
[18] 1503414
[19] 1800028
[20] 1500925
[21] 1700452
[22] 1600187
[23] 1700789
[24] 1700791
[25] 1700786
[26] 1501999
[27] 1600830
[28] 1500883
[29] 1503441
[30] 1500584
[31] 1500979

Other References of Interest

1600059

3.15 Descriptions of Potential Incidents of Concern (PICs)

This section presents detailed descriptions of the various Potential Incidents of Concern (PICs) at the RFP. A PIC is an operation or occurrence which appears to meet the HRR definition of a release but which cannot be accurately located based on available information. In some cases, the location of a PIC can be estimated within a general area but the dimensions cannot be identified and it cannot be mapped. As can be seen from a review of Table PIC-1, many of these PICs are due to relatively small releases of materials from vehicles. General locations for these releases are available from the table, but it is hoped that specific locations for these PICs will be identified. Additional information is being pursued for these PICs. If additional information is obtained during future HRR updates which allows a PIC to be accurately located, the PIC will be redesignated as a PAC and named according to the geographic area identified. PICs are not included on Plate 3. Table PIC-1 summarizes the PICs identified in this study. Table PIC-2 summarizes those events for which so little information was found that a narrative could not be written. Table PIC-1 essentially presents all the information available on the PICs addressed in that table.

TABLE PIC-1
POTENTIAL INCIDENT OF CONCERN

PIC NUMBER	UNIT NAME	PAGE NUMBER
1	Hydraulic Oil Leak - Portal 2	PIC-5
2	Gasoline Spill South of Building 707	PIC-6
3	Battery Acid Spill - Building 750	PIC-7
4	Process Cooling Water Spill - Building 776/777	PIC-8
5	Coolant Spill - Building 729	PIC-9
6	Fuel Oil Spill - Building 707	PIC-10
7	Hydraulic Oil Spill - Building 707	PIC-11
8	Diesel Oil Spill North of Building 559	PIC-12
9	Building 551 Chemical Leaks	PIC-13
10	Gasoline Spill East Side Building 662	PIC-14
11	Ethylene Glycol Spill - Building 443	PIC-15
12	Air Compressor Rupture - Building 440	PIC-16
13	Oil Spill - Building 886	PIC-17
14	Cooling Tower Water Discharge - Building 447	PIC-18
15	Process Waste Leak Between Buildings 881 and 559	PIC-20
16	Picric Acid Burn Site	PIC-21
17	Sewer Line Break - Building 771	PIC-22
18	Carbon Tetrachloride Spill - Building 776	PIC-23
19	Contaminated Vehicles - Building 331	PIC-24
20	Battery Acid Leak - Building 889	PIC-25
21	Antifreeze Leak - Building 334	PIC-26
22	Diesel Oil Spill North of Building 776	PIC-27
23	Antifreeze Leak - Building 130D Parking Lot	PIC-28
24	Antifreeze Leak - Building 771 Parking Lot	PIC-29
25	Antifreeze Leak - 205 Parking Lot	PIC-30
26	Hydraulic Oil Leak - Building 250	PIC-31
27	Hydraulic Fluid Leak - East Access Road	PIC-32

TABLE 3-5 (continued)
POTENTIAL INCIDENTS OF CONCERN

PIC NUMBER	UNIT NAME	PAGE NUMBER
28	Air Compressor Oil Spill - Building 865	PIC-33
29	Transmission Fluid Spill - Building 131	PIC-34
30	Hydraulic Oil Spill - Building 115	PIC-35
31	Hydraulic Oil Spill - Building 125	PIC-36
32	Hydraulic Oil Spill Between 904 Pad and Building 331	PIC-37
33	Gasoline Leak - T130 Parking Lot	PIC-38
34	Antifreeze Leak - Portal 1	PIC-39
35	Decontamination Water Spill	PIC-40
36	Antifreeze Leak - Building 886 Parking Lot	PIC-41
37	Gasoline Leak Near 555 Power Substation	PIC-42
38	Air Compressor Leak - Building 440	PIC-43
39	Motor Oil Leak - Building 441 Parking Lot	PIC-44
40	Automatic Transmission Fluid Leak - Building 443	PIC-45
41	Leaking Transformer - 777-1	PIC-46
42	Diesel Fuel Leak - Building 460	PIC-47
43	Drum Spill - 84 Intersection	PIC-48
44	Distillate Release - Building 374	PIC-49
45	Asphalt Thinner Spill - East of 904 Pad	PIC-50
46	Honey Wagon	PIC-51
47	Nickel Carbonyl Container Burial	PIC-52
48	Antifreeze Spill - Building 334 Parking Lot	PIC-53
49	Diesel Fuel Leak - Building 709	PIC-54
50	Process Waste Leak	PIC-55
51	Contaminated Tank	PIC-55
52	Storm Drain Dumping	PIC-55
53	Oil Storage Tank Overflow	PIC-55
54	Steamline Rupture	PIC-55
55	Leaking Drum Shipment	PIC-55

TABLE 3-5 (continued)
POTENTIAL INCIDENTS OF CONCERN

PIC NUMBER	UNIT NAME	PAGE NUMBER
56	Rio Grande Motorways Trailer Leak	PIC-55
57	Oil Spill From Co60 Pit	PIC-56
58	Contaminated Soil	PIC-56
59	Holes by Sump Pit	PIC-56
60	Trailer Tank 201	PIC-56
61	Tank Photographs	PIC-56

PIC REFERENCE NUMBER: 1

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Oil Leak - Portal 2

Approximate Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

November and December 1988[1,2]

Description of Operation or Occurrence

During the week ending November 5, 1988, a hydraulic system pressure gauge on the Portal 2 gate failed, sprayed oil onto the equipment cabinet and leaked oil onto the ground.[1] On December 7, 1988, a spill of less than 5 gallons of hydraulic fluid from the Portal 2 gate mechanism was reported to Environmental Management.[2]

Physical/Chemical Description of Constituents Released

Hydraulic oil was released to the environment.[1]

Responses to Operation or Occurrence

In November 1988, the oil spilled inside the cabinet was cleaned up and the oil outside the cabinet soaked into the ground.[1] No documentation was found which details further response to the occurrences.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1600454
[2] 1600455

PIC REFERENCE NUMBER: 2

IHSS Reference Number: Not Applicable

Unit Name: Gasoline Spill South of Building 707

Approximate Location: N749,500; E2,084,000

Date(s) of Operation or Occurrence

September 26, 1989

Description of Operation or Occurrence

A can of gasoline fell from a truck and spilled about one gallon onto the ground beside the road.[1]

Physical/Chemical Description of Constituents Released

Gasoline was released to the environment.[1]

Responses to Operation or Occurrence

The gasoline saturated soil was removed and placed into a drum.[1] No documentation was found which further details responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1501749

PIC REFERENCE NUMBER: 3

IHSS Reference Number: Not Applicable

Unit Name: Battery Acid Spill - Building 750

Approximate Location: N750,000; 2,084,000

Date(s) of Operation or Occurrence

October 10, 1989[1]

Description of Operation or Occurrence

A battery was dropped outside the entrance to Building 750. Liquid spilled from the battery onto the concrete walkway.[1]

Physical/Chemical Description of Constituents Released

Battery acid spilled onto the concrete walkway.[1]

Responses to Operation or Occurrence

Sodium bicarbonate was used to neutralize the liquid. The residue was cleaned up and disposed of in the landfill.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1500752

PIC REFERENCE NUMBER: 4

IHSS Reference Number: Not Applicable

Unit Name: Process Cooling Water Spill Building 776/777

Approximate Location: N750,500; E2,084,000

Date(s) of Operation or Occurrence

February 6, 1989

Description of Operation or Occurrence

On February 6, 1989, an alarm indicated a high liquid level in an unused production pit outside Building 776 and Building 777. A pipe froze and broke spilling 1,200 gallons of process cooling water into the pit.[1]

Physical/Chemical Description of Constituents Released

Process Cooling Water measuring 51 pCi/l of an unknown material was released to the environment.[1]

Responses to Operation or Occurrence

Supply and return valves to the production pit were closed isolating the pit from the system. The water in the production pit was analyzed and a determination was made to pump the liquid to the process waste drains.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1501267

PIC REFERENCE NUMBER: 5

IHSS Reference Number: Not Applicable

Unit Name: Coolant Spill - Building 729

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 13, 1989

Description of Operation or Occurrence

Due to a faulty thermostat, the cooling system in Building 729 failed during routine testing of the emergency generator. Five gallons of coolant flowed out of the radiator and into the ground outside of the building.[1]

Physical/Chemical Description of Constituents Released

A solution of 50% ethylene glycol in water was released to the environment.[1]

Responses to Operation or Occurrence

The generator was shut down and the faulty thermostat was replaced.[1] No documentation was found which detailed further responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1501802

PIC REFERENCE NUMBER: 6

IHSS Reference Number: Not Applicable

Unit Name: Fuel Oil Spill - Building 707

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

April 6, 1987

Description of Operation or Occurrence

A construction contractor was drilling a fence post hole when a fuel oil line was struck. The line ruptured and spilled approximately 28 gallons of diesel fuel.[1]

Physical/Chemical Description of Constituents Released

Number 2 diesel fuel was released to the environment.[1]

Responses to Operation or Occurrence

The CDH and Colorado Oil Inspector were notified of the fuel oil spill.[1] No documentation was found which detailed further response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1600547

PIC REFERENCE NUMBER: 7

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Oil Spill - Building 707

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

December 7, 1990

Description of Operation or Occurrence

Approximately two and one-half gallons of hydraulic oil were released from a broken line on a forklift and spilled onto the asphalt.[1]

Physical/Chemical Description of Constituents Released

Hydraulic oil was released to the environment.[1]

Responses to Operation or Occurrence

The released material was secured and was to be disposed of per procedures.[1] No documentation was found which further detailed response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1501736

PIC REFERENCE NUMBER: 8

IHSS Reference Number: Not Applicable

Unit Name: Diesel Oil Spill North of Building 559

Approximate Location: N750,000; E2,083,500

Date(s) of Operation or Occurrence

October 2, 1985

Description of Operation or Occurrence

A portable air compressor was tipped off of its leveling blocks spilling about one gallon of diesel fuel onto the roadway north of Building 559.[1]

Physical/Chemical Description of Constituents Released

Number 2 Diesel Fuel was released to the environment.[1]

Responses to Operation or Occurrence

A truck driver spread sand on the spill. The sand was to be cleaned-up the following day. The compressor unit was returned to Building 331.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

1600552

PIC REFERENCE NUMBER: 9

IHSS Reference Number: Not Applicable

Unit Name: Building 551 Chemical Leaks

Approximate Location: N750,000; E2,0830,000

Date(s) of Operation or Occurrence

April 1, 1965[1] and May 1974[2]

Description of Operation or Occurrence

On April 1, 1965, aqueous ammonia in a railroad container car leaked from drums onto the ground at Building 551.[1] A leaking drum of carbon tetrachloride was found outside Building 551 during an inspection in May 1974.[2]

Physical/Chemical Description of Constituents Released

Ammonia and carbon tetrachloride were released to the environment.[1,2]

Responses to Operation or Occurrence

The leaking drum of carbon tetrachloride found outside of Building 551 was disposed of in an undescribed location.[2] No documentation was found which detailed further response to the occurrences at this site.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The April 1965 incident at this site was in the railroad container car loading area north of Building 551 discussed as PAC 500-158. The exact location of these occurrences could not be determined from the documentation reviewed.

References

[1] 1600237
[2] 1500514

PIC REFERENCE NUMBER: 10

IHSS Reference Number: Not Applicable

Unit Name: Gasoline Spill East Side Building 662

Approximate Location: N748,900; E2,083,350

Date(s) of Operation or Occurrence

January 12, 1990

Description of Operation or Occurrence

An unspecified quantity of gas leaked from an electrician's truck near the east side of Building 662.[1]

Physical/Chemical Description of Constituents Released

Gasoline was released to the environment.[1]

Responses to Operation or Occurrence

The Hazardous Materials Response Team responded to the spill and the situation was corrected.[1] Details of the spill and corrective actions were not included in the documentation.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituent released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1700140

PIC REFERENCE NUMBER: 11

IHSS Reference Number: Not Applicable

Unit Name: Ethylene Glycol Spill - Building 443

Approximate Location: N749,000; E2,082,000

Date(s) of Operation or Occurrence

June 25, 1989

Description of Operation or Occurrence

Approximately 15 gallons of ethylene glycol was released from Building 443's #1 emergency cooling system generator. Some of the liquid was contained on the concrete pad, however there was evidence that some drained into the rocks surrounding the pad.[1]

Physical/Chemical Description of Constituents Released

The release consisted of ethylene glycol (antifreeze).

Responses to Operation or Occurrence

The antifreeze that was contained on the pad was cleaned up. RCRA and the Environmental Management Group were to be notified and asked to respond and evaluate.[1]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed. Review of site utility drawings, building floor plans, and interviews with past and present RFP employees were conducted but provided no additional location information.

References

[1] 1501756

PIC REFERENCE NUMBER: 12

IHSS Reference Number: Not Applicable

Unit Name: Air Compressor Rupture - Building 440

Approximate Location: N248,000; E2,082,500

Date(s) of Operation or Occurrence

July 6, 1989

Description of Operation or Occurrence

A small fuel oil leak occurred due to the rupture of the fuel line of a portable air compressor. The spill occurred on the ground east of Building 440 on July 6, 1989.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of fuel oil.[1]

Responses to Operation or Occurrence

The spill was immediately contained up with "oil dry".[1] The final disposition of the oil dry is not known.

Fate of Constituents Released to Environment

No documentation was found that detailed the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed. Review of site utility drawings, building floor plans, and interviews with past and present RFP employees were conducted but provided no additional location information.

References

[1] 1501758

PIC REFERENCE NUMBER: 13

IHSS Reference Number: Not Applicable

Unit Name: Oil Spill - Building 886

Approximate Location: N749,000; E2,084,500

Date(s) of Operation or Occurrence

October 1988

Description of Operation or Occurrence

A portable air compressor leaked on the concrete at Building 886.[1]

Physical/Chemical Description of Constituents Released

Oil contained in the air compressor was the only material involved.[1]

Responses to Operation or Occurrence

The compressor was moved leaving behind oil-stained concrete.[1]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed. Review of site utility drawings, building floor plans, and interviews with past and present RFP employees were conducted but provided no additional location information.

References

[1] 1600454

PIC REFERENCE NUMBER: 14

IHSS Reference Number: Not Applicable

Unit Name: Cooling Tower Water Discharge - Building 447

Approximate Location: N748,500; E2,082,000 - Surface ditch adjacent to Building 447 to the ditch along the roadway south of Building 991

Date(s) of Operation or Occurrence

December 2, 1958

Description of Operation or Occurrence

Cooling tower water from the Building 447 cooling tower was pumped into a surface ditch and allowed to flow across plant site. Liquid was noticed in a ditch along the roadway south of Building 991.[1]

No documentation was found which further detailed the location of this occurrence (see Comments).

Physical/Chemical Description of Constituents Released

The constituents released consisted of Building 447 cooling tower water containing sodium chromate. The liquid, as sampled opposite Building 991, contained 29 parts per million (ppm) hexavalent chromium or 81 ppm sodium chromate.[1]

Responses to Operation or Occurrence

A temporary dam was placed across the ditch (in an unknown location, see Comments) to contain the chromate water and allow it to seep into the ditch bottom. A liquid sample was collected opposite Building 991 and analyzed.[1]

Fate of Constituents Released to Environment

Although documentation was not found which detailed the fate of the constituents released in this incident, the reference states that sodium chromate, used as a corrosion inhibitor at the RFP, is not adsorbed by the soil and is readily leached out of the soil.[1]

Comments

The exact location of this occurrence could not be determined from documentation reviewed. Although aerial photographs were reviewed and a site visit conducted, no definitive information was obtained. It is surmised that the cooling tower water was discharged into the ditch which currently exists south of Building 447. It then flowed east to the railroad tracks, north to Cottonwood Avenue, and then east under Sixth Street to the west edge of Parking Lot Number 444. From this point, it is believed to have flowed north under Cottonwood Avenue then east along the north side of Cottonwood Avenue to Seventh Street. The flow is believed to have gone north along the west side of Seventh Street to a point adjacent to Tank 224, where it crossed under Seventh Street and flowed northeast into the Central Avenue Ditch at a point northwest of Building 675. The flow is then believed to have traveled east in the Central Avenue Ditch to a point south of Building 991. It is unknown how far beyond this point the flow may have traveled.

References

[1] 1600392

PIC REFERENCE NUMBER: 15

IHSS Reference Number: Not Applicable

Unit Name: Process Waste Leak Between Buildings 881 and 559

Approximate Location: N749,5000; E2,083,500

Date(s) of Operation or Occurrence

January 1981

Description of Operation or Occurrence

Liquid was observed in a valve pit (the valve pit location is unknown, see Comments) which services a process waste pipeline located between Building 881 and Building 559. After pumping out the pit, flow was observed between the inner pipeline and the outer containment pipeline.[1] A leak was found in the inner process waste pipeline near Eighth Street and Central Avenue west of Building 881. Albeit the leak was said to be in the inner pipeline, airborne radioactivity was detected during the excavation. One total long-lived alpha activity concentration from a portable air sampler was above shut down level.[2]

Physical/Chemical Description of Constituents Released

An unknown quantity of liquid process waste was released in a valve pit.[1] Although no documentation was found which further describes the constituents released in this incident, a general process waste description can be obtained from PAC 000-121.

Responses to Operation or Occurrence

The responses to this incident included pumping the liquid out of the valve pit, excavating and locating the inner pipeline leak, and repairing the pipeline.[1,2]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this incident, and the excavation performed in response to this incident, could not be determined from documentation reviewed. It is known that the valve pit in question is located somewhere between Buildings 881 and 559.

References

[1] 1501188
[2] 1501187

PIC REFERENCE NUMBER: 16

IHSS Reference Number: Not Applicable

Unit Name: Picric Acid Burn Site

Location: No documentation was found that indicates the exact location of this site. It is located east of the RFP patrol (security zone) fence.

Date(s) of Operation or Occurrence

June 1956[1]

Description of Operation or Occurrence

Picric acid from Building 771 was disposed of by burning in a small open pit. This took place at an unknown location east of the patrol fence (RFP security zone fence).[1]

Physical/Chemical Description of Constituents Released

One-half pound of picric acid was disposed of by burning.[1] The concentration of the acid is not known.

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed. Interviews with retired RFP employees were conducted but provided no additional location information.

References

[1] 1600152

PIC REFERENCE NUMBER: 17

IHSS Reference Number: Not Applicable

Unit Name: Sewer Line Break - Building 771

Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

Approximately November 1977

Description of Operation or Occurrence

A water sample was taken from Gate 20 of Building 771 to determine the total long-lived alpha activity and gross beta activity of water released from a sewer line break.[1]

Physical/Chemical Description of Constituents Released

The water was analyzed at 27 pCi/l total long-lived alpha activity and 68 pCi/l gross beta activity.[1]

Responses to Operation or Occurrence

A water sample was taken and analyzed.[1]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1500810

PIC REFERENCE NUMBER: 18

IHSS Reference Number: Not Applicable

Unit Name: Carbon Tetrachloride Spill - Building 776

Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

July 21, 1964

Description of Operation or Occurrence:

Radioactively contaminated carbon tetrachloride spilled from a 5-gallon can in the storage area during sampling. Two square feet of ground were contaminated in the Building 776 solvent storage area.[1]

Physical/Chemical Description of Constituents Released:

Radioactively contaminated carbon tetrachloride was released to the environment.[1]

Responses to Operation or Occurrence:

The 5-gallon cans of solvent in the storage area were double bagged and sent to Building 771. The contaminated ground was covered with gravel.[1] No documentation was found which detailed further responses to this occurrence.

Fate of Constituents Released to the Environment:

No documentation was found which detailed the fate of constituents released to the environment.

Comments:

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1501873

PIC REFERENCE NUMBER: 19

IHSS Reference Number: Not Applicable

Unit Name: Contaminated Vehicles - Building 331

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

May 1954

Description of Operation or Occurrence

While conducting a radiation survey at Building 331 several vehicles were found contaminated. The high count found was from a truck used for transporting contaminated barrels.[1]

Physical/Chemical Description of Constituents Released

The maximum direct count activity taken from a smear was 1200 cpm. The reference does not state the constituents involved in the incident.[1]

Responses to Operation or Occurrence

Two surveys were conducted and a total of ten smears were taken.[1] There was no mention of cleanup.

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1600021

PIC REFERENCE NUMBER: 20

IHSS Reference Number: Not Applicable

Unit Name: Battery Acid Leak - Building 889

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

July 18, 1989

Description of Operation or Occurrence

During the transfer of batteries to Building 889 a small amount of acid leak onto the asphalt.[1]

Physical/Chemical Description of Constituents Released

The release consisted of battery acid.

Responses to Operation or Occurrence

The acid was neutralized and cleaned up by Waste Operations. It was determined that the amount of acid spilled was less than a reportable quantity.[1]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1501760

PIC REFERENCE NUMBER: 21

IHSS Reference Number: Not Applicable

Unit Name: Antifreeze Leak - Building 334

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 22, 1990

Description of Operation or Occurrence

Approximately one gallon of antifreeze leaked from a private vehicle onto the parking lot near Building 334.[1]

Physical/Chemical Description of Constituents Released

The leak consisted of roughly one gallon of ethylene glycol (antifreeze).[1]

Responses to Operation or Occurrence

The leak was stopped and the spill was cleaned up and "disposed of properly".[1]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1501730

PIC REFERENCE NUMBER: 22

IHSS Reference Number: Not Applicable

Unit Name: Diesel Oil Spill North of Building 776

Approximate Location: N750,500; E2,084,000

Date(s) of Operation or Occurrence

March 19, 1986

Description of Operation or Occurrence

One gallon of diesel oil was spilled in the alley north of Building 776.[1]

Physical/Chemical Description of Constituents Released

Diesel oil was released to the environment.[1]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

None.

References

[1] 1500857

PIC REFERENCE NUMBER: 23

IHSS Reference Number: Not Applicable

Unit Name: Antifreeze Leak - Building 130D Parking Lot

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 14, 1991

Description of Operation or Occurrence

A spill of approximately two quarts of antifreeze was discovered in the parking lot south of Building 130D. A hose had ruptured on a privately owned automobile releasing the material to the asphalt.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly two quarts of a antifreeze/water mixture. The material was to have been handled as a RCRA-regulated hazardous waste containing lead and tetrachloroethylene.[1]

Responses to Operation or Occurrence

The HAZMAT team responded. The spill was cleaned up with Oil-Dri, packaged and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-011 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503409

PIC REFERENCE NUMBER: 24

IHSS Reference Number: Not Applicable

Unit Name: Antifreeze Leak - Building 771 Parking Lot

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 23, 1991

Description of Operation or Occurrence

A spill of approximately 1.5 pints of antifreeze was discovered in the parking lot north of Building 771. A hose had ruptured on a privately owned automobile releasing the material to the asphalt.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly 1.5 pints of a antifreeze/water mixture. The material was to have been handled as a RCRA-regulated hazardous waste containing lead and tetrachloroethylene.[1]

Responses to Operation or Occurrence

The HAZMAT team responded. The spill was contained and absorbed with Oil-Dri, packaged, and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-012 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503411

PIC REFERENCE NUMBER: 25

IHSS Reference Number: Not Applicable

Unit Name: Antifreeze Leak - 205 Parking Lot

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 23, 1991

Description of Operation or Occurrence

A spill of approximately three quarts of antifreeze was discovered in the Parking Lot 205, east of Building 111. A hose had ruptured on a privately owned automobile releasing the material to the asphalt.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly three quarts of a antifreeze/water mixture. The material was to have been handled as a RCRA-regulated hazardous waste containing lead and tetrachloroethylene.[1]

Responses to Operation or Occurrence

The HAZMAT team responded. The spill was contained and absorbed with Oil-Dri, packaged, and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-013 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503411

PIC REFERENCE NUMBER: 26

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Oil Leak - Building 250

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 26, 1991

Description of Operation or Occurrence

A spill of approximately two quarts of hydraulic oil occurred south of Building 250 (The Windsite). A hose on a tractor leaked releasing the material to the soil.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly two quarts of hydraulic oil. Approximately 1.5 cubic feet of contaminated material were packaged.[1]

Responses to Operation or Occurrence

The HAZMAT team responded. The spill was contained and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-014 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area #331-1743.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503412

PIC REFERENCE NUMBER: 27

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Fluid Leak - East Access Road

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 24, 1989

Description of Operation or Occurrence

The hose on a contractor's backhoe broke allowing hydraulic fluid to spill onto the gravel.[1]

Physical/Chemical Description of Constituents Released

Two to three gallons of hydraulic fluid were released.[1]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

None.

References

[1] 1501766

PIC REFERENCE NUMBER: 28

IHSS Reference Number: Not Applicable

Unit Name: Air Compressor Oil Spill - Building 865

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 29, 1991

Description of Operation or Occurrence

A release of one quart of air compressor oil occurred on the pavement west of Building 865 resulting from routine oil changing operations.

