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ENVIRONMENTAL RESTORATION PROGRAM

Site Descriptions of Environmental Restoration Units at the Oak Ridge K-25 Site, Oak Ridge, Tennessee

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Environmental Restoration Division
K-25 Environmental Restoration Program

Site Descriptions of Environmental Restoration Units at the Oak Ridge K-25 Site, Oak Ridge, Tennessee

Date Issued—October 1991

Prepared for
U.S. Department of Energy
Office of Environmental Restoration and Waste Management
under budget and reporting codes CD 10 72 and EW 20

OAK RIDGE K-25 SITE
Oak Ridge, Tennessee 37831-7101
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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ABSTRACT

This report gives an overview of each of the 116 Solid Waste Management Units (SWMUs) under the purview of the K-25 Environmental Restoration Program. It is an update of three documents published in 1987: *3004.u 2.A.1 Assessment for the Oak Ridge Gaseous Diffusion Plant* (K/HS-167), *CERCLA Assessment for the Oak Ridge Gaseous Diffusion Plant* (K/HS-168), and *3004.u 2.A.1 Assessment for Waste Accumulation Areas for the Oak Ridge Gaseous Diffusion Plant* (K/HS-196). This document outlines the history and current condition of each SWMU. Information was gathered from visits to the sites, research into plant records, interviews with personnel associated with the operation of each unit, and published reports as noted in the "References" section for each SWMU. This document treats each SWMU as an individual unit grouped into one of 14 hydrogeological areas at the K-25 Site rather than as one of the 16 Operable Units established in May 1991. This document is intended to meet the requirements of state and federal regulatory bodies as well as provide a reference source on all SWMUs at the K-25 Site. This report will be periodically updated to reflect the changing status of environmental restoration units at the K-25 Site.

ACRONYMS

AVLIS	Automatic Vapor Laser Isotope Separation
BNA	base neutral extractables
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNF	Central Neutralization Facility
DOE-OR	DOE Field Office, Oak Ridge
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
FFA	Federal Facilities Agreement
HSWA	Hazardous and Solid Waste Amendments
MFL	Miller's Fluorinated Lubricating (oil)
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
ORGDP	Oak Ridge Gaseous Diffusion Plant (name officially changed to Oak Ridge K-25 Site in October 1990)
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	Operable Unit
PA	preliminary assessment
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RCW	recirculating cooling water
RFI	RCRA Facility Investigation
RI	remedial investigation
SARA	Superfund Amendments and Reauthorization Act
SI	site investigation
SWMU	Solid Waste Management Unit
TDEC	Tennessee Department of Environment and Conservation
TDHE	Tennessee Department of Health and Environment
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
UST	underground storage tank
WAG	Waste Area Grouping

INTRODUCTION

The Oak Ridge K-25 Site is one of three major installations on the Oak Ridge Reservation (ORR), the others being the Oak Ridge Y-12 Plant and the Oak Ridge National Laboratory (ORNL). This document describes areas in the K-25 Site that are governed by different environmental laws and updates the status of contamination assessments and remedial activities that are, or will be, taking place at some of the areas. Section 1 of this report describes the various environmental restoration (ER) programs currently in place and outlines the permit requirements and regulatory initiative which mandate this report and the investigation of these areas.

K-25 SITE GENERAL HISTORY OF ENVIRONMENTAL ISSUES

The K-25 Site was built as part of the Manhattan Project during World War II to supply enriched uranium for nuclear weapons production. Construction of the K-25 Site started in 1943, and the K-25 building, the first diffusion facility for large-scale separation of ^{235}U, was fully operable by August 1945. Additional buildings involved in the enrichment process, K-27, K-29, K-31, and K-33, were operable by 1956. In response to the nation's postwar nuclear emphasis, plant operations were modified to include the production of enriched uranium that was compatible with reactors used to generate electric power. The K-25 Site continued to provide enriched uranium until 1985.

The production, laboratory, fabrication, decontamination, and maintenance processes associated with the activities at the K-25 Site resulted in hazardous and radioactive wastes. According to environmental laws, places where these wastes were either treated, stored, or disposed of have been designated solid waste management units (SWMUs). A SWMU "includes any discernable units that have ever accumulated, treated, stored, or disposed of solid wastes (irrespective of whether the units were intended for waste management). Such units may include, but are not limited to, any landfill, surface impoundment, waste pile, land treatment unit, incinerator, injection well, tank, (including storage, treatment, and accumulation tanks), container storage unit, recycling unit, and wastewater treatment unit. These are to include those that are subject to 40 CFR Part 264, and those which are not subject to such regulations anywhere on the DOE Oak Ridge Reservation. The definition also includes areas contaminated by routine, deliberate, or systematic discharges from process components."[1]

A description of all the SWMUs at the K-25 Site known as of May 15, 1991, is included in this document. At some of these facilities, investigations of contamination resulting from the operations that took place there are planned or are under way, in accordance with the environmental regulations listed in the following section. The descriptions included in this document also update the status of those investigations or describe the plans to initiate them.

REGULATORY INITIATIVE

The installations in Oak Ridge are currently administered by the DOE Field Office, Oak Ridge (DOE-OR), in Oak Ridge, Tennessee. All DOE-OR installations are currently subject to the requirements of several laws:

- *Resource Conservation and Recovery Act (RCRA)*—Created in 1976 as a management system for hazardous wastes which mandates permitting currently operating treatment, storage, and disposal (TSD) facilities. Under RCRA, these TSD facilities are referred to as SWMUs. RCRA defines a SWMU as any "discernible waste management unit at a RCRA facility from which hazardous waste or hazardous constituents might migrate, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which hazardous wastes or hazardous constituents have been routinely and systematically released."[2]

- *Hazardous and Solid Waste Amendments (HSWA)*—Amendments to RCRA (1984) which provide the U.S. Environmental Protection Agency (EPA) with the authority to enforce corrective actions by broadening the scope of the RCRA Corrective Action Program. In addition to evaluating and correcting releases to the uppermost aquifer from regulated RCRA units, the HSWA promotes the cleanup of continuing releases to any media resulting from waste management units and practices at RCRA facilities. Among the most significant provisions of the HSWA are:

  - Section 3004(u)—Corrective Action for Continuing Releases
    Section 3004(u) states that for permits issued after November 8, 1984, corrective action is required for releases of hazardous waste or constituents from any SWMU at any TSD facility seeking a permit for permanent operation, regardless of when waste was placed in the unit. Thus, corrective actions apply to releases presently occurring as well as to past releases.

  - Section 3004(v)—Corrective Action Beyond the Facility Boundary
    Section 3004(v) authorized the EPA to require that corrective action be taken by the facility owner or operator for releases that have migrated beyond the facility boundary (off-site). Such action should be taken where necessary in order to protect human health and the environment unless the owner/operator demonstrates to the satisfaction of the administrator that permission to undertake such action was denied.

- *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also referred to as Superfund)*—Created in 1980 to establish a program to identify sites (Operable Units) from which environmental releases of hazardous substances might occur or have occurred. At such sites, Superfund promotes the evaluation of damage to natural resources, ensures cleanup by the responsible party or the government, and creates a claims procedure for parties involved in site cleanup and natural resource reclamation. Sites identified by CERCLA are evaluated and then placed on the National Priorities List (NPL), if appropriate. The ORR was listed on the NPL in the December 1989 *Federal Register* (54 FR 48184).

- *Superfund Amendments and Reauthorization Act (SARA)*—Created in 1986 as a 5-year extension of the Superfund/CERCLA program to clean up hazardous releases at uncontrolled or abandoned hazardous waste sites.

- *National Environmental Policy Act (NEPA)*—Created in 1968 to direct federal agencies to consider the impacts of their actions (e.g., construction, remediation) on the human environment as a part of all decision-making processes.

PERMIT REQUIREMENTS

In accordance with RCRA, the state of Tennessee issued Permit Number HSWA TN001, identification number TN1 890 090 003, for Building 7652 to DOE, Oak Ridge Tennessee, with an effective date of October 25, 1986, and remaining effective until October 25, 1996. A requirement of Sect. II.A.1 of this permit is that the "Permittee shall provide to the Regional Administrator reports which identify and characterize all solid waste management units ... currently or previously located within the Reservation boundary, except units which are under the principal control of a principal owner who is other than the Department of Energy." In compliance with this requirement, 32 reports were prepared which characterized 41 SWMUs at the K-25 Site. These reports, all of which are titled RCRA Facility Investigation (RFI) Plans, briefly describe the site and recommend a sampling strategy to define the wastes and/or contamination that may be present. These 41 sites were selected for this sampling program on the basis of K-25 employees' knowledge of operations that had taken place at those sites. This report includes information which was gathered in the preparation of those reports and which has been obtained from the sampling programs that were recommended in them.

Section II.A.1 of the permit further states that "in preparing these reports, the permittee will review all existing sources of information and develop new information related to solid waste management practices and releases at the facility and also shall fully investigate the facility property to determine the existence of any additional solid waste management units." In accordance with these requirements, an investigation into the many and varied operations that have taken place at K-25 was initiated. The investigation included a description of the operations as well as an evaluation of different contaminants that may have resulted from these operations. This report includes the results of these historical investigations, as well as information resulting from remedial investigations that are currently underway at K-25. The investigation into the history of K-25 is an ongoing process. The information contained in this document is believed to be current as of April 1991. Additional information is continually being added to the investigations, however, and the information is often quickly outdated.

Another requirement of the HSWA permit is listed in Sect. II.A.8, which states, "All lists of SWMUs in Attachment A shall be revised and submitted in connection with each response under Condition II.A.7. The lists also shall be submitted annually by January 30 of each year along with a cover letter summarizing additions or deletions during the preceding year." A copy of the list submitted for K-25 for 1991 is included as Appendix A. This is a comprehensive list that includes 153 sites, 29 of which are included in the shutdown facilities maintenance program and, as such, are not included in this report. The remaining 124, whose

descriptions are included in this report, include active sites that have approved RCRA permits and other sites for which no further action is planned.

ENVIRONMENTAL RESTORATION PROGRAM

As a result of the ORR placement on the NPL in December 1989, all remedial activities, including characterization, remedial alternative selection, and implementation, must meet the requirements of RCRA, CERCLA, and NEPA. Therefore, the Environmental Restoration (ER) Program was established whose mission is "to eliminate or reduce to prescribed safe levels the risks to the environment or to human health and safety posed by inactive and surplus DOE-OR-managed sites and facilities that have been contaminated by radioactive, hazardous, or mixed wastes."[3] The DOE-ER Program decided to address the requirements of all applicable laws in a series of "integrated" documentation for each SWMU. In order to facilitate consistency in the preparation of these "integrated" documents at all DOE-OR facilities, the managing and operating contractor for DOE-OR facilities established an ER Division.

Another result of the ORR's being listed on the NPL is the preparation by DOE, the Tennessee Department of Environment and Conservation (TDEC), and the EPA of a Federal Facilities Agreement (FFA) for the ORR. The FFA was designed to ensure that all necessary steps were undertaken to protect the public health and the environment during the investigation, evaluation, and remediation of all SWMUs/operable units. The FFA was written to integrate the approaches of all applicable regulations to SWMUs at K-25 and other Oak Ridge installations. The FFA also outlines all document deliverables, review times, and schedules to ensure that activities are undertaken in a timely manner.

In the past, all activities under the K-25 Site Remedial Action Program (now referred to as the ER Program) were conducted using the RFI approach, as described by the EPA[2] and as stipulated in the 1989 HSWA permit referenced above. After the preparation of the FFA, the investigations of environmental contamination follow a logical progression of events that includes the following elements:

- **Preliminary Assessment (PA)**—This step includes investigation of existing available records for a site, including photographs and drawings, and a compilation of information from workers who are either presently involved with the current operations of the unit or who have knowledge of the past operations of the unit. If the PA indicates that the unit may have treated, stored, or disposed of hazardous waste in accordance with RCRA, may have contributed to environmental contamination in accordance with CERCLA, or may fall under the jurisdiction of any other environmental laws mentioned above, then the unit is placed on the SWMU list. If the PA indicates conclusively that no environmental contamination may have resulted from this unit, then no further action is recommended. This is indicated by the entry "no RFI" on the SWMU list.

- **Site Inspection (SI)**—This step includes a limited amount of collection of field samples to determine whether or not environmental contamination may have resulted from this unit. Analyses of the samples are compared with background and/or health-based guideline values to reach this determination. If the SI indicates either that no

environmental contamination has resulted from operations at this unit or that the resulting contamination is below health-based guideline values, and consequently poses no risk to human health or the environment, then a recommendation of no further action may be made. The PA and SI steps are frequently grouped and referred to as PA/SI. This is usually necessary because of the lack of adequate information available on SWMUs that are more than 40 years old. The units that are in the PA/SI phase are listed in Appendix C of the FFA. A copy of the units recommended for PA/SI as of March 27, 1991, is included as Appendix B of this report.

- **Remedial Investigation (RI)**—This step is necessary if the PA/SI phases have indicated that the unit has, or is very likely to have, contributed to environmental contamination. The 32 RFI Plans were originally written to address this phase. Since they were prepared, the FFA developed the PA/SI phases, and many of the sites that were to have had a remedial investigation have since been deferred to the PA/SI phases. Sites that are proposed for the RI phase are also included in Appendix C of the FFA, a copy of which is included as Appendix B of this report.

  The RI phase can include more than one round of sample collection/analysis/and evaluation. When the nature and extent of contamination in all relevant media have been determined, an RI report is prepared which will include a baseline risk assessment. The baseline risk assessment evaluates the risk posed to human health and the environment based on health-based guideline values and background contamination. Sites in the RI phase of investigation are noted by "RFI" on the SWMU list, which is included as Appendix A of this report.

There are other steps in the investigation of contamination at sites on the ORR, but all sites included in this report are included in the steps listed above. Other steps or phases of the investigation include Interim Corrective Measures, Feasibility Studies, Treatability Studies, and Remedial Actions.

GENERAL DOCUMENTS IN THE ENVIRONMENTAL RESTORATION PROGRAM

In addition to the 32 site-specific RFI plans, several "general" documents were prepared which addressed issues germane to the K-25 ER Program as a whole. These "general" documents are listed below, with a brief description of their contents.

- *RCRA Facility Investigation Plan General Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee*, K/HS-132, Revision 1—Serves as a comprehensive reference for K-25 Site RFI documentation.[4] The general document characterizes the K-25 Site environment, locates the SWMUs in the K-25 Site geographical setting, and provides a perspective on the scope of operation. Sampling strategies, quality assurance (QA), and quality control (QC) associated with sampling, analysis, and data management are discussed, along with procedures established to protect the health and safety of employees and the public.

- *Environmental Surveillance Procedures Quality Control Program*, ESH/SUB/87-21706/1—Contains appropriate procedures for the collection of all environmental media samples.[5]

- *ORGDP Remedial Action Quality Assurance Plan*, K/HS-231—Addresses the requirements for the operation and control of activities affecting quality during all of the remedial investigations at the various 3004(u) and CERCLA units at the K-25 Site.[6]

- *K-25 Site Environmental Restoration Program Waste Management Plan*, K/ER-1&D0—Defines the segregation, characterization, and handling of wastes generated during site investigation activities at the K-25 Site.[7]

- *ORGDP Remedial Action Program Data Management Plan*, K/HS-232—Sets forth the procedures for establishing and maintaining the integrity of the records and data base generated as a result of remedial activities at the K-25 Site.[8]

- *K-25 Plant Site Waste Area Grouping Strategy Document*, K/ER-22—Establishes a strategy of combining the individual SWMUs into Waste Area Groupings (WAGs).[9] WAGs consist of SWMUs within a common groundwater drainage basin or individual/small clusters of SWMUs which are spatially and/or hydrogeologically isolated from other WAGs.

DOE and TDEC have formulated an oversight agreement/agreement-in-principle. As stated in *Agreement Between the United States Department of Energy and the State of Tennessee*, TDEC is the lead agency for the state of Tennessee. The purpose of this agreement is to (1) ensure compliance with applicable federal, state, and local environmental laws and (2) assure the citizens of Tennessee that their health, safety, and environment are being protected through a program of independent monitoring and oversight by the state.

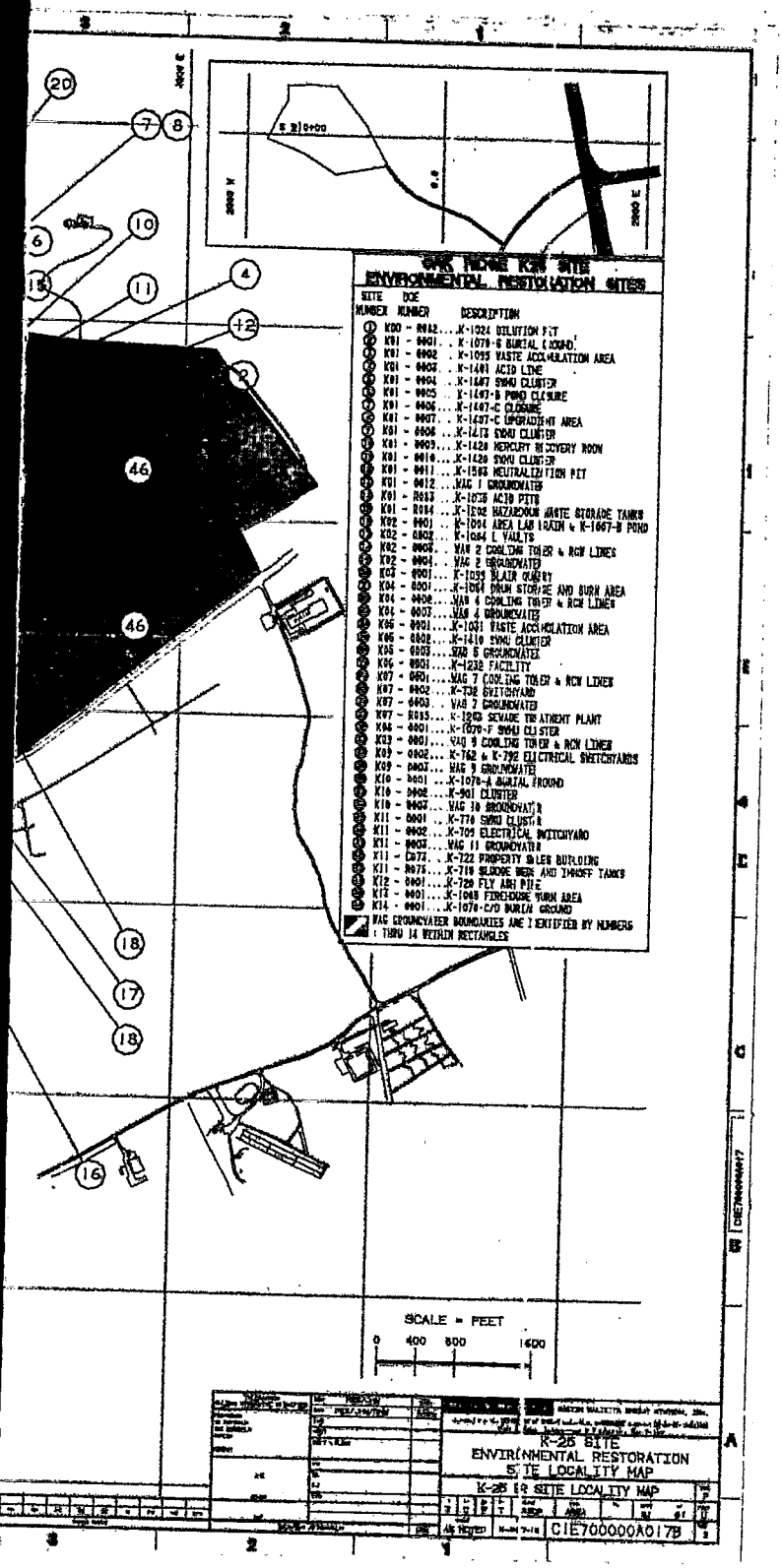
K-25 AREA GROUPING STRATEGY

The K-25 Site sites have been grouped into hydrogeologic areas. A map showing the different areas at K-25 is presented in Fig. 1. Because groundwater flows from site to site within an area, it is sometimes necessary to investigate groundwater within a larger area than is necessary for soil or source investigations. This is the case at hydrogeologic Areas 1 and 2. In the other areas, groundwater will be evaluated along with contaminant source evaluations.

In order the provide a better understanding of operations and the resulting contamination that may occur within each area, this report has grouped the sites at K-25 into their respective areas. A listing of the sites in each area is included as Table 1. In addition to those sites included in Table 1, groundwater contamination in each area may also have resulted from operations at sites that do not fall into the definition of sites or from underground storage tanks that either have been removed or are scheduled for removal in 1991. Table 1 lists the unit numbers and regulatory status of each site, whether or not the site is presently in use; the waste types that were or are being handled at the site; the media of concern in its contamination assessment, if applicable; and the appropriate investigative or remedial action required for each site. Since the groundwater in each area constitutes a separate operable unit, and, in most cases, a separate contamination assessment, a description of the groundwater in each area is also included along with a table summarizing the concentrations of constituents detected from samples collected through 1990.

One exception to the strategy of putting the sites into separate hydrogeologic basins is the K-1070-C/D Classified Burial Ground, which is noted as Area 14 on Fig. 1. This site is on a hilltop that is bisected by a groundwater divide; groundwater on the north side of the hill flows into Area 1, and groundwater on the south side of the hill flows into Area 2. The investigation of soil and surface water contamination will be investigated over the entire burial ground, which includes Area 14. On the other hand, the groundwater contamination in the K-1070-C/D Classified Burial Ground will be investigated with that in either Area 1 or Area 2.