Physical/Chemical Description of Constituents Released

The release consisted of one quart of air compressor oil that was determined to be a RCRA-regulated hazardous waste containing lead and chromium. Approximately 1.2 cubic feet of contaminated materials were generated during the cleanup.[1]

Responses to Operation or Occurrence

The HAZMAT team responded to the spill. The contaminated oil was picked up with absorbent material, packaged, marked and stored in accordance with RCRA regulatory requirements.[1] RCRA Contingency Plan Implementation Report No. 91-017 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to 90-day accumulation area #331-1743.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503415

PIC REFERENCE NUMBER: 29

IHSS Reference Number: Not Applicable

Unit Name: Transmission Fluid Spill - Building 331

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

September 4, 1991

Description of Operation or Occurrence

A spill of approximately three gallons of transmission fluid occurred in an area east of Building 131. Transmission failure of a contractor's vehicle resulted in the release of the material to the asphalt and concrete.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly three gallons of transmission fluid. Approximately two cubic feet of waste material was removed and handled as RCRA-regulated hazardous waste containing lead and chromium.[1]

Responses to Operation or Occurrence

The contaminated soil was containerized and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-019 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The packaged material was transferred to the Building 331 90-day accumulation area.[1] The report states that no threat to the environment should remain.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503417

PIC REFERENCE NUMBER: 30

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Oil Spill - Building 115

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

September 12, 1991

Description of Operation or Occurrence

A spill of approximately one gallon of hydraulic oil occurred in an area west of Building 115. The release was from a broken oil line a on a contractor's backhoe which released the material to the surrounding soil.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly one gallon of hydraulic oil that was determined to be a RCRA-regulated hazardous waste. Approximately three cubic feet of waste material was removed.[1]

Responses to Operation or Occurrence

The contaminated soil was containerized and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-020 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The packaged material was transferred to 90-Day Accumulation Area #331-1743.[1] The report states that no threat to the environment should remain.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503418

PIC REFERENCE NUMBER: 31

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Oil Spill - Building 125

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

September 17, 1991

Description of Operation or Occurrence

A spill of approximately one gallon of hydraulic oil occurred south of Building 125. A leaking hose on a trash truck resulted in a release of the material to the asphalt.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly one gallon of hydraulic oil that was determined to be a RCRA-regulated hazardous waste. Approximately 1.5 cubic feet of waste material was removed.[1]

Responses to Operation or Occurrence

The HAZMAT team responded. The spill was absorbed, containerized and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-021 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The packaged material was transferred to 90-Day Accumulation Area #331-1743.[1] The report states that no threat to the environment should remain.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503419

PIC REFERENCE NUMBER: 32

IHSS Reference Number: Not Applicable

Unit Name: Hydraulic Oil Spill Between 904 Pad and Building 331

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

September 24, 1991

Description of Operation or Occurrence

A spill of approximately ten gallons of hydraulic oil occurred while a trash truck was in transit between Building 331 and the 904 Pad. The majority of the spill occurred to the southwest of the 904 Pad near the contractor's trailers. Less than one pint of oil was released to the Building 331 parking lot.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly ten gallons of hydraulic oil. Approximately 75 cubic feet of waste material was removed.[1]

Responses to Operation or Occurrence

The contaminated rocks and soil at the 904 Pad was containerized in ten, 55-gallon drums and removed from the area.[1] An oil pan was placed beneath the vehicle at Building 331 to containerize the rest of the leak. The truck was repaired on September 25, 1991.[1]

RCRA Contingency Plan Implementation Report No. 91-022 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The packaged material was transferred a 90-day accumulation area near Building 331. The report states that no threat to the environment should remain.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503420

PIC REFERENCE NUMBER: 33

IHSS Reference Number: Not Applicable

Unit Name: Gasoline Leak - T130 Parking Lot

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

September 30, 1991

Description of Operation or Occurrence

A spill of approximately one-half gallon of gasoline occurred in the north parking lot of the 130 trailer complex. The fuel pump failed on a private vehicle, releasing the material onto the pavement.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly one-half gallon of gasoline. Approximately one cubic foot of waste material was removed and handled as a RCRA-regulated hazardous waste for its benzene content. The benzene content of unleaded gasoline typically ranges from 0.4 to 4.91%.[1]

Responses to Operation or Occurrence

The spill was contained and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-024 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the pavement and that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area #331-1743.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503422

PIC REFERENCE NUMBER: 34

IHSS Reference Number: Not Applicable

Unit Name: Antifreeze Leak - Portal 1

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 10, 1991

Description of Operation or Occurrence

A spill of approximately one gallon of antifreeze mixture occurred at thee north entrance to Portal 1. A small cut was found on the hose of a privately owned automobile releasing the material to the asphalt.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly one gallon of a 50% antifreeze/50% water mixture. Approximately four pounds of material was removed and was handled as a RCRA-regulated hazardous waste containing lead and tetrachloroethylene.[1]

Responses to Operation or Occurrence

The HAZMAT team responded. The spill was contained and removed from the area.[1] The leak was repaired by a garage mechanic so that the vehicle could be moved.

RCRA Contingency Plan Implementation Report No. 91-025 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503423

PIC REFERENCE NUMBER: 35

IHSS Reference Number: Not Applicable

Unit Name: Decontamination Water Spill

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 9, 1991

Description of Operation or Occurrence

While transporting decontamination water from the decontamination facility to the Building 231 storage tanks, a tanker truck spilled approximately five gallons of the liquid. Because the clamp down device on the tanker's port fill had not been tightened, water was allowed to splash out onto the pavement when the tanker stopped. A witness described one to two gallons spilling out at one such stop. The route taken by the vehicle required five stops; therefore, it was assumed that a total of five gallons was released.[1]

Physical/Chemical Description of Constituents Released

Analytical results indicated 18 ppb TCE. Approximately one and a half pounds of waste were generated during the decontamination of drilling equipment that had been used at the OU1 and OU2 sites. All waste was to be handled as a hazardous waste for spent halogenated solvents.[1]

Responses to Operation or Occurrence

Because the exact locations of spillage were not known, the asphalt was not remediated. The tanker truck was cleaned with Kimwipes. Samples of the decontamination water were taken and sent to a laboratory.[1]

RCRA Contingency Plan Implementation Report No. 91-026 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The material had evaporated before cleanup could take place. The report states that there did not appear to be any threat to the environment due to the small quantities of hazardous material released. The material used to clean the tanker was packaged, marked and stored according to RCRA requirements.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503424

PIC REFERENCE NUMBER: 36

IHSS Reference Number: Not Applicable

Unit Name: Antifreeze Leak - Building 886 Parking Lot

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 11, 1991

Description of Operation or Occurrence

An antifreeze leak occurred from a private vehicle at the parking lot east of Building 886 due to a loose hose clamp.[1]

Physical/Chemical Description of Constituents Released

The release consisted of approximately one and a half gallons of 50% water and 50% ethylene glycol. Roughly one half cubic feet of material was generated during the cleanup. The material determined to be a RCRA-regulated hazardous waste because it may exceed the TCLP limits for lead and tetrachloroethylene.[1]

Responses to Operation or Occurrence

The HAZMAT team responded to the spill. The material was contained, removed, and packaged according to RCRA regulatory requirements. The vehicle was repaired so it could be moved offsite. RCRA Contingency Plan Implementation Report No. 91-027 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503425

PIC REFERENCE NUMBER: 37

IHSS Reference Number: Not Applicable

Unit Name: Gasoline Leak Near 555 Power Substation

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 17, 1991

Description of Operation or Occurrence

A spill of approximately one-half gallon of gasoline occurred from a private vehicle in the ditch east of the 555 power substation. The angle at which the vehicle was parked allowed the material to leak out the filler spout onto the ground.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly one-half gallon of gasoline. Approximately forty gallons of soil was removed and handled as a RCRA-regulated hazardous waste for its benzene content. The benzene content of unleaded gasoline typically ranges from 0.4 to 4.91%.[1]

Responses to Operation or Occurrence

The spill was contained and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-028 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area #331-1743.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503426

PIC REFERENCE NUMBER: 38

IHSS Reference Number: Not Applicable

Unit Name: Air Compressor Leak - Building 440

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 21, 1991

Description of Operation or Occurrence

A spill of approximately one and a half gallons of motor oil from an air compressor occurred north of Building 440. The oil reservoir was overpressurized allowing the oil to be forced out through the dipstick tube onto the pavement.[1]

Physical/Chemical Description of Constituents Released

Approximately one and a half gallons of 10W40 motor oil was released. During the cleanup roughly three cubic feet of material were generated that was to be handled as a RCRA-regulated hazardous waste with toxicity characteristics of chromium and lead if confirmed by laboratory analysis.[1]

Responses to Operation or Occurrence

The oil was cleaned up with an absorbent material, containerized and removed from the area. RCRA Contingency Plan Implementation Report No. 91-029 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503427

PIC REFERENCE NUMBER: 39

IHSS Reference Number: Not Applicable

Unit Name: Motor Oil Leak - 441 Parking Lot

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 29, 1991

Description of Operation or Occurrence

A spill of approximately one quart of motor oil occurred at the 441 Parking Lot. The engine oil pan had been severely damaged allowing the release of oil to the asphalt.[1]

Physical/Chemical Description of Constituents Released

The spill consisted of roughly one quart of motor oil. Approximately one cubic foot of waste material was removed. The material was to be handled as a RCRA-regulated hazardous waste because it may exceed the TCLP standard for lead.[1]

Responses to Operation or Occurrence

The HAZMAT team responded to the release. The contaminated soil was containerized and removed from the area.[1] RCRA Contingency Plan Implementation Report No. 91-032 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that no threat to the environment should remain.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503430

PIC REFERENCE NUMBER: 40

IHSS Reference Number: Not Applicable

Unit Name: Automatic Transmission Fluid Leak - Building 443

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

October 29, 1991

Description of Operation or Occurrence

A spill of approximately three gallons of automatic transmission fluid from an air compressor occurred northwest of Building 443. The compressor was overpressurized allowing the oil to out onto the ground.[1]

Physical/Chemical Description of Constituents Released

Approximately three gallons of automatic transmission fluid were released. The cleanup generated roughly 21 cubic feet of material that was to be handled as a RCRA-regulated hazardous waste because it may exceed the TCLP standards for lead and chromium.[1]

Responses to Operation or Occurrence

The oil and contaminated soil was cleaned up, containerized and removed from the area. RCRA Contingency Plan Implementation Report No. 91-033 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j).

Fate of Constituents Released to Environment

The report states that the material was removed and that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area #331-1743.[1]

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1503431

PIC REFERENCE NUMBER: 41

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformer - 777-1

Approximate Location: N751,000; E2,084,000

Date(s) of Operation or Occurrence

1980 to August 1989

Description of Operation or Occurrence

In 1980 it was reported that transformer 771-1 was leaking at the drain valve.[1] In November 1985 and again in June and September 1986, transformer 771-1 was reported as leaking.[2,3,4]

Physical/Chemical Description of Constituents Released

The dielectric fluid of transformer 777-1 contains 56 ppm PCBs.[5,6,7]

Responses to Operation or Occurrence

In October 1986, the drain valve and case near the valve of transformer 771-1 was scheduled for recleaning.[8] Transformer 777-1 was scheduled for cleanup to take place on August 14, 1989.[9]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

References

[1] 1700025
[2] 1700110
[3] 1700074
[4] 1700068
[5] 1700062
[6] 1700027
[7] 1700001
[8] 1700077
[9] 1700129

PIC REFERENCE NUMBER: 42

IHSS Reference Number: Not Applicable

Unit Name: Diesel Fuel Leak - Building 460

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

August 3, 1986

Description of Operation or Occurrence

A report was made of a diesel fuel leak from a tanker truck by Plant Protection. The leak occurred south of Building 460 along the drainage excavation site.[1]

Physical/Chemical Description of Constituents Released

An estimated 100 to 150 gallons of diesel fuel leaked from the truck.[1]

Responses to Operation or Occurrence

Fire department personnel constructed a dike to prevent the spread of the spill. Dirt was used to absorb the standing fuel. The report mentions that cleanup operations were necessary but it is unknown if removal of the contaminated soil took place.[1]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1600552

PIC REFERENCE NUMBER: 43

IHSS Reference Number: Not Applicable

Unit Name: Drum Spill - 84 Intersection

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

December 31, 1964

Description of Operation or Occurrence

A spill occurred from a 30 gallon drum at the "84 intersection".[1] It is assumed that due to the change in the numbering system the building the report is referring to is Building 884. This indicates that the spill occurred at the junction of Eighth Street and Central Avenue.

Physical/Chemical Description of Constituents Released

An unknown quantity of oil spilled from the drum. Analytical results indicated three counts per minute while the background was 4.33 cpm.[1] The type of material producing this activity is unknown.

Responses to Operation or Occurrence

No responses were detailed. The document indicates that samples were taken and analyzed.[1]

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1600492

PIC REFERENCE NUMBER: 44

IHSS Reference Number: Not Applicable

Unit Name: Distillate Release - Building 374

Approximate Location: No documentation was found that indicated the exact location of this site.

Date(s) of Operation or Occurrence

September 30, 1977

Description of Operation or Occurrence

While transferring distillate from Building 374 to Building 774 a contractor broke a flange connected to the sump pump. Liquid was pumped to the ground south of Building 374. No personnel were contaminated.[1]

Physical/Chemical Description of Constituents Released

The liquid consisted of distillate that had been transferred to Building 774 on September 29. It was returned to Building 374 on September 30 because it was contaminated to 6,700 disintegration per minute per liter.[1]

Responses to Operation or Occurrence

Soil samples were taken for analysis. No cleanup was mentioned.

Fate of Constituents Released to Environment

No documentation was found that details the fate of constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from the documentation reviewed.

References

[1] 1600191

PIC REFERENCE NUMBER: 45

IHSS Reference Number: Not Applicable

Unit Name: Asphalt Thinner Spill

Approximate Location: East of 904 Pad

Date(s) of Operation or Occurrence

August 22, 1989

Description of Operation or Occurrence

A five-gallon can of asphalt thinner fell off a moving construction truck and broke east of the 904 Pad, spilling the contents.[1]

Physical/Chemical Description of Constituents Released

The asphalt thinner was not considered hazardous material.[1]

Responses to Operation or Occurrence

Construction Management supervised the cleanup and disposal of the spill using guidance from the RCRA/CERCLA group.[1] The RCRA/CERCLA Program Office determined that the event was not reportable to off-site agencies. No documentation was found which detailed the clean-up operation.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

None.

References

[1] 1501765

PIC REFERENCE NUMBER: 46

IHSS Reference Number: Not Applicable

Unit Name: Honey Wagon

Approximate Location: Roadways and Parking Lots between Building 250 and Building 124

Date(s) of Operation or Occurrence

September 1989

Description of Operation or Occurrence

A tanker truck used to transport untreated sewage from the Wind Site to the Building 124 sewage drain had several minor leaks. The truck allowed sewage to leak onto the ground wherever it went.[1,2]

Physical/Chemical Description of Constituents Released

Untreated sanitary sewage was released.[1] The sewage was transported by truck from the sanitary facilities at the Wind Site because it had no direct sewer lines or septic system.

Responses to Operation or Occurrence

The truck was removed from service.[2] No documentation was found which provided detail of responses to individual leak occurrences.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents released to the environment.

Comments

The exact location of this occurrence could not be determined from documentation reviewed.

References

[1] 1501747
[2] 1600444

PIC REFERENCE NUMBER: 47

IHSS Reference Number: Not Applicable

Unit Name: Nickel Carbonyl Container Burial

Approximate Location: N750,500; E2,085,500

Date(s) of Operation or Occurrence

June 17 and 18, 1963[1]

Description of Operation or Occurrence

Four 55-gallon drums, one GI can with two cylinders, and six loose cylinders of nickel carbonyl were removed from the burial pit west of Building 771 (PAC 700-1110) to a pit east of the Solar Evaporation Ponds. Explosives charges were used to vent the containers.[1]

Physical/Chemical Description of Constituents Released

Nickel carbonyl was released to the environment.[1]

Responses to Operation or Occurrence

Air samples were taken during the venting of the containers.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

Nickel carbonyl was released to the air during venting of the cylinders. No documentation was found which further details the fate of the constituent.

Comments

None.

References

[1] 1600236

PIC REFERENCE NUMBER: 48

IHSS Reference Number: Not Applicable.

Unit Name: Antifreeze Spill - 334 Parking Lot

Approximate Location: 2,082,000; 749,500

Date(s) of Operation or Occurrence

September 27, 1991

Description of Operation or Occurrence

On September 27, 1991, a ruptured hose on a personal vehicle released an antifreeze solution onto the surface of the Building 334 Parking Lot.[1]

Physical/Chemical Description of Constituents Released

Seven quarts of antifreeze solution consisting of ethylene glycol and water were released to the environment.[1]

Responses to Operation or Occurrence

Plant Services and the RFP Hazardous Materials team contained and cleaned up the spill. Contaminated materials were packaged, marked, and stored in accordance with RCRA requirements. RCRA Contingency Plan Implementation Report No. 91-023 was submitted to the CDH.[1]

Fate of Constituents Released to Environment

The spill was contained and removed from the asphalt surface. Contaminated materials were packaged, marked, and stored in accordance with RCRA requirements.[1]

Comments

None.

References

[1] 1503421

PIC REFERENCE NUMBER: 49

IHSS Reference Number: Not Applicable

Unit Name: Diesel Fuel Leak - Building 709

Approximate Location: N749,750; E2,084,000

Date(s) of Operation or Occurrence

July 17, 1991[1]

Description of Operation or Occurrence

On July 17, 1991, diesel fuel was discovered leaking from an above ground storage tank located near Building 709. A flow rate adjustment in an associated pumping system caused the release of diesel fuel from the tank vent to the surrounding soil.[1]

Physical/Chemical Description of Constituents Released

Approximately one quart of diesel fuel was released to the environment. The average benzene content of most diesel fuels is approximately 4%.[1]

Responses to Operation or Occurrence

The storage tank was isolated and shut down. A deficiency order was issued to the Maintenance Department for corrective action. The flow rate of the system was corrected. The system was to be monitored to avoid future releases. The contaminated soil, approximately one cubic foot, was removed and containerized and was to be handled as a RCRA-regulated waste.[1]

Fate of Constituents Released to Environment

The contaminated soil was containerized and was to be handled as a RCRA-regulated waste.[1]

Comments

None.

References

[1] 1503406

The following PICs are from documents that provided insufficient information as to location, date of occurrence, constituents released, and/or responses to occurrence.

TABLE PIC-2

PIC NUMBER	DOCUMENT NUMBER	DATE OF OCCURRENCE	QUOTE OR DESCRIPTION OF EVENT
PIC-50	1500883	1971	"Leakage from process waste tanks... No action"
PIC-51	1500594	January 3, 1968	The outside of a steel, 100 gal. tank was found contaminated with up to 2000 cpm alpha activity. Location described as "yard".
PIC-52	1700469	June 1982	"Twelve test drums which contained water, sand, and ethylene glycol were dumped where the liquid entered a storm drain. The user was told to contact Environmental Analysis prior to disposal of any liquid on the ground."
PIC-53	1500318	July 1972	"A 450 gallon oil storage tank overflowed while operators were pumping oil from another building to the storage tank." (More information is given in the document but no indication of location.)
PIC-54	1500516	July 1975	"An underground steamline ruptured spraying an asphalt-base insulation on two workers."
PIC-55	1500939	March 1971	"The shipment of drums of wastes was halted again the week of March 1 because of leaking sludge drums from Building 774. All drums must now be inspected prior to shipment for proper packaging, damage to liners and free liquids. Drums which have been inspected will be stored under cover and away from direct sunlight. Shipment of crated waste was resumed March 31, 1971."
PIC-56	1500381*5	November 9, 1955	"Sample of paper from floor of Rio Grande Motorways trailer #1715. The paper had been thoroughly saturated with liquid draining from waste barrels during accident on 11-3-55."

PIC-57	1500813	September 7, 1979	"Oil from spill in Co-60 pit." Analytical results indicated 238 pCi/l gross beta. Oil was "OK to dispose thru waste oil - 774".
PIC-58	1500870	June 1973	"Contaminated soil in the barrel storage area was checked and packaged for offsite shipment"
PIC-59	1500605	July 8, 1971	"Drilled check holes in the ground by sump pit.(2) Hit 40 gallons of water per minute in both holes."
PIC-60	1500755*27	Unknown	"Trailer tank 201 - This tank overflowed about 5 to 10 gallons of process wastes with measured activity of about 30,000 disintegrations per minute/l."
PIC-61	1800320 1800321	July 8, 1975	Photographs depicting removal of underground storage tank with holes in it indicating a release. Origin of tank and constituents released is unknown.

3.16 Off-Site Releases

Past environmental studies have demonstrated that contaminants generated by historical RFP activities are present in some locations outside the RFP boundaries. These contaminants have been transported offsite through surface water and air pathways.

RFP Operable Unit No. 3 (OU3), Off-Site Releases, is comprised of known areas of off-site contamination due to RFP operations. OU3 is comprised of four IHSSs: IHSS 199 (Contamination of the Land's Surface), IHSS 200 (Great Western Reservoir), IHSS 201 (Standley Lake), and IHSS 202 (Mower Reservoir). These four IHSSs all are located generally downwind and downgradient of RFP in relatively close proximity to the plant's eastern boundary. Although designated as separate IHSSs, each of these sites is essentially an off-site continuation of an on-site IHSS. IHSS 199, while not yet conclusively delineated (see discussion below), is for practical intents and purposes an off-site continuation of the 903 Lip Area (PAC 900-155). IHSS 200 incorporates off-site reaches of the Walnut Creek drainage and is therefore an off-site extension of PAC NE-142. IHSSs 201 and 202 incorporate off-site reaches of the Woman Creek drainage (PAC SE-142.10 and PAC SE-142.11), and also have potentially been impacted by airborne contaminants from the 903 Pad (see PAC 900-112 and PAC 900-155). For purposes of the HRR, the off-site IHSSs are not designated as separate PACs. However, they are discussed separately below because off-site IHSSs have been separately investigated and characterized in past studies.

The IAG milestone schedule for OU3 includes completion of a Phase I RFI/RI by December 1993. The work plan for this investigation has been completed, and includes sampling programs for off-site surface water, sediments, soil, ground water, air, and biota. The OU3 RFI/RI will supplement a number of off-site environmental sampling programs routinely conducted by RFP, CDH, and several municipalities that use Great Western Reservoir (IHSS 200) and Standley Lake (IHSS 201) as drinking water supplies.

The following sections discuss site conditions at each of the OU3 IHSSs. This information is summarized from the December 6, 1991 Final RFI/RI Work Plan for OU3.

IHSS 199 (Contamination of the Land's Surface)

IHSS 199, Contamination of the Land's Surface, targets off-site soil contamination as a result of RFP activities. Included within IHSS 199 are lands adjoining the eastern and southern RFP boundaries (the "lawsuit acreage") which were the subject of a 1975 lawsuit filed by the land owners against the United States and other defendants, alleging contamination of the land's surface by historical RFP releases. Several technical investigations and studies of the lawsuit acreage were conducted by the various parties to the lawsuit to provide supporting evidence in the case. A settlement agreement finalized in July 1985 required that RFP undertake remedial action on those portions of the land containing plutonium in surface soils in concentrations exceeding an action level adopted by the court of 0.9 picocuries per gram (pCi/g). Two contiguous tracts of land immediately east of RFP totalling 350 acres (the "remedy acreage"), which currently are owned by the City of Broomfield and Jefferson County, were targeted for remediation. Remediation consisted primarily of tilling to reduce surface concentrations and revegetating to stabilize the soil. To date, remedial activities have been undertaken on 120 acres of remedy acreage.

As presently defined, IHSS 199 includes all off-site soils that are contaminated by past RFP activities. The IHSS 199 boundary, therefore, is delineated by the extent of off-site contamination. Several studies have attempted to determine the extent of contamination at IHSS 199, and to identify prospective RFP source(s) of the contaminants. These past studies have focused almost exclusively on airborne plutonium releases from RFP, and in particular on the following possible sources: 1) a September 11, 1957 fire in Building 771, 2) a May 11, 1969 fire in Building 776; (3) leaking drums of plutonium-contaminated lathe coolant at the 903 Pad (PAC 900-112); and, (4) chronic low-level stack effluent. Past studies have

concluded that the great majority of the plutonium at IHSS 199 originated as windborne particulates from the 903 Pad, and have largely dismissed the contributions of the 1957 and 1969 fires and chronic stack emissions.

The past IHSS 199 studies have reached markedly different conclusions regarding the extent and concentration of plutonium in surface soils, illustrating the difficulty in delineating IHSS 199 based upon existing data. Results vary widely depending upon sampling methods, analytical methods and uncertainty, definition of "background" concentrations, and units of measurement. Most of the data collected since 1972 pertain specifically to the lawsuit acreage rather than IHSS 199 as a whole. In short, the IHSS 199 boundaries have not been conclusively delineated. Studies conducted to date, however, point to the following limitations.

- IHSS 199 most likely is limited to areas downwind of the RFP, namely to the northeast, east, and southeast of the plant.

- The remedy acreage was shown to have the highest concentrations of plutonium in soil of all lawsuit acreage, which adjoins most of the eastern and southern RFP boundaries. "Hot spots" may occur that were not detected through lawsuit acreage sampling; however, because other IHSS 199 lands downwind of the RFP are farther from the plant than the remedy acreage, it is reasonable to expect that these lands contain lower concentrations of plutonium than the remedy acreage.

- The most likely pathways of plutonium migration from IHSS 199 are wind and water erosion of surface soil.

Available information suggests that contaminants other than plutonium could conceivably have impacted IHSS 199 through airborne transport from RFP. Possible sources include the on-site burning of wastes, including waste oils contaminated with trace amounts of uranium (PAC 300-128, PAC 900-153, and PAC 300-171). Less plausible potential sources include a fire that breached the Building 444 exhaust filters, possibly releasing airborne beryllium to the environment (PAC 400-157.2), and wind stripping of waste water from the Solar Evaporation Ponds (PAC 000-101). Solar ponds water would possibly have contained inorganic ions and trace amounts of radionuclides and nonradioactive metals.

Very limited data exist for potential IHSS 199 contaminants other than plutonium. CDH has tested surface soils for uranium and beryllium, while RFP has conducted limited studies of various radionuclides other than plutonium, including americium, a daughter product of plutonium decay. The results of these studies suggest that concentrations of potential RFP contaminants other than plutonium and americium in off-site surface soils are consistent with expected background levels.

It is possible that on-site soils contaminated by the 903 Pad (PAC 900-155) could in turn generate windborne particulates that might impact IHSS 199, as could any abnormal airborne emission from the RFP, including those generated by soil remediation and similar activities at on-site RFP operable units. Results from off-site air monitoring stations operated by RFP suggest that IHSS 199 has not been measurably impacted by airborne emissions from RFP since the off-site air monitoring system was established in 1975. It is reasonable to expect that any future RFP emission potentially impacting IHSS 199 will also impact on-site soils and ambient air, and that the contamination will be detected through routine on-site air and soil monitoring.

IHSS 200 (Great Western Reservoir)

IHSS 200 encompasses Great Western Reservoir, off-site reaches of Walnut Creek (which formerly flowed into the reservoir from RFP), and downstream surface water features possibly impacted by outflow from the reservoir. Portions of Walnut Creek within the RFP boundaries (see PAC NE-142) are not included in IHSS 200.

Great Western Reservoir is located approximately 2.5 kilometers from the RFP eastern boundary. The reservoir is owned by the City of Broomfield and is utilized solely for the city's municipal water supply. Great Western Reservoir receives most of its water via an irrigation ditch from Clear Creek. Clear Creek is south of RFP and is not believed to be impacted by plant activities. Until recently, Great Western Reservoir also received influent from Walnut Creek, which flows from RFP (see PAC NE-142). A chromic acid release at the RFP in 1989 (see PAC 000-500 and PAC NE-142) prompted construction of a Walnut Creek diversion around Great Western Reservoir, known as the Broomfield Diversion Ditch, which now prevents surface water flowing from RFP from reaching Great Western Reservoir.

During the operating history of RFP, various waste streams were discharged through the on-site A-series and B-series ponds to Walnut Creek (see PAC NE-142). These effluents were discharged in accordance with internal guidelines (in particular, USAEC guidelines in the early history of the RFP), and, increasingly during the past two decades, with State and Federal pollution discharge regulations. The effluents contained metals, radionuclides, and inorganic ions (especially nitrate) within concentration limits considered acceptable at the time. Contaminants from these discharges accumulated in varying amounts in the sediments of the on-site holding ponds, Walnut Creek, and Great Western Reservoir. Radioactive materials released from RFP may also have been transported to Great Western Reservoir as airborne particulates (fugitive dust).

Available data from on-site RFP OUs, particularly OU 6 (Walnut Creek Drainage), provide an indication of contaminants other than plutonium which could conceivably have impacted Great Western Reservoir through surface water transport from RFP. Leakage from the Solar Evaporation Ponds (PAC 000-101) is known to have contaminated groundwater and surface water in the Walnut Creek drainage, primarily with nitrate and other inorganic ions. Inorganic ions, nonradioactive metals, VOCs, and uranium have been detected in the Walnut Creek holding ponds. Herbicides which have been applied in the past at various locations on RFP have also been detected in RFP surface water.

Numerous sampling programs have been conducted at Great Western Reservoir, focusing primarily on plutonium and americium contamination in reservoir bottom sediments. The results have shown that a discrete layer of sediment containing plutonium above the EPA estimated baseline (worldwide atmospheric fallout) level of less than or equal to 0.1 pCi/g is present throughout the bottom of the reservoir. Samples collected from Colorado Front Range reservoirs believed to be unaffected by RFP activities have corroborated this estimated baseline concentration. The highest concentrations of plutonium have been detected in the deepest areas of the reservoir. The plutonium-bearing sediment layer corresponds with historical RFP releases, and has been buried to varying depths by subsequent sedimentation. Sedimentation rates based on core samples vary from greater than 3.5 centimeters per year (cm/yr) in the eastern, deeper areas of the reservoir to less than 0.25 cm/yr in the shallowest areas.

Past studies of plutonium behavior in RFP surface water environs have demonstrated that the clay fraction of typical RFP-area sediments has an extremely high affinity for plutonium. Related laboratory studies have shown that the adsorption of plutonium onto these sediments is rapid and essentially irreversible. The studies demonstrated that plutonium in surface water impoundments (e.g., reservoirs) is not readily transported from the impoundments. It has been concluded that no evidence of plutonium migration through the sediment column exists at Great Western Reservoir.

RFP has monitored Walnut Creek water quality immediately inside the RFP boundary since the plant's inception. IHSS 200 surface water quality is also extensively monitored by the City of Broomfield and CDH. Water samples from Great Western Reservoir and off-site reaches of Walnut Creek are routinely analyzed for gross alpha and beta radiation, selected radionuclides, VOCs, pesticides, herbicides, metals and base neutral acids. Monitoring is conducted to evaluate RFP compliance with applicable State and Federal water quality standards. Currently applicable standards for RFP include:

- National Pollution Discharge Elimination System (NPDES) standards for RFP, first issued in 1974, which limit nonradioactive discharges;

- State drinking water standards for radioactive contaminants in community water systems, promulgated in 1977; and

- Colorado Water Quality Control Commission (CWQCC) temporary water quality standards for both radioactive and nonradioactive contaminants, which were adopted in July 1989 for all tributaries to Great Western Reservoir from RFP.

Potential RFP-derived contaminants in IHSS 200 other than plutonium and americium have not been extensively studied. A 1973 EPA study measured concentrations in Great Western Reservoir sediments of beryllium and of selected radionuclides other than plutonium. No significant variations in the concentrations of these potential RFP contaminants were observed throughout the reservoir or between Great Western Reservoir and Standley Lake (IHSS 201). An accidental release of tritium from RFP into Walnut Creek and Great Western Reservoir occurred in 1973 (see PAC 000-500 and PAC NE-142). Tritium concentrations in Great Western Reservoir water returned to approximately background levels by 1977. Tritium is one of the radionuclides routinely monitored in RFP surface water effluents. Tritium contamination in reservoir sediments has not been studied; however, tritium is not expected to concentrate in sediments because of its high mobility in the environment.

IHSS 201 (STANDLEY LAKE)

IHSS 201 encompasses Standley Lake, off-site reaches of Woman Creek (which flows into the reservoir from RFP), and downstream surface water features possibly impacted by outflow from the reservoir. Portions of the Woman Creek drainage within RFP (see PAC SE-142.10 and PAC SE-142.11) are not included in IHSS 201.

Standley Lake is a large reservoir located approximately 3 kilometers southeast of the RFP eastern boundary. Uses of the reservoir include municipal water supply and recreation. Approximately 67 percent of the water is used as water supply for the cities of Westminster, Northglenn, and Thornton. The remaining 33 percent is transported through irrigation ditches to agricultural areas northeast of the reservoir, primarily between Broomfield and Fort Lupton. Standley Lake receives approximately 96 percent of its water from Clear Creek via an irrigation ditch, but is also fed by Woman Creek, which drains the southern side of RFP.

During the operating history of RFP, various waste streams were discharged to the Woman Creek drainage (see PAC SE-142.10 and PAC SE-142.11). These effluents were discharged in accordance with internal guidelines (in particular, USAEC guidelines in the early history of RFP), and, increasingly during the past two decades, with State and Federal pollution discharge regulations. The effluents contained metals, radionuclides, and inorganic ions within concentration limits considered acceptable at the time. Contaminants from these discharges accumulated in varying amounts in the sediments of the on-site holding ponds, Woman Creek, and Standley Lake. Radioactive materials released from RFP may also have been transported to Standley Lake as airborne particulates (fugitive dust).

Prospective RFP sources of contaminants other than plutonium to Standley Lake, particularly VOCs and uranium, exist at OU 1 (881 Hillside) and OU 2 (903 Pad, Mound, and East Trenches). Herbicides, which have been applied in the past at various locations within RFP, have also been detected in RFP surface water.

Sampling programs at Standley Lake have focused primarily on plutonium and americium contamination in reservoir bottom sediments. The results suggest that a discrete layer of sediment containing plutonium above the EPA estimated baseline (worldwide atmospheric fallout) level of less than or equal to 0.1 pCi/g is present in some areas of the reservoir. As in Great Western Reservoir, the highest plutonium concentrations appear to exist in the deepest areas of Standley Lake. The plutonium-bearing sediment corresponds with historical RFP releases, which appear to have peaked in 1969. The affected sediments have been buried to varying depths by subsequent sedimentation. Sedimentation rates based on a core sample from the deeper area of the reservoir are estimated to be 3.4 cm/yr.

Routine water quality monitoring programs similar to those described above for IHSS 200 are conducted at IHSS 201 by RFP, CDH, and the cities of Westminster, Thornton, and Northglenn. Similar water quality standards to those described for IHSS 200 apply to IHSS 201.

IHSS 202 (Mower Reservoir)

IHSS 202 encompasses Mower Reservoir, off-site reaches of the irrigation ditch which feeds the reservoir from Woman Creek, and downstream surface water features possibly impacted by outflow from the reservoir.

Very little documentation exists for Mower Reservoir, a small, privately-owned impoundment located just southeast of RFP. The reservoir is fed by Woman Creek via Mower Ditch, an irrigation ditch that originates within RFP. Mower Reservoir is used for agricultural purposes, primarily cattle watering and irrigation. It covers an area of approximately nine acres. Intermittent discharge from Mower Reservoir flows southeast from the reservoir, eventually discharging to Standley Lake (IHSS 201).

In contrast to the extensive historical sampling data available for IHSSs 200 and 201, only very limited data have been collected to characterize Mower Reservoir. Mower Reservoir sediment samples collected in 1970 slightly exceeded EPA's expected plutonium baseline concentration of less than or equal to 0.1 pCi/g. Mower Reservoir sediments have not been sampled since 1970. Because the reservoir is not a public water supply, water quality is not monitored and has not previously been evaluated.

RFP-derived contaminants in Mower Reservoir are believed to have been transported primarily as airborne particulates, and to a lesser degree by surface water through Woman Creek. Numerous investigations of IHSS 199 have shown elevated plutonium concentrations in surface soils around Mower Reservoir. It is expected that Mower Reservoir received similar amounts of plutonium through airborne transport as the nearby land surface.

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4.0 RECOMMENDATIONS FOR FURTHER WORK

Per IAG requirements detailed in Subsection 1.1, the HRR is to be updated by DOE every three months to include newly identified or suspected release sites. Also, potential sources of additional historical data have been identified during the course of the project which were not accessible or which were not able to be reviewed within the IAG schedule for the HRR. The following subsections address recommendations for further HRR work based on these factors.

4.1 FUTURE UPDATING OF THE HRR

Quarterly updates of the HRR by DOE are required under the IAG. The first of these updates will be submitted to CDH and EPA on October 1, 1992. These updates will require open channels of communication between a number of RFP groups and the establishment of a reporting mechanism which receives input from these various groups on a regular schedule. It will also require maintenance and control of the HRR files and database. This document presents detailed information on a number of release sites at the RFP. For each of these sites, descriptions have considered the information found by the HRR project team for each site. As more information is collected and entered into the HRR database, the description of each PAC should be reviewed and updated, as necessary.

The RFP has several mechanisms in place for tracking unplanned events and unusual occurrences. The RFP personnel responsible for updating the HRR should be in contact with other RFP personnel in the Occurrence Notification Center (ONC) and in the Systems Management Group. The ONC is involved in categorization of unusual occurrences and the Management Systems Group is responsible for accumulating and maintaining records of such activities.

4.2 ADDITIONAL SOURCES OF HISTORICAL DATA

During the preparation of this initial HRR, a number of file sources were identified which could not be evaluated due to access restrictions or lack of available time under the IAG schedule for the HRR. It is recommended that the file sources listed below continue to be actively pursued by DOE. Any new information on historical releases obtained from these sources can be incorporated into the HRR as part of the quarterly updates described in the preceding subsection.

Files Held In RFP Production Buildings and By RFP Employees

On numerous occasions during the preparation of the HRR, files pertaining to and retained in specific RFP production buildings were identified by RFP employees as prospective sources of information for the HRR. Also identified were files held by individual RFP employees who may have been involved in release response or reporting activities.

INDEX

771 Outfall NE-9, NE-10, 700-39, 700-41, UBC-7
881 Hillside 3-21, SE-11, 800-9, 800-10, 800-12, 800-21, Offsite-5
881 Outfall SE-10, SE-11
903 Pad 3-22, 3-25, 3-35, SE-5, SE-6, 000-60, 000-61, 400-42, 700-53, 900-2, 900-8, 900-10, 900-11, 900-12, 900-14, 900-15, 900-17, 900-19, 900-20, 900-21, 900-31, 900-44, 900-45, Offsite-1, Offsite-2, Offsite-5
A-Series Drainage iii, NE-9, NE-10, NE-11, NE-12, NE-15, NE-23, NE-24, NE-25, NE-26, NE-33, 000-8
A-Series Ponds NE-10, NE-23, NE-26, NE-35, NW-1, 000-39
Acid iv, 2-8, 3-15, 3-16, 3-17, 3-18, 3-19, 3-21, 3-23, 3-27, 3-30, NE-16, NE-17, NE-21, NE-33, SE-6, SE-7, 000-6, 000-7, 000-50, 000-53, 000-54, 000-56, 000-57, 000-59, 100-10, 100-11, 100-13, 100-23, 300-1, 300-22, 300-26, 400-1, 400-9, 400-14, 400-24, 400-25, 400-35, 400-36, 400-37, 400-39, 500-1, 500-5, 600-1, 600-16, 600-17, 600-22, 700-14, 700-34, 700-37, 700-53, 700-62, 800-1, 800-28, 800-31, 900-33, 900-40, 900-52, UBC-2, UBC-5, UBC-6, UBC-7, UBC-8, PIC-2, PIC-7, PIC-21, PIC-25, Offsite-3
AEC vii, 2-2, NE-17
Aluminum 2-8, NW-8, SW-13, 000-7, 400-44, 500-5, 500-6, 500-7, 900-55
Americium vii, 2-8, NE-30, SE-6, 000-23, 000-31, 100-1, 300-1, 300-20, 400-37, 600-7, 600-13, 700-1, 700-52, 700-69, 700-70, 700-84, 700-88, 800-10, UBC-7, Offsite-2, Offsite-3, Offsite-4, Offsite-5
Asbestos 2-8, 3-15, NW-5, NW-6, NW-9, 100-22, 800-9, 800-12, 800-14
B-Series Drainage iii, NE-9, NE-14, NE-15, NE-16, NE-17, NE-18, NE-20, NE-21, NE-23, NE-24, NE-25, NE-26, NE-33, 700-14
B-Series Ponds NE-14, NE-15, NE-16, NE-17, NE-23, NE-26, NE-35, 000-44, 000-50, 700-15, 900-45, Offsite-3
Beryllium 1-3, 2-8, 3-17, NE-18, 000-23, 000-50, 000-54, 000-58, 100-1, 400-1, 400-5, 400-9, 400-17, 400-19, 400-20, 400-37, 400-52, 400-53, 500-6, 700-14, 700-16, 700-48, 700-62, 800-1, 800-15, 800-24, 800-25, 900-10, 900-35, UBC-5, Offsite-2, Offsite-4
Bowman's Pond 700-34, 700-89
Buffer zone 1-7, 2-7, 3-3, 3-11, 3-13, 3-14, NE-1, NE-17, NE-36, NE-37, NW-1, NW-17, SE-1, SE-6, SW-1, 000-19, 000-34, 000-40, 000-60, 000-61, 100-1, 300-1, 400-1, 600-1, 700-1, 800-1, 900-1, 900-12, 900-32
Building 111 3-15, 100-1, 100-18, PIC-30
Building 115 3-15, 3-35, 100-16, 300-6, PIC-3, PIC-35
Building 121 3-15, 100-1, 100-21
Building 122 000-19, 000-25, 100-1, 400-1, 400-11, 700-16, UBC-1
Building 123 3-15, 3-33, 3-34, 000-19, 000-25, 100-1, 100-5, 100-6, 100-10, 100-11, 100-13, 100-22, 100-23, 100-24, 300-5, 400-1, 400-11, 700-16, UBC-1
Building 124 3-15, 3-34, SW-13, SW-14, 100-8, PIC-51
Building 218 600-16
Building 219 SW-10
Building 222 100-9
Building 331 3-16, 3-35, NE-39, 100-22, 300-1, 300-5, 300-6, 300-7, 300-8, 300-16, 300-28, 300-36, 900-11, 900-29, UBC-1, UBC-9, PIC-2, PIC-3, PIC-12, PIC-24, PIC-34, PIC-37
Building 333 300-1
Building 334 3-15, 3-16, 3-17, 3-28, 3-30, NE-26, 000-25, 300-1, 300-14, 300-15, 300-18, 300-35, 400-40, 400-42, 600-20, 700-46, PIC-2, PIC-3, PIC-26, PIC-28, PIC-29, PIC-30, PIC-39, PIC-53
Building 335 300-1, 300-5, 300-6, 300-7, 300-8, 300-9, 300-16, 300-17
Building 367 300-1, 300-27
Building 371 3-16, 3-30, 3-33, 3-34, NE-12, NE-21, NW-1, 000-57, 000-60, 000-61, 300-1, 300-7, 300-10, 300-12, 300-14, 300-15, 300-19, 300-22, 300-23, 300-24, 300-25, 300-26, 300-34, 900-45, UBC-1, UBC-9
Building 373 NE-12, NW-5, 300-1, 300-10
Building 374 3-16, 3-33, 3-34, NE-14, 000-6, 000-7, 000-10, 000-14, 000-45, 000-57, 000-58, 100-13, 100-24, 300-1, 300-8, 300-10, 300-11, 300-12, 300-14, 300-19, 300-20, 300-22, 300-23, 300-26, 300-30, 300-31, 400-1, 400-35, 400-37, 500-1, 700-1, 700-48, 700-50, 700-73, 800-27, 800-28, 900-44, UBC-1, PIC-3, PIC-49
Building 381 3-16, 300-29
Building 440 3-17, 3-35, 400-1, 400-19, 400-20, 400-21, 400-47, 400-48, UBC-1, UBC-5, PIC-2, PIC-3, PIC-16, PIC-43
Building 441 3-35, 000-19, 000-25, 000-26, 000-35, 000-56, 100-5, 400-1, 400-11, 400-12, 400-17, 700-16, 700-48, UBC-1, PIC-3
Building 442 3-17, 3-34, NE-16, 000-50, 400-1, 400-17, 400-18, 400-25, 400-49, UBC-1
Building 443 iii, 3-17, 3-35, 000-26, 000-44, 100-11, 400-1, 400-13, 400-14, 400-24, 400-25, 400-32, 400-40, 400-46, 600-1, PIC-2, PIC-3, PIC-15, PIC-45
Building 444 3-16, 3-17, 3-18, 3-25, 3-27, 3-29, 3-30, 3-33, 3-34, NE-5, NE-7, NE-20, NE-33, NW-8, SW-5, SW-8, SW-10, 000-19, 000-25, 000-26, 000-50, 000-56, 000-58, 000-59, 100-11, 300-8, 400-1, 400-2, 400-5, 400-9, 400-10, 400-11, 400-15, 400-16, 400-19, 400-20, 400-21, 400-22, 400-23, 400-33, 400-37, 400-38, 400-39, 400-44, 400-52, 400-53, 600-1, 600-6, 600-11, 600-12, 600-16, 600-20, 600-21, 600-23, 700-16, 700-48, 900-5, 900-6, 900-7, 900-10, 900-12, 900-14, 900-28, UBC-1, UBC-5, UBC-6, Offsite-2
Building 445 400-1, 400-21
Building 446 400-44, 400-45
Building 447 3-16, 3-17, 3-25, SW-8, SW-10, 400-1, 400-5, 400-9, 400-15, 400-19, 400-20, 400-33, 400-41, UBC-1, UBC-5, PIC-2, PIC-18
Building 452 400-25, 600-9

Building 460 3-16, 3-17, 3-27, 3-30, 3-33, SW-5, 000-57, 300-19, 400-2, 400-15, 400-21, 400-35, 400-45, 800-1, PIC-3, PIC-47
Building 528 500-1, 500-9, 500-10, UBC-1
Building 551 3-17, 3-29, 400-13, 400-17, 400-42, 500-1, 500-5, 500-6, 500-7, 500-11, PIC-2, PIC-13
Building 552 300-19
Building 553 300-7, 500-7
Building 559 3-17, 3-29, 000-26, 000-35, 300-14, 500-1, 500-9, 500-10, 500-13, 500-18, UBC-1, UBC-6, PIC-2, PIC-12, PIC-20
Building 662 3-18, 000-26, 600-1, 600-12, 600-18, 600-20, 600-21, 600-23, PIC-2, PIC-14
Building 663 3-18, 000-25, 600-1, 600-12, 600-20, 600-21, 600-22, 600-23
Building 664 3-18, 3-26, 3-29, 400-48, 600-1, 600-7, 600-13, 600-14
Building 666 3-18, 600-24, 900-11
Building 668 600-1
Building 701 700-1, 700-43, UBC-1, UBC-6
Building 705 000-54, 700-1
Building 707 3-18, 3-20, 3-26, 3-28, 3-34, 3-35, NE-16, NE-25, 000-19, 000-27, 000-29, 000-30, 000-35, 300-14, 700-1, 700-12, 700-14, 700-16, 700-62, 700-71, 700-72, 700-80, UBC-1, UBC-6, UBC-7, PIC-2, PIC-6, PIC-10, PIC-11
Building 708 3-20, 000-47, 700-82
Building 709 3-34, 000-47, PIC-3, PIC-54
Building 712 700-30, 700-31
Building 713 700-30, 700-31
Building 714 700-36, 700-37, 700-93
Building 727 700-32
Building 728 000-27, 000-35, 700-22, 700-23, 700-29
Building 730 3-18, 3-26, 000-27, 000-31, 000-35, 700-9, 700-10, 700-28, 700-29, 700-43, 700-44
Building 732 3-20, 3-35, 700-77
Building 750 2-3, 3-20, 3-28, 000-47, 700-1, 700-61, 700-92, PIC-2, PIC-7
Building 770 700-52, 700-53, 700-54, 700-55, UBC-1
Building 771 1-4, 3-19, 3-20, 3-27, 3-28, 3-33, 3-34, 3-35, NE-9, NE-10, NE-16, NE-29, NE-31, 000-10, 000-15, 000-19, 000-27, 000-29, 000-30, 000-31, 000-32, 000-35, 000-37, 000-41, 000-42, 000-57, 600-16, 600-22, 700-1, 700-2, 700-14, 700-22, 700-23, 700-28, 700-29, 700-34, 700-35, 700-36, 700-37, 700-39, 700-40, 700-41, 700-46, 700-52, 700-53, 700-54, 700-55, 700-57, 700-58, 700-59, 700-69, 700-70, 700-75, 700-87, 700-88, 700-89, 700-91, 700-93, 900-14, 900-33, UBC-1, UBC-7, PIC-2, PIC-21, PIC-22, PIC-23, PIC-29, PIC-52, Offsite-1
Building 774 3-19, 3-27, NE-9, NE-10, NE-12, NE-14, NE-15, NE-20, NE-25, NE-26, NE-29, NE-31, SE-5, SE-10, 000-5, 000-15, 000-19, 000-26, 000-27, 000-28, 000-29, 000-30, 000-31, 000-32, 000-34, 000-35, 000-41, 000-42, 300-14, 300-19, 300-20, 400-20, 400-35, 400-37, 400-53, 700-1, 700-18, 700-20, 700-21, 700-24, 700-25, 700-28, 700-30, 700-34, 700-35, 700-36, 700-39, 700-43, 700-45, 700-46, 700-48, 700-50, 700-51, 700-53, 700-54, 700-59, 700-60, 700-67, 700-75, 700-87, 700-88, 900-10, 900-11, 900-14, 900-15, 900-21, 900-33, 900-44, UBC-1, UBC-7, PIC-49, PIC-55
Building 776 1-7, 3-18, 3-20, 3-26, 3-28, 3-34, 000-19, 000-27, 000-29, 000-30, 000-31, 000-35, 000-57, 600-5, 600-11, 600-15, 600-21, 700-1, 700-9, 700-10, 700-12, 700-26, 700-27, 700-28, 700-30, 700-43, 700-52, 700-53, 700-55, 700-57, 700-58, 700-64, 700-69, 700-76, 700-78, 700-86, 700-90, 800-17, 900-12, 900-14, 900-21, UBC-1, UBC-2, UBC-7, PIC-2, PIC-8, PIC-23, PIC-27, Offsite-1
Building 777 1-7, 000-27, 000-28, 600-5, 600-11, 700-1, 700-43, 700-44, 700-48, 700-64, 900-1, 900-12, UBC-1, UBC-2, UBC-7, PIC-8
Building 778 3-20, NE-16, 000-27, 000-30, 300-20, 700-2, 700-12, 700-57, 700-61, 700-64, 700-77, 700-90, UBC-1, UBC-7
Building 779 3-19, 3-20, 3-27, 3-28, 000-9, 000-19, 000-28, 000-30, 000-49, 000-57, 700-2, 700-30, 700-32, 700-43, 700-44, 700-63, 700-66, 700-83, 700-90, UBC-1, UBC-7, UBC-8
Building 788 3-34, 000-6, 000-10, 700-2
Building 865 3-21, 3-30, 3-35, 000-19, 000-33, 800-1, 800-24, 800-25, 800-30, 800-32, 800-33, 800-40, UBC-1, PIC-3, PIC-33
Building 881 2-3, 3-14, 3-21, 3-28, 3-29, 3-30, 3-31, NE-16, SE-5, SE-6, SE-9, SE-10, SE-11, SE-13, SE-14, 000-19, 000-27, 000-28, 000-32, 000-37, 000-55, 000-56, 300-8, 400-20, 400-24, 400-52, 400-53, 600-5, 600-15, 600-16, 600-17, 600-21, 600-22, 700-14, 700-16, 700-26, 700-46, 700-48, 700-57, 700-64, 800-1, 800-5, 800-7, 800-8, 800-9, 800-10, 800-12, 800-14, 800-15, 800-21, 800-22, 800-23, 800-26, 800-27, 800-30, 800-33, 800-35, 800-38, 900-7, 900-9, 900-14, 900-17, 900-20, 900-21, 900-28, UBC-1, UBC-6, UBC-8, PIC-20
Building 883 iii, 3-21, 3-22, 3-30, 3-34, 3-36, 000-19, 000-26, 000-27, 000-32, 000-33, 000-56, 000-60, 000-61, 400-17, 600-16, 600-21, 600-22, 700-16, 700-48, 800-1, 800-15, 800-19, 800-25, 800-28, 800-30, 800-31, 800-36, 800-37, 800-39, 800-41, 900-7, 900-14, 900-33, UBC-1, UBC-6
Building 884 000-33, 800-19, 800-20, PIC-48
Building 885 3-21, 3-29, 800-21
Building 886 3-21, 3-29, 3-35, 000-33, 800-1, 800-17, 800-32, 800-33, 800-40, UBC-1, PIC-2, PIC-3, PIC-17, PIC-41
Building 889 3-21, 3-29, 000-19, 800-1, 800-19, 800-20, 800-30, 800-33, 800-34, UBC-1, PIC-2, PIC-25
Building 903 900-11
Building 904 900-11
Building 910 000-60, 000-61, 900-1, 900-47
Building 952 NW-17, 900-17, 900-20, 900-23, 900-40
Building 964 900-1, 900-38
Building 980 3-22, 3-29, 3-30, 900-1, 900-37, 900-43
Building 991 3-22, 3-23, 3-29, 3-30, SW-5, SW-8, 000-34, 700-14, 900-1, 900-15, 900-28, 900-29, 900-35, 900-42, 900-48, 900-51, 900-52, 900-53, 900-55, UBC-1, UBC-8, PIC-18
Building 993 900-1, 900-55
Building 995 NE-9, NE-14, NE-15, NE-16, NE-17, NE-20, NE-21, NE-22, NE-27, NE-28, NW-5, 000-28,