Fig. 1. Groundwater areas at the Oak Ridge



OAK RIDGE K-25 SITE
ENVIRONMENTAL RESTORATION SITES
SITE NUMBER
DOE NUMBER
DESCRIPTION
K00 - R082 ... K-1024 DILUTION PIT
K01 - 0001 .. K-1070-G BURIAL GROUND
K01 - 0002 . K-1095 WASTE ACCUMULATION AREA
K01 - 0003 . K-1401 ACID LINE
K01 - 0004 .. K-1407 SWMU CLUSTER
K01 - 0005 .. K-1407-B POND CLOSURE
K01 - 0006 ... K-1407-C CLOSURE
K01 - 0007 .. K-1407-C UPGRADIENT AREA
K01 - 0008 .. K-1413 SWMU CLUSTER
K01 - 0009 ... K-1420 MERCURY RECOVERY ROOM
K01 - 0010 ... K-1420 SWMU CLUSTER
K01 - 0011 ... K-1503 NEUTRALIZATION PIT
K01 - 0012 ... WAG 1 GROUNDWATER
K01 - R083 ... K-1035 ACID PITS
K01 - R084 ... K-1202 HAZARDOUS WASTE STORAGE TANKS
K02 - 0001 .. K-1004 AREA LAB DRAIN & K-1007-B POND
K02 - 0002 ... K-1004 L VAULTS
K02 - 0003 .. WAG 2 COOLING TOWER & RCW LINES
K02 - 0004 .. WAG 2 GROUNDWATER
K03 - 0001 ... K-1099 BLAIR QUARRY
K04 - 0001 ... K-1064 DRUM STORAGE AND BURN AREA
K04 - 0002 ... WAG 4 COOLING TOWER & RCW LINES
K04 - 0003 ... WAG 4 GROUNDWATER
K05 - 0001 ... K-1031 WASTE ACCUMULATION AREA
K05 - 0002 ... K-1410 SWMU CLUSTER
K05 - 0003 ... WAG 5 GROUNDWATER
K06 - 0001 ... K-1232 FACILITY
K07 - 0001 ... WAG 7 COOLING TOWER & RCW LINES
K07 - 0002 ... K-732 SWITCHYARD
K07 - 0003 .. WAG 7 GROUNDWATER
K07 - R085 ... K-1203 SEWAGE TREATMENT PLANT
K08 - 0001 ... K-1070-F SWMU CLUSTER
K09 - 0001 ... WAG 9 COOLING TOWER & RCW LINES
K09 - 0002 ... K-762 & K-792 ELECTRICAL SWITCHYARDS
K09 - 0003 ... WAG 9 GROUNDWATER
K10 - 0001 ... K-1070-A BURIAL GROUND
K10 - 0002 ... K-901 CLUSTER
K10 - 0003 ... WAG 10 GROUNDWATER
K11 - 0001 .. K-770 SWMU CLUSTER
K11 - 0002 ... K-709 ELECTRICAL SWITCHYARD
K11 - 0003 ... WAG 11 GROUNDWATER
K11 - C073 .. K-722 PROPERTY SALES BUILDING
K11 - R075 ... K-710 SLUDGE BEDS AND IMHOFF TANKS
K12 - 0001 ... K-720 FLY ASH PIPE
K13 - 0001 ... K-1065 FIREHOUSE BURN AREA
K14 - 0001 ... K-1070-C/D BURIAL GROUND
WAG GROUNDWATER BOUNDARIES ARE IDENTIFIED BY NUMBERS 1 THRU 14 WITHIN RECTANGLES
SCALE = FEET
0 400 800 1600
K-25 SITE
ENVIRONMENTAL RESTORATION
SITE LOCALITY MAP
K-25 ER SITE LOCALITY MAP
C1E700000A017B

25 Site.

Table 1. K-25 Solid Waste Manangement Units as of October 1, 1991

UNIT	Operable Unit	Unit Number	Status	Presently Used	Waste Type	Media of Concern	Action
AREA 1							
K-822 Cooling Tower Basin	—	C003a	CERCLA	N	4	s,gw	SI
K-1035 Acid Pits	—	R083	3004.u	N	2,4 & 5	s,gw,sw	SI
K-1035-A Satellite Drum Storage Area	—	R028	RCRA	N	2,4 & 5	none	No RI
K-1037 Recirculating Cooling Water Lines	—	C003b	CERCLA	Y	4	s,gw	SI
K-1070-B Old Classified Burial Ground	K-1407	R002	3004.u	N	2,3,4,5, & 7	s,gw	RI
K-1070-G Burial Ground	—	R054	3004.u	N	2,3,4,5 & 6	s,gw	SI
K-1095 Paint Shop	—	R056	3004.u	Y	2,3	s,gw	No RI
K-1095 Waste Accumulation Area	—	R053	3004.u	Y	2,3 & 4	s,gw	SI
K-1202 Hazardous Waste Storage Tanks	K-1407	R084	RCRA	Y	1,2,4 & 5	s,gw	RI
K-1302 Gas Cylinder Storage Area	—	R038	RCRA	N	—	none	No RI
K-1303 Mercury Distillation and Recovery Unit	—	R086	3004.u	N	Hg	s,gw,sw	SI
K-1401 Acid Line	K-1401	R013	3004.u	N	2,3,4, & 5	s,gw	RI
K-1401 Degreasers	K-1401	C005	CERCLA	N	2,3 & 4	s	RI
K-1401-2W Contaminated Scrap Metal Dumpster	—	C068	CERCLA	N	5	none	No RI
K-1401-3E Contaminated Scrap Metal Dumpster	—	C065	CERCLA	N	5	none	No RI
K-1401-4W Contaminated Scrap Metal Dumpster	—	C066	CERCLA	N	5	none	No RI
K-1407-A Neutralization Pit	K-1407	R003	RCRA	Y	2,3,4 & 5	s,gw	RI
K-1407-B Holding Pond	K-1407	R004	RCRA	N	2,3,4,5 & 6	s,gw	RI
K-1407-C Retention Basin	K-1407	R039	RCRA	N	2,3,4 & 5	s,gw	RI
K-1407-C Soil	K-1407	R023	Pending	N	4 & 5	s,gw	RI
K-1407-H Central Neutralization Facility	—	R035	RCRA	Y	4	none	No RI
K-1413 Process Lines	K-1413	R059	3004.u	N	2,3,4 & 5	s,gw,sw	RI
K-1413 Treatment Tank	K-1413	R015	RCRA	N	2,3,4 & 5	s,gw,sw	RI
K-1417 Block Casting/Storage Area	—	R033	RCRA	Y	2,3,4,5 & 6	none	No RI
K-1417 Soil	—	R024	Pending	N	5	s,gw	RI
K-1419 Sludge Fixation Plant	—	R032	RCRA	N	2,3,4,5 & 6	none	No RI
K-1420 Contaminated Drum Storage	—	C067	CERCLA	N	5	none	No RI
K-1420 Contaminated Scrap Metal Dumpster	—	C069	CERCLA	N	5	none	No RI
K-1420 Mercury Recovery Room	K-1420	R012	3004.u	N	Hg	air	RI
K-1420 Oil Decontamination Facility	—	R073	3004.u	N	1,2,3,4 & 5	s,gw	No RI
K-1420 Oil Storage	K-1420	R010	3004.u	N	2,3,4,5 & 6	s,gw	RI
K-1420 Process Lines	K-1420	R016	3004.u	N	2,3,4,5 & 6	s,gw	RI
K-1420-A Flammable Waste Storage Tank	—	R037	RCRA	N	1,2 & 3	none	No RI
K-1421 Incinerator	K-1420	R057	3004.u	N	1,2,3,4,5 & 6	s	RI
K-1425 Waste Oil/Hazardous Waste/PCB Drum Storage	—	R036	RCRA	N	1,2,3,5 & 6	none	No RI
K-1435 Hazardous Waste/PCB Incinerator	—	R034	RCRA	Y	1,2,3 & 6	none	No RI
K-1503 Neutralization Pit	—	R047	3004.u	N	4	s	SI
K-1700 Stream	K-1407	C002	CERCLA	Y	2,3,4 & 5	s,sw	RI
AREA 1 Groundwater	Area 1 g.w.	0012	3004.u	N	1,2,3,4,5 & 6	gw	RI
AREA 2							
K-1001-B Waste Accumulation Area		R048	3004.u	N	4	none	No RI
K-1001-C Waste Accumulation Area		R049	3004.u	N	4	none	No RI
K-1001-D Waste Accumulation Area		R050	3004.u	Y	4	none	No RI
K-1003 Waste Accumulation Area		R051	3004.u	Y	4	none	No RI
K-1004 Area Lab Drain	K-1007	R017	3004.u	Y	2,3,4,5 & 6	s	RI
K-1004 Waste Accumulation Area	—	R042	3004.u	Y	2,3, & 4	none	No RI
K-1004-L Contaminated Scrap Metal Dumpster	—	C061	CERCLA	N	5	none	No RI
K-1004-L Underground Tank	K-1004	R074	3004.u	N	5	s,gw	RI
K-1004-L Vaults	K-1004	C046	CERCLA	N	5	s,gw	RI
K-1004-N1 Recirculating Cooling Water Lines	K-1004	C003d	CERCLA	N	4	s,gw	RI
K-1006 Contaminated Scrap Metal Dumpster	—	C062	CERCLA	N	5	none	No RI
K-1007 Gas Tank	K-1007	U007	UST	N	1 & 2	s	RI
K-1007 Waste Accumulation Area	—	R052	3004.u	N	4	none	No RI
K-1007-P1 Holding Pond	K-1007	R044	3004.u	Y	2,3,4,5 & 6	s,gw	RI
K-1210 Recirculating Cooling Water Lines	K-1004	C003d	CERCLA	N	4	s,gw	RI
K-1225 Contaminated Scrap Metal Dumpster	—	C060	CERCLA	N	5	none	No RI
K-1414 Gas Tanks	—	U001	UST	N	1 & 2	s,gw	UST
AREA 2 Groundwater	Area 2 g.w.	0004	3004.u	N	1,2,3,4,5 & 6	gw	RI

Table 1 (continued)

UNIT	Operable Unit	Unit Number	Status	Presently Used	Waste Type	Media of Concern	Action
AREA 3							
K-1099 Blair Quarry		R019	3004.u	N	4 & 5	s,gw	SI
AREA 4							
K-801-H Cooling Tower Basin	K-1064	C003e	CERCLA	Y	4	s,gw	RI
K-802-H Cooling Tower Basin	K-1064	C003g	CERCLA	Y	4	s,gw	RI
K-1064 Drum Storage and Burn Area	K-1064	R007	3004.u	N	3,4, & 5	s,gw	RI
K-1064-G Drum Deheading Facility	K-1064	R020	3004.u	N	2,3,4 & 5	s,gw	RI
AREA 5							
K-1031 Waste Paint Accumulation Area	K-1410	R055	3004.u	N	2,3,4 & 5	s	RI
K-1410 Neutralization Pit	K-1410	R011	3004.u	N	2,3,4 & 5	s,gw	RI
K-1410 Plating Facility	K-1410	C006	CERCLA	N	1,2,3,4 & 5		RI
AREA 6							
K-1232 Chemical Recovery Facility		R014	RCRA	Y	2,3 & 4	gw	SI
AREA 7							
K-27-29 Recirculating Cooling Water Lines	K-29	C003h	CERCLA	N	4	s,gw	RI
K-732 Switchyard	K-29	R075a	3004.u	Y	6	s,gw	RI
K-832-H Cooling Tower Basin	K-29	C003i	CERCLA	N	4	s,gw	RI
K-1203 Sewage Treatment Plant	K-29	R085	3004.u	Y	5	gw	RI
AREA 8							
Duct Island Road		0002	3004.u	Y	1,2,4 & 6	s	PA/SI
K-900 Bottle Smasher		R025	RCRA	Y	2,3,4 & 5	s	SI
K-1070-F Construction Spoil Area		R018	3004.u	N	4 & 5	gw	SI
AREA 9							
K-31 Recirculating Cooling Water Lines	K-33	C003j	CERCLA	N	4	s,gw	RI
K-33 ANDCO Water Treatment Unit		R041	3004.u	N	4	none	No RI
K-33 Recirculating Cooling Water Lines	K-33	C003k	CERCLA	N	4	s,gw	RI
K-762 Switchyard	K-33	R075a	3004.u	N	6	s,sw,gw	RI
K-792 Switchyard	K-33	R075b	3004.u	N	6	s,sw,gw	RI
K-861 Cooling Tower Basin	K-33	C003l	CERCLA	N	4	s,gw	RI
K-892-G Cooling Tower Basin	K-33	C003m	CERCLA	N	4	s,gw	RI
K-892-H Cooling Tower Basin	K-33	C003n	CERCLA	N	4	s,gw	RI
K-892-J Cooling Tower Basin	K-33	C003o	CERCLA	N	4	s,gw	RI
AREA 10							
K-901 Waste Disposal Area	Area 10	R077	3004.u	N	4 & 5	gw	RI
K-901-A Holding Pond	Area 10	R006	3004.u	Y	,2,3,4,5,6 &	s,gw,sw	RI
K-901-A Sanitary Disposal Area	Area 10	R081	3004.u	N	2,3,4 & 5	s,gw,sw	RI
K-1070-A Landfarm	Area 10	0004	3004.u	N	1,2,4 & 6	s	RI
K-1070-A Old Contaminated Burial Ground	Area 10	R001	3004.u	N		gw	RI
AREA 11							
K-709 Switchyard	K-770	R075a	3004.u	N	6	s,sw	RI
K-710 Sludge Beds and Imhoff Tanks	K-770	R076	3004.u	N	5		RI
K-711 Hazardous Waste Storage Facility		R058	RCRA	N	1,2,3 & 6	sw	No RI
K-722 Property Sales Building	K-770	C073	CERCLA	Y	5		PA/SI
K-725 Beryllium Building	K-770	C004	CERCLA	N	4 & 5	s	RI
K-726 PCB Storage Facility		R040	3004.u	Y	1 & 6	none	No RI
K-770 Contaminated Debris	K-770	C009	CERCLA	N	2,3,4,5,6 & 7	s,gw,sw	RI
K-770 Scrap Metal Yard	K-770	R008	3004.u	N	2,3,4,5,6 & 7	s,gw,sw	RI
AREA 12							
K-720 Fly Ash Pile		R045	3004.u	N	4	s,gw	SI
AREA 13							
K-1085 Old Firehouse Burn Area		R043	3004.u	N	1,2,3,4,5 & 6	s,gw	SI
AREA 14							
K-1070-C/D Classified Burial Ground	K-1070-C/D	R005	3004.u	N	1,2,3,4,5 & 6	s,gw,sw	RI
K-1070-D1, -D2, and -D3 Storage Dikes		R026	RCRA	N	1,2,3,4,5 & 6	s,gw	No RI

Table 1 (continued)

UNIT	* Operable Unit	Unit Number	Status	Presently Used	Waste Type	Media of Concern	Action
SITES NOT ASSIGNED TO A HYDROLOGIC AREA							
Flannagan's Loop Road		0001	3004.u	Y	1,2,4 & 6	s	PA/SI
K-301-1 Vault 4 Hazardous Waste Storage Facility		R078	RCRA	Y	4 & 5	none	No RI
K-303-5 Low-Level Waste Storage		C072	CERCLA	Y	4 & 5	none	No RI
K-305 Vaults 19 and 19A Hazardous Waste Storage Facility		R079	RCRA	Y	4 & 5	none	No RI
K-306-1 PCB/Hazardous Waste Drum Storage		R031	RCRA	Y	1,2,3,4,5 & 6	none	No RI
K-306-1 Vault 23A Hazardous Waste Storage Facility		R030	RCRA	Y	1,3,4 & 6	none	No RI
K-310-1 Vaults 2, 2A, and 2B Hazardous Waste Storage Facility		R080	RCRA	Y	4	none	No RI
K-310-2 Low-Level Waste Storage		C070	CERCLA	Y	4 & 5	none	No RI
K-310-3 Low-Level Waste Storage		C071	CERCLA	Y	4 & 5	none	No RI
K-311-1 Radiogenic Lead Storage		R029	RCRA	Y	4 & 5	none	No RI
K-1024 Dilution Pit	K-25	R082	3004.u	N	3,4 & 5	s,gw,sw	SI
K-1025-C Storage Building		R027	RCRA		2,3,4 & 5	none	No RI
K-1030 Building Contaminated Scrap Metal Dumpster		C064	CERCLA	Y	5	none	No RI
K-1030 Contaminated Scrap Metal Dumpster		C063	CERCLA	Y	5	none	No RI
K-1515 Lagoon		R022	3004.u	N	4	none	No RI
K-1515-F Land Treatment		R021	3004.u	N	4	none	No RI

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2. U.S. Environmental Protection Agency, *RCRA Facility Investigation (RFI) Guidance*, PB89-200299, May 1989.

3. *Management Plan for the Oak Ridge Operations Environmental Restoration Program*, DOE/ORO 931, U.S. DOE, Oak Ridge Operations Office, Oak Ridge, Tenn., December 1990.

4. *RCRA Facility Investigation Plan—General Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee*, K/HS-132/R1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

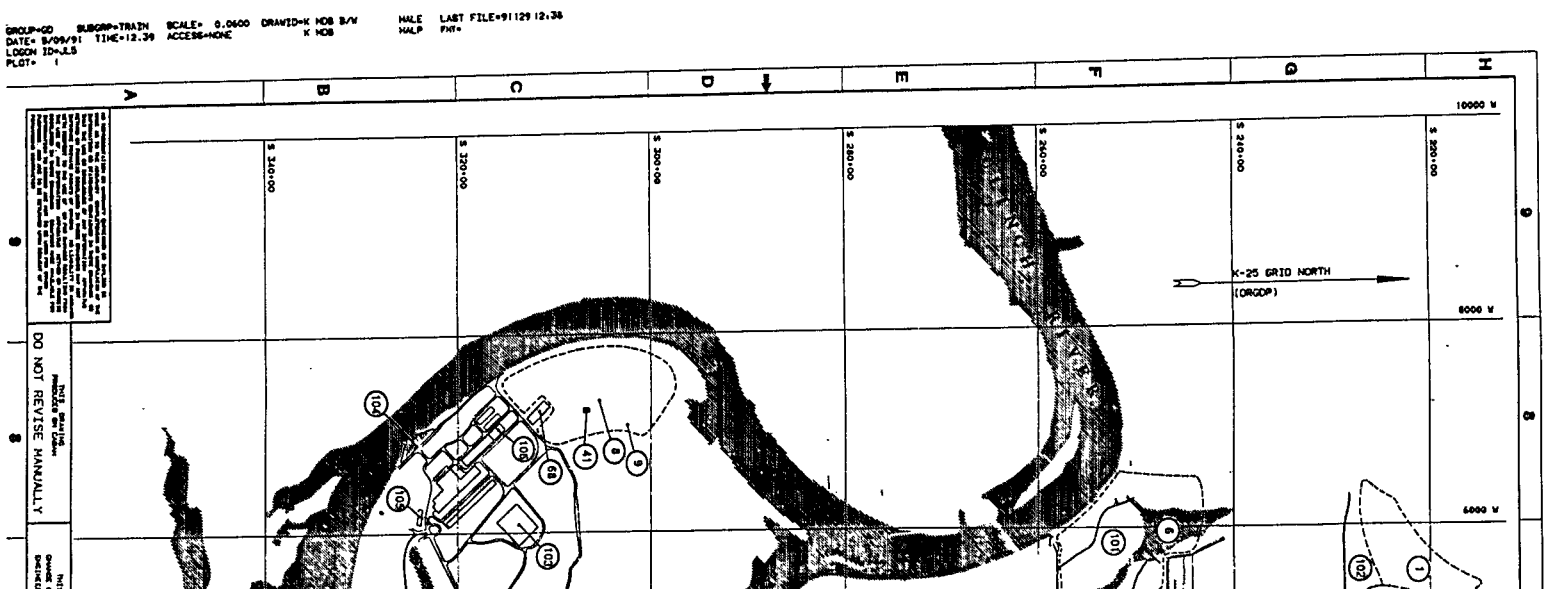
5. C. W. Kimbrough, L. W. Long, and L. W. McMahon, *Environmental Surveillance Procedures Quality Control Program*, ESH/Sub/87-21706/1, Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn., September 1988. (Formerly the Remedial Action Program QC Manual.)

6. *ORGDP Remedial Action Quality Assurance Plan*, K/HS-231, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., April 1989.

7. *K-25 Site Environmental Restoration Program Waste Management Plan*, K/ER-1&D0, Martin Marietta Energy Systems, Inc., Oak Ridge K-25 Site, Oak Ridge, Tenn., November 1990.