000-34, 000-35, 000-44, 000-49, 000-50, 000-56, 000-57, 000-58, 400-25, 700-24, 700-25, 700-39, 700-43, 900-1, 900-25, 900-47, 900-51
Building 996 900-1, 900-35, UBC-8
Building 997 900-1, 900-35, UBC-8
Building 998 900-1, 900-35, UBC-8
Building 999 900-1, 900-35, UBC-8
C-Series Drainage NE-33, SE-5, SE-6, SE-7, SE-11, SE-14, SW-14
C-Series Ponds NE-35
Carbon tetrachloride vii, 2-8, 000-8, 000-23, 000-41, 000-42, 300-24, 400-19, 400-20, 700-9, 700-10, 700-12, 900-9, 900-11, UBC-8, PIC-2, PIC-13, PIC-23
Cattle Fence NE-1, NW-1, SE-1, SE-12, 000-5, 000-44, 800-10
Caustic 3-15, 3-19, 3-30, NE-16, SE-5, SW-5, SW-14, 000-44, 000-45, 300-30, 400-10, 400-24, 400-25, 700-34, 700-35, 700-37, 700-87, 700-88, 900-40
Central Avenue 3-3, 3-15, 3-29, NE-1, NE-16, NW-1, SE-1, SW-1, 000-30, 000-35, 000-37, 000-41, 000-42, 000-44, 000-45, 000-60, 400-14, 400-31, 500-11, 600-5, 600-6, 600-9, 600-10, 700-48, 800-15, 800-32, 900-6, 900-10, 900-21, 900-28, 900-30, 900-44, PIC-18, PIC-20, PIC-48
Central Avenue Ditch NE-16, 000-44, 000-45, 400-31, 500-11, 600-10, 800-32, PIC-18
Chlorine NE-21, NE-22, NE-34, SW-13, 300-1
Chromate 300-10, PIC-18
Chromic acid 3-23, NE-16, NE-17, NE-33, 000-50, 000-53, 000-54, 000-59, 900-52, UBC-6, Offsite-3
Chromium 2-8, NE-16, NE-17, NE-18, NE-20, NE-33, NE-34, NW-8, SE-13, 000-7, 000-23, 000-50, 000-54, 000-56, 100-25, 300-31, 400-15, 400-20, 400-37, 400-39, 700-30, 700-32, PIC-18, PIC-33, PIC-34, PIC-43, PIC-45
Church Ditch NE-1, NE-15, NW-1, SW-1
Closure 1-10, NE-31, NE-32, NW-5, NW-7, NW-16, 000-8, 000-14, 000-19, 000-20, 000-24, 000-39, 000-40, 300-18, 300-23, 300-24, 400-14, 400-25, 700-18, 700-20, 700-21, 700-75, 900-10, 900-43
Condensate 3-14, 3-17, 3-20, 3-30, NE-9, NE-10, NE-16, NE-17, SE-5, SE-10, SE-11, SE-13, 000-15, 000-26, 000-57, 300-23, 400-32, 600-9, 700-16, 700-34, 700-35, 700-36, 700-72, 700-87, 700-88, 800-35
Container 3-14, 3-16, 3-22, 3-29, 3-30, NW-6, NW-15, NW-19, 300-14, 300-18, 300-26, 400-39, 500-7, 500-19, 700-53, 700-55, 700-73, 800-36, 900-33, 900-34, 900-43, 900-52, PIC-3, PIC-13, PIC-52
Contaminated soil NE-9, NE-16, NE-17, NE-20, NW-19, SW-6, 000-24, 000-42, 100-8, 100-9, 300-14, 300-16, 400-17, 400-25, 400-51, 500-9, 700-26, 700-35, 700-40, 700-41, 700-43, 700-46, 700-48, 700-54, 700-57, 700-59, 700-63, 700-64, 700-66, 800-12, 800-30, 900-6, 900-11, 900-12, 900-14, 900-15, 900-21, 900-32, 900-33, 900-34, UBC-7, PIC-4, PIC-34, PIC-35, PIC-44, PIC-45, PIC-47, PIC-54, PIC-56
Contingency Plan Implementation Report iii, 3-8, 3-9, 3-33, NE-16, NE-17, NE-34, NE-39, SE-6, 000-7, 000-14, 000-50, 000-53, 100-9, 100-12, 100-13, 100-23, 100-25, 300-20, 300-26, 300-31, 300-36, 400-36, 400-49, 400-51, 500-19, 700-35, UBC-5, UBC-6, UBC-7, UBC-8, PIC-28, PIC-29, PIC-30, PIC-31, PIC-33, PIC-34, PIC-35, PIC-36, PIC-37, PIC-38, PIC-39, PIC-40, PIC-41, PIC-42, PIC-43, PIC-44, PIC-45, PIC-53
Cooling tower 3-14, 3-15, 3-16, 3-19, 3-27, NE-10, NE-12, NE-15, NW-5, NW-8, SE-5, SE-7, SE-10, SE-13, SE-14, 300-1, 300-10, 300-11, 400-15, 400-16, 400-19, 400-20, 700-30, 700-31, 700-32, 800-10, 900-1, PIC-2, PIC-18
Corrosion NE-12, 000-20, 300-10, 300-19, 400-15, 400-22, 700-10, 900-33, 900-51, PIC-18
Criticality 800-1
Cyanide vii, 000-7, 400-9, 400-21, 400-37, 400-39, 800-27, 900-5, UBC-6
Dock 3-16, 3-21, 3-22, 3-25, 3-29, SE-13, 000-41, 000-42, 100-17, 300-22, 300-26, 400-5, 400-9, 400-10, 400-17, 400-18, 400-19, 400-21, 500-7, 700-26, 700-52, 700-53, 700-54, 700-55, 700-57, 700-66, 700-71, 800-35, 900-35, 900-48
East Gate NE-38, 300-22, 900-6
East Spray Field NE-33, NE-34, NE-35, SE-6
Effluent 1-8, 3-19, 3-28, NE-14, NE-15, NE-20, NE-21, NE-33, NE-34, NE-35, SE-10, SE-13, SW-13, 000-5, 000-10, 000-23, 000-35, 000-39, 000-40, 000-44, 000-50, 000-55, 000-56, 000-57, 000-58, 300-1, 300-10, 400-25, 700-40, 700-41, 700-50, 700-75, 700-76, 800-10, 800-14, 900-1, 900-15, 900-42, Offsite-1
Ethanolamine 900-10
Ethylene glycol 2-8, NE-16, 000-47, 000-57, 100-11, 700-40, PIC-2, PIC-9, PIC-15, PIC-26, PIC-41, PIC-53, PIC-55
Explosion NE-37, 300-8, 700-26, 700-57, 700-76, UBC-7
Fiberglass 400-35, 600-1, 600-7
FIDLER vii, 1-7, NW-8, NW-10, 000-33, 700-50, 700-88, 700-89, 800-20, 800-33, 900-32, 900-34
Fire 1-4, 1-7, 3-16, 3-17, 3-21, NE-21, NE-36, NE-37, NE-39, NW-8, NW-17, NW-19, 000-19, 000-20, 000-28, 100-25, 300-1, 300-5, 300-7, 300-8, 300-16, 300-17, 300-28, 300-29, 300-34, 400-9, 400-19, 400-20, 400-24, 400-31, 400-33, 400-52, 400-53, 500-11, 600-5, 600-11, 600-15, 600-16, 700-1, 700-22, 700-26, 700-35, 700-52, 700-53, 700-57, 700-61, 700-64, 700-71, 700-76, 700-78, 700-91, 800-19, 800-30, 800-35, 800-36, 900-2, 900-11, 900-21, 900-30, 900-33, UBC-2, UBC-5, UBC-6, UBC-7, PIC-47, Offsite-1, Offsite-2
Firing range 1-2, 2-9, NW-1
Flume pond 3-13, 3-27, NE-23
Fluoride NE-21, 000-7, 000-24, 000-56, 400-39, 700-14, 700-16, 700-37, 700-62
Footing Drain 3-20, NE-10, NE-12, NE-15, NE-29, NE-31, SE-6, SE-14, 000-10, 000-60, 000-61, 500-9, 700-45, 700-50, 700-87, 700-88, 700-89, 800-12, UBC-7, UBC-9
Freon NW-15, 400-33
Glovebox 600-5, 600-6
Graphite SE-5, SW-5, SW-14, 300-7, 300-8, 400-1, 400-9, 400-21, 600-20, 900-5, 900-33

Great Western Reservoir NE-15, NE-23, 000-5, 700-15, Offsite-1, Offsite-3, Offsite-4, Offsite-5
Groundwater 1-7, 1-8, NE-10, NE-12, NE-29, NW-1, NW-6, NW-7, NW-8, NW-9, NW-10, 000-7, 000-8, 000-10, 000-14, 000-16, 000-24, 000-32, 000-33, 000-39, 000-40, 100-11, 300-20, 400-5, 400-11, 400-22, 700-15, 700-22, 700-28, 700-29, 700-48, 800-12, 800-13, 900-2, 900-11, 900-14, 900-15, 900-17, 900-18, 900-19, 900-20, 900-26, 900-47, UBC-2, Offsite-3
HEPA Filter 900-32
Hydrofluoric acid 2-8, 3-19, 3-27, 100-23, 400-35, 400-39, 700-37
Hydrogen peroxide 3-17, 3-30, 400-31, 500-11
IHSS 199 Offsite-1, Offsite-2, Offsite-5
IHSS 200 NE-10, NE-18, Offsite-1, Offsite-3, Offsite-4, Offsite-5
IHSS 201 Offsite-1, Offsite-4, Offsite-5
IHSS 202 Offsite-1, Offsite-5
IIR vii, NW-13, 100-12
Incinerator 3-14, 3-15, 3-26, NW-5, NW-8, SE-5, SW-5, SW-6, SW-8, SW-9, SW-10, SW-11, SW-12, SW-14, 100-21, 900-33
Indiana Street NE-17, NE-23, NE-24, SE-6
Ion exchange 700-52, 700-53, 700-69
Irrigation NE-9, NE-29, NE-33, NE-34, NE-35, NE-37, 000-39, 000-40, 000-58, Offsite-3, Offsite-4, Offsite-5
Landfill iii, 3-14, 3-25, NE-5, NE-8, NE-26, NE-27, NE-28, NE-29, NE-30, NE-31, NE-32, NW-1, NW-5, NW-6, NW-7, NW-8, NW-9, NW-10, NW-11, NW-15, NW-17, NW-18, NW-19, NW-20, SW-5, SW-6, SW-8, SW-10, SW-11, SW-12, 000-7, 000-60, 000-61, 100-21, 300-25, 400-44, 500-5, 500-13, 600-9, 700-86, 800-12, 800-31, 900-7, 900-8, 900-15, 900-34, 900-39, 900-40, PIC-7
Landfill pond NE-29, NE-30, NE-31, NE-32, NW-7, NW-10, NW-11
Lathe coolant NE-5, NE-7, NW-15, 000-41, 900-5, 900-7, Offsite-1
Laundry 3-20, NE-9, NE-10, NE-15, NE-16, NE-17, NE-20, NW-5, 000-23, 000-27, 000-30, 000-31, 000-32, 000-35, 000-50, 000-54, 000-55, 000-56, 400-1, 400-17, 700-1, 700-2, 700-22, 700-28, 700-29, 700-39, 700-40, 700-41, 700-43, 700-59, 700-77, 800-1, 800-14, UBC-5, UBC-6
Lead 2-8, 3-9, 100-5, 400-37, 700-51, UBC-2, PIC-28, PIC-29, PIC-30, PIC-33, PIC-34, PIC-39, PIC-41, PIC-43, PIC-44, PIC-45
Lithium 2-8, 3-15, 3-27, 000-7, 300-6, 300-7, 300-8, 300-17, 400-15, 400-20, 900-17, 900-19, 900-23, UBC-5
McKay Ditch NE-1, NE-10, NE-12, NE-23, NW-1, SW-1, 000-39, 000-40, 700-40, 700-41
Mercury 2-8, 3-15, 100-1, 100-8, 100-9
Mound 3-22, 3-25, 600-20, 900-6, 900-12, 900-14, 900-15, 900-28, 900-48, Offsite-5
Mower Reservoir Offsite-1, Offsite-5
Nickel carbonyl 3-14, 3-20, 3-30, NW-17, NW-18, 700-91, 900-23, PIC-3, PIC-52
Nitrate 2-3, 2-8, NE-9, NE-10, NE-11, NE-12, NE-14, NE-18, NE-20, NE-30, NE-31, NE-34, NW-6, SE-6, 000-5, 000-7, 000-8, 000-9, 000-14, 000-17, 000-23, 000-24, 000-25, 000-27, 000-29, 000-31, 000-32, 000-33, 000-34, 000-39, 000-40, 000-54, 000-56, 000-58, 100-5, 100-6, 100-12, 300-19, 300-31, 500-6, 700-14, 700-16, 700-18, 700-20, 700-22, 700-24, 700-48, 700-50, 700-52, 700-59, 700-69, 700-73, 700-88, 900-17, 900-19, 900-38, 900-44, 900-45, UBC-5, UBC-9, Offsite-3
Nitric acid 2-8, SE-6, 000-54, 000-57, 100-11, 100-13, 100-23, 300-22, 400-9, 400-35, 400-39, 500-1, 600-1, 600-16, 600-17, 700-14, 700-53, 700-62, 800-28, 900-33, UBC-2, UBC-7
North Walnut Creek NE-1, NE-9, NE-23, NW-1, NW-7, 000-10, 000-14, 000-39, 300-10, 700-39, 700-45, 900-1
NPDES iii, viii, NE-9, NE-10, NE-12, NE-17, NE-18, NE-20, NE-21, NE-33, NE-34, NE-35, NW-10, SE-7, 000-39, 000-56, 900-26, 900-47, Offsite-4
Offsite 2-12, 2-14, 3-3, 3-11, NE-5, NE-8, NE-10, NE-15, NE-25, NW-5, NW-6, NW-8, NW-10, SE-6, 000-10, 000-14, 000-39, 000-40, 000-45, 100-1, 100-21, 100-25, 300-20, 600-6, 600-11, 600-13, 700-1, 700-41, 700-54, 800-1, 900-11, 900-12, 900-15, 900-25, 900-28, 900-32, 900-34, PIC-41, PIC-56, Offsite-1
Oil 2-8, 3-15, 3-16, 3-17, 3-18, 3-20, 3-21, 3-22, 3-25, 3-26, 3-28, NE-5, NE-7, NE-20, NE-34, NE-38, NE-39, NW-1, NW-8, NW-9, NW-15, NW-19, SE-6, SW-15, 000-41, 000-42, 000-56, 000-60, 000-61, 100-16, 100-18, 100-20, 100-25, 300-1, 300-5, 300-6, 300-9, 300-12, 300-16, 300-17, 300-28, 300-35, 400-5, 400-13, 400-14, 400-19, 400-20, 400-22, 400-42, 400-44, 400-47, 400-49, 400-51, 500-15, 500-18, 500-19, 500-20, 600-1, 600-5, 600-6, 600-9, 600-10, 600-13, 600-18, 600-21, 700-14, 700-16, 700-26, 700-35, 700-64, 700-78, 700-82, 700-83, 700-86, 700-92, 800-5, 800-9, 800-12, 800-21, 800-37, 800-39, 800-41, 900-5, 900-6, 900-10, 900-11, 900-12, 900-14, 900-15, 900-28, 900-29, 900-30, 900-38, 900-39, 900-43, 900-54, UBC-9, PIC-2, PIC-3, PIC-4, PIC-5, PIC-10, PIC-11, PIC-12, PIC-16, PIC-17, PIC-27, PIC-28, PIC-29, PIC-30, PIC-31, PIC-33, PIC-35, PIC-36, PIC-37, PIC-43, PIC-44, PIC-45, PIC-48, PIC-55, PIC-56
OPWL iii, viii, 000-19, 000-20, 000-23, 000-24, 000-25, 000-28, 000-35, 100-11, 400-12, 700-16, 700-23, 700-25, 700-29, 700-45, 700-46, 700-49, 700-51
OU1 800-5, 800-7, 800-8, 800-9, 800-10, 800-13, 800-14, 900-17, 900-19, 900-21, PIC-40
OU10 NW-14, NW-16, 300-18, 300-23, 300-24, 400-14, 400-22, 400-36, 400-37, 400-39, 700-73, 800-21, 900-37, 900-39, 900-43, 900-45
OU11 000-40
OU12 400-5, 400-10, 400-15, 400-20, 400-25, 800-15
OU13 000-45, 300-6, 300-8, 300-17, 300-21, 400-18, 400-31, 500-5, 500-6, 500-7, 500-11
OU14 000-38, 300-14, 700-26, 800-17, 800-19
OU15 400-34, 800-23, 800-24, 800-25, 800-26, 800-27
OU16 000-47, 400-32, 500-13, 700-71, 700-72
OU2 NE-5, NE-8, 900-6, 900-8, 900-12, 900-15, 900-23, 900-29, 900-30, 900-32, 900-40, PIC-40

OU3 900-12, Offsite-1
OU4 000-14, 700-51
OU5 SE-7, SW-6, SW-9, SW-11, SW-12
OU6 NE-10, NE-18, NE-23, NE-25, NE-28, NE-32, NE-34, 700-41, 900-26, 900-34
OU7 NW-10, NW-20
OU8 000-42, 300-10, 300-12, 300-22, 700-10, 700-12, 700-15, 700-30, 700-32, 700-35, 700-37, 700-43, 700-55, 700-58, 700-60, 700-61, 700-62, 700-63, 700-66, 700-67, 700-70, 900-35, 900-42
OU9 000-24, 400-12, 500-10, 700-16, 700-19, 700-21, 700-23, 700-25, 700-29, 700-46, 700-48, 700-51, 700-75
Outfall 3-19, 3-21, 3-25, 3-27, NE-9, NE-10, NE-16, NE-17, NE-29, SE-6, SE-10, SE-11, SW-5, SW-8, 000-28, 000-32, 700-39, 700-40, 700-41, 700-87, 700-88, 800-10, 800-12, UBC-7
PA viii, 000-9, 300-1, 300-19, 300-25, 500-1, 700-1, 700-30, 700-52, 800-1, 900-1, 900-30
PAC 000-101 NE-7, NE-10, NE-12, NW-7, 000-19, 000-39, 500-5, 700-32, 700-51, 700-88, 900-1, 900-33, 900-38, Offsite-2, Offsite-3
PAC 000-121 iv, 000-38, 000-49, 100-11, 400-12, 700-16, 700-23, 700-25, 700-29, 700-46, 700-49, 700-51, PIC-20
PAC 000-168 000-10
PAC 000-172 700-53, 900-10
PAC 000-190 NE-16, NE-17, 400-14, 400-25
PAC 000-192 NE-16, NE-17, 000-47, 700-15
PAC 000-500 iv, NE-16, 000-60, 900-25, Offsite-3, Offsite-4
PAC 000-501 300-12
PAC 100-148 100-12
PAC 100-601 100-6
PAC 100-602 100-6, 100-13
PAC 100-603 100-6
PAC 100-604 000-50, 000-53
PAC 100-611 100-6
PAC 300-128 300-9, 300-17, 900-29, Offsite-2
PAC 300-134 300-6, 300-7, 300-17
PAC 300-151 000-60
PAC 300-156.1 NE-26, 700-46
PAC 300-171 300-6, 300-9, Offsite-2
PAC 300-186 700-85
PAC 400-116.1 400-5
PAC 400-116.2 400-10, 400-19
PAC 400-122 000-25, 100-12, 400-12
PAC 400-136.1 400-16
PAC 400-136.2 400-16, 400-21
PAC 400-136.3 400-16
PAC 400-157.2 400-21, Offsite-2
PAC 400-182 400-5, 400-23, 400-39
PAC 400-187 400-14, 400-25
PAC 400-191 500-11
PAC 400-205 SE-6
PAC 400-207 400-38
PAC 400-807 400-21
PAC 500-117.1 500-7
PAC 500-158 PIC-13
PAC 500-159 000-26, 000-38, 500-10
PAC 500-169 400-31
PAC 500-197 000-7, 500-13
PAC 600-1001 600-12, 900-10
PAC 600-117.3 600-6
PAC 600-152 NW-8, 400-42
PAC 600-160 600-6, 600-23
PAC 600-164.1 000-38
PAC 600-189 600-17
PAC 700-1100 700-26
PAC 700-1108 000-15, 000-32, 700-34, 700-50
PAC 700-1110 PIC-52
PAC 700-118.1 700-12
PAC 700-118.2 700-12
PAC 700-123.1 000-38, 700-15, 700-62
PAC 700-123.2 000-27, 000-38, 700-62
PAC 700-124.2 700-20
PAC 700-125 000-26, 700-19, 700-21, 700-45
PAC 700-126.1 000-27, 700-23
PAC 700-126.2 000-27, 700-23
PAC 700-127 000-28, 000-29, 700-25
PAC 700-131 700-27, 700-76
PAC 700-132 000-27, 000-31
PAC 700-137 700-31
PAC 700-138 700-30, 700-32
PAC 700-139.1 000-38, 700-36, 700-87
PAC 700-139.2 700-37
PAC 700-143 NE-9, NE-10
PAC 700-144 000-50, 000-53, 700-29, 700-44
PAC 700-146.1 700-18
PAC 700-147.1 000-27, 000-30, 000-38
PAC 700-149 000-28, 000-30, 000-31, 000-32
PAC 700-150.1 700-46, 700-70
PAC 700-150.2 000-38, 700-26, 700-58
PAC 700-150.3 700-60
PAC 700-150.4 700-61
PAC 700-150.5 000-38, 700-15, 700-16
PAC 700-150.6 700-66
PAC 700-150.7 000-38, 300-16
PAC 700-150.8 700-63
PAC 700-163.2 700-53
PAC 700-194 NE-16, NE-17
PAC 800-102 800-12
PAC 800-103 800-7, 900-9
PAC 800-104 800-8, 900-9
PAC 800-105.1 800-5, 800-12
PAC 800-105.2 800-5, 800-12
PAC 800-106 SE-11
PAC 800-107 800-9
PAC 800-145 000-50, 000-53
PAC 800-164.3 000-38
PAC 900-108 900-12, 900-15
PAC 900-109 NE-5, NE-6, NE-7, NE-8, 000-9, 800-7, 800-8, 900-9, 900-18, 900-20
PAC 900-112 SE-5, SE-6, 000-60, 400-42, 900-15, 900-31, 900-44, Offsite-1
PAC 900-113 600-20, 900-6, 900-12, 900-28, 900-48
PAC 900-119.1 900-17, 900-19, 900-21
PAC 900-119.2 900-9, 900-17, 900-19, 900-21
PAC 900-130 700-26, 700-46, 700-57
PAC 900-140 300-8, 900-17, 900-19, 900-40
PAC 900-141 000-50, 000-53

PAC 900-153 NE-5, NE-7, 300-6, 900-6, 900-12, 900-15, 900-30, Offsite-2
PAC 900-155 SE-5, SE-6, 900-10, 900-11, 900-40, Offsite-1, Offsite-2
PAC 900-165 NE-26, 300-14, 700-46, 700-53, 700-66, 900-38
PAC 900-175 900-48
PAC 900-176 900-33
PAC 900-183 900-23
PAC 900-213 NE-17, 900-11
PAC NE-110 NE-6, NE-7, NE-8, 000-9, 000-50, 900-7, 900-28
PAC NE-111 NE-5, NE-6, NE-8, 000-6, 000-9, 600-6, 900-7, 900-28
PAC NE-111.1 000-6, 000-9, 600-6
PAC NE-111.1 - NE-111.8 000-6, 000-9, 600-6
PAC NE-142.1 NE-23, NE-35, 000-60
PAC NE-142.1 - NE-142.4 NE-23
PAC NE-142.12 NE-23
PAC NE-142.4 NE-35, 000-60
PAC NE-142.5 NE-9, NE-23, NE-25, NE-35, 000-50, 700-72, 900-15
PAC NE-142.5 - NE-142.9 NE-9, NE-23, 700-72, 900-15
PAC NE-142.6 NW-7, 000-19, 000-50
PAC NE-142.7 000-50
PAC NE-142.8 000-50
PAC NE-142.9 NE-35, 000-50
PAC NE-156.2 NE-17, NE-26
PAC NE-166.1 NW-8
PAC NE-166.2 NW-8
PAC NE-166.3 NW-8
PAC NE-167.1 NW-7
PAC NE-167.2 NW-7
PAC NE-167.3 NW-7
PAC NE-216.1 NE-16, NE-33, SE-6
PAC NE-216.2 NE-33
PAC NE-216.3 NE-33
PAC NW-114 NE-29, NW-7, NW-17, NW-19, SW-6, SW-10, 100-21, 500-13, 600-9, 700-86, 800-12, 800-31, 900-8, 900-34, 900-39
PAC NW-170 NW-1, NW-15, 500-5
PAC NW-203 NW-6, NW-15
PAC SE-142.10 NE-35, SE-11, SE-14, SW-14, SW-15, 800-10, 800-13, Offsite-1, Offsite-4
PAC SE-142.11 NE-35, SE-11, SE-14, SW-14, SW-15, 800-10, 800-13, Offsite-1, Offsite-4
PAC SE-1600 SE-5, SE-14, SW-14, 800-5, 800-10, 800-11
PAC SE-1601.1 SE-5, SE-11, SW-14, 800-10
PAC SE-1601.2 SE-5, SE-11, SE-13, SW-14, 800-10
PAC SW-115 NW-5, SW-8, SW-11, SW-13
PAC SW-133.4 SW-9
PAC SW-133.5 NW-5, SW-6, SW-12
PAC SW-133.6 SW-9, SW-15
PAC SW-1700 SE-6
PAC SW-196 SE-5, SE-11, SE-14, SW-5, SW-8
Paint thinner NW-15, 900-9, 900-43
PCB ii, viii, 2-3, 3-14, 3-15, NE-38, NW-6, NW-19, 100-18, 100-20, 400-41, 500-15, 500-18, 500-20, 600-18, 700-78, 700-82, 700-83, 700-92
Perchloroethene 900-11, 900-35
Perchloroethylene 000-42, 400-42, 900-8
Perclene 000-41, 000-42, 400-9, 600-21
Pesticide 3-16, 300-27
Plenum 1-4, 000-19, 000-20, 300-16, 400-10, 400-20, 400-33, 400-52, 500-1, 700-2, 700-28, 700-29, 700-43, 700-52, 700-57, 700-91
Plutonium viii, 1-3, 1-4, 1-7, 2-8, NE-5, NE-7, NE-8, NE-10, NE-16, NE-17, NE-18, NE-20, NE-27, NE-28, NE-30, NE-31, NW-5, NW-6, SE-6, 000-7, 000-23, 000-24, 000-30, 000-41, 000-42, 000-49, 000-50, 000-60, 000-61, 100-1, 300-20, 400-5, 400-22, 500-1, 600-5, 600-7, 600-11, 600-13, 600-15, 700-1, 700-2, 700-16, 700-18, 700-20, 700-22, 700-24, 700-26, 700-39, 700-40, 700-41, 700-45, 700-48, 700-52, 700-54, 700-57, 700-59, 700-61, 700-64, 700-69, 700-76, 700-84, 700-88, 800-1, 800-10, 800-12, 800-20, 800-30, 800-35, 900-1, 900-5, 900-6, 900-7, 900-10, 900-12, 900-14, 900-21, 900-25, 900-26, 900-31, 900-33, 900-34, 900-35, 900-44, 900-45, UBC-2, UBC-6, UBC-7, UBC-8, Offsite-1, Offsite-2, Offsite-3, Offsite-4, Offsite-5
Polychlorinated biphenyl viii, 2-3, NW-19
Pond iii, 2-7, 3-13, 3-14, 3-16, 3-20, 3-27, 3-29, 3-30, 3-33, 3-34, NE-1, NE-7, NE-9, NE-10, NE-11, NE-12, NE-14, NE-15, NE-16, NE-17, NE-18, NE-20, NE-21, NE-22, NE-23, NE-25, NE-29, NE-30, NE-31, NE-32, NE-33, NE-34, NE-35, NW-7, NW-9, NW-10, NW-11, SE-1, SE-5, SE-6, SE-7, SE-10, SE-11, SE-12, SE-13, SE-14, SW-5, SW-13, SW-14, 000-5, 000-6, 000-7, 000-8, 000-9, 000-10, 000-14, 000-15, 000-16, 000-19, 000-29, 000-30, 000-31, 000-34, 000-39, 000-44, 000-45, 000-47, 000-57, 000-58, 000-60, 300-7, 300-10, 300-11, 300-20, 400-15, 400-16, 400-25, 400-35, 400-36, 400-52, 500-5, 700-2, 700-14, 700-15, 700-24, 700-32, 700-34, 700-50, 700-72, 700-84, 700-85, 700-87, 700-88, 700-89, 800-5, 800-10, 800-11, 800-12, 800-13, 900-1, 900-2, 900-7, 900-11, 900-33, 900-38, 900-44
Pond 1 NE-9, NE-29, NW-7
Pond 2 NE-29, NW-7, 000-5, 000-6, 000-9, 000-14, 000-15, 000-16
Pond 2A 000-5, 000-16, 500-5
Pond 2B 000-16
Pond 2C 000-6, 000-9, 000-16
Pond 2D 000-16
Pond 6 SE-5, SE-11, SE-14, SW-5, SW-13, SW-14
Pond 7 3-14, SE-5, SE-10, SE-11, SE-12, SE-13, SE-14, SW-14, 800-5, 800-11
Pond 8 3-14, SE-5, SE-11, SE-13, SE-14, SW-14, 800-5
Pond 9 SE-5, SE-11, SE-14, SW-14
Pond A-1 3-13, NE-9, NE-10, NE-12
Pond A-2 3-13, NE-9, NE-15, NE-16, NE-17, 000-19, 000-44
Pond A-3 3-13, NE-9, NE-12, 000-39, 700-32
Pond A-4 3-13, NE-1, NE-9, NE-12, NE-15, NE-17, NE-18, SE-7
Pond B-1 3-13, NE-14, NE-15, NE-16, NE-17, NE-20, NE-25, 000-44, 000-45, 000-47, 000-57, 000-58, 700-14, 700-15, 700-72