8. D. A. Kucsmas, *ORGDP Remedial Action Program Data Management Plan, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee*, K/HS-232, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

9. *K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee*, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.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K-25 GRID NORTH
(ORGDP)
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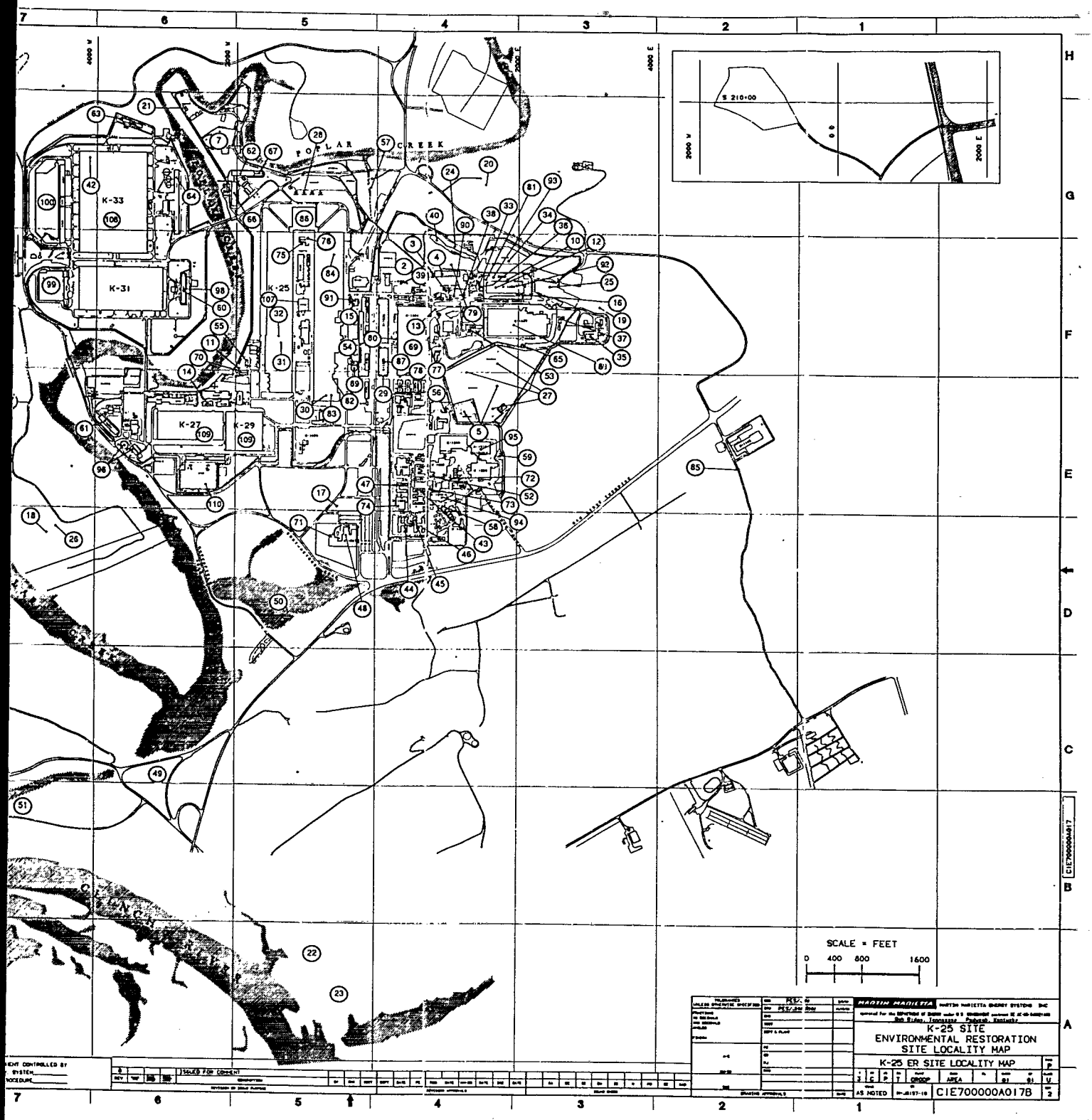

Solid Waste Management Unit Map

KEY TO SOLID WASTE MANAGEMENT UNIT MAP

Solid Waste Management Units

1. K-1070-A Old Contaminated Burial Ground
2. K-1070-B Old Classified Burial Ground
3. K-1407-Neutralization Pit
4. K-1407-B Holding Pond
5. K-1070-C/D Classified Burial Ground
6. K-901-A Holding Pond
7. K-1064 Drum Storage and Burn Area
8. K-770 Scrap Metal Yard
9. K-770 Contaminated Debris
10. K-1420 Oil Storage
11. K-1410 Neutralization Pit
12. K-1420 Mercury Recovery Room
13. K-1401 Acid Line
14. K-1232 Chemical Recovery Facility
15. K-1413 Treatment Tank
16. K-1420 Process Lines
17. K-1004 Area Lab Drain
18. K-1070-F Construction Spoil Area
19. K-1070-G Burial Ground
20. K-1099 Blair Quarry
21. K-1064-G Drum Deheading Facility
22. K-1515-F Land Treatment
23. K-1515 Lagoon
24. K-1407-C Soil
25. K-1417 Soil
26. K-900 Bottle Smasher
27. K-1070-D1, D2, D3 Storage Dikes (3 Units)
28. K-1025-C Storage Building
29. K-1035-A Satellite Drum Storage Area
30. K-311-1 Radiogenic Lead Storage
31. K-306-1 Vault 23A Hazardous Waste Storage Facility
32. K-306-1 PCB/Hazardous Waste Drum Storage
33. K-1419 Sludge Fixation Plant
34. K-1417 Block Casting/Storage Area
35. K-1435 Hazardous Waste/PCB Incinerator
36. K-1407-H Central Neutralization Facility
37. K-1425 Waste Oil/Hazardous Waste/PCB Drum Storage
38. K-1420-A Flammable Waste Storage Tank
39. K-1302 Gas Cylinder Storage Area
40. K-1407-C Retention Basin
41. K-726 PCB Storage Facility
42. K-33 ANDCO Water Treatment Unit
43. K-1004 Waste Accumulation Area
44. K-1001-B Waste Accumulation Area
45. K-1001-C Waste Accumulation Area
46. K-1001-D Waste Accumulation Area
47. K-1003 Waste Accumulation Area
48. K-1007 Waste Accumulation Area
49. K-1085 Old Firehouse Burn Area
50. K-1007-P1 Holding Pond
51. K-720 Fly Ash Pile
52. K-1004-J Vaults
53. K-1503 Neutralization Pit
54. K-1095 Waste Accumulation Area
55. K-1031 Waste Paint Accumulation Area
56. K-1414 Gas Tanks
57. K-1700 Stream
58. K-1004-L Recirculating Cooling Water Lines
59. K-1004-N1 Cooling Tower
60. K-861 Cooling Tower Basin
61. K-832-H Cooling Tower Basin
62. K-801-H Cooling Tower Basin
63. K-892-J Cooling Tower Basin
64. K-892-G/H Cooling Tower Basins
65. K-822 Cooling Tower Basin
66. K-802-H Cooling Tower Basin
67. K-801-H Cooling Tower
68. K-725 Beryllium Building
69. K-1401 Degreasers
70. K-1410 Plating Facility
71. K-1007 Gas Tank
72. K-1225 Contaminated Scrap Metal Dumpster
73. K-1004-L Contaminated Scrap Metal Dumpster
74. K-1006 Contaminated Scrap Metal Dumpster
75. K-1030 Contaminated Scrap Metal Dumpster
76. K-1030 Building Contaminated Scrap Metal Dumpster
77. K-1401-3E Contaminated Scrap Metal Dumpster
78. K-1401-4W Contaminated Scrap Metal Dumpster
79. K-1420 Contaminated Drum Storage
80. K-1401-2W Contaminated Scrap Metal Dumpster

(81) K-1420 Contaminated Scrap Metal Dumpster
(82) K-310-2 Low-Level Waste Storage
(83) K-310-3 Low-Level Waste Storage
(84) K-303-5 Low-Level Waste Storage
(85) Flannagan's Loop Road
(86) K-301-1 Vault 4 Haz. Waste Storage Facility
(86) K-305 Vaults 19 and 19A Haz. Waste Storage Facility
(86) K-310-1 Vaults 2, 2A, and 2B Haz. Waste Storage Facility
(87) K-1035 Acid Pits
(88) K-1037 Recirculating Cooling Water Lines
(89) K-1095 Paint Shop
(90) K-1202 Hazardous Waste Storage Tanks
(91) K-1413 Process Lines
(92) K-1420 Oil Decontamination Facility
(93) K-1421 Incinerator
(94) K-1004-L Underground Tank
(95) K-1004-N1 Recirculating Cooling Water Lines
(96) K-1203 Sewage Treatment Plant
(97) Duct Island Road
(98) K-31 Recirculating Cooling Water Lines
(99) K-762 Switchyard
(100) K-792 Switchyard
(101) K-901 Waste Disposal Area
(101) K-901-A Sanitary Disposal Area
(102) K-1070-A Landfarm
(103) K-709 Switchyard
(104) K-710 Sludge Beds and Imhoff Tanks
(105) K-711 Hazardous Waste Storage Facility
(106) K-722 Property Sales Building
(107) K-1024 Dilution Pit
(108) K-33 Recirculating Cooling Water Lines
(109) K-27/29 Recirculating Cooling Water Lines
(110) K-732 Switchyard

Area 1 Site Descriptions

Unit Name: K-822 Cooling Tower Basin

Unit Number: K01-C003a

Regulatory Status: CERCLA

Unit Location: Area 1, main plant area, immediately south of the K-1037 building (Map Ref. No. 65)

Approximate Dimensions and Capacity: The main cooling water system was designed to cool 4000 gal/min. The adjacent K-822-B tower was designed to handle 1200 gal/min.

Dates Operated: 1973 to present for the main tower and basin. The smaller tower was operated from 1973 to 1974.

Present Function: Low-level use in air-conditioning system for K-1037 building

Life Cycle Operation: K-822 provided recirculating cooling water for the K-1037 Barrier Plant until 1981, when the plant was closed. Since that time, the tower has been running at very reduced capacity (less than 10%) for the Atomic Vapor Laser Isotope Separation (AVLIS) project in the K-1037 building and adjoining office complex..

Waste Characteristics: The tower used chromated water from the K-802 Pumphouse, which also supplied fire water for the entire Oak Ridge Gaseous Diffusion Plant (ORGDP). A chromate/zinc/phosphate treatment was used for corrosion control until 1977, when K-802 was converted to a phosphate system.

Release Data: No leaks are recorded at this site.

Site Characterization Status: A site inspection is planned for this site.

Media of Concern: Soil and groundwater

Comments: The K-822 Cooling Tower is also known as the K-1037 Cooling Tower.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

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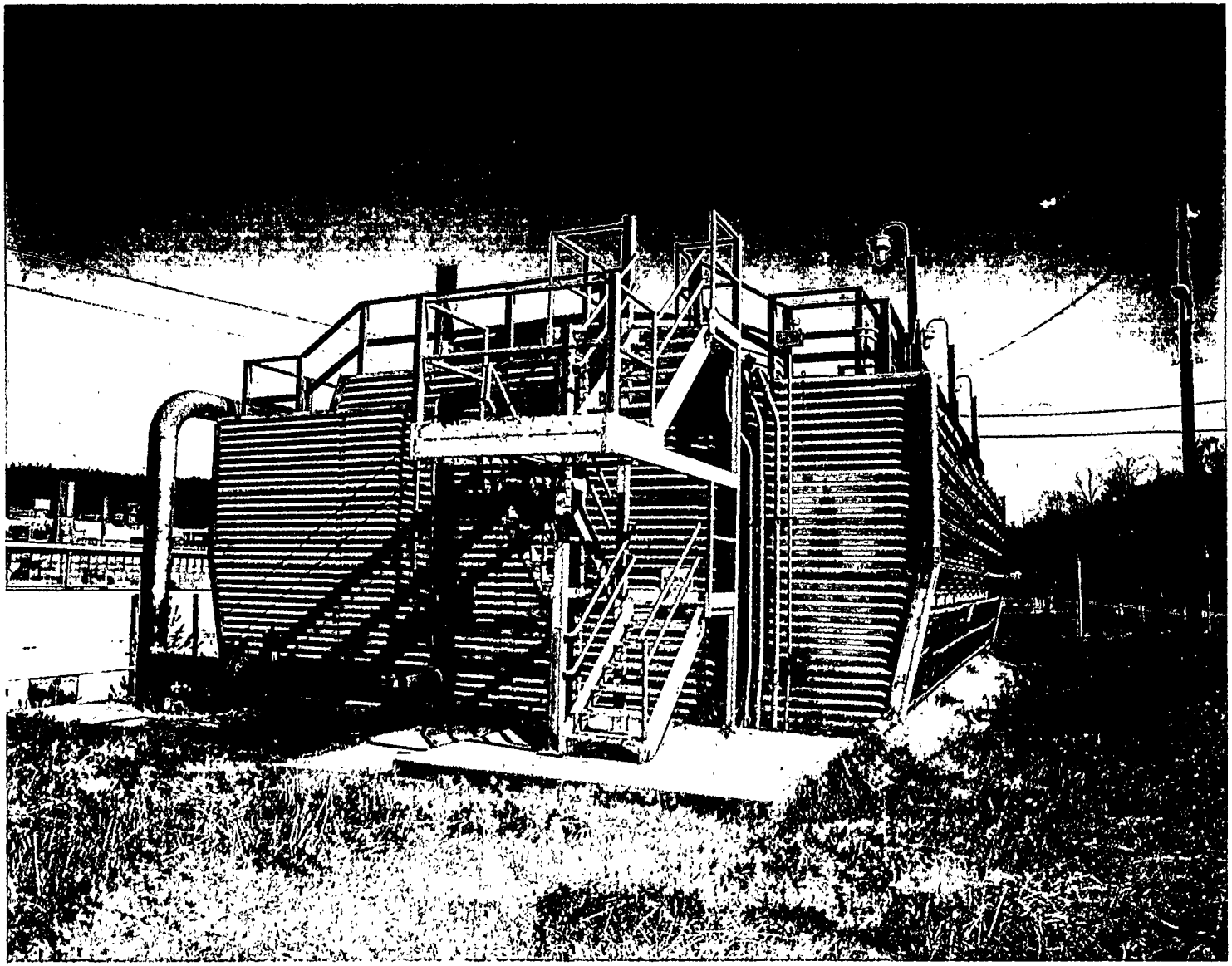
Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0610



K-822 Cooling Tower Basin

Unit Name: K-1035 Acid Pits

Unit Number: K01-R083

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, near the south end of building K-1035 (Map Ref. No. 87)

Approximate Dimensions and Capacity: Design drawings and capacity data are not available for either pit. Field inspections indicate that the internal dimensions (to the top of the stone base) of the Printed Circuit Board Facility's acid pit are 34 × 38 in. The Acid Cleaning Area's neutralization pit is 28 in. in diameter and ~24 in. deep (to top of the stone base). The total depth (including the depth below the top of the stone base) is not known for either pit. Process flows occurred in batch quantities amounting to ~100 gal/week through each pit. K-25 Site Block Plans show that the process drain lines from the acid pit and the neutralizing pit flow to a single catch basin in the area water drain system.

Dates Operated: The neutralization pit served the Acid Cleaning Area from the early 1960s to 1985; the acid pit served the Printed Circuit Board Facility from the early 1960s to 1976 or 1977.

Present Function: The Printed Circuit Board Facility was dismantled over a period of time. The dismantling operation, including the removal of the adjoining chemicals storage shed, was completed in 1990. The Acid Cleaning Area is on standby, with no current activity.

Life Cycle Operations: The acid and neutralization pits received acid and solvent wastes primarily from two dedicated instrument shops in Building K-1035: the Printed Circuit Board Facility, which was shut down in 1977 and partly decommissioned, and the Acid Cleaning Area, which is in a standby mode with equipment in place, capable of restart operations as needed (see Fig. 2).

The fabrication process at the Printed Circuit Board Facility used both electroless and electrolytic copper plating processes. Before the plating steps, the boards were dampened with an accelerator and an activator/catalyst (Department of Transportation classification: hydrochloric acid mixture). The solution used for the electroless copper plating step was a copper mix concentrate identified as a dilute sodium hydroxide solution (Department of Transportation classification: caustic soda solution). The electrolytic plating solution was copper sulfate.

Following the copper plating steps, an etching process was employed to produce the circuit configuration. The etching agents (copper dissolvers) were ferric chloride and ammonia perchlorate. The solvents employed throughout the circuit board fabrication process include trichlorethylene, isopropyl alcohol, and Freon TF (liquid at room temperature). The K-1035 Acid Pit received the acid and solvent wastes from the circuit board fabrication process.

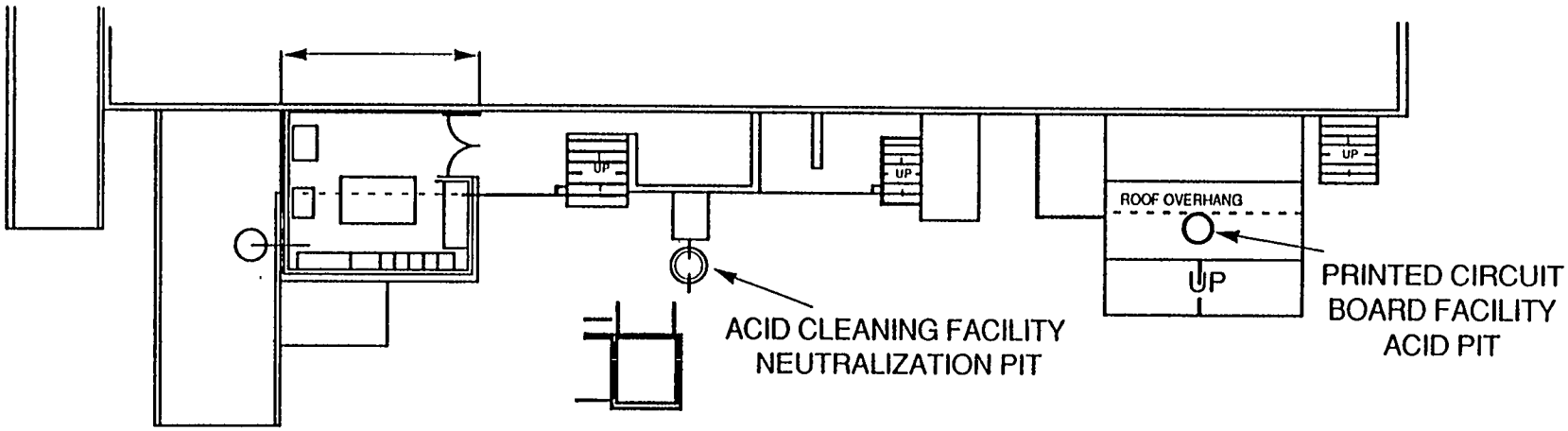


Fig. 2. K-1035 Acid and Neutralization Pits.

PHOTO NO. K/PH-91-3116

K-1035 Acid Pits

The Acid Cleaning Area located in the southwest section of Building K-1035 has accommodated the chemical cleaning of instruments and components (materials such as copper, stainless steel, nickel, etc.). The cleaning acids included hydrochloric acid, aqueous hydrofluoric acid, nitric acid, and chromic acid. The solvents included trichlorethylene, isopropyl alcohol, and Freon TF.

In addition to the facilities described above, the glass shop, the pneumatic repair shop, and the line recorder cleaning station in Building K-1035 have at times used acids and solvents that may have entered the building's sanitary drains. However, the released wastes are judged by the facility manager to have been minimal and as such would have been adequately diluted by sanitary water flushes prior to entering the K-25 Site sanitary sewer system.

Waste Characteristics: The volume and composition of the wastes handled by the acid and neutralization pits varied with time. A former facility manager familiar with the subject operations estimates that an average of ~100 gal/week of process wastes were released in batch quantities to each of the two pits. At times, the acid and solvent cleaning area processed uranium-contaminated instruments. In these cases, the process could have contributed uranium to the discharge from this area.

Release Data: None available

Site Characterization Status: A site inspection is planned for this unit.

Media of Concern: Soil, groundwater, and surface water

Comments:

References:

K-25 Site ER Program, *RCRA Facility Investigation Plan, K-1035 Acid Pit Area*, ES/ER-2&D1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1990.

Date Prepared: December 1990

Date Revised: May 1991

Unit Name: K-1035-A Satellite Drum Storage Area

Unit Number: K01-R028

Regulatory Status: RCRA

Unit Location: Area 1, main plant area, adjoining south face of K-1035 building, between the K-1401 and K-25 buildings (Map Ref. No. 29)

Approximate Dimensions and Capacity: 6 × 18 ft; 16 55-gal drums

Dates Operated: Early 1960s to about 1989

Present Function: General maintenance storage

Life Cycle Operation: This facility was constructed to accommodate the storage of hazardous wastes generated by the operation of the Printed Circuit Board Facility from the early 1960s to the cessation of production in 1976 or 1977. The unit consists of a diked area having metal floor pans to store 55-gal drums of process waste materials. Since cessation of printed circuit board production, the unit has been voided of the drums and floor pans. The unit was cleaned and prepared for use as a general storage area.

Waste Characteristics: D002 and D004 through D011 characteristically listed hazardous wastes.

Release Data: There have been no known spills in this unit.

Site Characterization Status: No further action is planned for this unit. The unit's certificate of closure has been reviewed and concurred with by the Tennessee Department of Environment and Conservation (TDEC).

Media of Concern: None

Comments:

References:

RCRA Closure Plan for the Oak Ridge Gaseous Diffusion Plant K-1035-A Satellite Drum Storage, K/HS-244, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

Letter, Tennessee Department of Health and Environment, to Ms. Marianne Heiskell, U.S. DOE, and Mr. Waldo Golliher, Energy Systems, Re: Closure Certification, K-1035-A Drum Storage, K-25 Plant, EPA ID No.: TNO 890 090-004, June 22, 1990.

Letter, W. R. Golliher, Plant Manager, ORGDP, to Marianne M. Heiskell, K-25 Site Manager, Re: Closure of the K-1035-A Drum Storage Unit—EPA ID No. TNO 890-090-004—ORGDP, Feb. 14, 1990.

Letter, Marianne M. Heiskell, K-25 Site Manager, to Tom Tiesler, TDHE, Re: Closure of the K-1035-A Drum Storage—EPA ID No TNO 890 090 004—ORGDP, Feb. 16, 1990.

Letter, Gregory D. Reed, to Department of Energy, Re: RCRA Closure for the ORDGP K-1035-A Satellite Drum Storage, Feb. 6, 1990.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0954

K-1035-A Satellite Drum Storage Area

Unit Name: K-1037 Recirculating Cooling Water Lines

Unit Number: K01-C003b

Regulatory Status: CERCLA

Unit Location: Area 1, main plant area, south of Portal 6 (Map Ref. No. 88)

Approximate Dimensions and Capacity: 5200 gal/min

Dates Operated: 1973 to present

Present Function: Low-level use in air-conditioning system for the K-1037 building

Life Cycle Operation: K-822 provided recirculating cooling water for the K-1037 Barrier Plant until 1981, when the plant was closed. Since that time, the tower has been running at very reduced capacity (less than 10%) for the AVLIS project in the K-1037 building and adjoining office complex.

Waste Characteristics: The tower used chromated water from the K-802 Pumphouse, which also supplied fire water for the entire ORGDP. A chromate/zinc/phosphate treatment was used for corrosion control until 1977, when K-802 was converted to a phosphate system.

Release Data: No leaks are recorded at this unit.

Site Characterization Status: A site inspection is planned for this unit.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

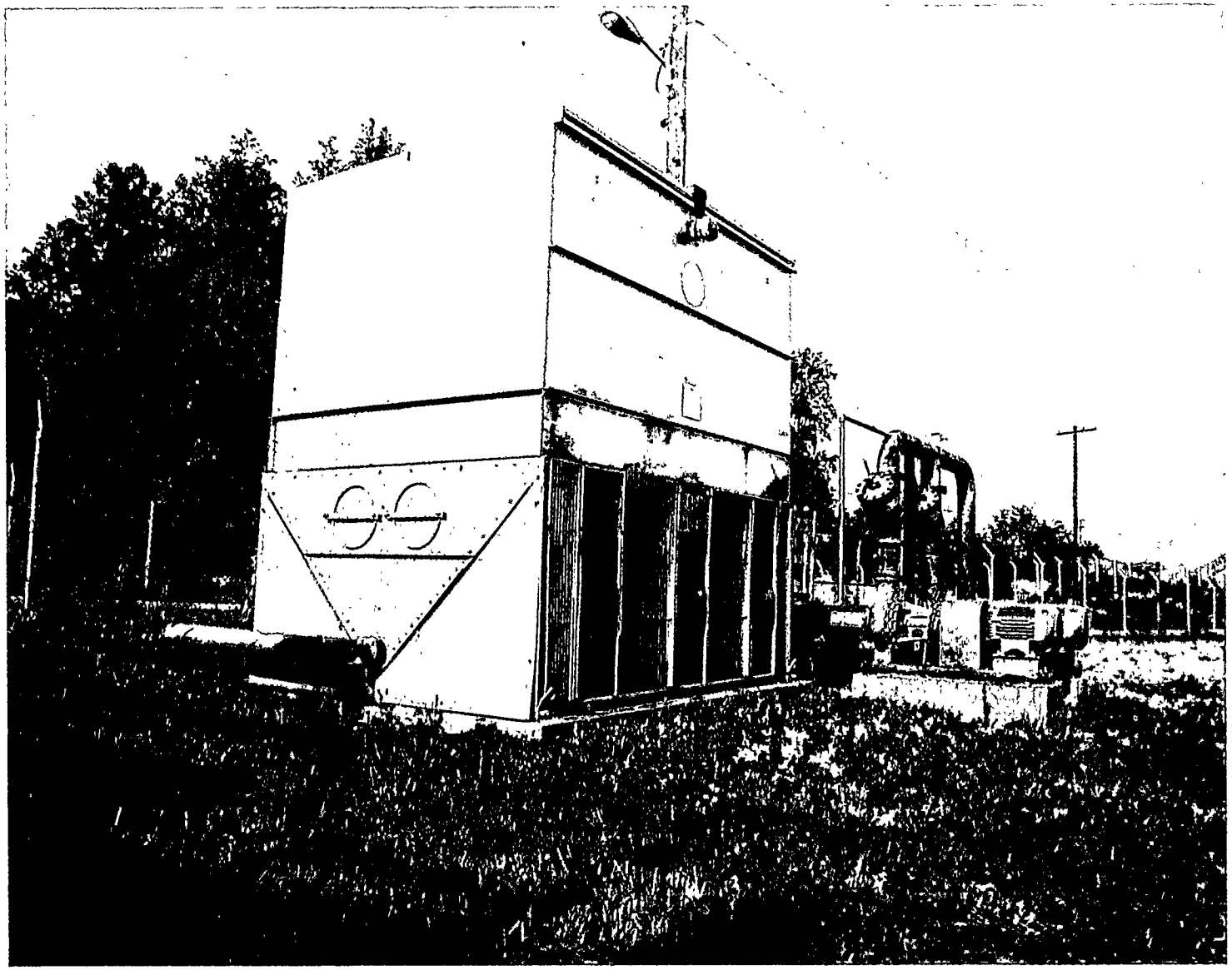
Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3150

K-1037 Recirculating Cooling Water Lines

PHOTO NO. K/PH-91-3142



K-1037 Recirculating Cooling Water Lines

Unit Name: K-1070-B Old Classified Burial Ground

Unit Number: K01-R002

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, west of K-25 Building, north of K-1407 Maintenance Building, east of K-1407-B Holding Pond (Map Ref. No. 2)

Approximate Dimensions and Capacity: 3.7 acres

Dates Operated: Early 1950s to 1976

Present Function: Unused

Life Cycle Operation: This site was used for disposal of a wide variety of wastes, including numerous truckloads of material from the "Y" burial ground at the intersection of State Routes 58 and 95. Equipment included barrier, compressor, and coolant equipment from the S-50 Plant and old K-25 Power House. In 1969, large amounts of obsolete equipment from the Barrier Plant were buried there.

Waste Characteristics: The burial ground contains classified nonhazardous and potentially hazardous materials such as hardware and equipment. Lead, uranium, aluminum, copper, beryllium, lead, bronze, and brass are among the metals buried at this unit. Also in the burial ground is asbestos. Contamination from liquid organics or hydrocarbon oils is thought to be minimal.

Release Data: High-level radioactive material and surrounding dirt were reportedly cleaned from an area southeast of the burial ground in the mid-1970s.

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Soil and groundwater

Comments: This site is part of the K-1407 Operable Unit (OU).

References:

RCRA Facility Investigation Plan for the K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0720

K-1070-B Old Classified Burial Ground

Unit Name: K-1070-G Burial Ground

Unit Number: K01-R054

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, southwest of K-1700 Stream, northeast of Portal 6 (Map Ref. No. 19)

Approximate Dimensions and Capacity: 100 × 100 ft

Dates Operated: 1943–1950s

Present Function: Unused

Life Cycle Operation: The site was never a designated or authorized burial ground. A campsite for housing construction workers was located on the site during World War II, and there are no signs that a gas filling station, oil storage area, or equipment service facility existed at the site. Construction wastes were dumped down a hill onto the site in the 1940s. The area was seeded with pine trees in the 1950s.

Waste Characteristics: The contents of the burial ground are unknown at this time. Surface materials indicate construction rubble and pipe.

Release Data: None

Site Characterization Status: Because the contents of burials are unknown, a preliminary assessment/site investigation is planned for this unit.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, K-1070-G Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-152, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0775

K-1070-G Burial Ground

Unit Name: K-1095 Paint Shop

Unit Number: K01-R056

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, east of the K-25 Building (Map Ref. No. 89)

Approximate Dimensions and Capacity: 1200 ft^2

Dates Operated: 1980 to present

Present Function: Paint shop

Life Cycle Operation: The K-1095 Building was constructed in 1979 and began operation in 1980 as a paint shop and a storage area for paint and associated solvents and thinners. The building houses a sign shop, a preparation room, a spray area, a drying room, and two spray booths equipped with a water wash system (Fig. 3). Inside the building are two containment pits that are covered by grating. The K-1095 building is used not only as a painting facility but also to store paints, solvents, thinners, and various other associated paint materials (brushes, rags, etc.).

In order to facilitate the cleanup of spills and materials control, felt paper covers are placed on the floor when paint is handled or mixed or when paint applicators are cleaned. The K-1095 building also contains two containment pits that are used to collect waste paint and water generated from the various operations conducted within the building. Operations with the potential for spills, such as the transfer of waste solvents, thinners, and waste paints, are accomplished by pouring the wastes into 55-gal drums located on the grating over the west containment pit. The east containment pit is used to collect paint that is precipitated from the air by the water wash system associated with the spray booth.

Waste Characteristics: The following is a list of the material stored or utilized in the K-1095 building:

Oil-based paints
Latex (rubber-based) paints*
Varnishes
Shellacs
Polyurethane
Epoxies
Enamels
Glyptal

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*Use of other paints such as zinc-based paint, lead-oxide-based paint, and chlorinated rubber-based paint was discontinued prior to the operation of the K-1095 building.

Thinners
Cleaning solvents

Because of the nature of materials used or stored at the K-1095 building, the contaminants of concern are semivolatile and volatile organics. The volume of each waste remains a variable dependent on the changing maintenance activities.

Release Data: The K-1095 painting, paint storage, and waste accumulation operations are a structured and controlled operation. Accordingly, no documented incidents of uncontrolled waste releases exist.

Site Characterization Status: No further action is planned for this unit by K-25 ER.

Media of Concern: None

Comments:

References:

RCRA Facility Investigation Plan, K-1095 Waste Paint Accumulation Area, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-158, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., August 1988.

Date Prepared: April 1988

Date Revised: May 1991

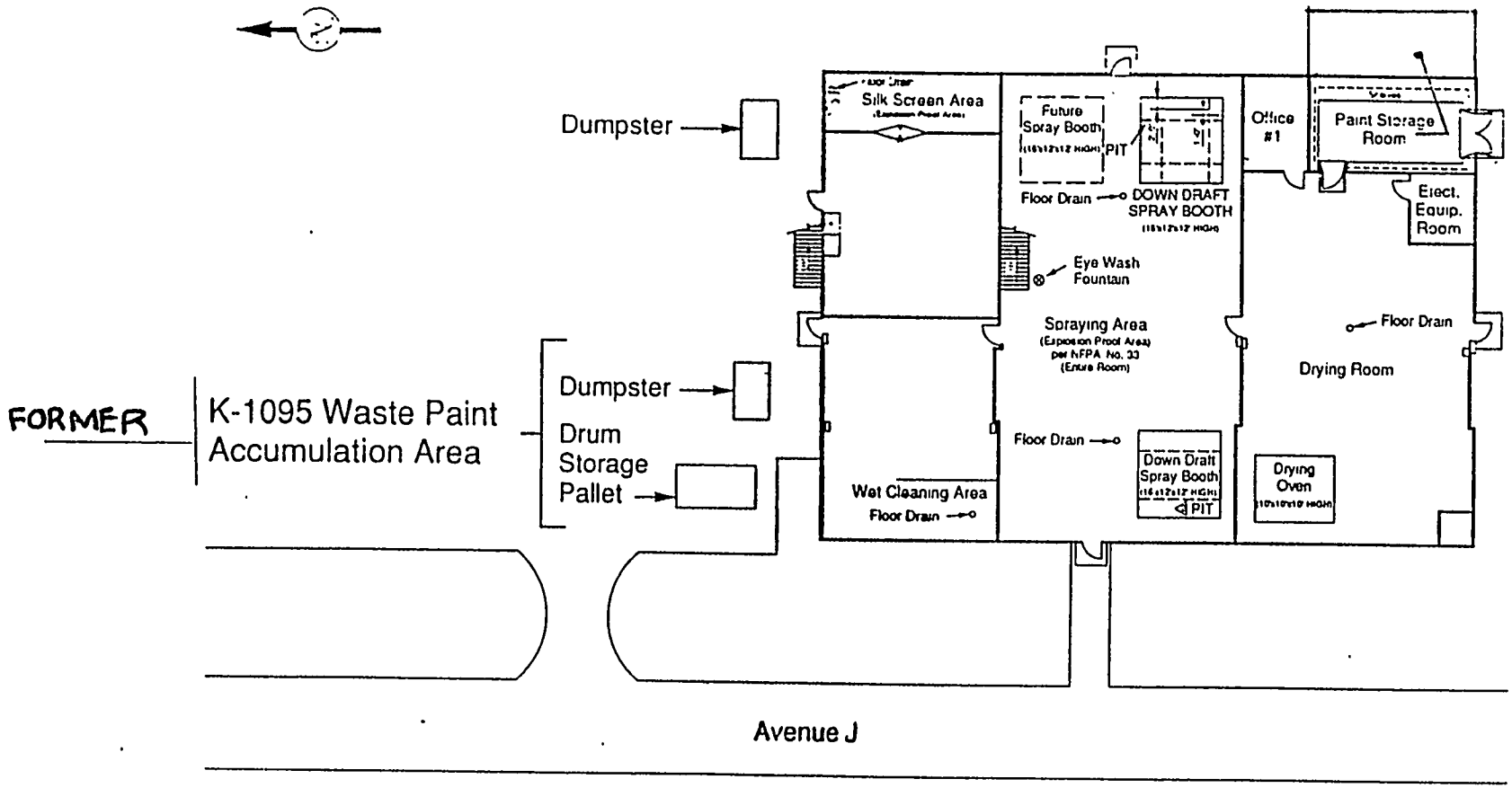
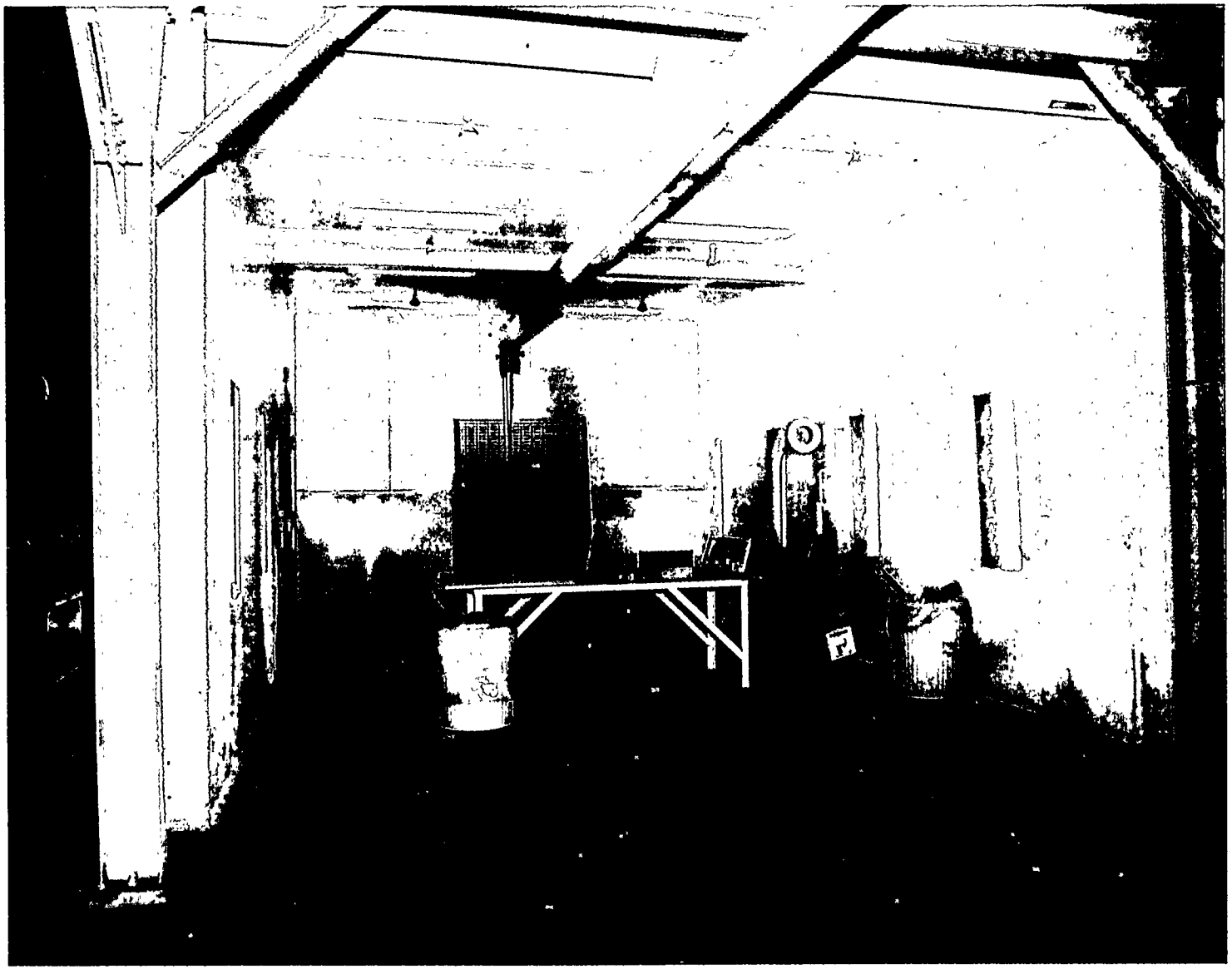


Fig. 3. Diagram of the K-1095 building and the waste paint accumulation area.

PHOTO NO. K/PH-91-3144



K-1095 Paint Shop (East Bay)

PHOTO NO. K/PH-91-3143

K-1095 Paint Shop (West Bay)

Unit Name: K-1095 Waste Accumulation Area

Unit Number: K01-R053

Regulatory Status: 3004.u

Area Number/Unit Location: North of the K-1095 Paint Shop (Map Ref. No. 54)

Approximate Dimensions and Capacity: 550 ft^2

Dates Operated: 1980 to present

Life Cycle Operation: Inside the K-1095 building are two containment pits that are covered by grating. Empty paint cans and other refuse from K-1095 are collected in dumpsters located just north of the building (Fig. 2) prior to disposal.

Operations with the potential for spills, such as the transfer of waste solvents, thinners, and waste paints, are accomplished by pouring the wastes into 55-gal drums located on the grating over the west containment pit. The east containment pit is used to collect paint that is precipitated from the air by the water wash system associated with the spray booth.

During earlier operations, the storage pad located at the northwest corner of the K-1095 facility was used for the temporary storage of drums of solvents and thinners. The dumpster located near this storage pad was used for the collection of materials that have the potential for liquid spills (i.e., empty paint cans). To reduce the potential for spills, personnel allow waste paint cans to dry prior to placing them in the dumpster. However, some paint stains are visible on the ground and asphalt surrounding the dumpster. The waste paint accumulation area was later relocated to the building's interior, and a 90-day maximum retention period is assigned to this operation. The dumpster located at the northeast corner of the K-1035 building was used for collection of materials with potential for liquid spills. Paint cans are now packaged and stored within the building.

Disposal procedures for wastes collected at K-1095 are coordinated by the K-25 Site Disposal Coordinator in the Waste Management Division. Wastes collected at K-1095, except for spent solvents and thinners, are disposed of in the Y-12 Sanitary Landfill. Solvents and thinners are stored at approved storage facilities to await incineration at the TSCA Incinerator. Purchasing and inventory controls on hazardous materials receipts at the K-25 Site and the K-1095 building provide the chain of custody for disposal control.

Waste Characteristics: Because of the nature of painting materials used or stored at the K-1095 building, the contaminants of concern are semivolatile and volatile organics. The volume of each waste remains a variable dependent on the changing maintenance activities. Lead-oxide paints were being phased out beginning in the mid-1970s, before the K-1095 Paint Shop opened.

Release Data: The K-1095 painting, paint storage, and waste accumulation operations are a structured and controlled operation. Accordingly, no documented incidents of uncontrolled waste releases exist.

Waste Characterization Status: A site inspection is planned for this unit.

Media of Concern: Soil, groundwater

Comments: This unit has also been known as the K-1095 Waste Paint Accumulation Area.

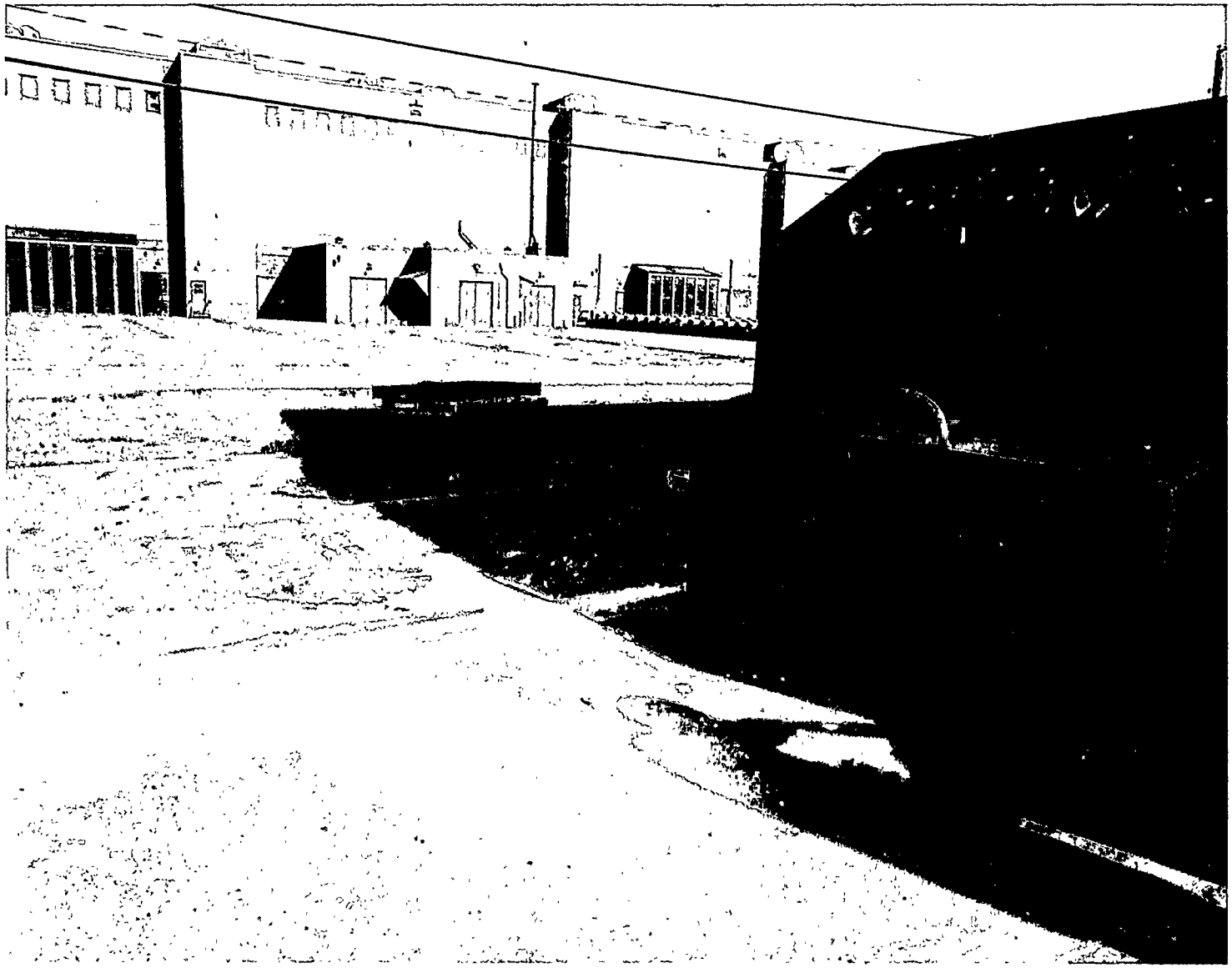
References:

RCRA Facility Investigation Plan, K-1095 Waste Paint Accumulation Area, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-158, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., August 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0952



K-1095 Waste Accumulation Area

Unit Name: K-1202 Hazardous Waste Storage Tanks

Unit Number: K01-R084

Regulatory Status: RCRA

Unit Location: Area 1, main plant area, east of Building K-1407 (Map Ref. No. 90)

Approximate Dimensions and Capacity: The K-1202 Hazardous Waste Storage Tanks and associated elements occupy a land area of ~50 by 55 ft. The unit principally consists of two elevated 15,000-gal-capacity horizontal tanks and one oil transfer pump.

Dates Operated: The south tank has contained lubricating oil from 1944 to early 1991. The north tank contained lubricating oil from 1944 to 1989 and has contained mixed wastes from 1988 to the present.

Present Function: The south tank presently stores lubricating oil for the K-25 Site. Both tanks are presently used for interim storage of mixed wastes awaiting incineration.