Pond B-2 3-13, NE-9, NE-14, NE-15, NE-16, NE-17, NE-20, NW-7, 000-19, 000-34, 000-44, 000-45, 000-58
Pond B-3 3-13, NE-14, NE-15, NE-16, NE-20, NE-22, NE-33, NE-34, NE-35, 000-44, 000-57, 000-58
Pond B-4 3-13, NE-14, NE-15, NE-16, NE-17, NE-20, 700-14, 700-72
Pond B-5 3-13, 3-33, NE-1, NE-14, NE-15, NE-16, NE-17, NE-18, NE-22, NE-25, NE-34, SE-7, 000-47, 000-57, 700-14, 700-15, 700-72
Pond C-1 3-14, NE-15, SE-1, SE-5, SE-6, SE-11, SE-14, SW-14, 000-60, 800-13, 900-11
Pond C-2 3-14, NE-17, NE-18, NE-34, SE-1, SE-5, SE-6, SE-7, 400-35, 400-36, 800-10, 800-13
Pondcrete 3-20, 3-22, 3-31, NE-17, 000-6, 000-7, 000-10, 700-1, 700-2, 700-73, 900-44, 900-45
Process waste iv, viii, 3-15, 3-19, 3-20, 3-26, 3-28, NE-9, NE-15, NE-20, SE-5, SE-10, SE-11, 000-5, 000-7, 000-10, 000-16, 000-19, 000-20, 000-23, 000-25, 000-26, 000-27, 000-28, 000-29, 000-30, 000-31, 000-32, 000-33, 000-34, 000-35, 000-37, 000-38, 000-45, 000-49, 000-50, 000-54, 000-55, 000-56, 000-57, 100-5, 100-6, 100-11, 100-12, 100-13, 100-23, 100-24, 300-19, 300-20, 300-21, 300-26, 300-30, 300-31, 400-11, 400-19, 400-20, 400-37, 500-9, 500-10, 700-1, 700-14, 700-15, 700-16, 700-18, 700-20, 700-22, 700-24, 700-25, 700-28, 700-39, 700-45, 700-46, 700-48, 700-49, 700-50, 700-51, 700-59, 700-60, 700-62, 700-73, 700-75, 700-84, 700-87, 700-89, 800-27, 800-28, 800-33, 900-42, UBC-2, UBC-5, UBC-6, UBC-7, UBC-8, PIC-2, PIC-3, PIC-8, PIC-20, PIC-55
PSZ viii, 000-9, 000-10, 300-25, 500-13, 700-14, 700-41, 900-6, 900-14, 900-30
Radiometric survey 1-7, 100-6, 400-5, 400-18, 400-22, 600-13, 700-18, 700-21, 700-67, 800-20, 900-6, 900-17, 900-42
Radionuclides 1-4, 1-7, 2-8, NW-5, NW-8, NW-19, 000-23, 000-50, 100-5, 100-6, 400-11, 700-28, 700-43, 700-59, 700-63, 700-66, 700-67, 800-12, 800-28, 900-12, 900-15, UBC-9, Offsite-2, Offsite-3, Offsite-4
Ralston Reservoir SW-1
Reservoir NE-15, NE-23, SW-1, 000-5, 700-15, 800-12, PIC-43, Offsite-1, Offsite-3, Offsite-4, Offsite-5
Reverse osmosis viii, NE-22, NW-5, 000-10, 000-45, 000-60, 000-61, 900-1, 900-47
Rock Creek NE-1, NW-1
Roof Drain NE-10
Salt 000-60, 000-61, 300-1, 800-28, 900-22, UBC-5
Saltcrete 3-20, 3-31, 300-1, 700-1, 700-73, 900-44
Sand SW-5, SW-13, 000-19, 300-20, 300-31, 400-48, 700-64, 900-22, 900-25, 900-47, 900-55, PIC-12, PIC-55
Sanitary Sewer iii, iv, 3-15, 3-21, NE-16, NE-17, NE-33, SE-5, SE-14, 000-32, 000-33, 000-34, 000-49, 000-50, 000-53, 000-54, 000-55, 000-56, 000-57, 000-58, 100-15, 400-24, 400-25, 700-28, 700-35, 700-43, 700-48, 700-88, 800-14, 800-32, 900-7, 900-25
SIR viii
Sludge 2-8, 3-20, 3-22, 3-25, 3-27, NE-5, NE-6, NE-7, NE-8, NE-20, NE-27, NE-28, NW-5, NW-8, NW-10, SE-6, SE-7, SW-13, 000-6, 000-7, 000-8, 000-9, 000-10, 000-31, 000-34, 000-50, 300-1, 600-6, 700-28, 700-43, 700-75, 800-5, 800-12, 800-21, 900-1, 900-5, 900-7, 900-8, 900-25, 900-26, 900-44, 900-45, 900-47, PIC-55
Soil iii, 1-7, 1-8, 2-10, 3-8, 3-9, 3-13, 3-28, NE-5, NE-7, NE-9, NE-12, NE-16, NE-17, NE-20, NE-25, NE-26, NE-27, NE-28, NE-31, NE-33, NE-34, NW-6, NW-7, NW-8, NW-10, NW-15, NW-16, NW-17, NW-19, SE-6, SE-10, SE-11, SW-6, SW-8, SW-11, 000-6, 000-9, 000-14, 000-19, 000-20, 000-23, 000-24, 000-25, 000-26, 000-27, 000-29, 000-30, 000-31, 000-32, 000-33, 000-34, 000-37, 000-40, 000-42, 100-1, 100-8, 100-9, 100-11, 100-12, 100-16, 300-5, 300-12, 300-14, 300-15, 300-16, 300-19, 300-20, 300-23, 300-27, 400-5, 400-9, 400-10, 400-13, 400-15, 400-17, 400-18, 400-19, 400-25, 400-39, 400-49, 400-51, 500-9, 500-15, 600-6, 600-11, 600-13, 600-14, 600-18, 700-9, 700-10, 700-12, 700-16, 700-24, 700-26, 700-34, 700-35, 700-37, 700-40, 700-41, 700-42, 700-43, 700-45, 700-46, 700-48, 700-50, 700-52, 700-53, 700-54, 700-55, 700-57, 700-59, 700-60, 700-63, 700-64, 700-66, 700-67, 700-69, 700-76, 700-78, 700-80, 700-87, 700-88, 800-12, 800-17, 800-19, 800-29, 800-30, 900-5, 900-6, 900-7, 900-10, 900-11, 900-12, 900-14, 900-15, 900-17, 900-19, 900-21, 900-23, 900-25, 900-26, 900-28, 900-31, 900-32, 900-33, 900-34, 900-37, 900-39, 900-40, 900-44, 900-45, 900-47, UBC-2, UBC-5, UBC-7, UBC-8, UBC-9, PIC-4, PIC-6, PIC-18, PIC-31, PIC-34, PIC-35, PIC-37, PIC-42, PIC-44, PIC-45, PIC-47, PIC-49, PIC-54, PIC-56, Offsite-1, Offsite-2
Solar Evaporation Pond 000-29, 000-30, 000-31, 000-57, 500-5, 700-2, 700-24, 700-85, 700-88, 900-44
Solar pond iii, 3-33, 3-34, NE-7, NE-12, NE-17, NE-21, 000-5, 000-6, 000-7, 000-8, 000-9, 000-10, 000-14, 000-15, 000-16, 000-39, 300-20, 700-84, 700-88, 700-89, 900-1, 900-7, 900-33
Solvent 3-16, 3-18, 3-20, 3-22, 3-26, 3-29, 3-30, 000-41, 100-1, 300-6, 300-8, 300-9, 300-16, 400-10, 400-35, 700-2, 700-9, 700-12, 700-53, 700-71, 800-12, 900-8, 900-9, 900-17, 900-18, 900-19, 900-28, 900-53, PIC-23
South Boulder Diversion Canal SW-1
South Interceptor SE-1, SE-5, SE-6, SW-1, SW-5, 000-57, 800-9, 800-14
South Walnut Creek NE-1, NE-14, NE-15, NE-16, NE-23, 000-44, 000-47, 700-14, 900-1, 900-25, 900-45
Spray field iii, 3-13, 3-15, 3-29, NE-12, NE-29, NE-30, NE-31, NE-32, NE-33, NE-34, NE-35, NW-1, SE-6, SW-1, 000-10, 000-39, 000-40
Standley Lake Offsite-1, Offsite-4, Offsite-5
Storage 1-4, 1-7, 3-14, 3-16, 3-17, 3-18, 3-20, 3-21, 3-22, 3-25, 3-26, 3-29, 3-30, 3-31, 3-36, NE-16, NE-26, NE-39, NW-1, NW-6, NW-11, NW-13, NW-15, NW-16, NW-17, NW-19, NW-20, 000-10, 000-19, 000-20, 000-26, 000-28, 000-35, 000-41, 000-42, 000-44, 000-45, 000-49, 100-10, 100-25, 300-1,

300-17, 300-18, 300-23, 300-24, 300-30, 400-2, 400-19, 400-21, 400-22, 400-32, 400-33, 400-35, 400-39, 400-42, 400-43, 400-44, 500-1, 500-5, 500-6, 500-7, 500-11, 500-19, 600-1, 600-5, 600-6, 600-9, 600-11, 600-12, 600-13, 600-15, 600-16, 600-18, 600-20, 600-21, 600-22, 600-24, 700-1, 700-9, 700-10, 700-14, 700-20, 700-37, 700-39, 700-46, 700-52, 700-53, 700-54, 700-55, 700-61, 700-66, 700-71, 700-73, 700-75, 700-86, 700-87, 700-91, 800-1, 800-5, 800-12, 800-15, 800-19, 800-21, 800-22, 800-23, 800-24, 800-25, 800-26, 900-1, 900-2, 900-8, 900-9, 900-10, 900-11, 900-12, 900-14, 900-15, 900-17, 900-18, 900-19, 900-21, 900-23, 900-31, 900-32, 900-33, 900-35, 900-37, 900-38, 900-39, 900-40, 900-43, 900-44, 900-45, 900-48, 900-50, UBC-7, UBC-8, PIC-3, PIC-23, PIC-40, PIC-54, PIC-55, PIC-56

Strontium 2-8, NE-30, NE-31, NW-9

Survey 1-7, NW-6, NW-9, NW-10, SW-6, 000-27, 000-33, 000-50, 000-54, 000-59, 100-6, 100-18, 300-5, 400-5, 400-17, 400-18, 400-22, 600-5, 600-7, 600-11, 600-13, 700-18, 700-21, 700-39, 700-41, 700-45, 700-50, 700-67, 700-88, 700-89, 800-17, 800-19, 800-20, 800-33, 900-6, 900-17, 900-31, 900-34, 900-37, 900-42, 900-45, PIC-24

Suspended solids NE-21, NE-34, SE-6, SW-13, 000-56

Tank 3-7, 3-16, 3-17, 3-18, 3-19, 3-20, 3-26, 3-27, 3-28, 3-30, 3-31, NE-16, 000-19, 000-20, 000-24, 000-25, 000-26, 000-28, 000-29, 000-30, 000-31, 000-33, 000-35, 000-44, 000-45, 000-56, 000-60, 100-5, 300-10, 300-12, 300-17, 300-20, 300-23, 300-26, 300-30, 300-31, 300-33, 400-1, 400-11, 400-13, 400-14, 400-24, 400-25, 400-32, 400-35, 400-37, 400-42, 400-46, 400-47, 500-9, 500-10, 600-5, 600-6, 600-9, 600-10, 600-16, 700-9, 700-10, 700-12, 700-18, 700-19, 700-20, 700-21, 700-22, 700-24, 700-28, 700-34, 700-35, 700-36, 700-37, 700-46, 700-52, 700-69, 700-70, 700-75, 700-77, 700-84, 700-85, 700-87, 700-88, 800-5, 800-17, 800-33, 800-34, UBC-5, UBC-6, UBC-7, UBC-8, PIC-3, PIC-4, PIC-18, PIC-54, PIC-55, PIC-56

Tear Gas 3-14, NE-36, NW-8

Transformer ii, 3-15, 3-16, 3-17, 3-18, 3-20, 3-21, 3-22, NE-38, NW-19, SW-5, 000-26, 100-18, 100-20, 300-34, 300-35, 400-40, 400-41, 500-15, 500-17, 500-18, 500-20, 500-22, 600-18, 600-24, 600-25, 700-78, 700-80, 700-82, 700-83, 700-87, 700-92, 700-93, 800-37, 800-38, 900-54, PIC-3, PIC-46

Trench iv, vii, 3-13, 3-22, 3-25, 3-29, NE-5, NE-6, NE-7, NE-8, NE-12, NE-27, NE-28, SE-11, SE-14, SW-8, 000-7, 000-9, 000-10, 000-17, 000-39, 000-40, 000-50, 100-13, 300-25, 700-32, 700-86, 700-88, 800-7, 800-8, 800-9, 800-12, 800-13, 900-5, 900-6, 900-7, 900-8, 900-9, 900-12, 900-14, 900-15, 900-18, 900-20, 900-23, 900-28

Triangle Area 3-22, 3-29, NE-26, 700-46, 700-53, 700-66, 900-33, 900-38

Trichloroethane viii, 000-23, 300-24, 400-14, 400-33, 700-71, 900-8, 900-35

Trichloroethene 000-8, 000-23, 900-11

Trichloroethylene viii, 2-8, 100-17, 700-9, 700-10, UBC-7

Tritium iii, 2-8, NE-12, NE-17, NE-20, NE-30, NE-31, NW-7, NW-8, NW-9, NW-10, 000-23, 000-40, 000-49, 000-50, 000-57, 100-1, 300-10, 300-23, 400-37, 700-2, 700-72, 800-33, UBC-9, Offsite-4

Upper Church Ditch NE-1, NE-15, NW-1, SW-1

Uranium ix, 1-3, 2-8, 3-8, 3-17, 3-20, 3-30, NE-5, NE-7, NE-8, NE-18, NE-27, NE-28, NW-5, NW-8, SE-6, SW-5, SW-6, SW-8, SW-9, SW-10, 000-7, 000-23, 000-25, 000-33, 000-41, 000-42, 000-50, 000-54, 000-58, 000-60, 000-61, 100-1, 100-11, 300-1, 300-5, 300-20, 400-1, 400-2, 400-5, 400-9, 400-15, 400-17, 400-18, 400-19, 400-20, 400-21, 400-22, 400-33, 400-37, 400-42, 400-52, 500-1, 500-5, 500-7, 600-7, 600-11, 600-13, 700-14, 700-16, 700-18, 700-20, 700-22, 700-45, 700-48, 700-62, 700-84, 700-90, 800-1, 800-15, 800-17, 800-19, 800-25, 800-28, 800-30, 800-33, 800-35, 900-1, 900-5, 900-6, 900-7, 900-10, 900-12, 900-14, 900-15, 900-17, 900-19, 900-28, 900-29, 900-35, 900-44, 900-48, 900-55, UBC-5, UBC-8, UBC-9, Offsite-2, Offsite-3, Offsite-5

Valve Vault 11 3-33, 300-19, 300-21

Valve Vault 12 iii, 3-16, 3-30, 3-33, 300-19, 300-20, 300-21, 700-84, 700-85

Valve Vault 124-B 3-15, 100-8, 100-9

Valve Vault 13 3-33, 300-19, 300-21

Valve Vault 18 3-33, 100-11

Valve Vault 2 3-21, 3-33, 800-28

Valve Vault 7 3-18, 3-26, 700-14, 700-15, 700-62

Violation NE-33, NE-34, SE-6, 000-39

Walnut Creek NE-1, NE-9, NE-12, NE-14, NE-15, NE-16, NE-17, NE-20, NE-23, NW-1, NW-7, 000-10, 000-14, 000-32, 000-39, 000-40, 000-44, 000-47, 000-55, 300-6, 300-7, 300-8, 300-10, 700-14, 700-30, 700-39, 700-45, 700-72, 700-87, 900-1, 900-25, 900-45, Offsite-1, Offsite-3, Offsite-4

West Gate SW-1

West Interceptor Ditch NW-1

West Spray Field 3-15, 3-29, NE-12, NW-1, SW-1, 000-10, 000-39, 000-40

Wind Site NW-1, PIC-51

Windblown 900-26

Woman Creek 3-14, NE-33, SE-1, SE-5, SE-6, SE-7, SE-10, SE-11, SE-13, SE-14, SW-1, SW-5, SW-13, SW-14, SW-15, 800-9, 800-10, 800-12, 800-13, 800-14, 800-29, 900-1, 900-11, Offsite-1, Offsite-4, Offsite-5

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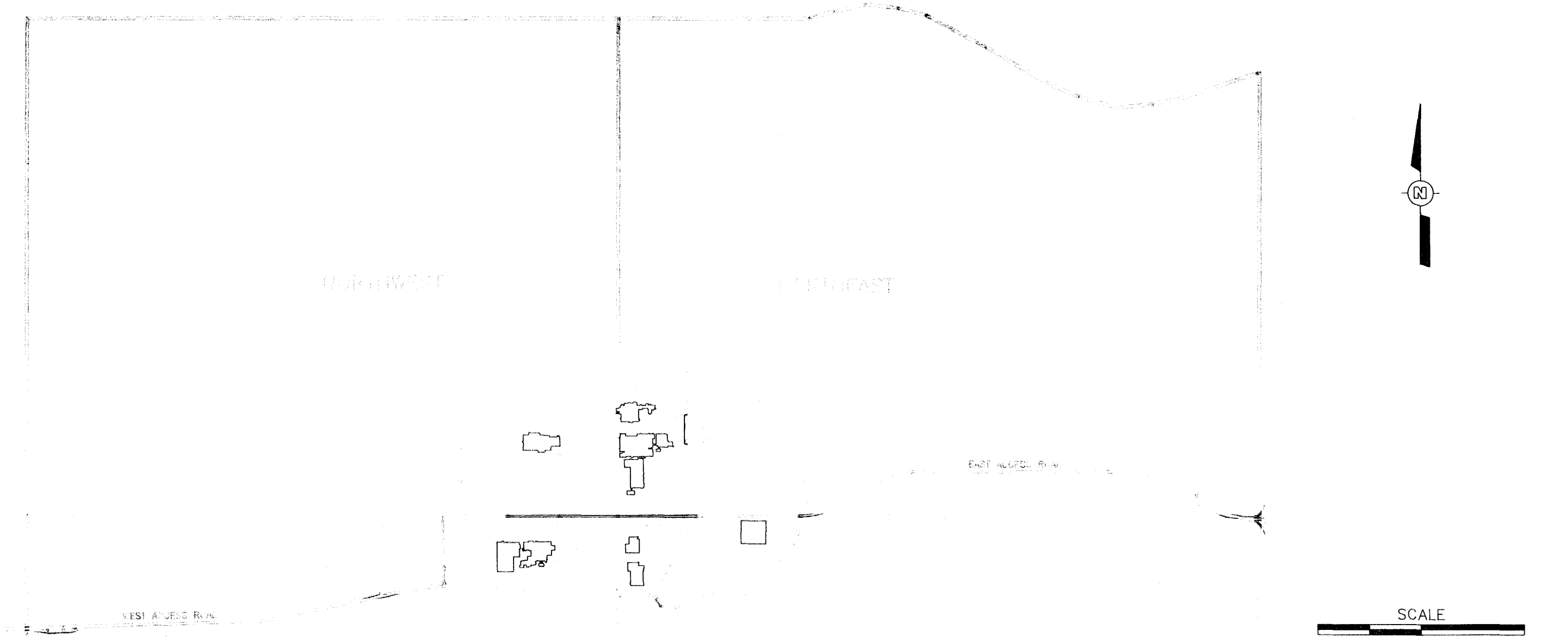
Document # 000378

Titled: Plate 2 HRR IHSSs

Fiche location: A-SW-M31



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PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

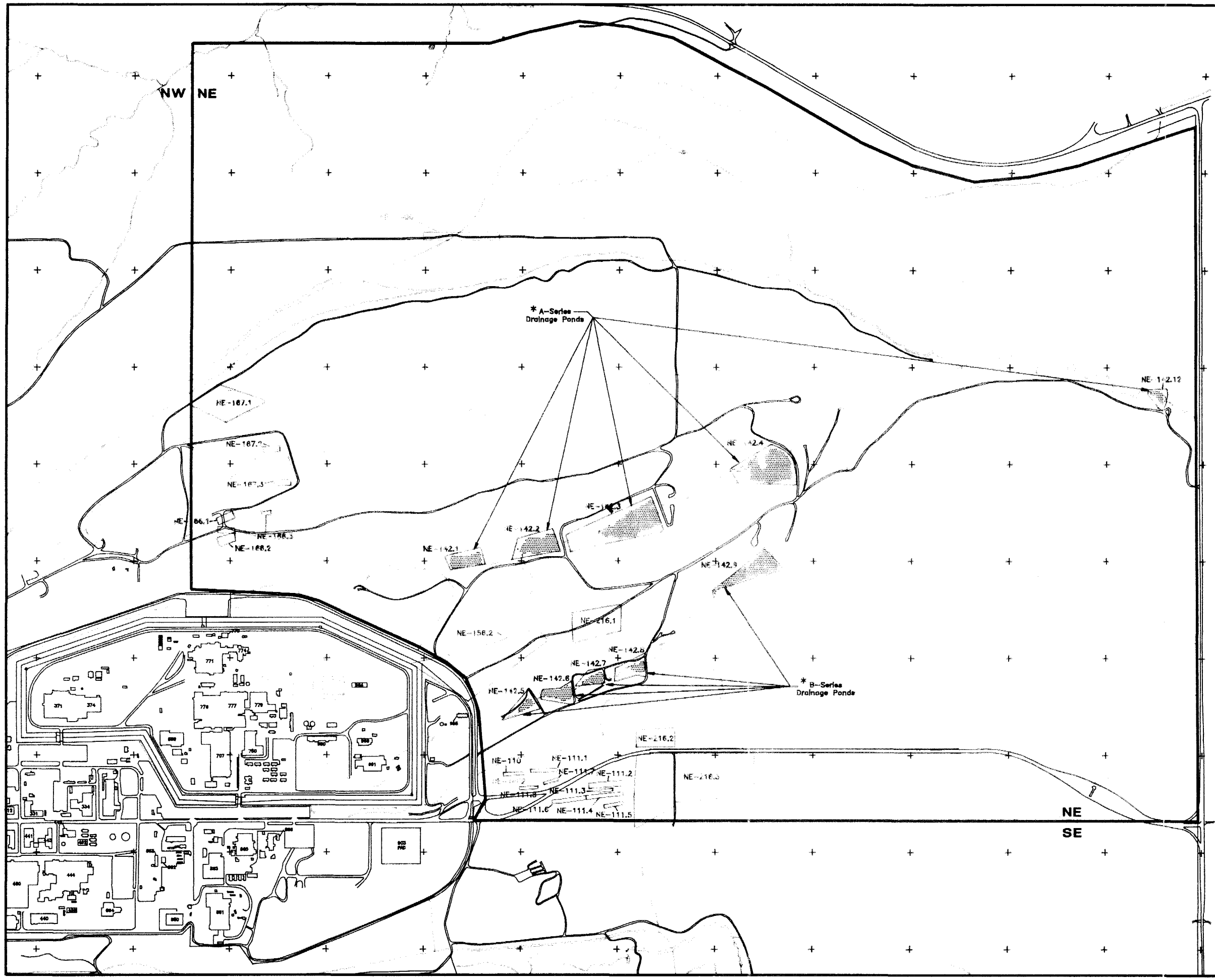
FIGURE 3–1

TITLE:
PAC AREA BOUNDARIES

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944–B121	SHEET
DESIGN BY	A. VIRGIL	CHECKED		OF
DRAWN BY	A. VIRGIL	APPROVED	FJB	
DATE	12/18/91	SCALE	AS SHOWN	