Life Cycle Operation: The K-1202 Storage Tanks Pumping Facility was designed in 1944 for the storage of process equipment lubricating oil. It consisted of two 15,000-gal tanks on a concrete slab, necessary piping, a meter, and a single pumping station supported on concrete piers. The facility was subsequently modified to add internal heating coils.

In about 1980 the concrete slab area was diked to provide directional flow of potential oil spills from the tank site to a surface drainage ditch. The flow discharge from the diked area is controlled by a valve in a drain line from the diked area to an outside drainage ditch that flows to the K-1407-B Pond.

When the K-25 and K-27 buildings were operating, oil for centrifugal equipment was stored in the north tank, and oil for the axial compressor cascade was stored in the south tank. After the K-25 and K-27 buildings were shut down (1964), oil was stored in both tanks until about 1987, when the north tank was emptied and readied for storage of RCRA waste from the Paducah Gaseous Diffusion Plant for incineration. The north tank piping was modified to provide a nitrogen blanketing system.

The south tank continued to be used until February 1991 for maintaining an inventory of lubricating oil. That oil was sold to commercial interests, and the south tank was readied to receive additional wastes from Paducah and other sources for eventual incineration.

Visual inspection of the site indicates that, to date, any leaks or spills of hydrocarbon oils have been minimal. The containment dike constructed around the elevated tanks provides assurance of controlled operations.

Portable pumps transfer the wastes from their shipping containers to the storage tanks. The original oil transfer pump station is not used to transfer the miscellaneous wastes.

The entry point between the portable pump transfer line and the existing piping configuration is downstream of the oil transfer pump station. The entry point is within the dike configuration.

Waste Characteristics: The process equipment oils were hydrocarbons. The mixed wastes that were stored in the north tank consisted of ~7500 gal of radioactive contaminated wastes, ~2000 gal of solvents with flash points of less than 140°F, and oils contaminated with solvents transferred from the Oak Ridge Y-12 Plant. Waste classifications and quantities are expected to vary with time.

Release Data: No records exist which document significant releases. It is assumed that oil spots observed around the unit area are the result of small spills from oil transfer operations, transferring oil from rail tank cars to storage tanks and from storage tanks to mobile oil tankers and small containers. Evidence of oil on the ground around the transfer pump reflects past spills and drippings from the oil transfer hoses.

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Soil, surface water

Comments: This site is part of the K-1407 OU. The potential for a significant waste release in the past is conceivable. The following observations may be cause for potential environmental concerns:

Another unit close to the tanks which may contribute to environmental contamination is a containment pit immediately south of the storage tanks. This pit was once used for maintenance of a diesel engine. An open-joint wood grating provides a walking surface over the pit. Liquids entering the pit bottom discharge to an underground storm drain line located northwest of the pit. This engine service pit was an upstream component of the oil rail tank car, oil transfer pump station, and lubricating oil storage tank facility.

The oily residue on the pit bottom is a mixture of congealed oil and dirt. The source of this oil is probably leaks or spills resulting from connection and disconnection of the transfer hose, storage of transfer hoses in the pit, and locomotive maintenance activities.

The pump transfer station is not diked. Various observers have noticed waste oil leaks and spills around the station.

Oil was dispensed to the user by gravity into a mobile tanker, 55-gal drums, etc., outside of the containment dike on the west side. A control valve is installed in the dispensing hose.

Interim storage and transfers of mixed wastes present a potential for unwanted spills.

References:

Drawings:

Kellex Corporation, "Maintenance Building Area—Lubricating Oil Storage Tank Foundations," 1200-M-02-LA-5.

Kellex Corporation, "Maintenance Building Area—Lubricating Oil Storage Tank Decking," 1200-M-02-LA-6.

Kellex Corporation, "Maintenance Building Area—Lubricating Oil Storage Tank Piping," 1200-M-02-LA-7.

Kellex Corporation, "Maintenance Building Area—Field Alteration to Existing 10-ft diam by 25-ft, 9-in Storage Tank," 1200-F-75-AB.

Martin Marietta Energy Systems, Inc., "Modification of K-1202 Storage Tank—Piping Plan," PIE-40385 A.

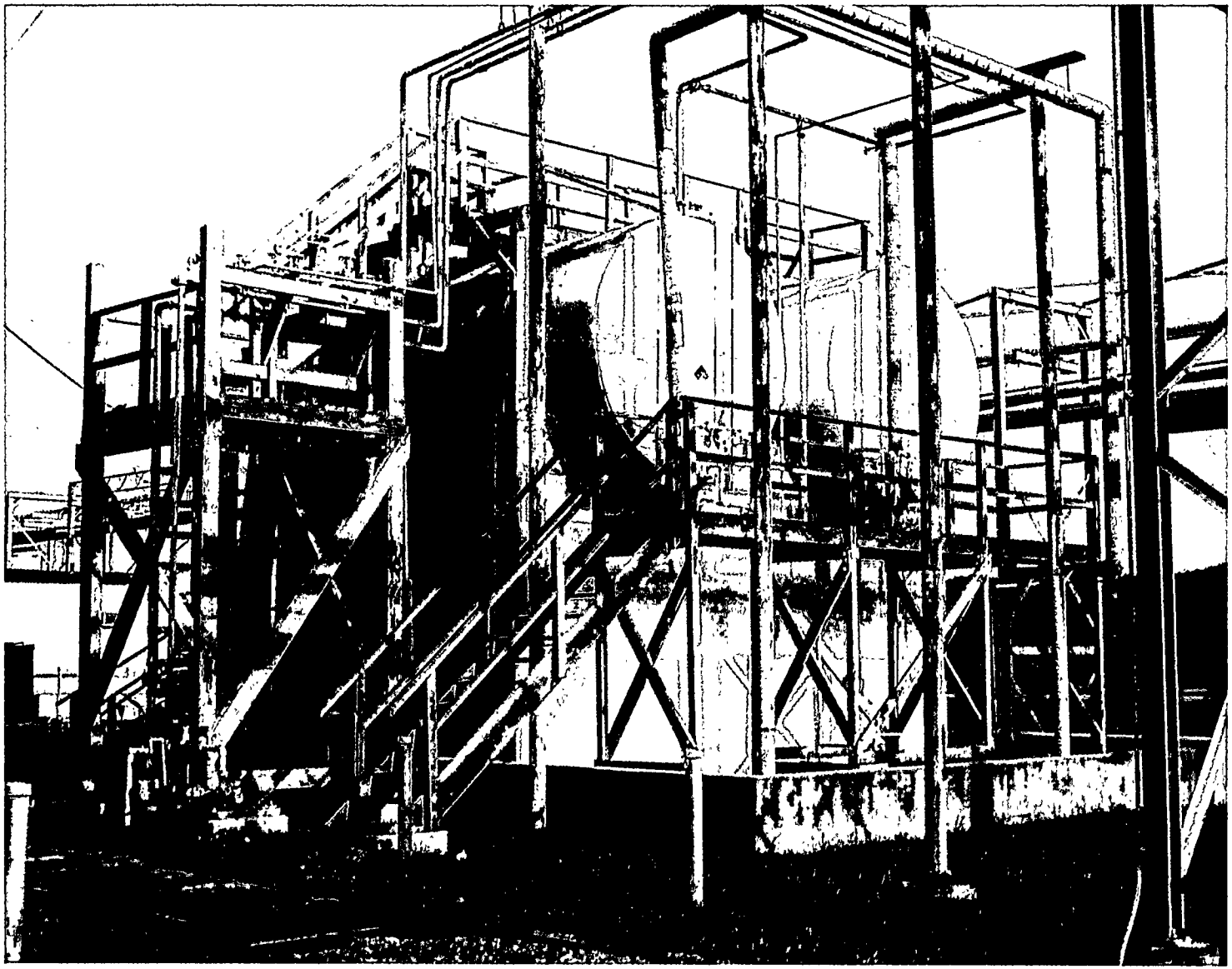
Union Carbide Nuclear Corporation, "Location of New Service Pit for 131 Ton Diesel Engine," UCNC C-KW-K 12244 A.

Union Carbide Nuclear Corporation, "Service Pit for 131 Ton Diesel Engine," UCNC C-KW-K 12244 B.

Date Prepared: November 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3154



K-1202 Hazardous Waste Storage Tanks

Unit Name: K-1302 Gas Cylinder Storage Area

Unit Number: K01-R038

Regulatory Status: RCRA; Part B Permit Application has been submitted.

Area Number/Unit Location: Area 1, main plant area, north of K-1401 and east of the K-25 building (Map Ref. No. 39)

Approximate Dimensions and Capacity: Floor area of 16 by 4.5 ft, containing ~20 cylinders

Dates Operated: 1979–1987

Present Function: The room holds a horizontal gas surge tank, which was original process equipment that is now inactive. The room no longer accommodates the subject cylinder storage/venting operation.

Life Cycle Operation: The room was used for interim storage of gas cylinders awaiting venting through the building's ventilation-exhaust stack system.

Waste Characteristics: Various gases that include hydrogen fluoride, fluorine, phosgene, chlorine, and other nonflammable compressed gases. During one period, for which dates are not available, the room also held the plant's inventory of ClF_3, although such storage was not part of the storage/venting system.

Release Data: The only releases from the unit have been under controlled conditions where cylinders are vented through an exhaust stack within the storage area. This stack is permitted under the Clean Air Regulations of TDEC.

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

Comments: No further action is planned for this unit.

References:

Architectural Floor Plan, Building K-1302, Dwg. No. N-3456-H-201, March 9, 1944.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0955

K-1302 Gas Cylinder Storage Area

Unit Name: K-1303 Mercury Distillation and Recovery Unit

Unit Number: K01-R086

Regulatory Status: 3004.u

Area Number/Unit Location: Area 1, main plant area, north of the K-1401 building and 16th Street

Approximate Dimensions and Capacity: L-shaped overall, 180 by 88 ft; 13,000 ft^2

Dates Operated: 1948–1956

Present Function: The mercury distillation and recovery unit is no longer in operation.

Life Cycle Operation: The K-1303 facility has accommodated a variety of major operations, including units for fluorine production, decontamination and recovery of fluorinated lubricating oils, vacuum distillation and recovery of mercury, decontamination of uranium-enrichment process equipment, air model testing, and a research compressor.

The Mercury Distillation and Recovery Unit was located in cubicle 2 within the north bay of Building K-1303 prior to a 103- by 31-ft northeast bay being added in 1966. In 1948 the cubicle 2 exhaust system was modified to direct and discharge mercury fumes to the atmosphere above the building's roof.

Waste Characteristics: Mercury

Release Data: During a 1991 "walkdown" inspection, a former mercury unit worker recalled that globules of mercury used to collect on the ground along the roof's drip line prior to the addition of the northeast wing over the area. The globules may be explained by the presence of the exhaust system installed in 1948 for cubicle 2. The system discharged mercury fumes into the atmosphere above the roof. Some of the fumes may have condensed onto the roof and eventually been washed by rainfall onto the ground alongside the building.

Site Characterization Status: A site inspection is planned for this unit.

Media of Concern: Soil, groundwater, storm drains

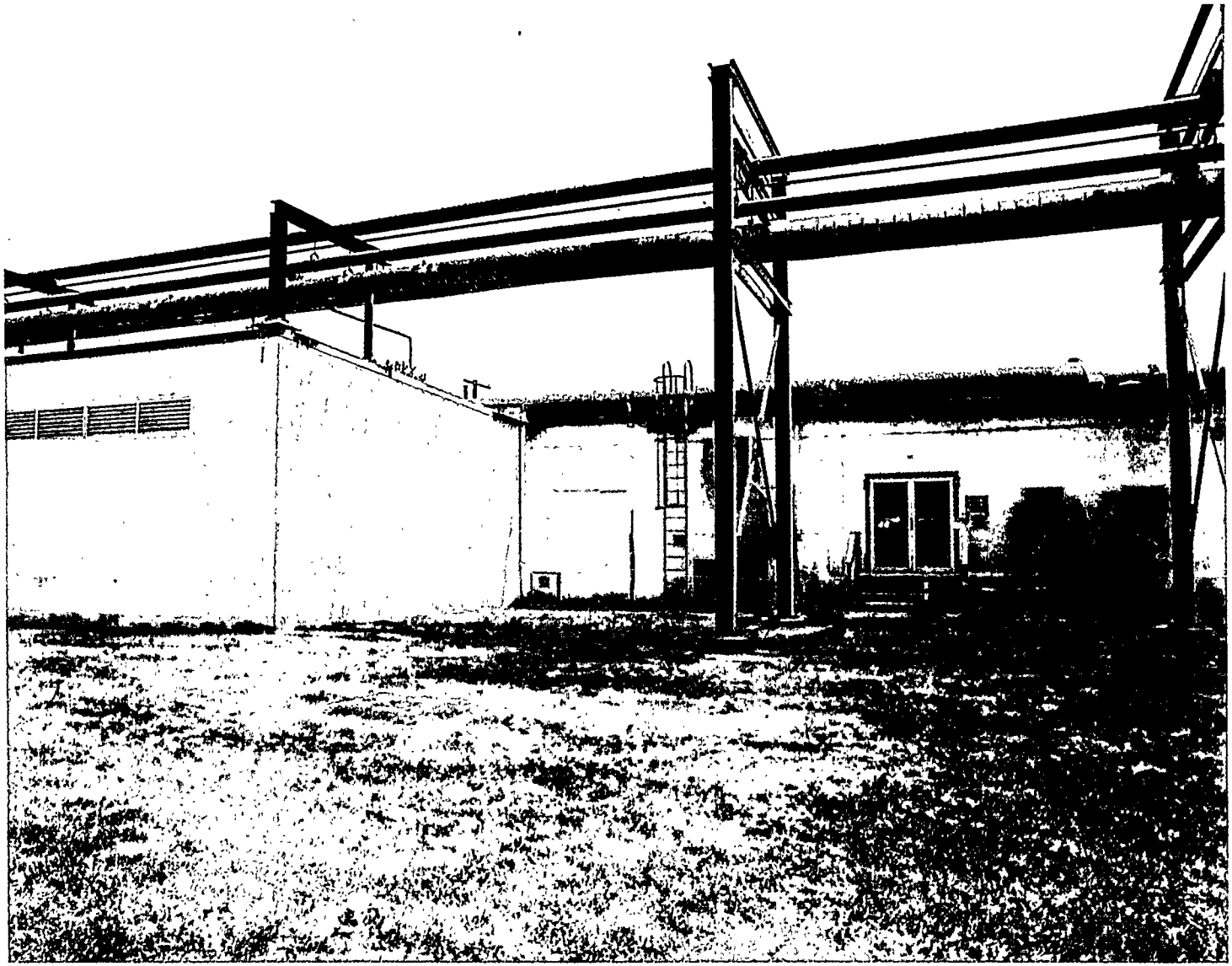
Comments:

References:

CCCC Dwg. No. AWP-7764-1, Exhaust and Water Service for Mercury Stills, Building K-1303

Date Prepared: May 1991

PHOTO NO. K/PH-91-3783



K-1303 Mercury Distillation and Recovery Unit

Unit Name: K-1401 Acid Line

Unit Number: K01-R013

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area. The K-1401 Acid Line runs along the east side of the K-1401 Building (Map Ref. No. 13).

Approximate Dimensions and Capacity: 10-in. diam by ~1500 ft.

Dates Operated: 1940s to 1987

Present Function: Unused

Life Cycle Operation: This line was used to transfer corrosive solutions from the K-1401 Maintenance Facility to the K-1407-A Neutralization Facility. The lines were taken out of service in 1987.

Waste Characteristics: The waste streams that have been transported through this acid line include degreasers, caustics, and acids used to clean equipment exposed to uranium tetrafluoride. Degreasers contained organics including trichloroethene, trichloroethylene, and carbon tetrachloride. Freon, cutting oil, aromatics, acetone, paints, epoxy, and methyl-ethyl ketones were also sent through the lines. Metals included chromium (chromic acid) and mercury from instruments and containers.

Release Data: In 1975, the line leaked and was partially replaced. Subsequent leaks occurred because the acid made its way through joints and corroded limestone around the pipe. The K-1401 drain line was slip-lined in 1982 with a 10-in. polyethylene sleeve. The line was leak-tested in 1987 and found to leak.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater

Comments: This site is part of the K-1401 OU.

References:

RCRA Facility Investigation Plan, K-1401 Acid Line, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-142, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1988.

Date Prepared: April 1987

Date Revised: May 1991

K-1401 Acid Line

Unit Name: K-1401 Degreasers

Unit Number: K01-C005

Regulatory Status: CERCLA

Area Number/Unit Location: Area 1, main plant area, between column lines J and K on the east side of the K-1401 building (Map Ref. No. 69)

Approximate Dimensions and Capacity: 10 by 50 ft (4 each)

Dates Operated: 1940s to 1988

Present Function: The degreasing unit is on standby.

Life Cycle Operation: Degreasing and cleaning operations began in 1944–1945 to service various sized and shaped parts associated with ORGDP's uranium enrichment process. Acids, alkalis, detergents, and organic vapor degreasers have been used in the processes.

Waste Characteristics: 1,1,1 Trichloroethane is used as a vapor degreaser to clean process equipment. Trichloroethylene was likely used in the 1940s to 1960s, along with small quantities of carbon tetrachloride.

Release Data: There have been no known releases from this unit.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil

Comments: This unit is part of the K-1401 OU.

References:

RCRA Facility Investigation Plan, K-1401 Acid Line, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-142, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1988.

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0615

K-1401 Degreasers

Unit Name: K-1401-2W Contaminated Scrap Metal Dumpster

Unit Number: K01-C068

Regulatory Status: CERCLA

Area Number/Unit Location: Area 1, main plant area, at the west face of the K-1401 building, near door opening 2W (Map Ref. No. 80)

Approximate Dimensions and Capacity: 3 each: 7 × 4 × 3 ft; 40 ft^3 each

Dates Operated: Mid-1970s to 1989

Present Function: The dumpsters have been removed.

Life Cycle Operation: These outdoor scrap metal dumpsters received contaminated scrap metal and floor cleanups generated by shop operations. This mode of interim collection and storage of contaminated scrap metal ceased around 1989. Since that time, scrap metal dumpsters have been positioned in specific work areas.

Waste Characteristics: No waste remains on the site.

Release Data: No known releases

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

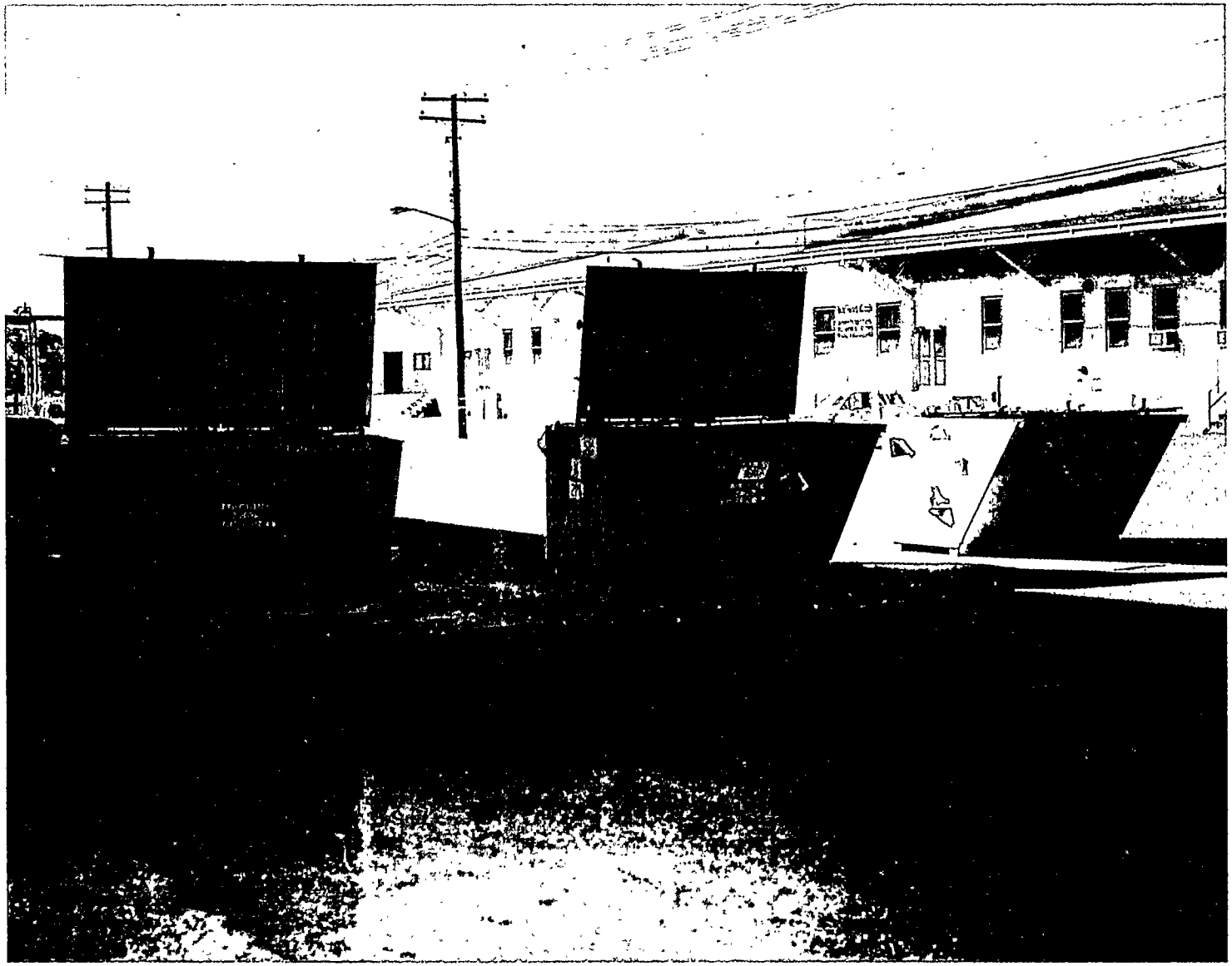
Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3108



K-1401-2W Contaminated Scrap Metal Dumpster

Unit Name: K-1401-3E Contaminated Scrap Metal Dumpster

Unit Number: K01-C065

Regulatory Status: CERCLA

Area Number/Unit Location: Area 1, main plant area, outside the 3E door to the the K-1401 maintenance building (Map Ref. No. 77)

Approximate Dimensions and Capacity: 2 each: 7 × 4 × 3 ft; 40 ft^3 each

Dates Operated: Mid-1970s to 1989

Present Function: The dumpsters have been removed.