4944B121 05/22/92 9:26am CAB



LEGEND

ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

* THE A AND B SERIES DRAINAGE PONDS AND DRAINAGES ARE CONSIDERED POTENTIAL AREAS OF CONCERN

SCALE

0 1000 2000 FEET

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Rocky Flats Plant
Golden, Colorado

FIGURE NE-1

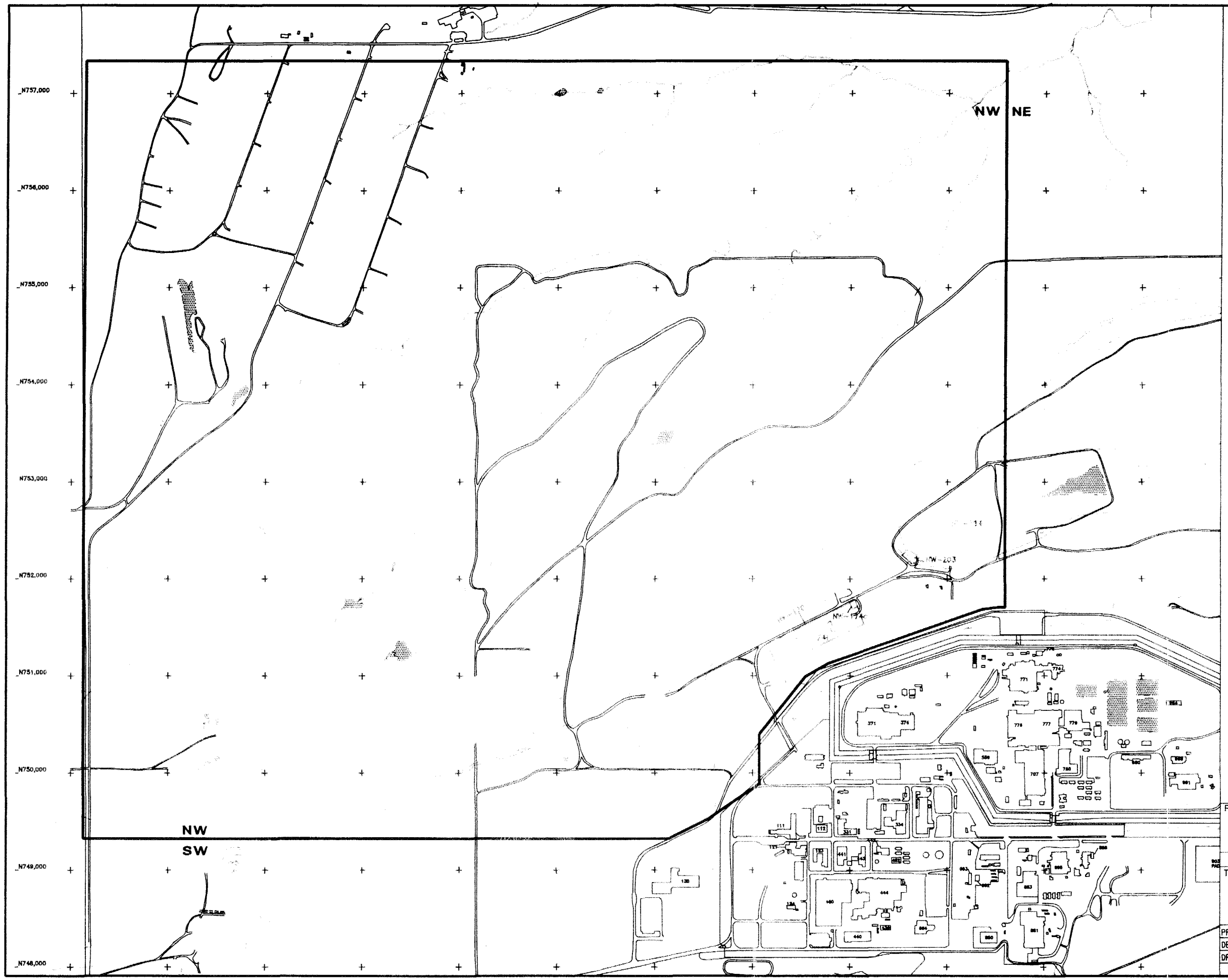
TITLE:

NORTHEAST AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B74	SHEET
DESIGN BY	C. BENTZ	CHECKED		OF
DRAWN BY	C. BENTZ	APPROVED	FJB	
DATE	12/19/91	SCALE	AS SHOWN	

4944B74 05/20/92 9:52am AWK



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U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE NW-1

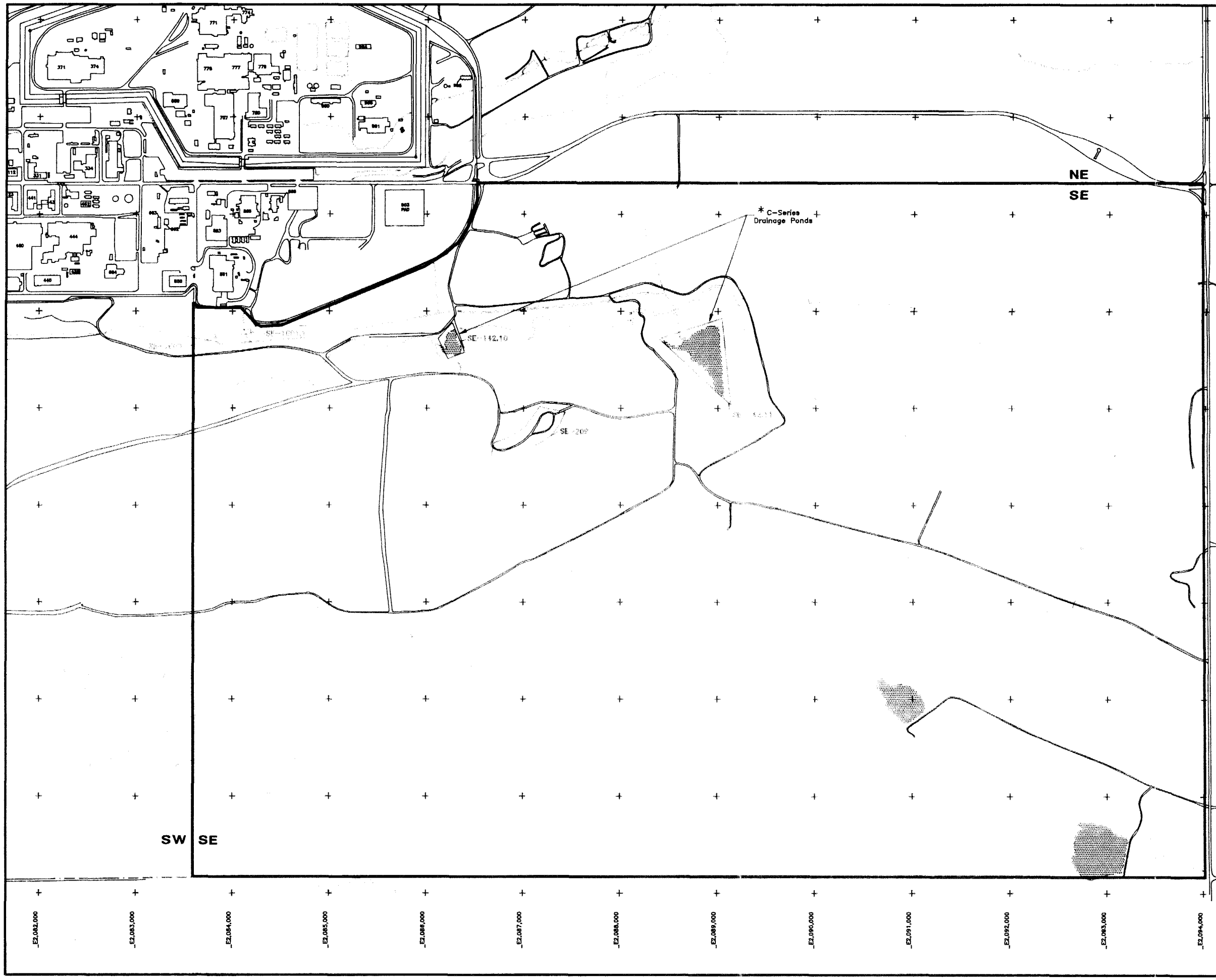
TITLE:

NORTHWEST AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B73	SHEET
DESIGN BY	C. BENTZ	CHECKED		OF
DRAWN BY	C. BENTZ	APPROVED	FJB	
DATE	12/19/91	SCALE	AS SHOWN	

4944B73 05/22/92 9:12am CAB



LEGEND

ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

* THE C-SERIES DRAINAGE PONDS AND DRAINAGE ARE CONSIDERED POTENTIAL AREAS OF CONCERN

SCALE

0 1000 2000 FEET

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Rocky Flats Plant
Golden, Colorado

FIGURE SE-1

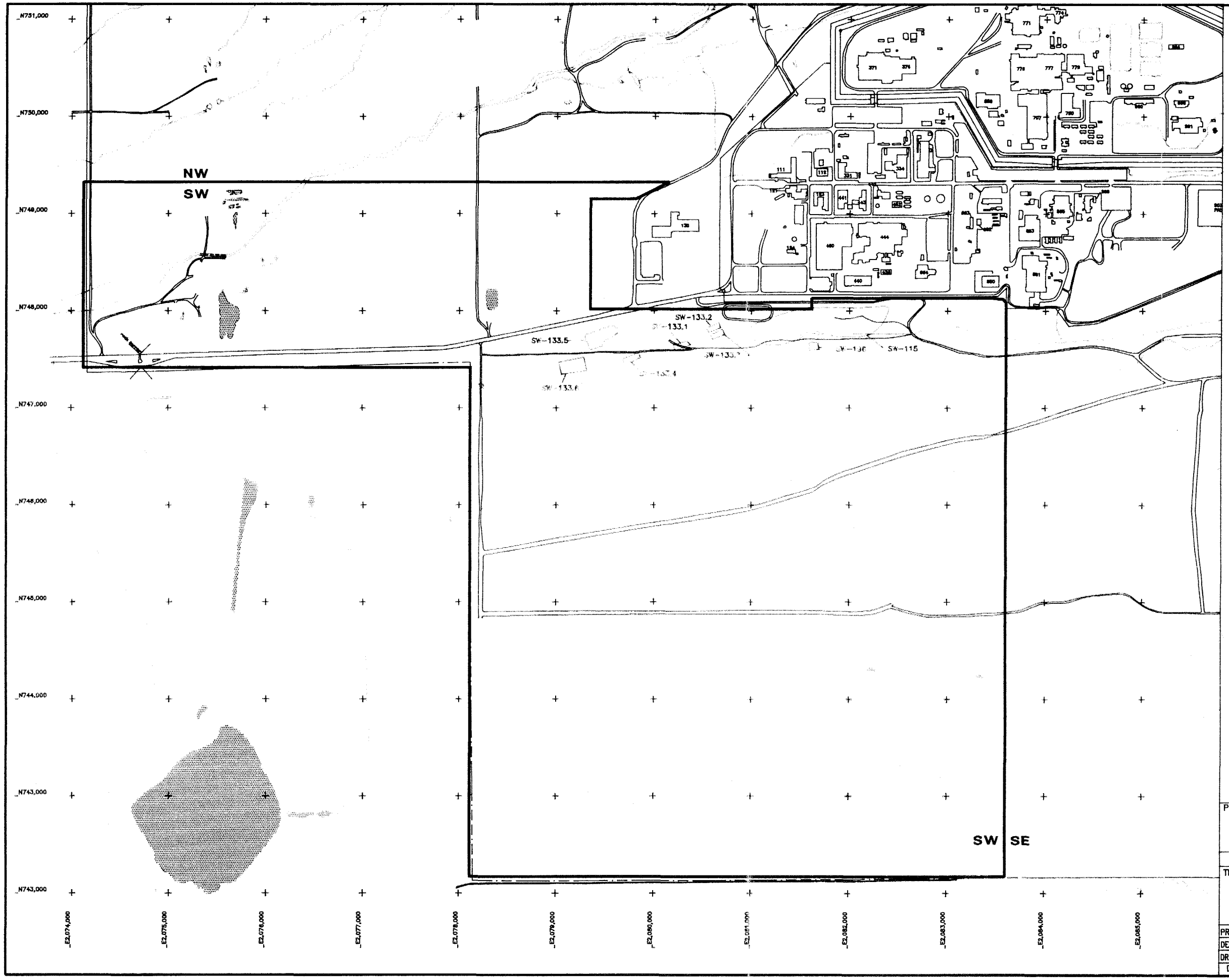
TITLE:

SOUTHEAST AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B76	SHEET
DESIGN BY	C. BENTZ	CHECKED		OF
DRAWN BY	C. BENTZ	APPROVED	FJD	
DATE	12/19/91	SCALE	AS SHOWN	

4944B76 05/22/92 9:15am CAB



LEGEND

SW-133.6 — ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SW-133.6 — CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 1000 2000 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE SW-1

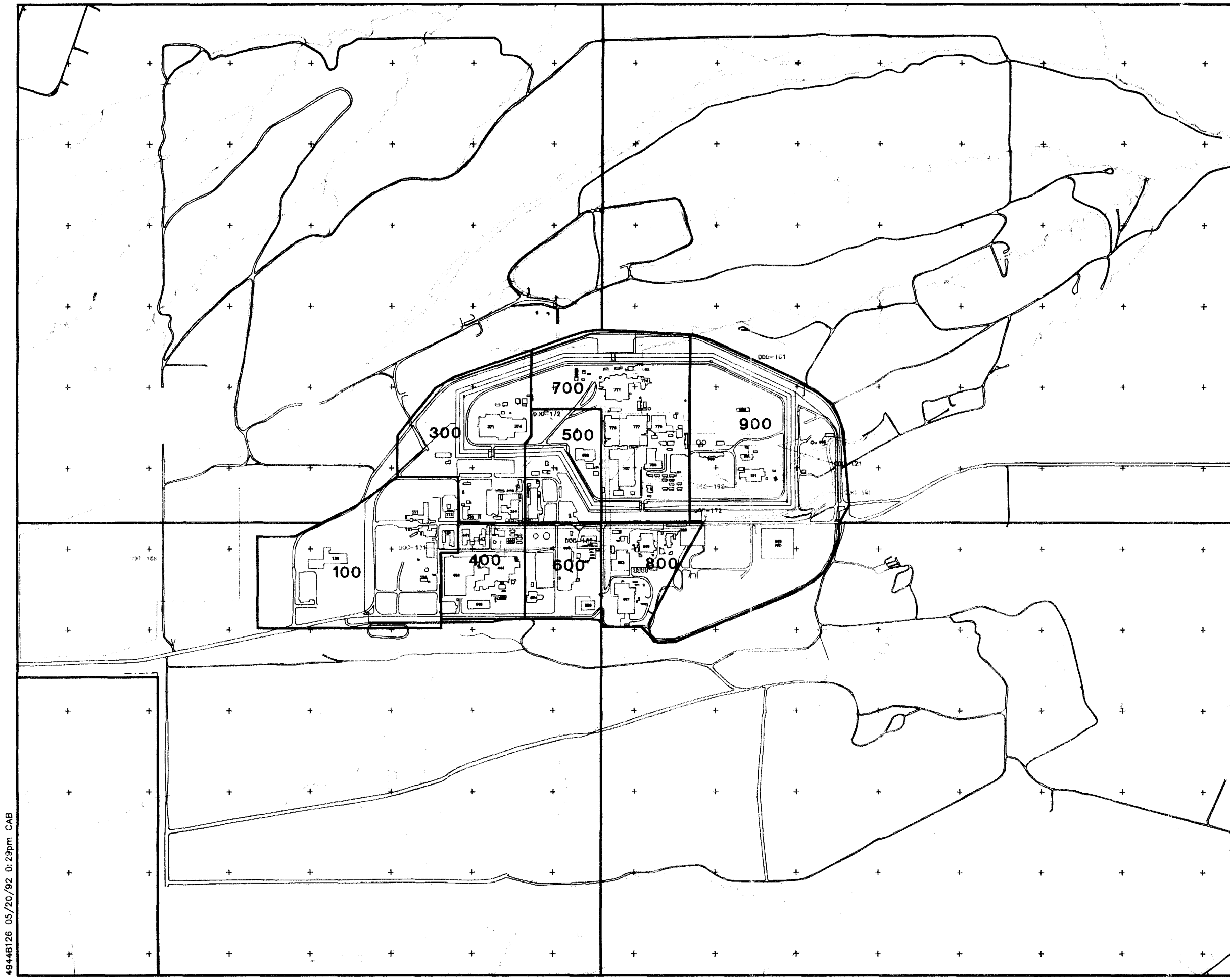
TITLE:

SOUTHWEST AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B75	SHEET
DESIGN BY	C. BENTZ	CHECKED		OF
DRAWN BY	C. BENTZ	APPROVED	FJB	
DATE	12/19/91	SCALE	AS SHOWN	

4944B75 05/20/92 9:06am AWK



LEGEND

000-121 ORIGINAL INDUSTRIAL WASTE LINE

000-180 ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

000-172 CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 1200 2400 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE 000-1

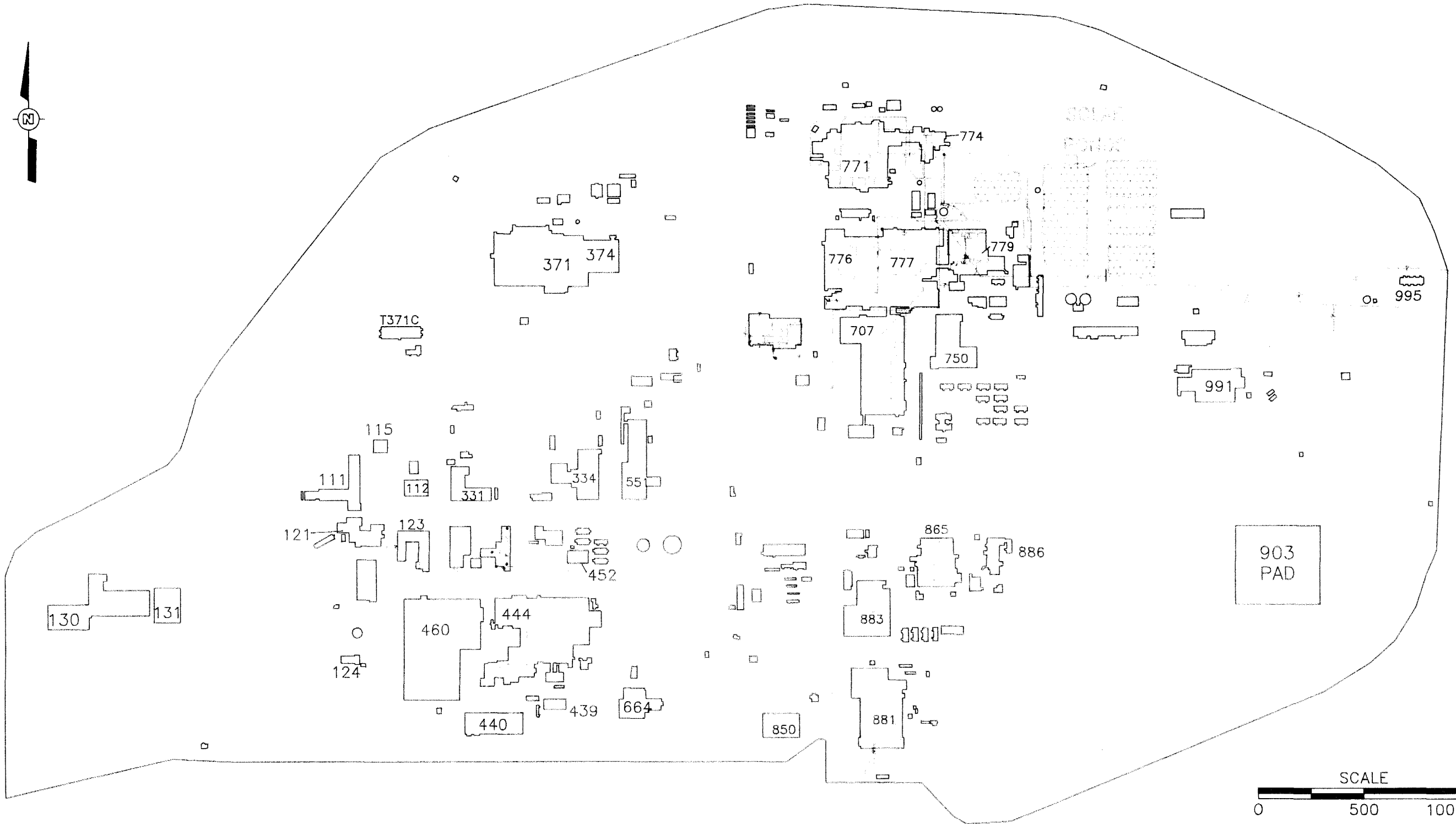
TITLE:

000 AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B126
DESIGN BY	C. BENTZ	CHECKED	
DRAWN BY	C. BENTZ	APPROVED	FJB
DATE	12/27/91	SCALE	AS SHOWN

4944B126 05/20/92 0:29pm CAB



LEGEND

PIPE BENEATH BUILDING

PIPE EXTERIOR TO BUILDING

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

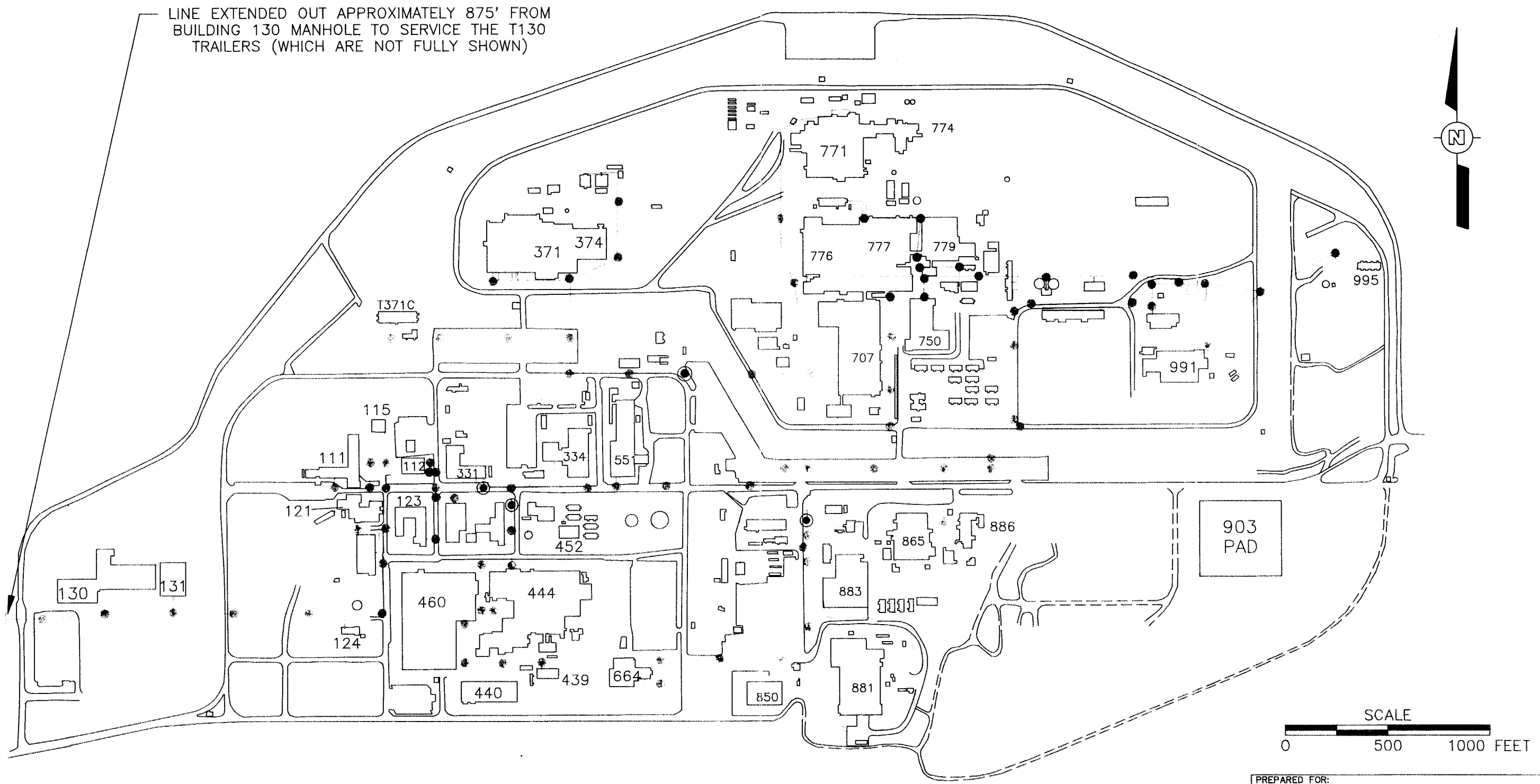
FIGURE 000-5

TITLE:
PAC 000 - 121
(ORIGINAL PROCESS WASTE LINES)
LOCATION MAP

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B120	SHEET
DESIGN BY	C. Rayburn	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-16-91	SCALE	AS SHOWN	

4944B120 05/22/92 9:50am CAB



LEGEND

- MANHOLE
- MONITORING LOCATION
- SEWER LINE

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

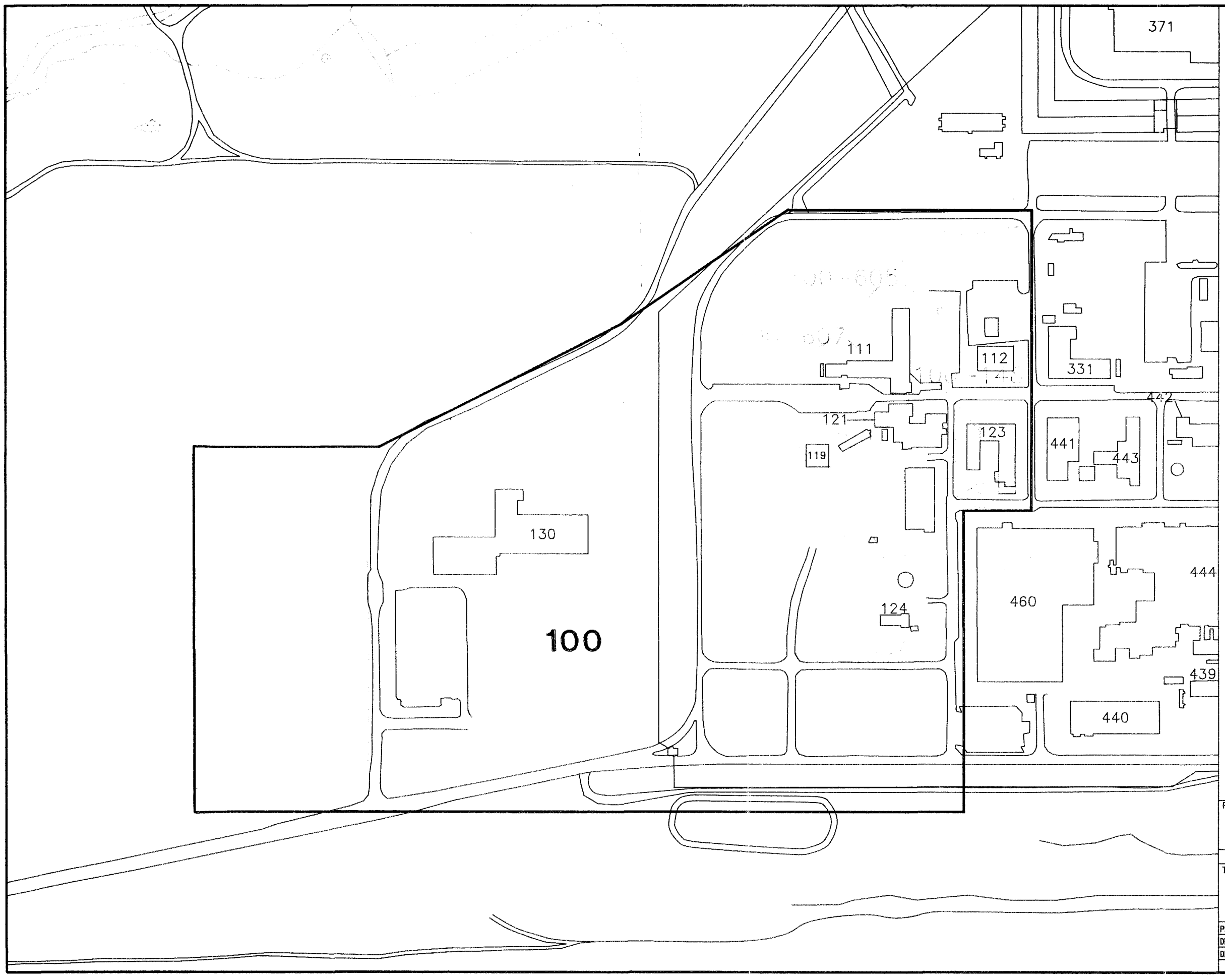
FIGURE 000-6

TITLE:
PAC 000-500
(SANITARY SEWER SYSTEM)
LOCATION MAP

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B119	SHEET
DESIGN BY	C. Rayburn	CHECKED	FJB	OF
DRAWN BY	KRONER	APPROVED		
DATE	12-16-91	SCALE	1=500	

4944BT19 12/27/91 6:30pm CAB



LEGEND

CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 300 600 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant
Golden, Colorado

FIGURE 100-1

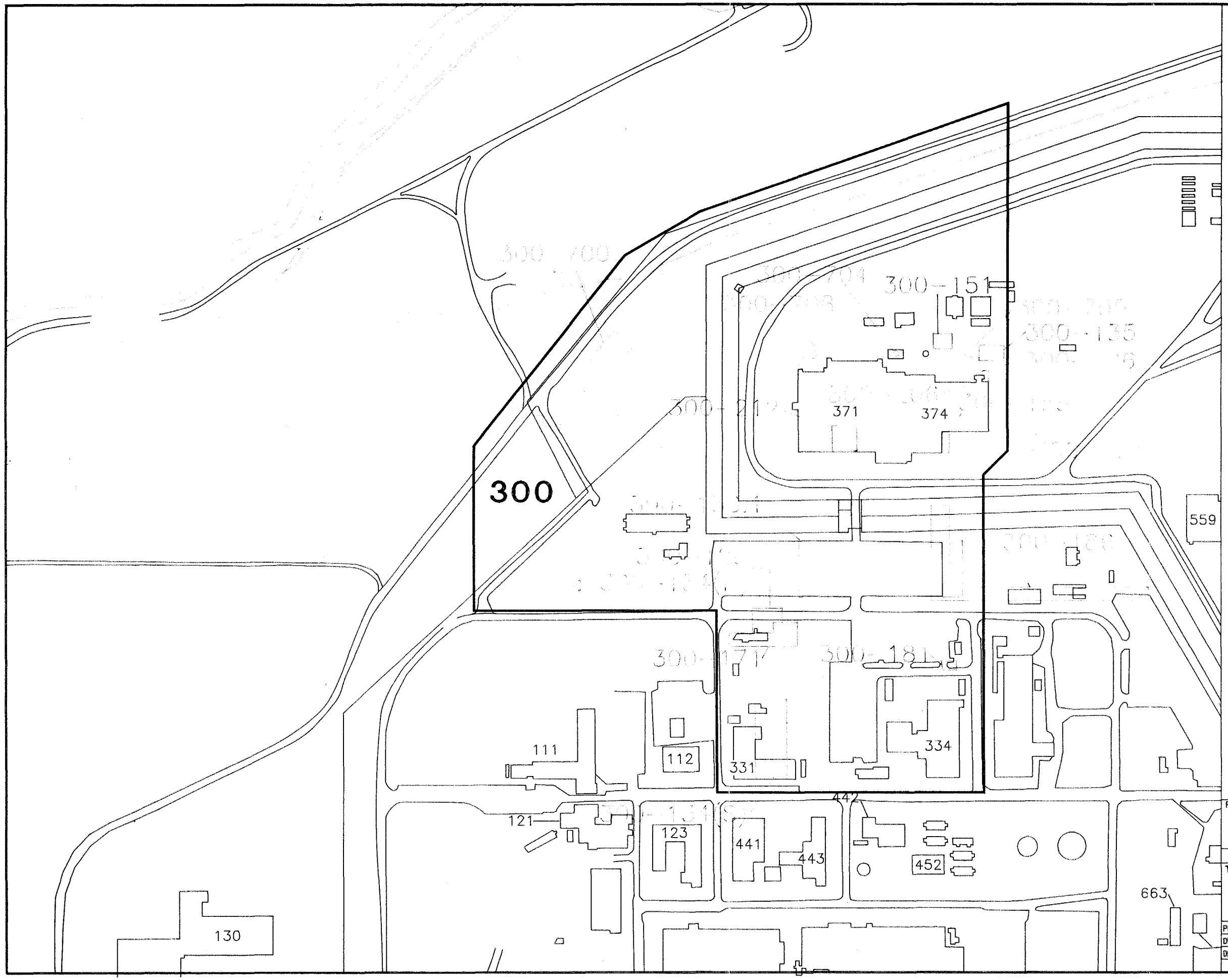
TITLE:

100 AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-877	SHEET
DESIGN BY	KRONER	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B77 05/22/92 9:42am CAB



LEGEND

300-212 ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

300-135 CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 300 600 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE 300-1

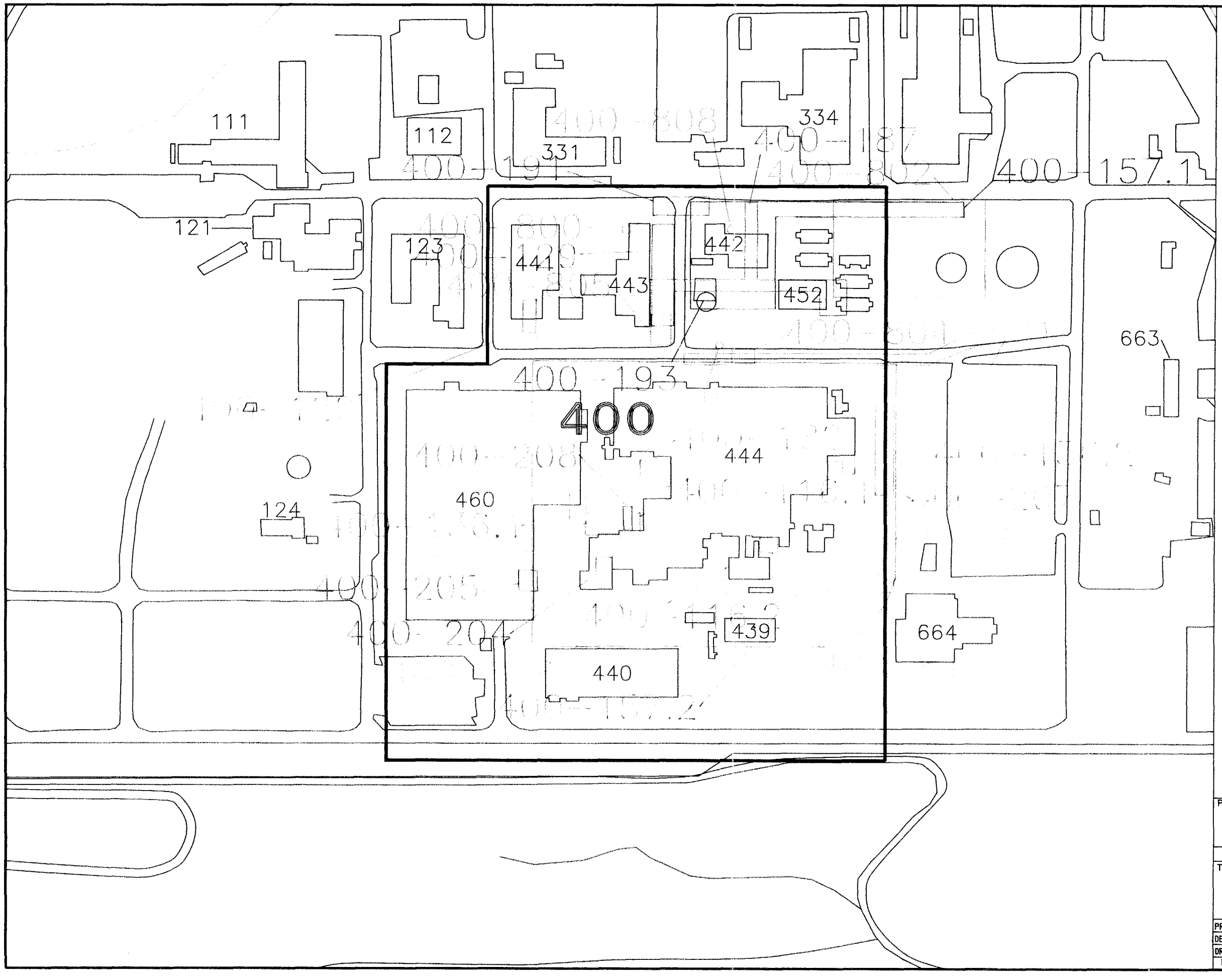
TITLE:

300 AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B78	SHEET
DESIGN BY	KRONER	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B78 05/22/92 9:07am CAB



LEGEND

400-205 ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

400-162 CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 200 400 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE 400-1

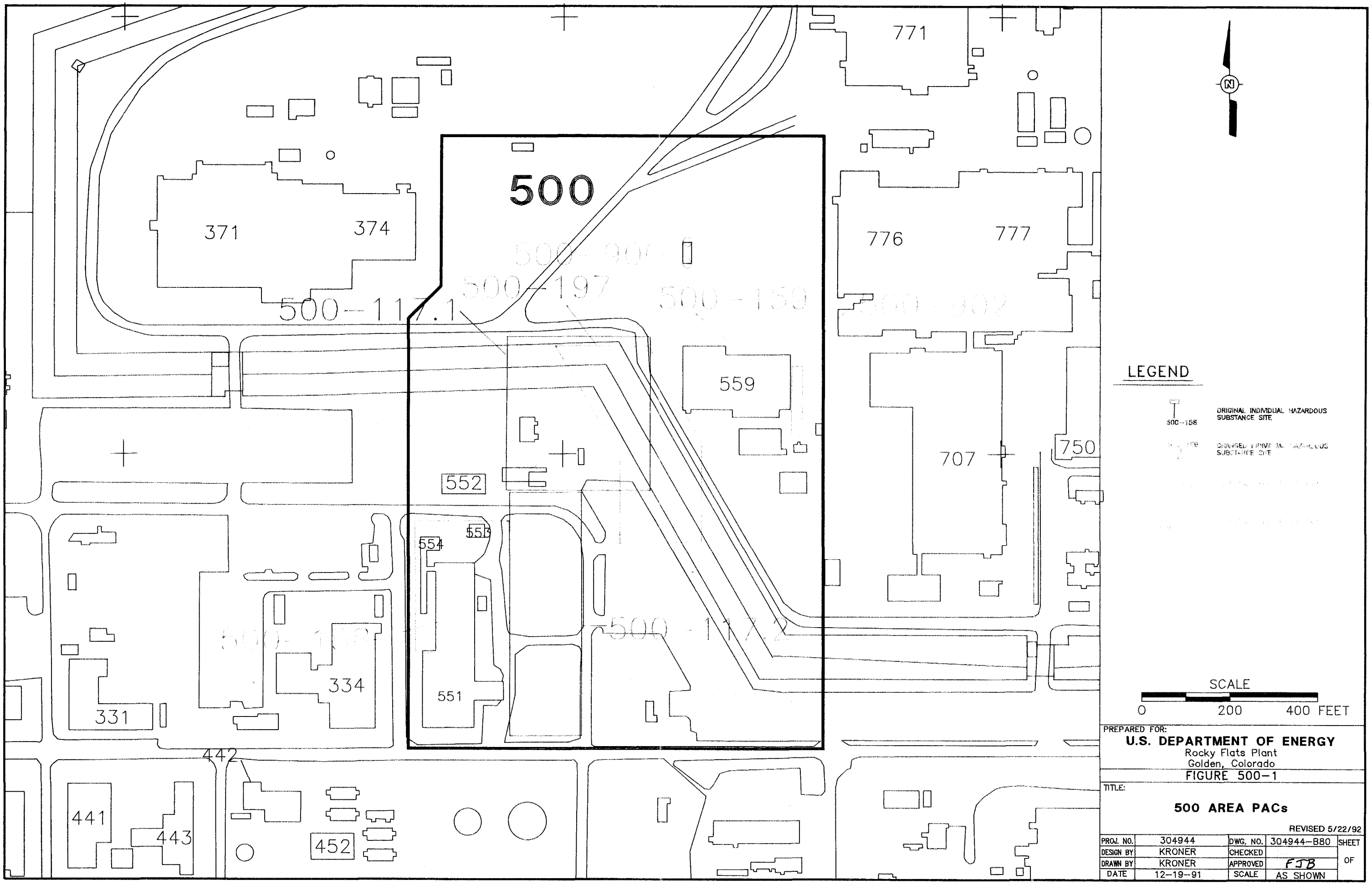
TITLE:

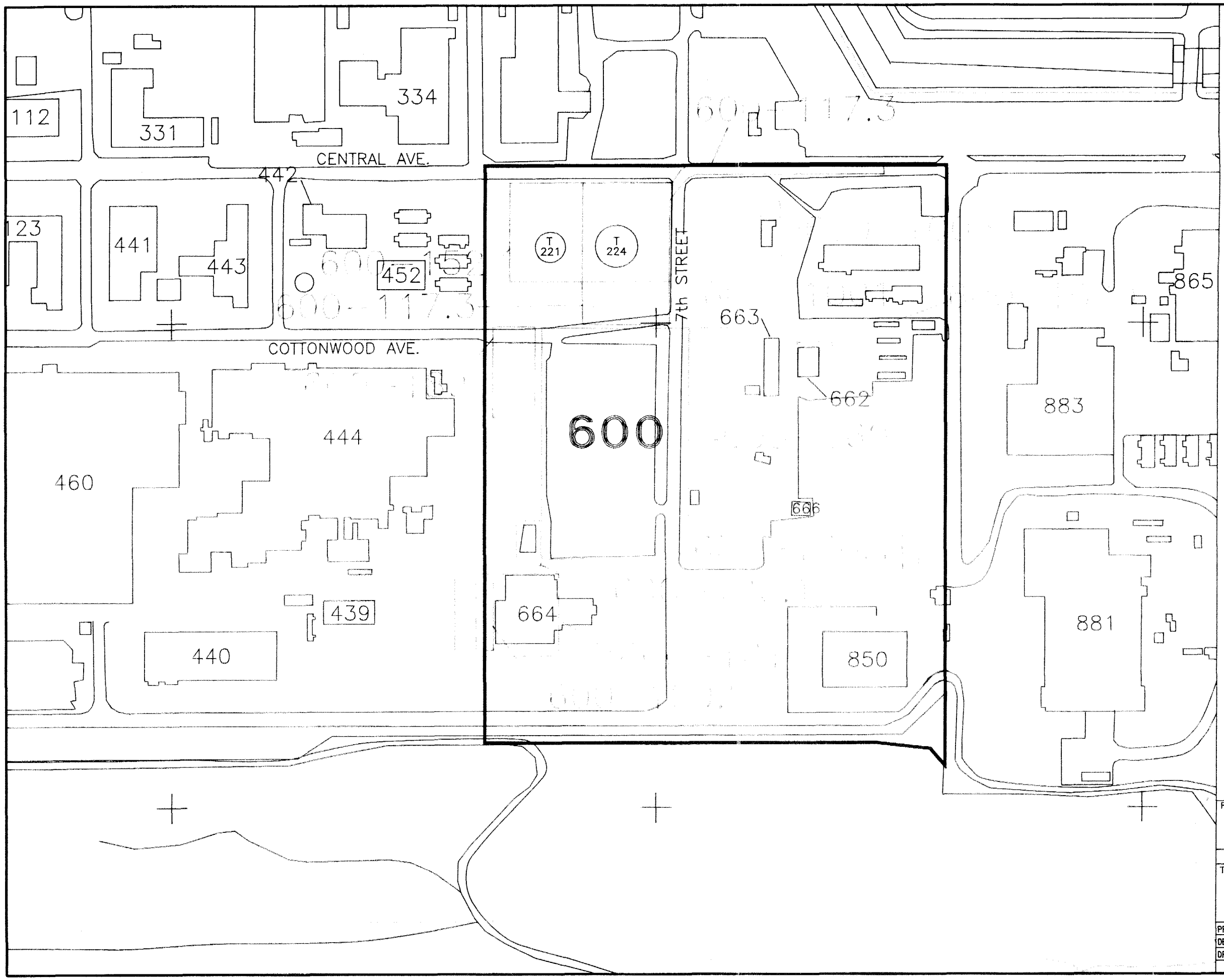
400 AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B79	SHEET
DESIGN BY	KRONER	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B79 05/20/92 1:16pm CAB


500
371
374
500-117.1
500-197
500-159
559
552
553
554
551
500-117.2
334
331
442
441
443
452
771
776
777
707
750
LEGEND
500-158
ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE
CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE
SCALE
0
200
400 FEET
PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado
FIGURE 500-1
TITLE:
500 AREA PACs
REVISED 5/22/92
PROJ. NO. 304944
DWG. NO. 304944-880
SHEET
DESIGN BY KRONER
CHECKED
DRAWN BY KRONER
APPROVED FJB
OF
DATE 12-19-91
SCALE AS SHOWN
4944B80 05/22/92 9:30am CAB



LEGEND

CHARGED INFORMAL HAZARDOUS SUBSTANCE SITE

SCALE

0 200 400 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 600-1

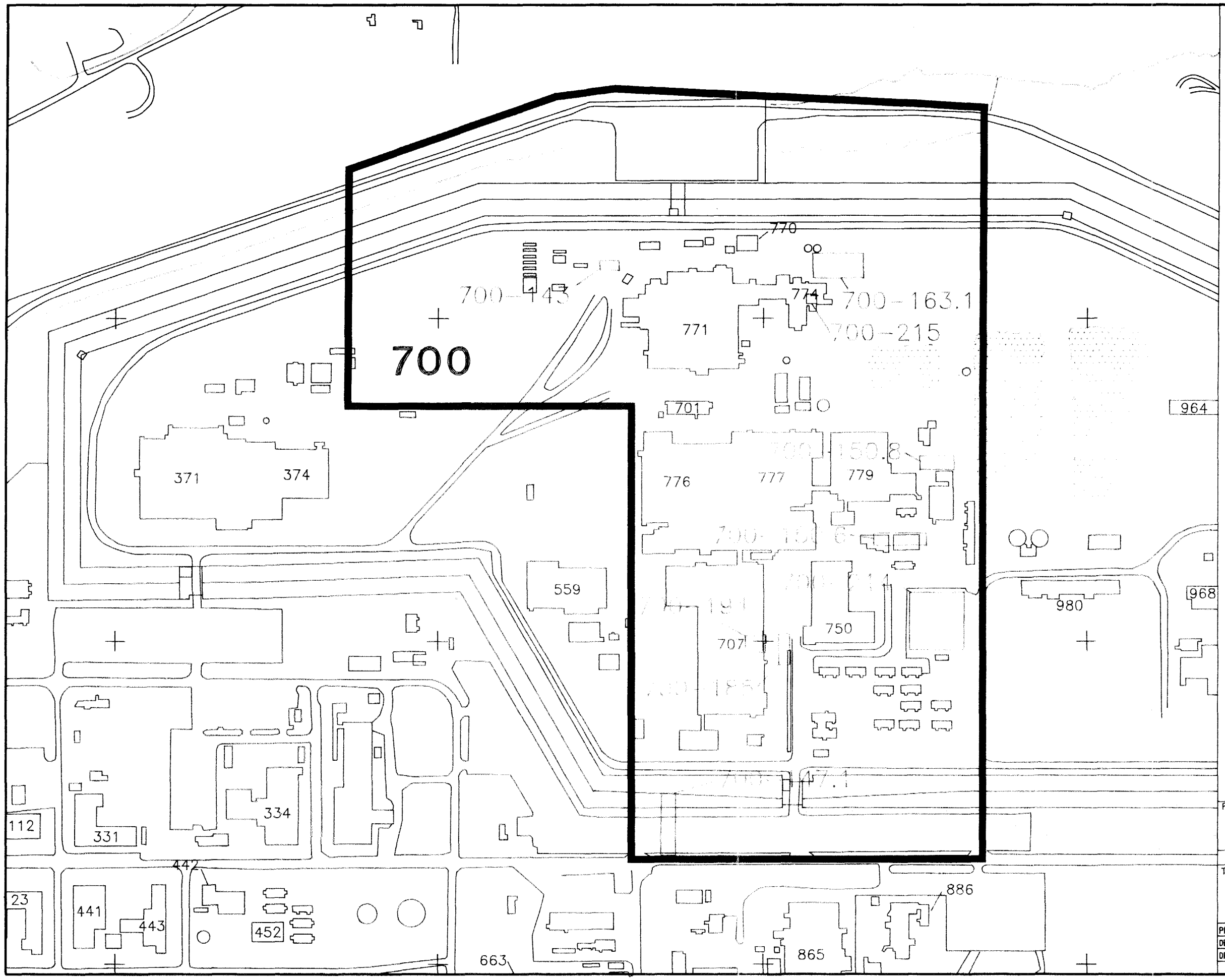
TITLE:

600 AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B81	SHEET
DESIGN BY	KRONER	CHECKED	AKS	OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B81 05/20/92 3:13pm AWK



LEGEND

ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 300 600 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE 700-1

TITLE:

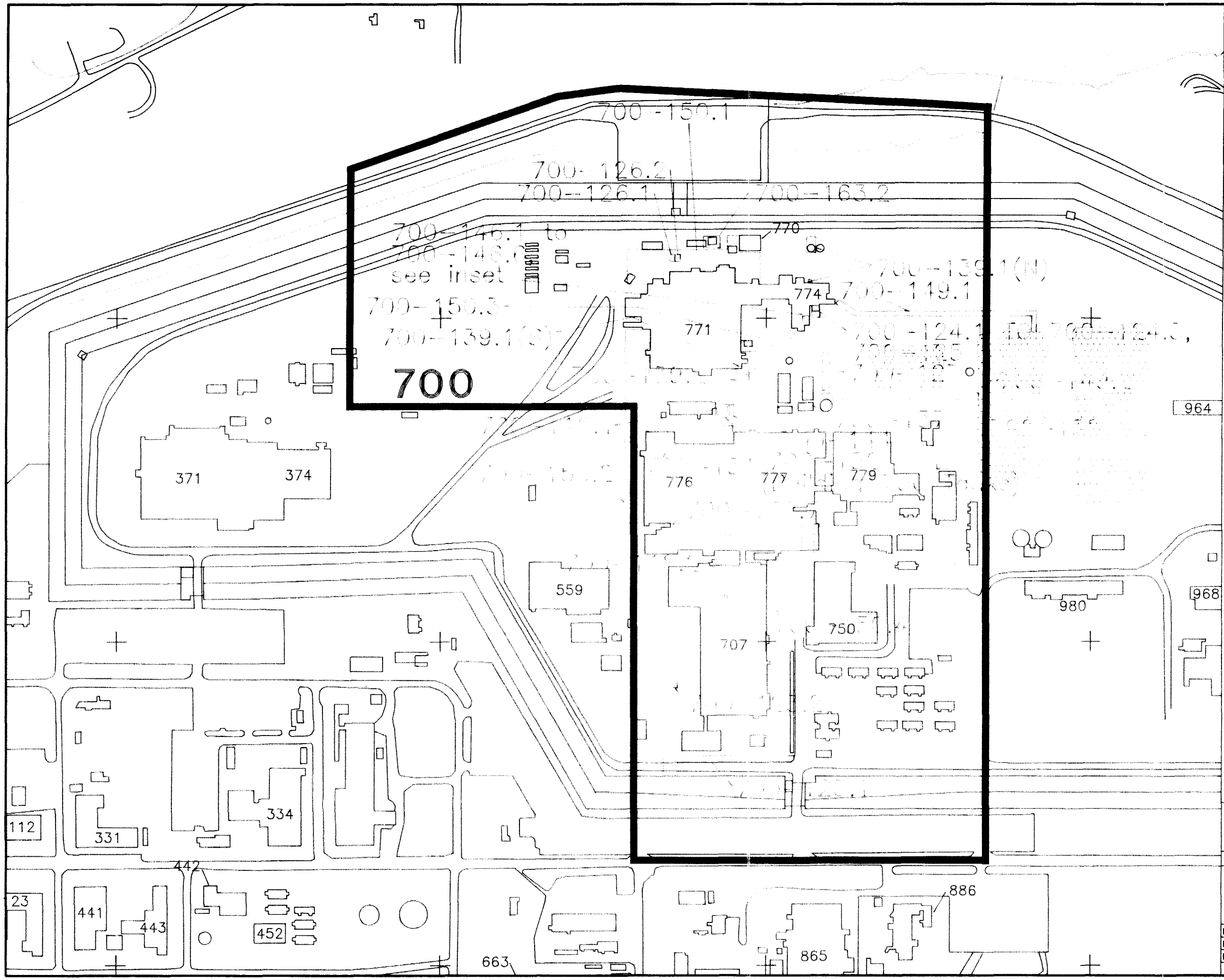
700 AREA

ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITES

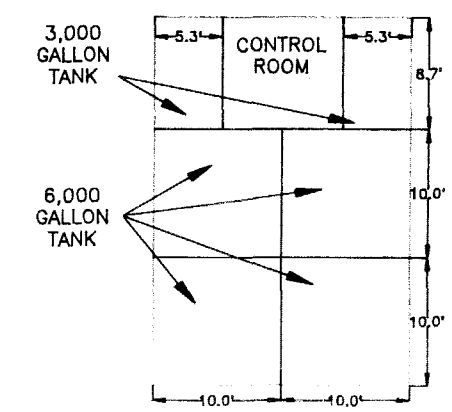
REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B82	SHEET
DESIGN BY	KRONER	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B82 05/20/92 1:37pm CAB