Life Cycle Operation: The outdoor scrap metal dumpsters received contaminated metal scrap generated by the weld shop operations. The operative mode of outdoor collection and interim storage of scrap metal ceased about 1989. Thereafter, all scrap was collected into receivers positioned within specific work areas within the K-1401 building.

Waste Characteristics: No wastes remain on the site.

Release Data: No known releases

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

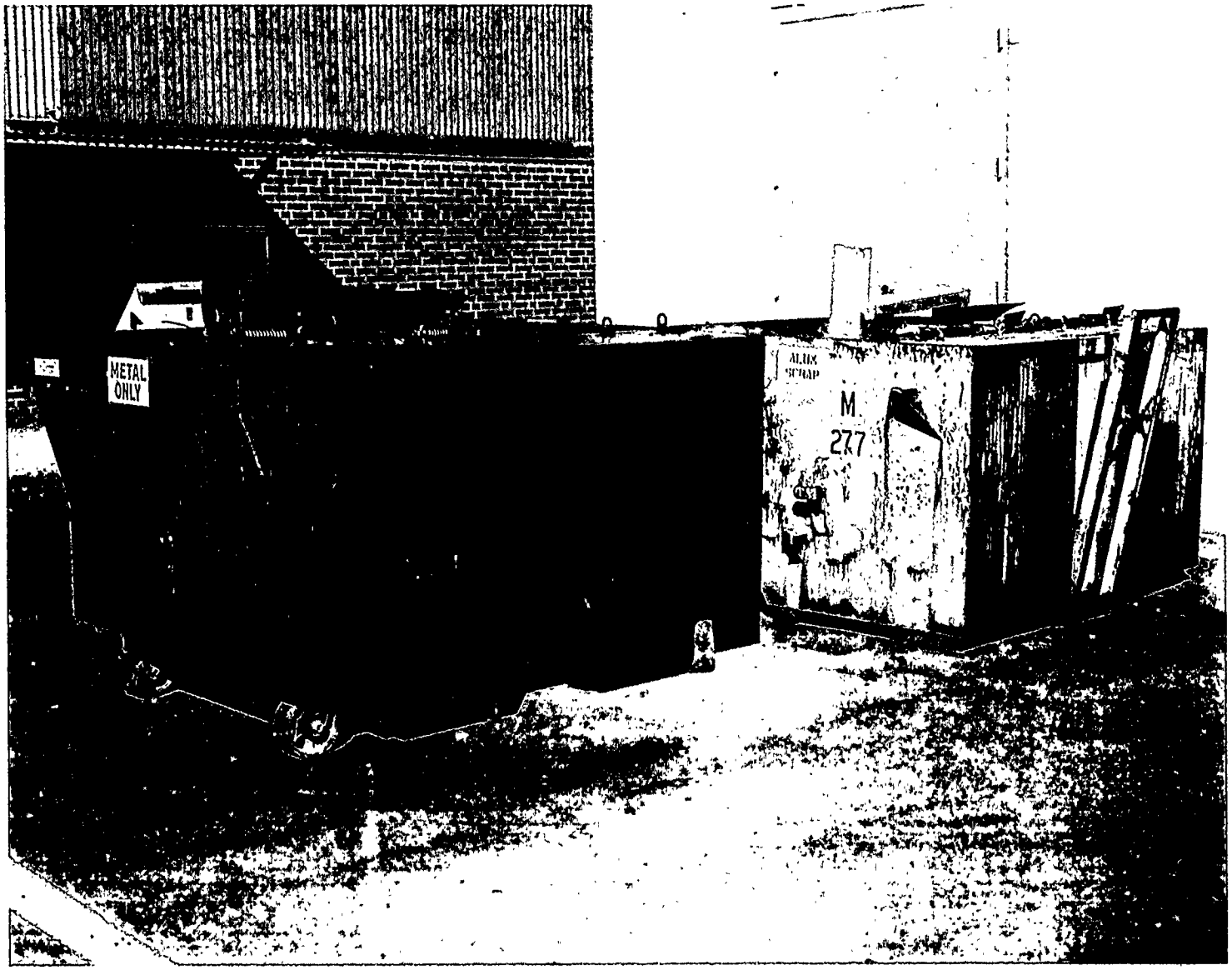
Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3110



K-1401-3E Contaminated Scrap Metal Dumpster

Unit Name: K-1401-4W Contaminated Scrap Metal Dumpster

Unit Number: K01-C066

Regulatory Status: CERCLA

Area Number/Unit Location: Area 1, main plant area, outside the 4W door to the K-1401 building (Map Ref. No. 78)

Approximate Dimensions and Capacity: 2 each: 7 × 4 × 3 ft; 40 ft^3 each

Dates Operated: Mid-1970s to ca. 1989

Present Function: The dumpsters have been removed.

Life Cycle Operation: The outdoor dumpsters received contaminated scrap metal generated by machine shop operations and/or by the sheet metal shop operations. Outdoor collection and interim storage of scrap metal ceased about 1989.

Waste Characteristics: No waste remains on the site.

Release Data: No known releases

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

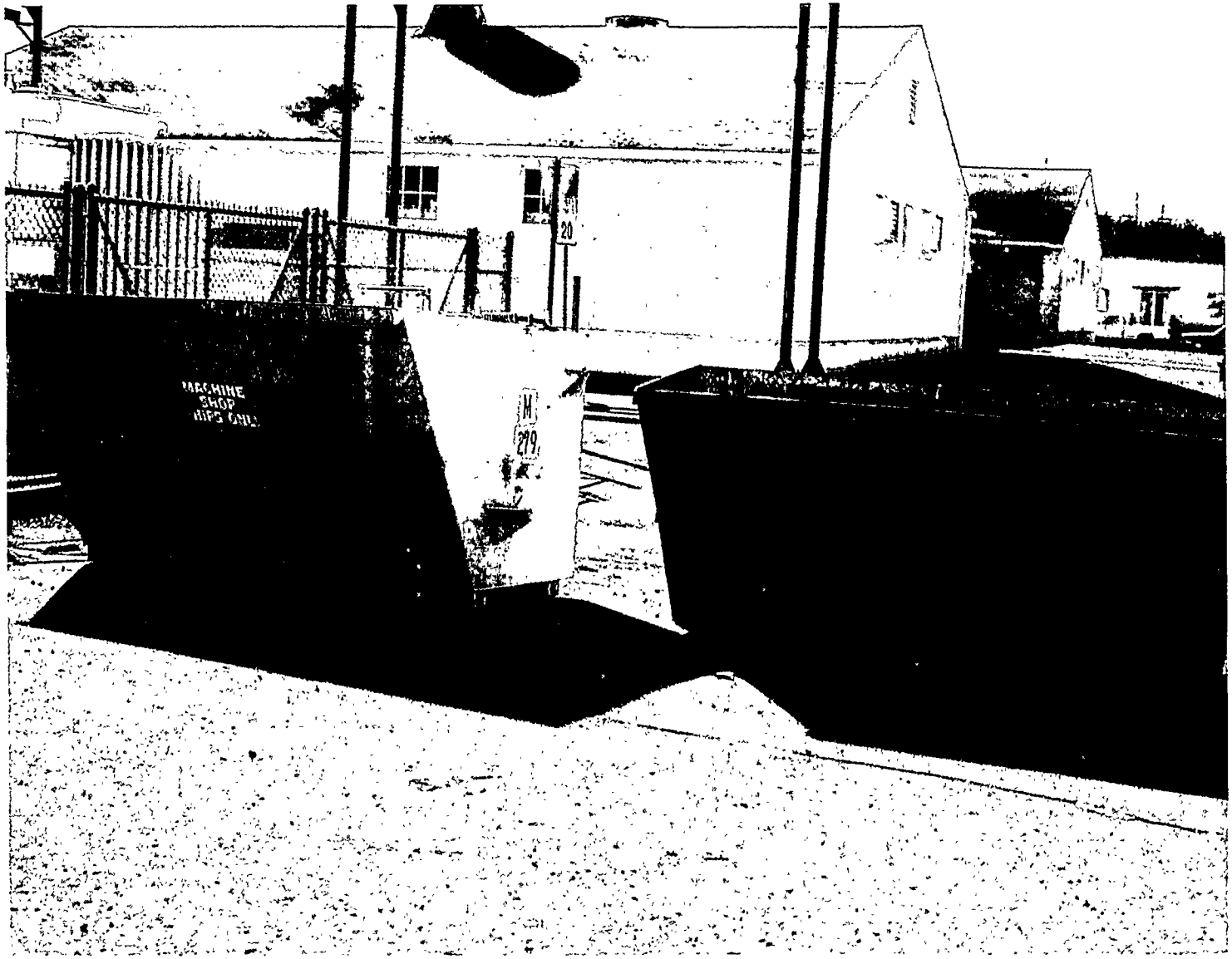
Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3109



K-1401-4W Contaminated Scrap Metal Dumpster

Unit Name: K-1407-A Neutralization Pit

Unit Number: K01-R003

Regulatory Status: RCRA

Area Number/Unit Location: Area 1, main plant area, near the K-1407-B Holding Pond and K-1407-C Retention Basin (Map Ref. No. 3)

Approximate Dimensions and Capacity: 28-ft diam by 12 ft; 35,000-gal capacity

Dates Operated: 1940s to present

Present Function: Neutralization of coal pile runoff and backup to the Central Neutralization Facility

Life Cycle Operation: The K-1407-A Neutralization Pit was originally used for neutralizing corrosive wastewater and received influent from the following operations: K-1420 uranium recovery operations, K-1501 zeolite regenerations, K-1420 plating operations, K-1413 laboratory solutions, K-1401 Acid Line, K-1420-C floor pan cleaning solutions, and coal pile runoff. Corrosive wastewaters were neutralized with either powdered lime or concentrated sulfuric acid. Neutralized wastewater was then discharged to the K-1407-B Holding Pond for settling if the water was contaminated with radioactive or hazardous wastes. Noncontaminated coal pile runoff was discharged to either the K-1407-E or K-1407-F Settling Ponds. Since the opening of the Central Neutraliztion Facility, only coal pile runoff goes into the pit for neutralization.

Waste Characteristics: A variety of organics—aromatic hydrocarbons, acetone, Freons, paints, epoxies, carbon tetrachloride, and other degreasers—were discharged into the neutraliztion pit through the K-1401 Acid Line. Transuranics in Building K-1420 were discharged into process drains, which flowed into the K-1407-A Neutralization Pit and K-1407-B Holding Pond.

Release Data: There have been no known uncontrolled releases from this unit.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Groundwater and soil

Comments: This site is part of the K-1407 OU.

References:

RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

RCRA Facility Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0599

K-1407-A Neutralization Pit

Unit Name: K-1407-B Holding Pond

Unit Number: K01-R004

Regulatory Status: RCRA

Unit Location: Area 1, main plant area, on the north side of the K-25 Site, ~200 ft south of Poplar Creek and immediately south of Mitchell Branch (K-1700 Stream) (Map Ref. No. 4)

Approximate Dimensions and Capacity: 1.3 acres; capacity, ~1 million gal

Dates Operated: 1943 to 1988

Present Function: As of November 1988, the pond no longer receives effluent. The unit is scheduled for closure in May 1992.

Life Cycle Operation: This unit was used as a settling basin for metal hydroxide sludges that were precipitated after neutralization in the K-1407-A Neutralization Pit. In addition, wastewater was discharged directly into the pond from the following locations: K-1302 recirculating cooling water (RCW) supply, K-1503 Neutralization Pit, K-1421 Incinerator drain, and the following K-1420 sources: plating facility rinsewater, Mercury Recovery Room, decontamination facility spray booth rinse water, A-floor pan cleaning, cylinder cleaning solution, vapor blaster solutions, and pigtail cleaning solution.

Waste Characteristics: Wastewaters that entered the pond when it was operating were discharges from the K-1407-A Neutralization Pit containing organics and metal hydroxide precipitates generated from the neutralization process. In addition, the following wastes were likely discharged into the pond from various operations in K-1420: uranium compounds, transuranics, organic degreasers, and oils, including some containing polychlorinated biphenyls (PCBs). The sludge was removed from the pond in 1988 and either fixed in concrete or stored.

Release Data: This is an unlined pond that contained hazardous materials for more than 40 years. Soil contamination from this unit is probable. Groundwater monitoring data collected to date indicate that contamination in the area has migrated from other SWMUs upgradient of the B-Pond.

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Groundwater and soil

Comments: This site is part of the K-1407 OU.

References:

U.S. Department of Energy and Martin Marietta Energy Systems, Inc., *Post Closure Care of the K-1407-B Pond*, Tennessee Permit No. TNHW-30, Tennessee Department of Health and Environment, September 1989.

Closure Plan, K-1407-B Holding Pond, K/ER-26, K/HS-216/R1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., April 1990.

J. L. Haymore, S. R. Williams, and J. W. Zolyniak, *K-1407-B and K-1407-C Surface Impoundment False-Positive Groundwater Assessment*, K/HS-214, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1988.

J. M. Forstrom, *1989 Annual Groundwater Report, K-1407-B and K-1407-C Interim Status Units, Oak Ridge Gaseous Diffusion Plant*, K/HS-287, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

K-25 Environmental Restoration Program, *Data Analysis Approach Report for K-1407-B Holding Pond and K-1407-C Retention Basin*, K/ER-23&D0, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1990.

RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

RCRA Facility Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

J. M. Forstrom, *Groundwater Contamination in the Vicinity of the K-1407-B and -C Ponds and Implications for Closure*, K/ER/Sub-90/01090/1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, June 1990.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0631

K-1407-B Holding Pond

Unit Name: K-1407-C Retention Basin

Unit Number: K01-R039

Regulatory Status: RCRA

Unit Location: Area 1, main plant area, west of K-1070-B Old Classified Burial Ground and northeast of K-25 Building (Map Ref. No. 40)

Approximate Dimensions and Capacity: 300 by 75 ft; capacity, ~2.5 million gal

Dates Operated: 1973–1988

Present Function: Unused

Life Cycle Operation: The K-1407-C Retention Basin was initially built in 1973 for the storage of potassium hydroxide sludge that was dredged from the K-1407-B Holding Pond. The sludge from K-1407-B consisted of precipitates generated at the K-1407-A Neutralization Pit. The sludge also contained radioactive constituents and corrosive materials. The first attempt to characterize the pond was in 1984. The samples collected at that time indicated that the pond might qualify for a clean closure in accordance with RCRA. In order to verify this, additional samples were collected and analyzed. These samples indicated that radioactive and RCRA hazardous materials are present in the pond at depths exceeding 18 in.

Waste Characteristics: The K-1407-C pond contained organics and corrosive metal hydroxide sludges that were radioactively contaminated.

Release Data: This unit was an unlined impoundment. Samples collected to date indicate that during its 15-year lifetime, sludge constituents such as metals and radioactivity contaminated the soil beneath the pond.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater

Comments: This site is part of the K-1407 OU.

References:

K-25 Site Environmental Restoration Program, *Closure Plan, K-1407-C Retention Basin*, K/ER-27, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., April 1990.

J. L. Haymore, S. R. Williams, and J. W. Zolyniak, *K-1407-B and K-1407-C Surface Impoundment False-Positive Groundwater Assessment*, K/HS-214, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1988.

J. M. Forstrom, *1989 Annual Groundwater Report, K-1407-B and K-1407-C Interim Status Units, Oak Ridge Gaseous Diffusion Plant*, K/HS-287, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

K-25 Site Environmental Restoration Program, *Data Analysis Approach Report for K-1407-B Holding Pond and K-1407-C Retention Basin*, K/ER-23&D0, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1990.

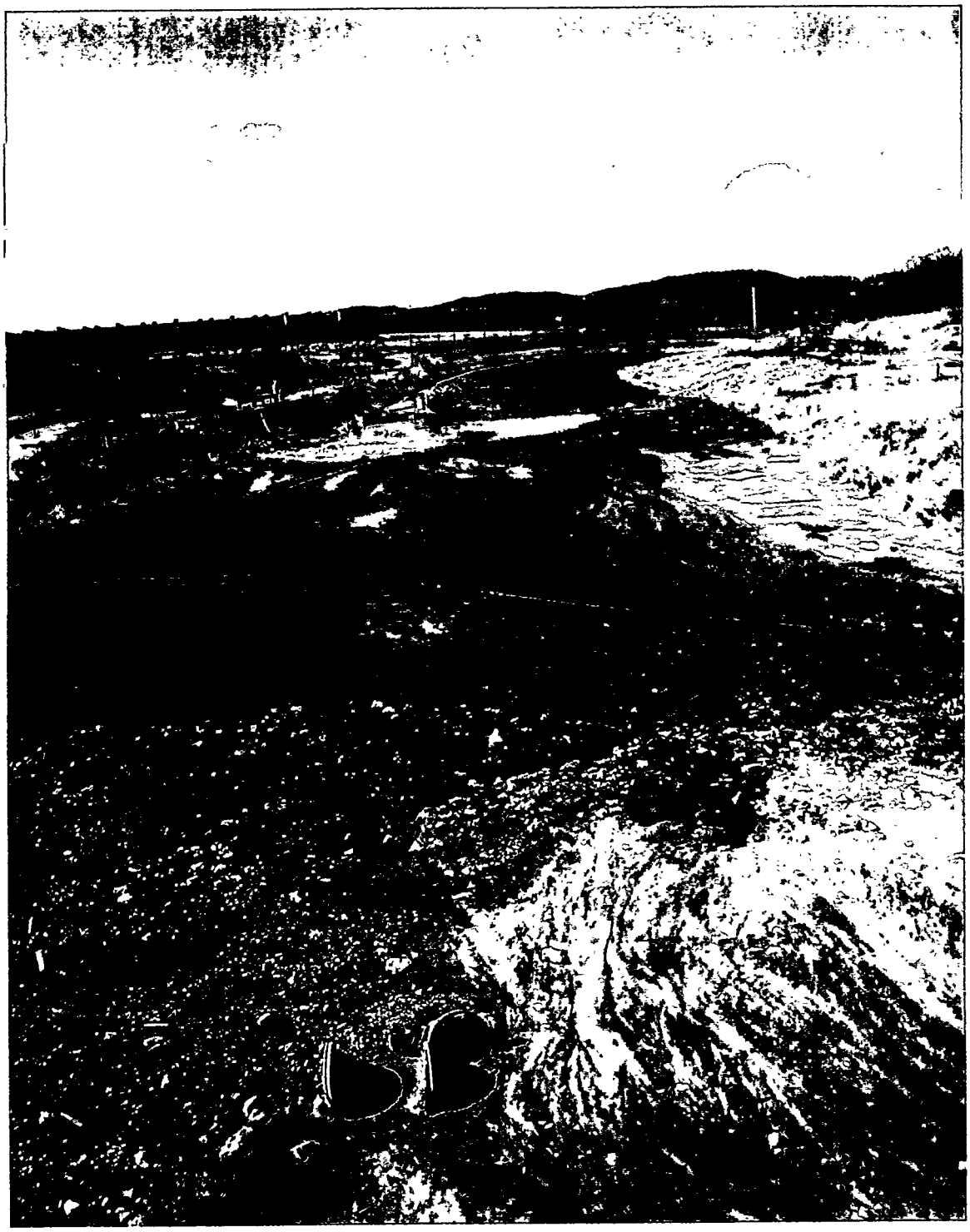
RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-159, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

J. M. Forstrom, *Groundwater Contamination in the Vicinity of the K-1407-B and -C Ponds and Implications for Closure*, K/ER/Sub-90/01090/1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1990.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0632



K-1407-C Retention Basin

Unit Name: K-1407-C Soil

Unit Number: K01-R012

Regulatory Status: Pending

Unit Location: Area 1, main plant area, immediately north of the K-1407-C Retention Basin (Map Ref. No. 24)

Approximate Dimensions and Capacity: The contours of the K-1407-C Soil are indistinguishable from those of the K-1417 Soil. The total combined dimensions of the K-1407-C and K-1417 Soil piles are 150 × 50 × 10 ft; the total combined volume of soil is estimated at 1535 m^3.

Dates Operated: 1983 to present

Present Function: Waste pile of soil contaminated with uranium

Life Cycle Operation: The contaminated soil was discovered during the construction of new facilities at ORGDP. Samples collected from the soil indicated very low concentrations of uranium.

Waste Characteristics: Uranium. It is estimated that the total radiological activity from contaminants in the two piles is 42 Ci.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Soil and groundwater

Comments: This site is part of the K-1407 OU.

References:

RCRA Facility Investigation Plan, Contamination in Well UNW-6, Upgradient of K-1407-C Pond, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-159, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0631

K-1407-C Soil and K-1417 Soil

Unit Name: K-1407-E Settling Pond

Unit Number: K01-R088

Regulatory Status: RCRA

Unit Location: Groundwater Area 1, immediately south of the K-1407-B Holding Pond.

Approximate Dimensions and Capacity: 206,000 gal.

Dates Operated: Early 1980s-present

Present Function: The K-1407-E and F ponds are used to settle non-hazardous, non-radioactive metal hydroxide sludges. The ponds have been in standby mode since Spring of 1991.

Life Cycle Operation: The K-1407-E and F ponds have received neutralized coal pile runoff which was not contaminated with radioactive or hazardous constituents. After settling, water was discharged to the K-1407-B Holding Pond until 1987. Since that time, waters are either discharged to Mitchell Branch or the K-25 Site Central Neutralization Facility.

Waste Characteristics: In 1989 a waste acid which also contained low levels of chromium was inadvertently discharged to the K-1407-F pond. The discharge was immediately corrected upon discovery. The K-1407-E pond subsequently received sludges from the "F" pond. Although samples obtained from the pond sludge did not exhibit a characteristic of hazardous waste, the ponds are still considered SWMUs.

Release Data: No known uncontrolled releases.

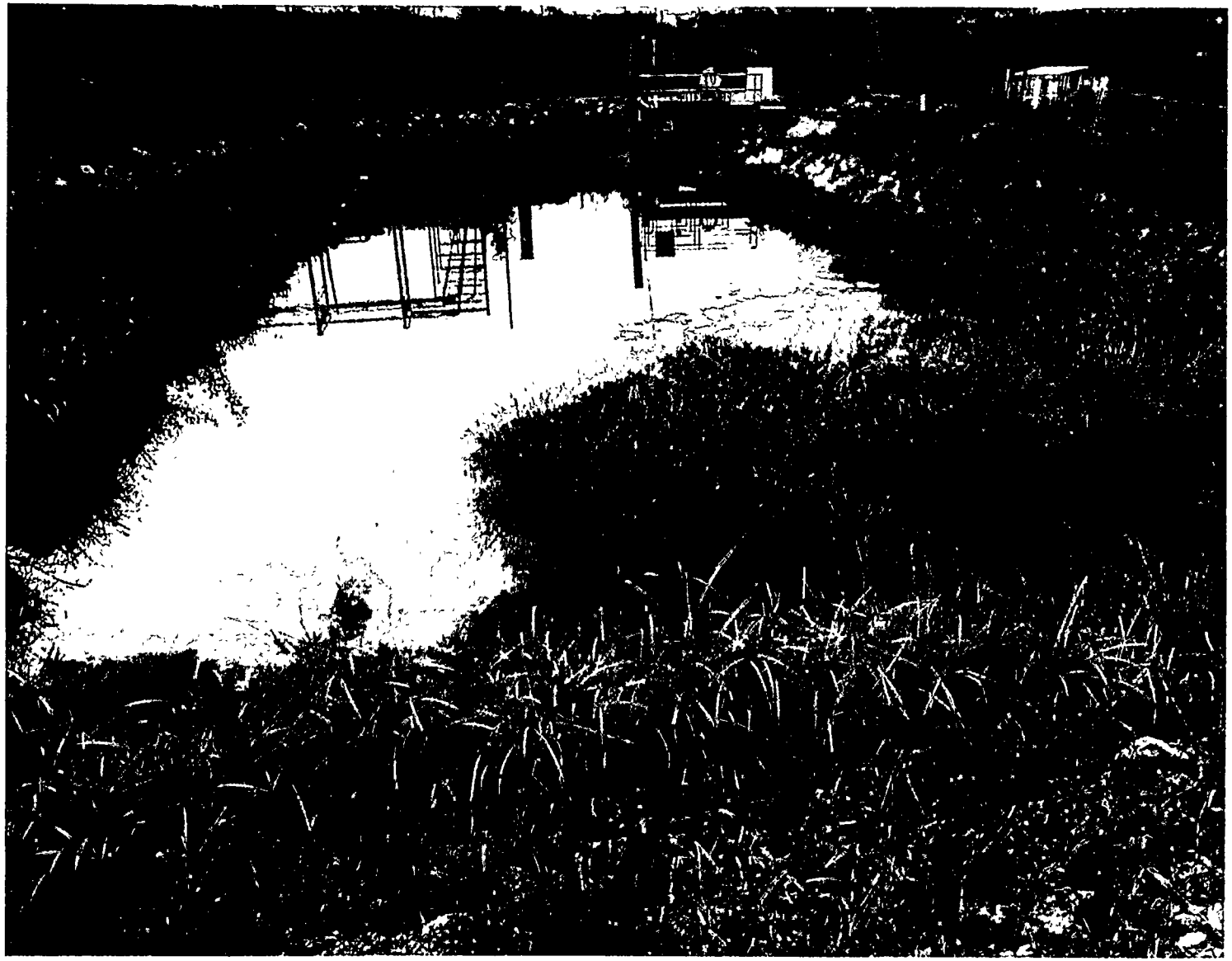
Site Characterization Status: Because this site is an active facility, no further action is planned by the K-25 Site Environmental Restoration Program.

Media of Concern: Soil and groundwater

References: RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, ORGDP, Oak Ridge, TN, December, 1988, K/HS-135.

Date Prepared: November 1991

PHOTO NO. K/PH-91-5082



K-1407-E Settling Pond

Unit Name: K-1407-F Settling Pond

Unit Number: K01-R089

Regulatory Status: RCRA

Unit Location: Groundwater Area 1, immediately south of the K-1407-B Holding Pond.

Approximate Dimensions and Capacity: 350,000 gal.

Dates Operated: Early 1980s-present

Present Function: The K-1407-E and F ponds are used to settle non-hazardous, non-radioactive metal hydroxide sludges. The ponds have been in standby mode since Spring of 1991.

Life Cycle Operation: The K-1407-E and F ponds have received neutralized coal pile runoff which was not contaminated with radioactive or hazardous constituents. After settling, water was discharged to the K-1407-B Holding Pond until 1987. Since that time, waters are either discharged to Mitchell Branch or the K-25 Site Central Neutralization Facility.

Waste Characteristics: In 1989 a waste acid which also contained low levels of chromium was inadvertently discharged to the K-1407-F pond. The discharge was immediately corrected upon discovery. The K-1407-E pond subsequently received sludges from the "F" pond. Although samples obtained from the pond sludge did not exhibit a characteristic of hazardous waste, the ponds are still considered SWMUs.

Release Data: No known uncontrolled releases.

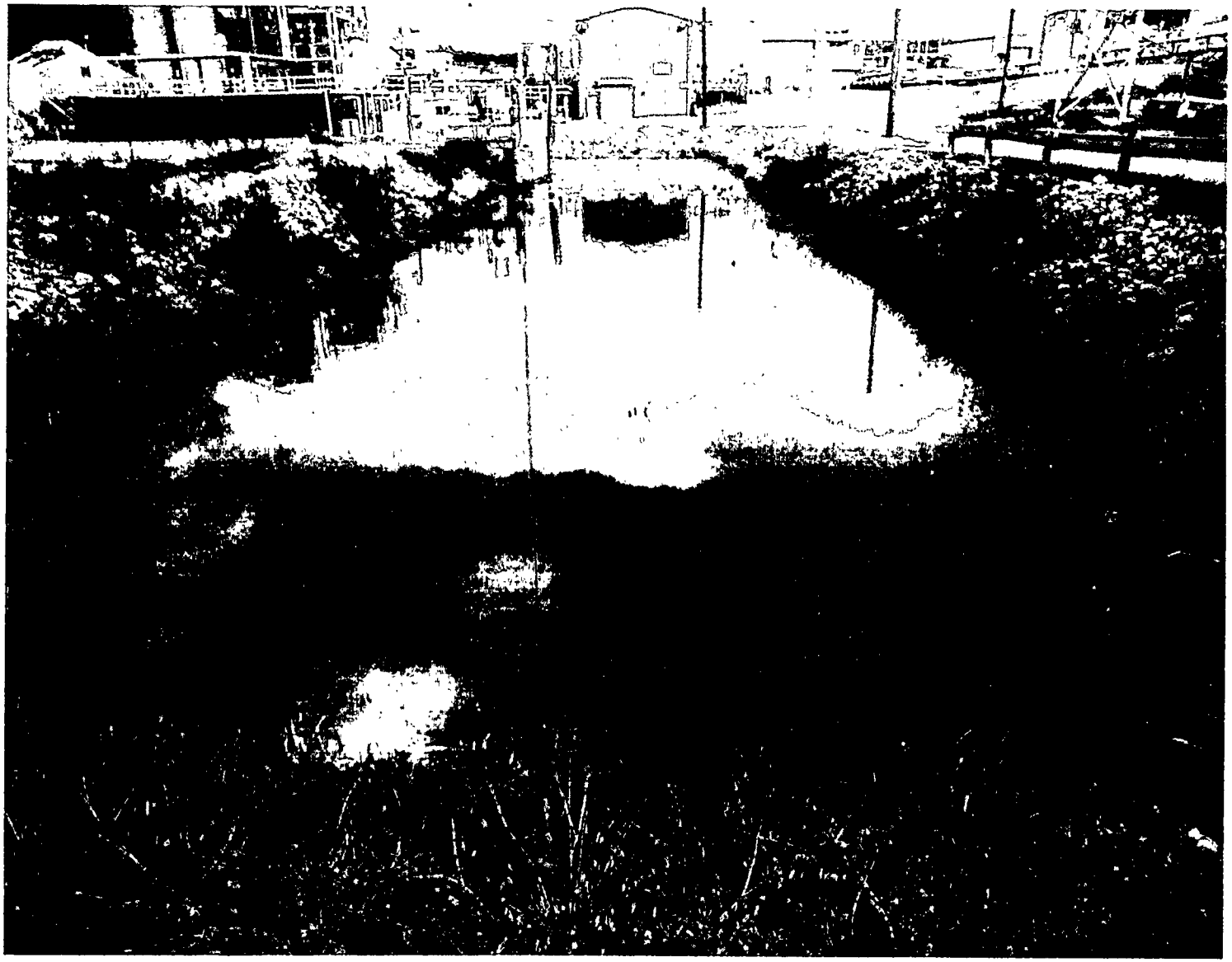
Site Characterization Status: Because this unit is an active site, no further action is planned by the K-25 Site Environmental Restoration Program.

Media of Concern: Soil and groundwater

References: RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, ORGDP, Oak Ridge, TN, December, 1988, K/HS-135.

Date Prepared: November 1991

PHOTO NO. K/PH-91-5083



K-1407-F Settling Pond

Unit Name: K-1407-H Central Neutralization Facility

Unit Number: K01-R035

Regulatory Status: RCRA; Part B Application submitted.

Area Number/Unit Location: Area 1, main plant area, west of building K-1420 (Map Ref. No. 36)

Approximate Dimensions and Capacity: Two 24,000-gal reaction tanks and a 60,000-gal sludge thickener tank

Dates Operated: 1987 to present

Present Function: Neutralization, precipitation, and settling of hazardous waste solutions.

Life Cycle Operation: Since its construction, the K-1407-H Central Neutraliztion Facility (CNF) has provided pH adjustment and chemical precipitation for several aqueous streams throughout the K-25 Site. All three hazardous waste tanks at the facility are contained in a diked tank farm area. Simplified process flow diagrams for the treatment tanks are given in Figs. 4 and 5. Because wastes are treated in the batch mode, flow rates vary significantly.

Waste Characteristics: Corrosive and extraction potential (EP)-toxic metals. Wastes are received from the K-1419 Sludge Fixation Facility, the K-1435 TSCA Incinerator, and various process wastewaters.

Release Data: There have been no uncontrolled releases from this facility.

Site Characterization Status: No further action is planned for this unit by K-25 ER.

Media of Concern: None

Comments: The liquid effluent from the facility is discharged through a National Pollutant Discharge Elimination System (NPDES)-permitted location.

References:

Date Prepared: April 1987

Date Revised: August 1991

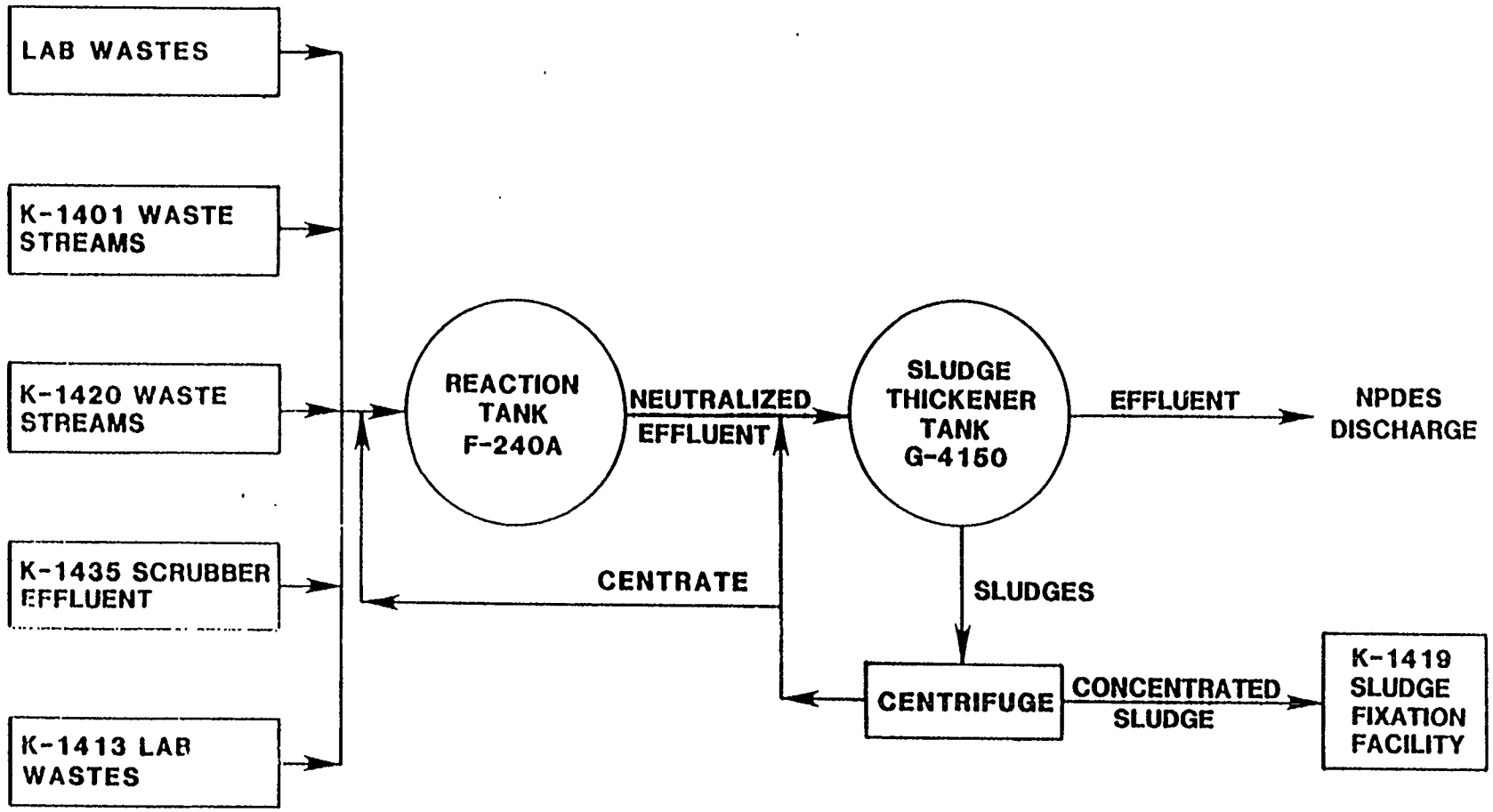


Fig. 4. Process flow diagram for the Central Neutralization Facility—reaction tank F-240A.

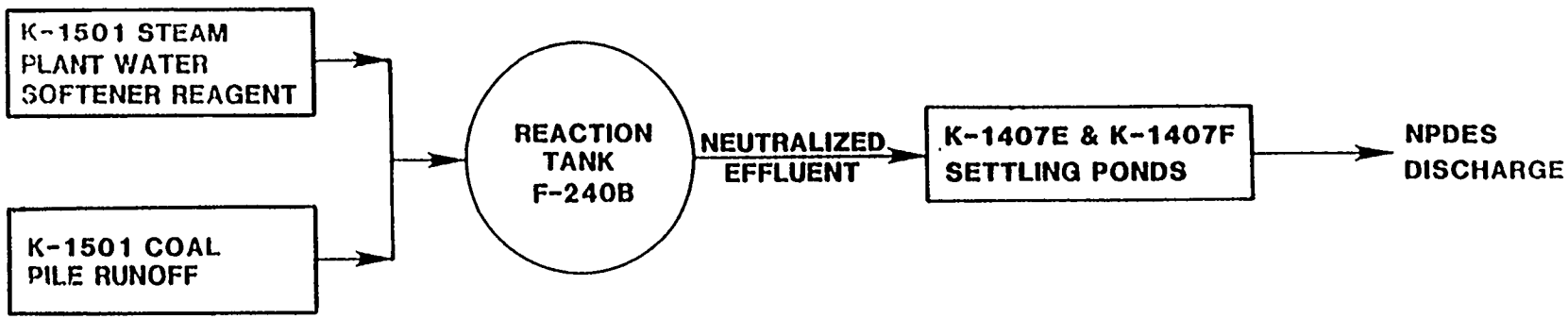


Fig. 5. Process flow diagram for the Central Neutralization Facility—reaction tank F-240B.

PHOTO NO. K/PH-87-0614

K-1407-H Central Neutralization Facility

Unit Name: K-1413 Process Lines

Unit Number: K01-R059

Regulatory Status: 3004.u

Area Number/Unit Location: Area 1, due east of Section K-302 of the K-25 building, southeast of the intersection of 16th Street and Avenue J (Map Ref. No. 91)

Approximate Dimensions and Capacity: Four-in.-diameter plastic pipes run ~225 lin ft from the three K-1413 pits to the pump station. A 3-in. header runs ~1150 lin ft from the pump station to the K-1401 Acid Line.

Dates Operated: The K-1413 complex was an operative research and development facility from the early 1950s to 1981–1982. The site currently continues to serve field maintenance shop operations.

Present Function: The K-1413 Process Lines serve the K-1413 building, which currently accommodates field maintenance shops; K-1413 is not an operating research and development unit. The facility is on standby status pending a decision as to whether the facility is to be considered for decontamination and decommissioning or should be rehabilitated to accommodate new plant operations as yet undefined.

Life Cycle Operations: The K-1413 site was built and put into operation as a research and development facility in the early 1950s. Originally, the K-1413 site consisted of only the K-1413 building and the east pit. In the late 1960s an annex was added to the K-1413 building, and the north pit was constructed. In 1974–1975 the south pit was constructed to isolate the treatment and disposal of classified waste. A pumping station, located just north of the K-1413 building, was also built at this time, and process drains connected this station to the north pit, the east pit, and the K-1407-A/B Neutralization and Holding Pond Facility. The south pit was not connected to the K-1413 building; however, a process drain allowed the transfer of waste streams from the north pit to the south pit when a valve between the north pit and the pumping station was closed. This transfer was driven by a pump located at the north pit. The wastes were then pumped from the south pit into a tanker truck and transported to the K-1407-C Retention Basin. Prior to 1974–1975 the waste streams from the north and east pits discharged by gravity flow into the storm sewer systems that are located on the east and west sides of the K-1413 building. (See Fig. 6.) In 1981–1982 the north pit pump was deactivated, and the process drain between the north pit and the south pit was cut and capped.

Waste Characteristics: The volume and composition of the chemicals processed during the facility's life cycle operations varied with time. Records of the chemicals used in the various activities are not available; this is a partial list of possible contaminants. Records of the quantities and concentrations of the chemicals listed below are also not available.

Uranium tetrafluoride	Uranium hexafluoride
Uranium oxide	Perchloroethylene

Antimony
Titanium
Fluorine
NH_4OH
Nickel
Diethylene glycol
Sulfuric, hydrochloric, nitric, and organic acids
Tungsten, rhenium, uranium sodium, calcium, and potassium hydroxides
Tantalum
Zirconium
Uranyl nitrate
Anisole
Ruthenium
Dibutyl ether
Nickel, copper, and chromium,
Hydrogen and sodium fluorides
Hydrogen chloride
Tungsten and rhemium hexafluorides
Mercury

Release Data: Because of the practice prior to 1974–1975 of allowing waste streams from the north and east pits to discharge into the area's storm sewer network, it is conceivable that contamination of soil and groundwater via the underground piping system may have occurred.

Site Characterization Status: A remedial investigation is planned for this site as part of the K-1413 OU. Additional environmental data are available for storm drains SD-210 and SD-200 and four groundwater monitoring wells.

Media of Concern: Soil, groundwater, storm drains

Comments: This site is part of the K-1413 OU.

References:

RCRA Facility Investigation Plan, K-1413 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-144, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1988.

Date Prepared: August 1987

Date Revised: May 1991

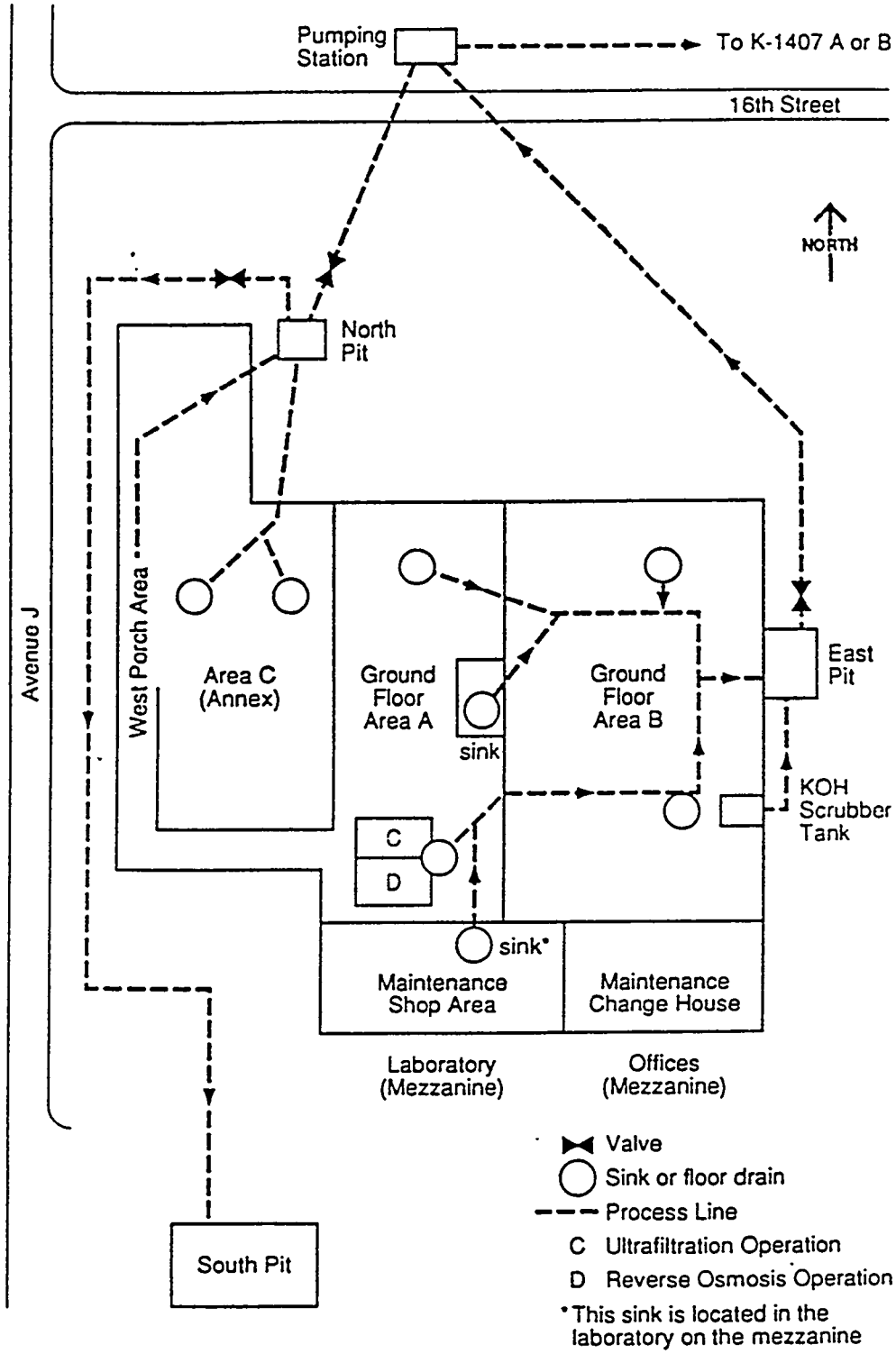


Fig. 6. K-1413 Facility (schematic only—not to scale).