INSET OF
PAC 700-146.1 TO
700-146.6



DIMENSIONS ARE APPROXIMATE

LEGEND

700-139 CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 300 600 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 700-2

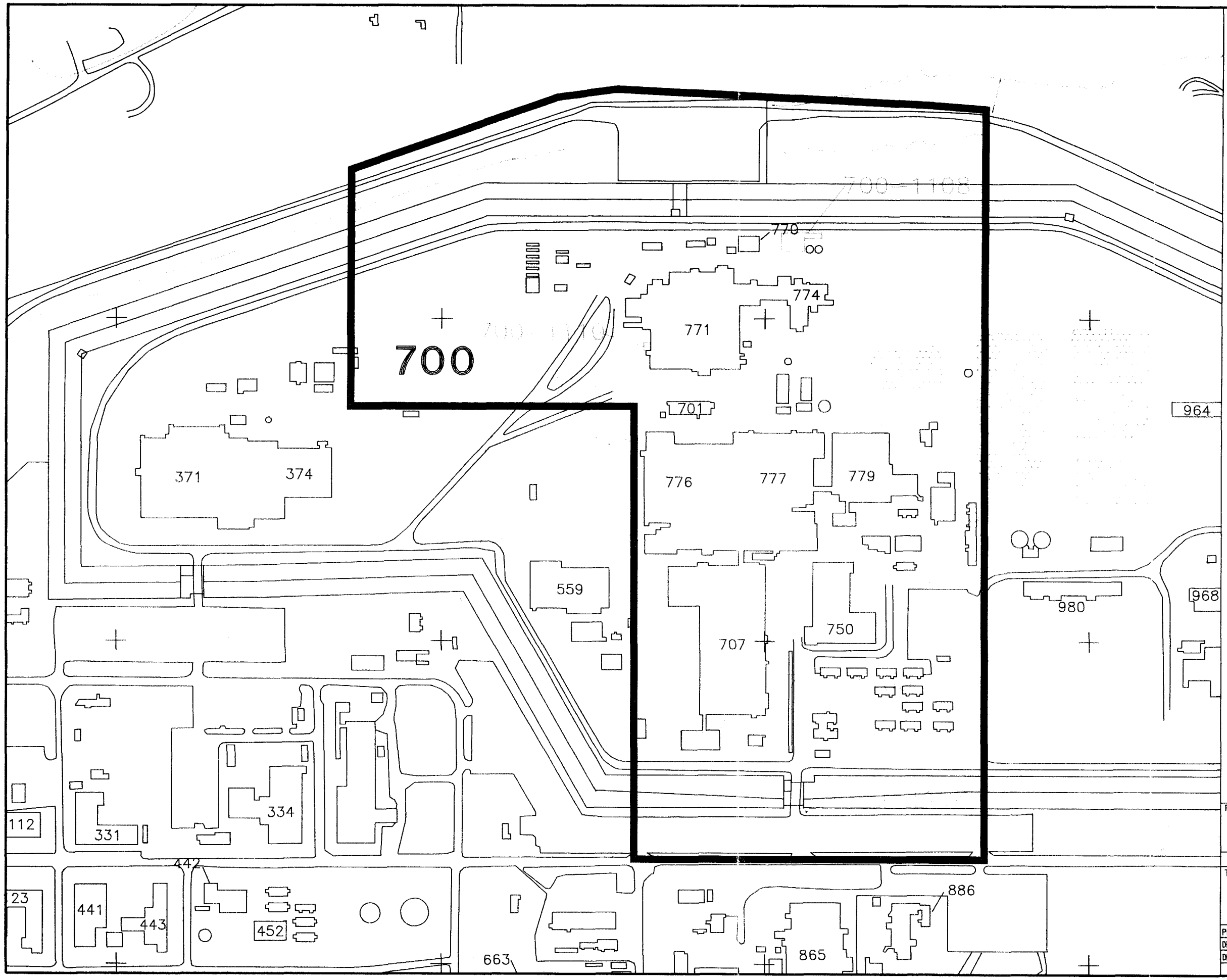
TITLE:

700 AREA
CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITES

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B132	SHEET
DESIGN BY	KRONER	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B132 05/19/92 10:24am AWK



LEGEND

SCALE

0 300 600 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE 700-3

TITLE:

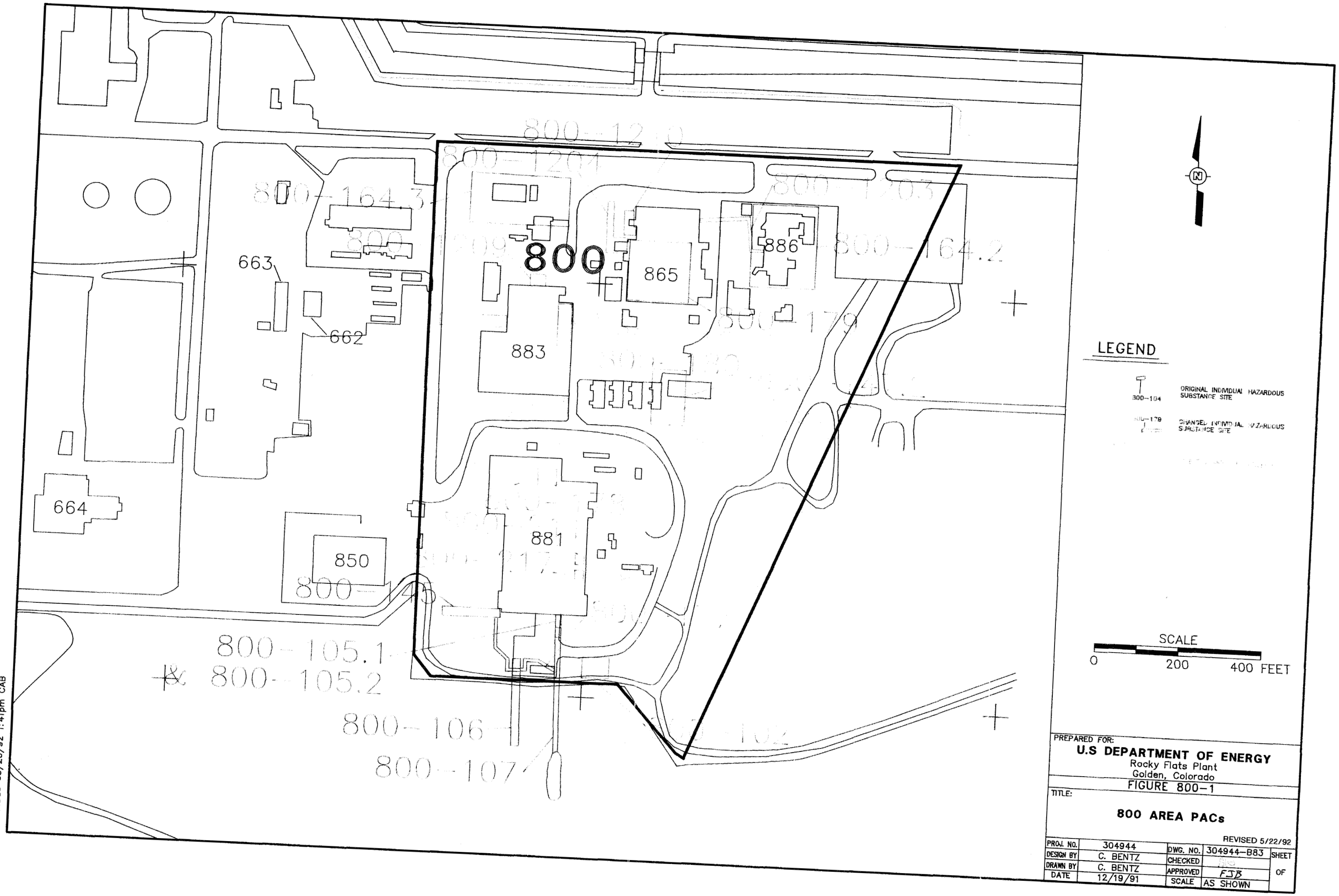
700 AREA

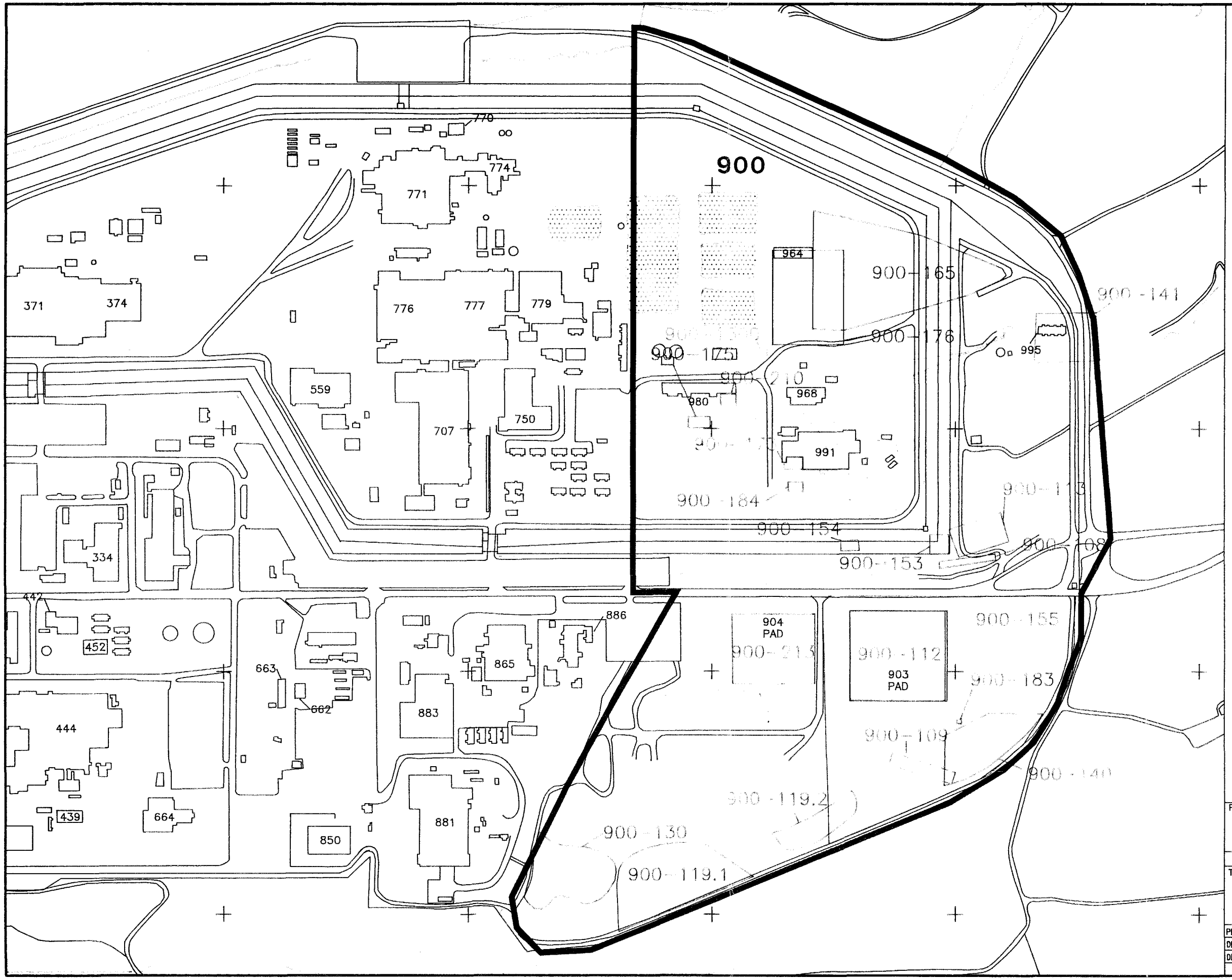
POTENTIAL AREAS OF CONCERN

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B133	SHEET
DESIGN BY	KRONER	CHECKED		OF
DRAWN BY	KRONER	APPROVED	FJB	
DATE	12-19-91	SCALE	AS SHOWN	

4944B133 05/20/92 0:39pm CAB


800
865
886
883
881
850
663
662
664
800-164.3
800-1201
800-1203
800-164.2
800-179
800-145
800-105.1
800-105.2
800-106
800-107
N
LEGEND
800-104
ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE
CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE
SCALE
0
200
400 FEET
PREPARED FOR:
U.S DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado
FIGURE 800-1
TITLE:
800 AREA PACs
REVISED 5/22/92
PROJ. NO. 304944
DESIGN BY C. BENTZ
DRAWN BY C. BENTZ
DATE 12/19/91
DWG. NO. 304944-B83
CHECKED
APPROVED FJB
SCALE AS SHOWN
SHEET
OF
4944B83 05/20/92 1:41pm CAB



LEGEND

900-165 ORIGINAL INDIVIDUAL HAZARDOUS SUBSTANCE SITE

900-17 CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITE

SCALE

0 400 800 FEET

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

FIGURE 900-1

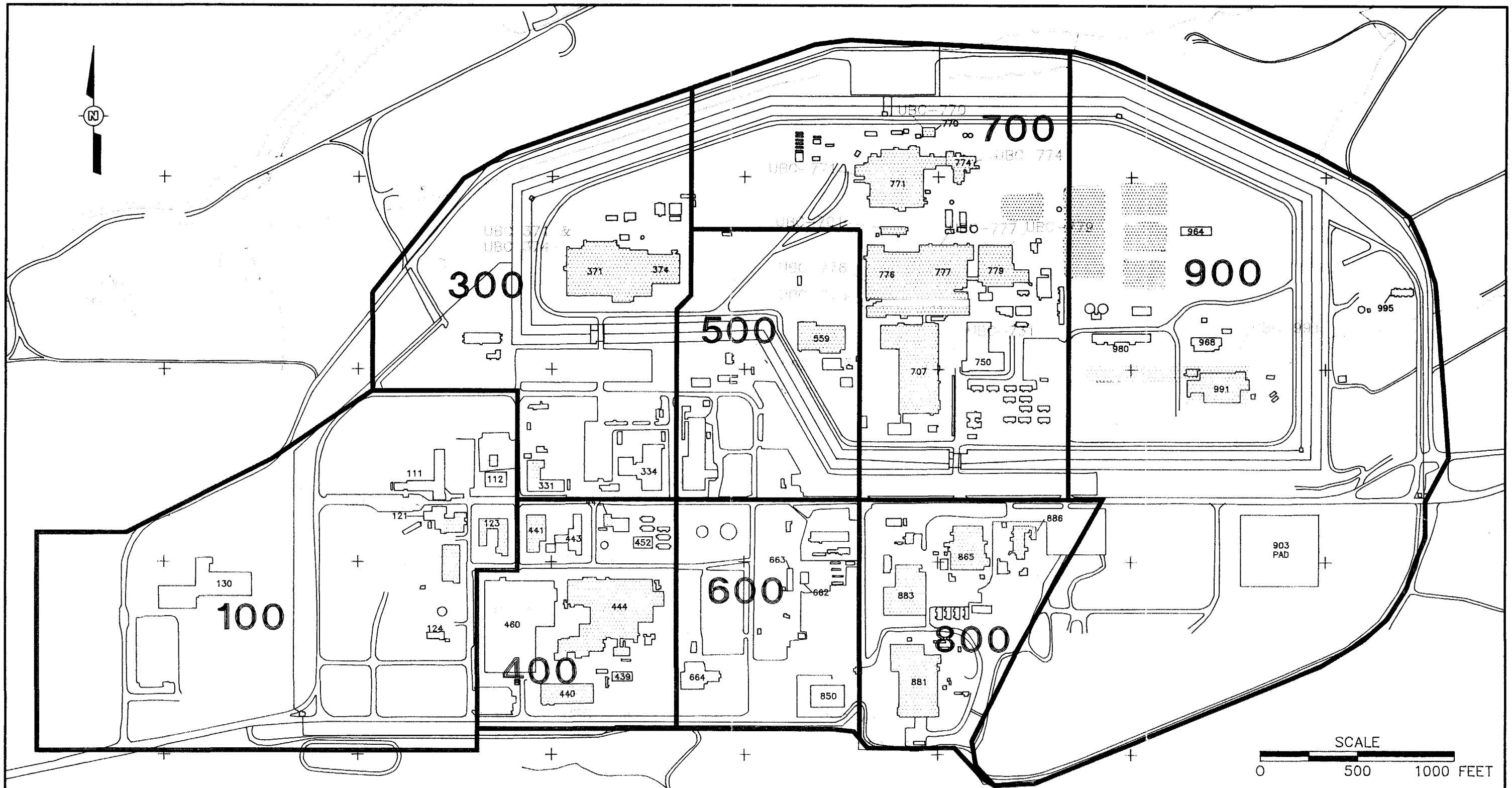
TITLE:

900 AREA PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B84	SHEET
DESIGN BY	C. BENTZ	CHECKED		OF
DRAWN BY	C. BENTZ	APPROVED	F.J.B	
DATE	12/19/91	SCALE	AS SHOWN	

4944B84 05/19/92 10:40am AWK



PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

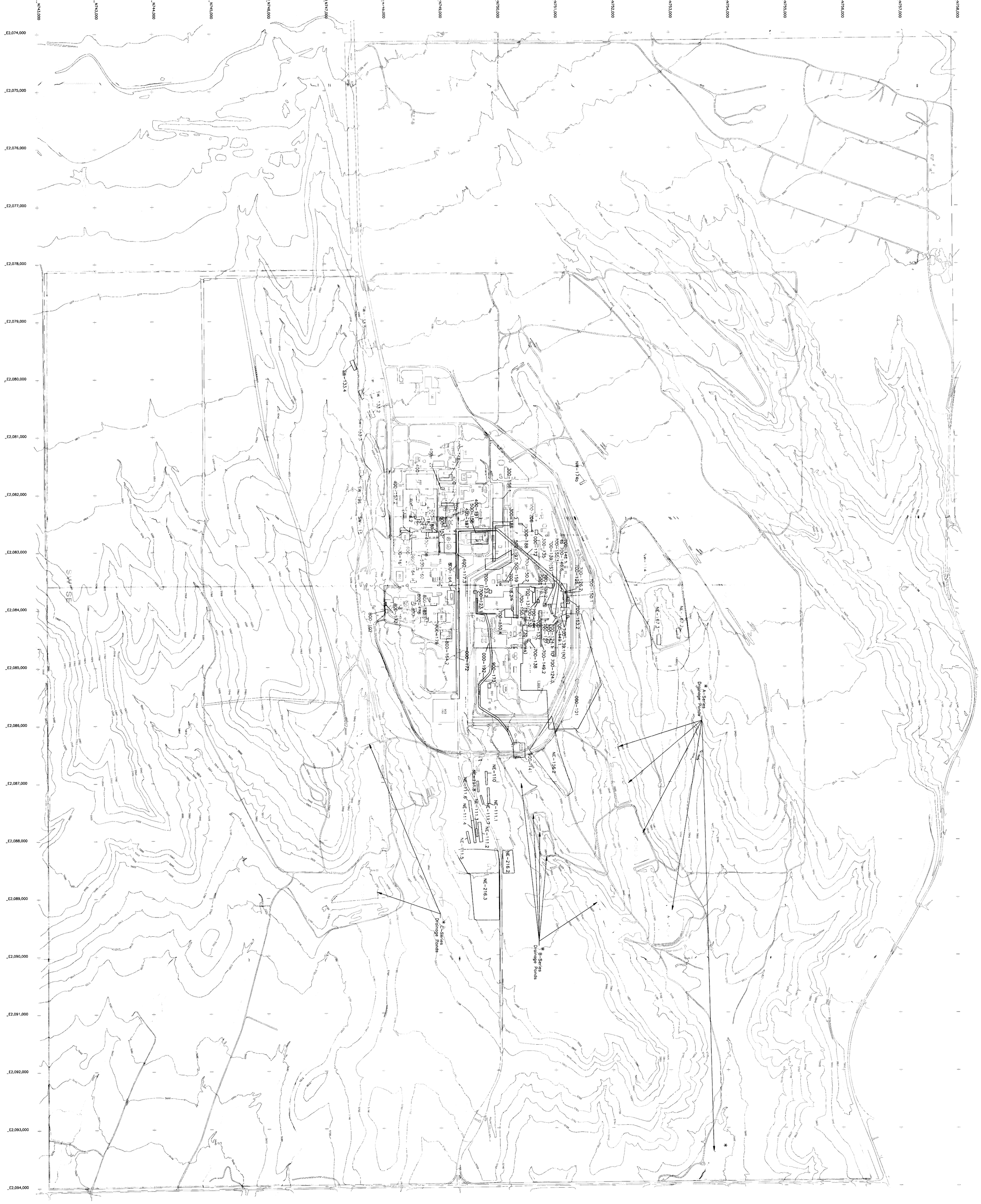
FIGURE UBC-1

TITLE:
UNDER BUILDING CONTAMINATION PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-B125
DESIGN BY	C. BENTZ	CHECKED	
DRAWN BY	C. BENTZ	APPROVED	FJB
DATE	12/27/91	SCALE	AS SHOWN

4944B125 05/22/92 10:40am CAB



LEGEND

700-139.2—D CHANGED INDIVIDUAL HAZARDOUS SUBSTANCE SITES

* The A-, B-, and C- Series Ponds, as well as the A-, B-, and C- Series Drainages on the Rocky Flats Plant are all considered Potential Areas of Concern.

SCALE
500 0 500 1000 FEET

N

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant
Golden, Colorado

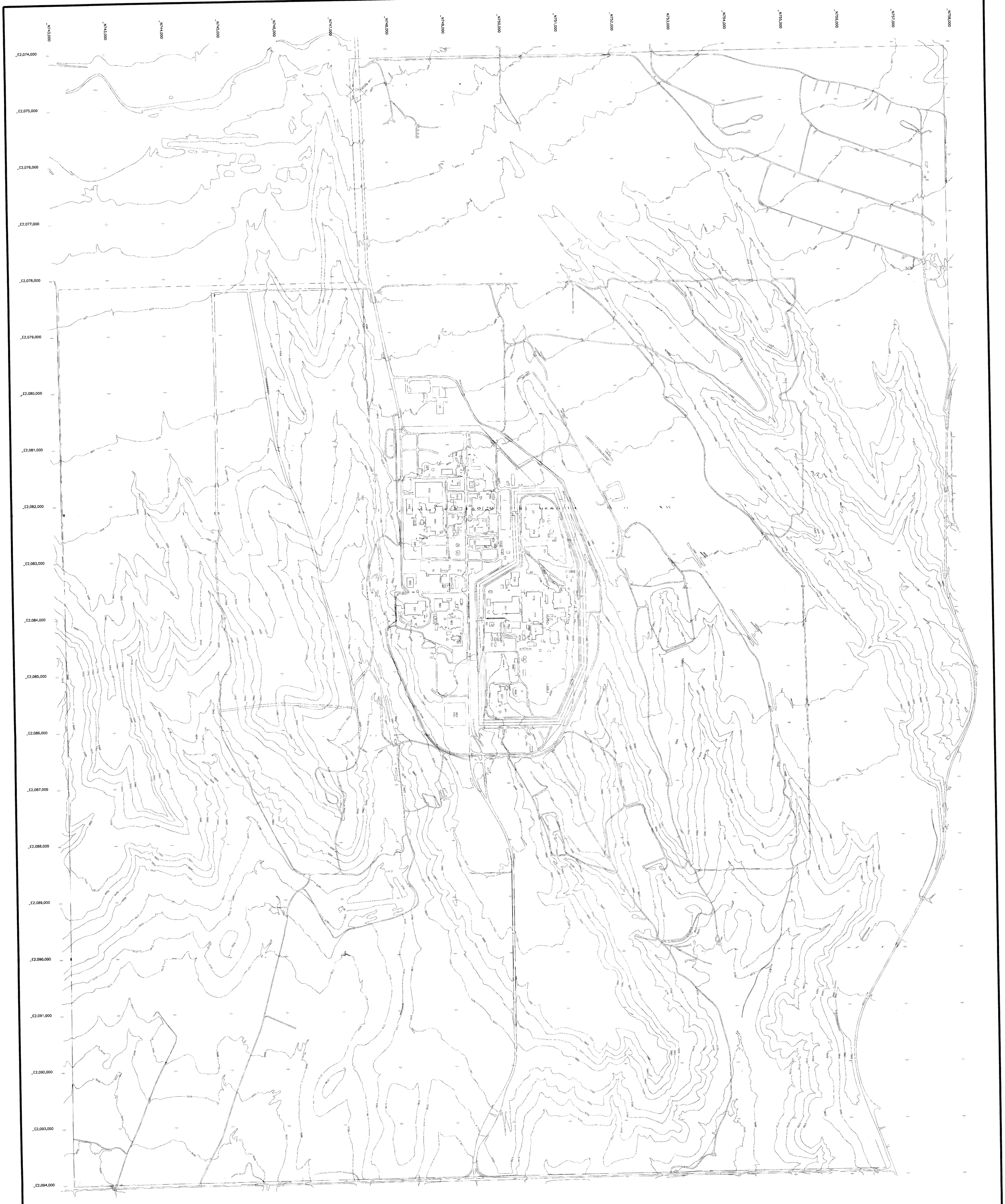
PLATE 2

TITLE:

HRR IHSSs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-M1
DESIGN BY	C. BENTZ	CHECKED	
DRAWN BY	C. BENTZ	APPROVED	
DATE	12/17/91	SCALE	AS SHOWN



LEGEND

SCALE
500 0 500 1000 FEET

N

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

PLATE 3

TITLE:

NEW PACs

REVISED 5/22/92

PROJ. NO.	304944	DWG. NO.	304944-M2
DESIGN BY	C. BENTZ	CHECKED	
DRAWN BY	C. BENTZ	APPROVED	