Unit Name: K-1413 Treatment Tank

Unit Number: K01-R015

Regulatory Status: RCRA

Unit Location: Area 1, due east of Section K-302 of the K-25 building, southeast of intersection of 16th Street and Avenue J (Map Ref. No. 15)

Approximate Dimensions and Capacity: The K-1413 Complex occupies a land area of ~200 × 200 ft, with a building footprint of ~7200 ft^2. The complex (Fig. 6) includes three tanks exterior to the building structure:

- K-1413-C Neutralization Pit to the south of the building; capacity, ~21,000 gal.
- One pit to the north of the building; capacity, 2,500 gal.
- One pit to the east of the building; capacity, 2,500 gal.

Dates Operated: The K-1413 Complex was an operative research and development facility from the early 1950s to 1981–1982. The site currently continues to serve field maintenance shop operations.

Present Function: The K-1413 building currently accommodates field maintenance shops; K-1413 is not an operating research and development unit. The facility is on standby status pending a decision as to whether the facility is to be considered for decontamination and decommissioning or should be rehabilitated to accommodate new plant operations as yet undefined. A closure plan is being prepared for the treatment tank.

Life Cycle Operations: The K-1413 site was built and put into operation as a research and development facility in the early 1950s. Originally, the K-1413 site consisted of only the K-1413 building and the east pit. In the late 1960s an annex was added to the K-1413 building, and the north pit was constructed. In 1974–1975 the south pit was constructed to isolate the treatment and disposal of classified waste. A pumping station, located just north of the K-1413 building, was also built at this time, and process drains connected this station to the north pit, the east pit, and the K-1407-A/B Neutralization and Holding Pond Facility. The south pit was not connected to the K-1413 building; however, a process drain allowed the transfer of waste streams from the north pit to the south pit when a valve between the north pit and the pumping station was closed. This transfer was driven by a pump located at the north pit. The wastes were then pumped from the south pit into a tanker truck and transported to the K-1407-C Retention Basin. Prior to 1974–1975 the waste streams from the north and east pits discharged by gravity flow into the storm sewer systems that are located on the east and west sides of the K-1413 building. (See Fig. 6.)

In 1981–1982 the north pit pump was deactivated, and the process drain between the north pit and the south pit was cut and capped. The south pit was, therefore, a closed system with waste solutions brought in by tanker trucks. The east pit remained in use.

A variety of activities have been carried out in the K-1413 building since the facility was put into operation in the 1950s. An early K-1413 development project involved the fluorination of uranium metal chips to UF_6. The chips were immersed in perchloroethylene and shipped to the K-1413 facility in 55-gal drums. Interviews revealed that spills of perchloroethylene occurred at the facility.

UF_6 was accidentally lost to the stack in at least one incident. Because of the dispersion of UF_6 to UO_2F_2, any uranium released during the incident would not have remained at significant levels within the K-1413 OU.

Wastes from the annex were discharged into the storm drains or later pumped to K-1407-A or K-1407-B from the north pit. This practice was discontinued, and wastes were then transferred from the north pit to the south pit, pumped from the south pit into a tanker truck, and transported to the K-1407-C Retention Basin in order to isolate the treatment and disposal of classified waste.

The fluoride volatility development program used depleted and slightly enriched uranium oxide in zirconium-clad fuel elements. The process included removal of the zirconium-clad material in a fluidized bed using hydrogen chloride. Other steps in this program included conversion of UO_3 to U_3O_8 using an oxygen/nitrogen mixture and fluorination of U_3O_8 to UF_6 using elemental fluorine. The UF_6 was cold-trapped, and off-gases produced in the various processes were passed through a filter and then scrubbed with sodium or potassium hydroxide solutions, which would have been discharged to the east pit when spent.

Other development projects included the following:

- Investigation of compressors for pumping fluorine and uranium hexafluoride.
- Reduction of UO_3 to UO_2 using hydrogen and vibrating trays.
- Conversion of UO_2 to UF_4 using HF.
- Tower fluorination of UO_2 or UF_4 to UF_6.
- Calcination of uranyl nitrate to U_3O_8.
- Hydration of normal assay UO_3 with solutions of NH_4OH for specific crystal formation.
- Separation of boron isotopes.
- Trapping of fission products such as antimony, tantalum, titanium, and ruthenium from UF_6 reactor returns (Hanford recovered spent fuels).

Chemicals used in other programs include sulfuric and hydrochloric acids, organic acids, nickel compounds, and sodium and calcium hydroxide. The K-1413 Facility was also used

as a pilot plant to demonstrate the separation technology of radioactive noble gases (e.g., krypton and xenon).

These development operations would have resulted in the discharge of sulfuric, hydrofluoric, nitric, and hydrochloric acids and sodium and calcium hydroxides. Organic acids and other organics, such as diethylene glycol and dibutyl ether, and metal fluorides, including sodium, chromium, nickel, uranium, and copper, would also have been included in the waste stream. The major sources of these wastes were the laboratory on the mezzanine and the sink on the main floor in Area A, which drained to the east pit. (See Fig. 6). The cleaning of containers of tungsten and rhenium hexafluoride would have resulted in waste solutions (oxyfluorides, etc.) of these materials in the K-1413 Laboratory.

In addition to the waste generated at the K-1413 building, the K-1413 Neutralization Pits were also used to treat classified waste streams from the K-1231 and K-1232 facilities. Wastewater transported by tankers from the Y-12 Plant has also been treated at the south pit during the operations history of the K-1413 Facility. Records indicate that one shipment of Y-12 wastewater contained 2.7 mg/L of mercury. Sodium sulfide was used at the south pit in the treatment of the wastewater, and the waste was transferred to the K-1232 Facility for further treatment. Because follow-up samples of rainwater that collected in the south pit contained traces of mercury, the rainwater was collected and transferred to the K-1232 Facility for treatment. Further follow-up samples showed no mercury contamination.

The east and north pits at the K-1413 site were originally separated into two halves by 4-in.-thick baffles that came within 4–6 in. of the bottom of the pits. Both halves of the pits were then filled with limestone gravel. The waste stream entered near the top of the pit and was forced by the baffle to percolate down through one half and back up the other half of the pit before it was discharged. Wastes generated in the laboratory on the mezzanine and in the ground floor areas A and B of the K-1413 building were treated in the east pit, and wastes generated in area C were treated in the north pit using this limestone neutralization process. The limestone was removed from the pits when the pumping station was installed.

Since 1973–1975, the east pit has received waste from a 20% potassium hydroxide scrubber (Fig. 6). The wastes were transferred to the pit when the solution was depleted to 10% KOH. The waste solution included hydroxides of tungsten, rhenium, and uranium as well as high fluoride ion content. Currently, the north pit discharges rainwater that collects in a graded trenchway in the west porch area (Fig. 6). The north pit is not presently used for the treatment of waste because wet chemical operations are no longer conducted in the K-1413 building. The south pit is now considered a closed system and no longer provides pH adjustments for acidic waste.

Waste Characteristics: The volume and composition of the chemicals processed during the facility's life cycle operations varied with time. Because the chemicals utilized at various times are not available, this is a partial list of possible contaminants. Records of the quantities and concentrations of the chemicals listed below are also not available.

Uranium tetrafluoride	Uranium hexafluoride
Uranium oxide	Perchloroethylene

Antimony
Titanium
Fluorine
NH_4OH
Nickel
Diethylene glycol
Sulfuric, hydrochloric, nitric, and organic acids
Tungsten, rhenium, uranium, sodium calcium, and potassium hydroxides
Tantalum
Zirconium
Uranyl nitrate
Anisole
Ruthenium
Dibutyl ether
Nickel, copper, and chromium,
Hydrogen chloride
Hydrogen and sodium fluorides
Mercury
Tungsten and rhenium hexafluorides

Release Data: Beyond the spills and stack release noted in the Life Cycle Operations section, no records of other incidents are available. Because of the earlier practice (prior to 1974–1975) of allowing waste streams from the north and east pits to discharge into the area's storm sewer network, it is conceivable that contamination of soil and groundwater via the underground piping system may have occurred.

Site Characterization Status: A remedial investigation is planned for this site as part of the K-1413 OU. Additional environmental data are available for storm drains SD-210 and SD-200 and four groundwater monitoring wells.

Media of Concern: Soil, groundwater, storm drains

Comments: This site is part of the K-1413 OU.

References:

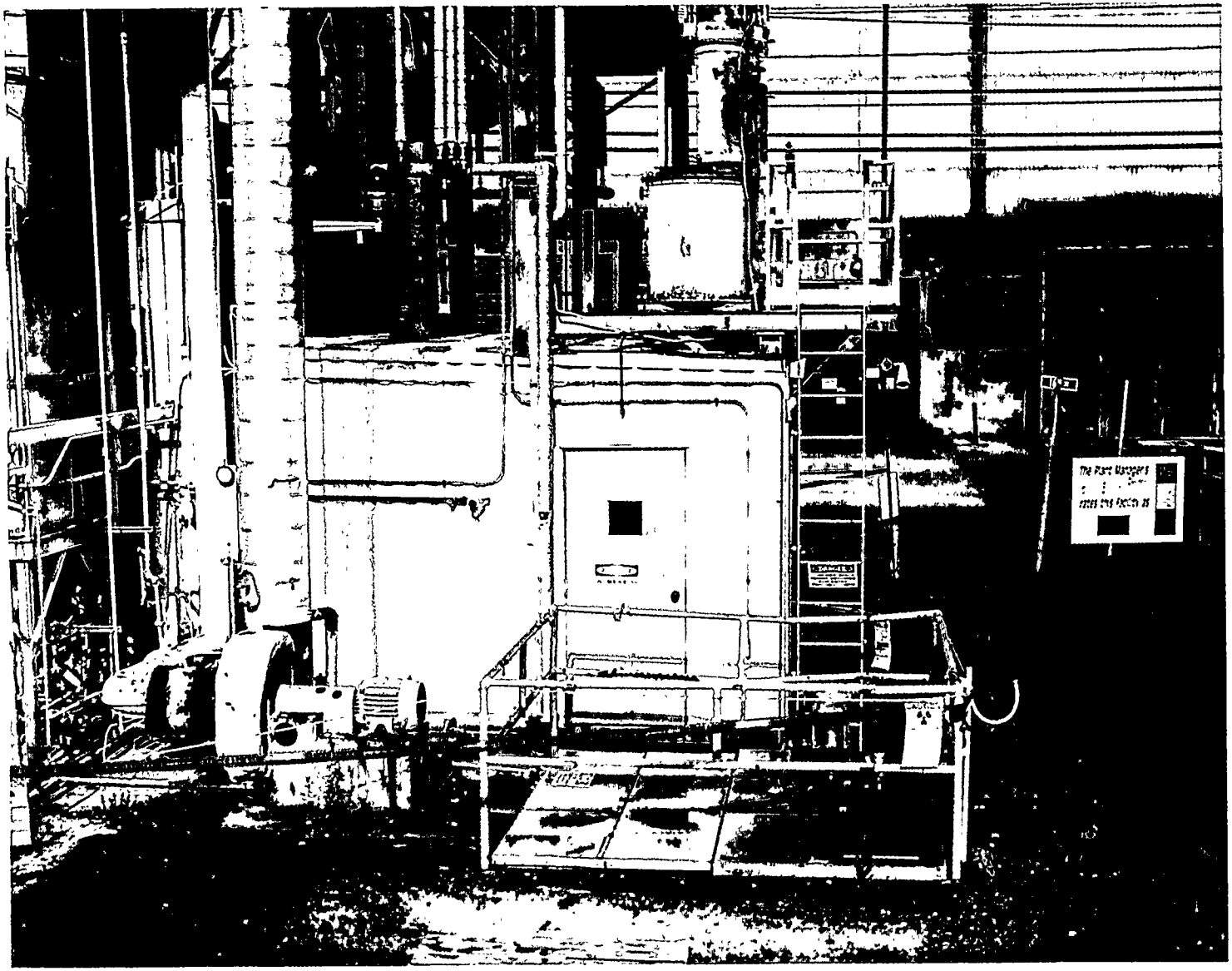
RCRA Facility Investigation Plan, K-1413 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge Tennessee, K/HS-144, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1988.

Resource Conservation and Recovery Act Closure Plan for K-1413 Treatment Tank, K/HS-332, Revision 2, prepared by IT Corporation for Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1991.

Date Prepared: April 1987

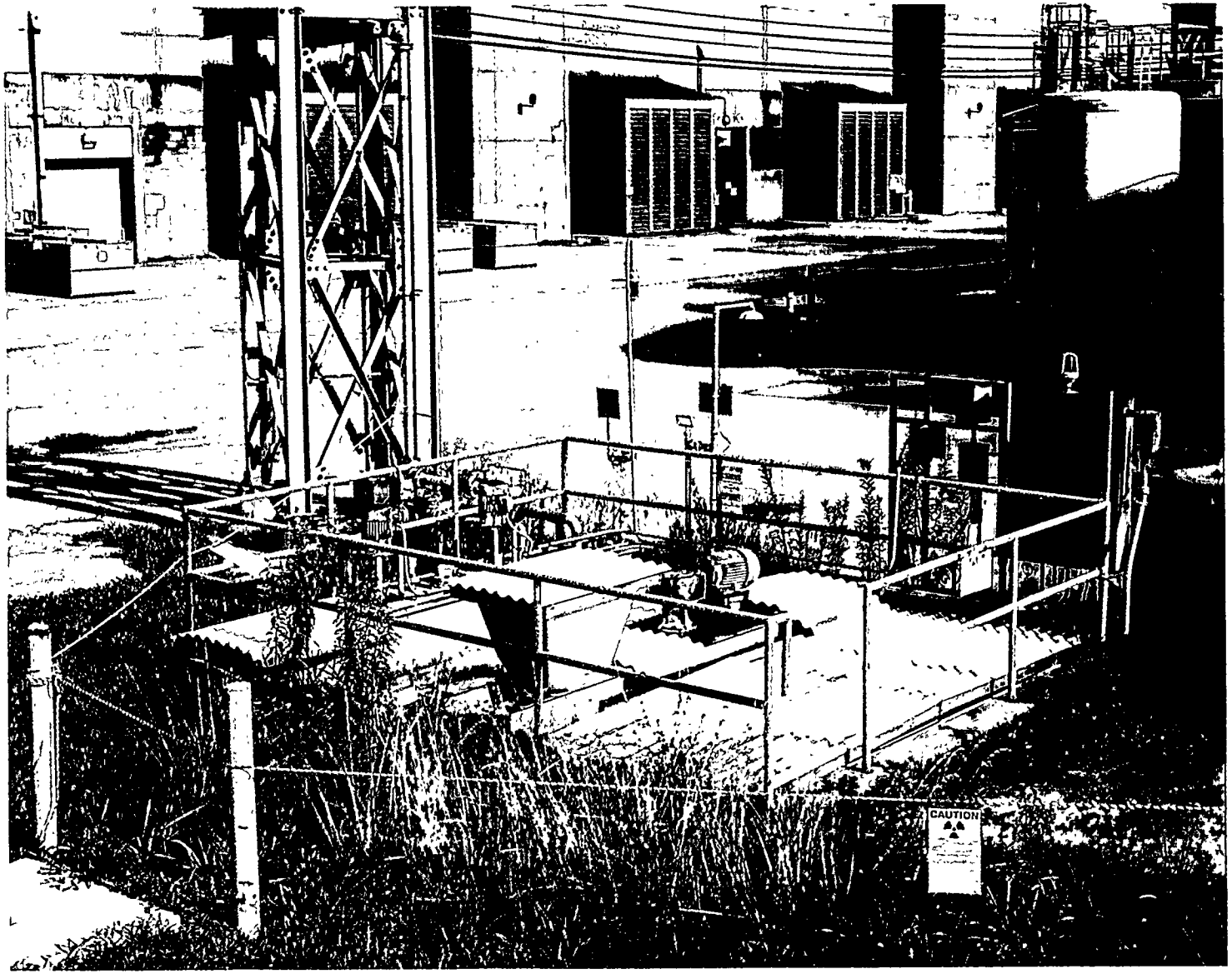
Date Revised: May 1991

PHOTO NO. K/PH-91-3139



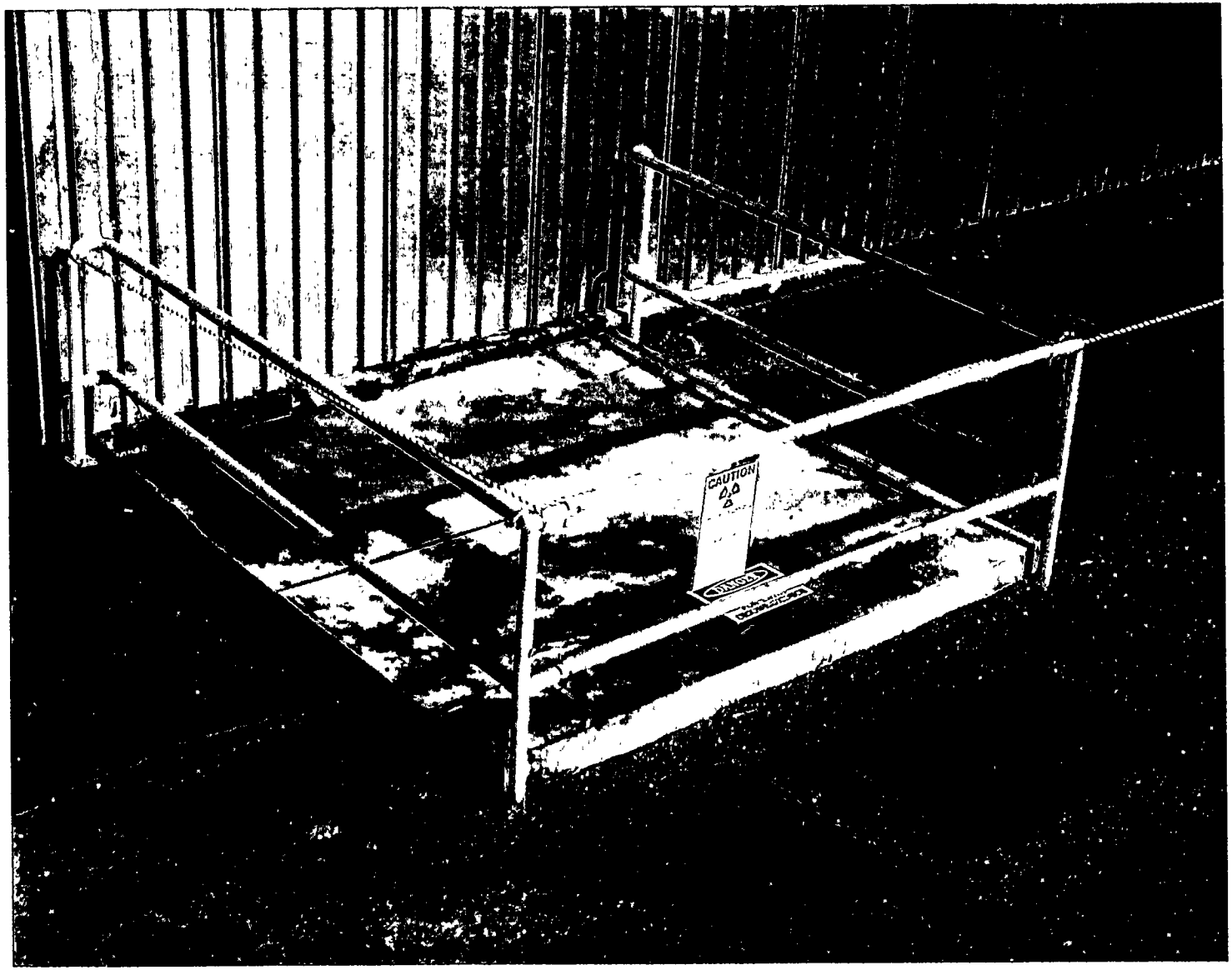
K-1413 Treatment Tank (North Pit)

PHOTO NO. K/PH-91-3117



K-1413 Treatment Tank (South Pit)

PHOTO NO. K/PH-91-3140



K-1413 Treatment Tank (East Pit)

Unit Name: K-1417 Block Casting/Storage Area

Unit Number: K01-R033

Regulatory Status: RCRA

Area Number/Unit Location: Area 1, main plant area, north of the K-1420 Building and east of the K-1407-C Retention Basin (Map Ref. No. 34)

Approximate Dimensions and Capacity: 3 acres

Dates Operated: 1987 to present

Present Function: Storage of waste that has been fixed in concrete. This site is a RCRA-permitted storage area containing 78,000 drums of sludge from the K-1407-B Holding Pond and K-1407-C Retention Basin.

Life Cycle Operation: Storage of concrete-fixed wastes since 1987 has been the only use for the Block Casting/Storage Area.

Waste Characteristics: Listed wastes include 45,776 drums of pond sludge fixed in concrete and roughly 32,000 drums of raw sludge. Sludge wastes were generated from a plating process and also contain radioactive constituents. Analyses of sludges were reported in the documents listed below.

Release Data: Drums of sludge from the K-1407-B Holding Pond were found to be leaking. Monitoring of the drums is continuing.

Site Characterization Status: No further action is planned for this unit by K-25 ER.

Media of Concern: None

Comments:

References:

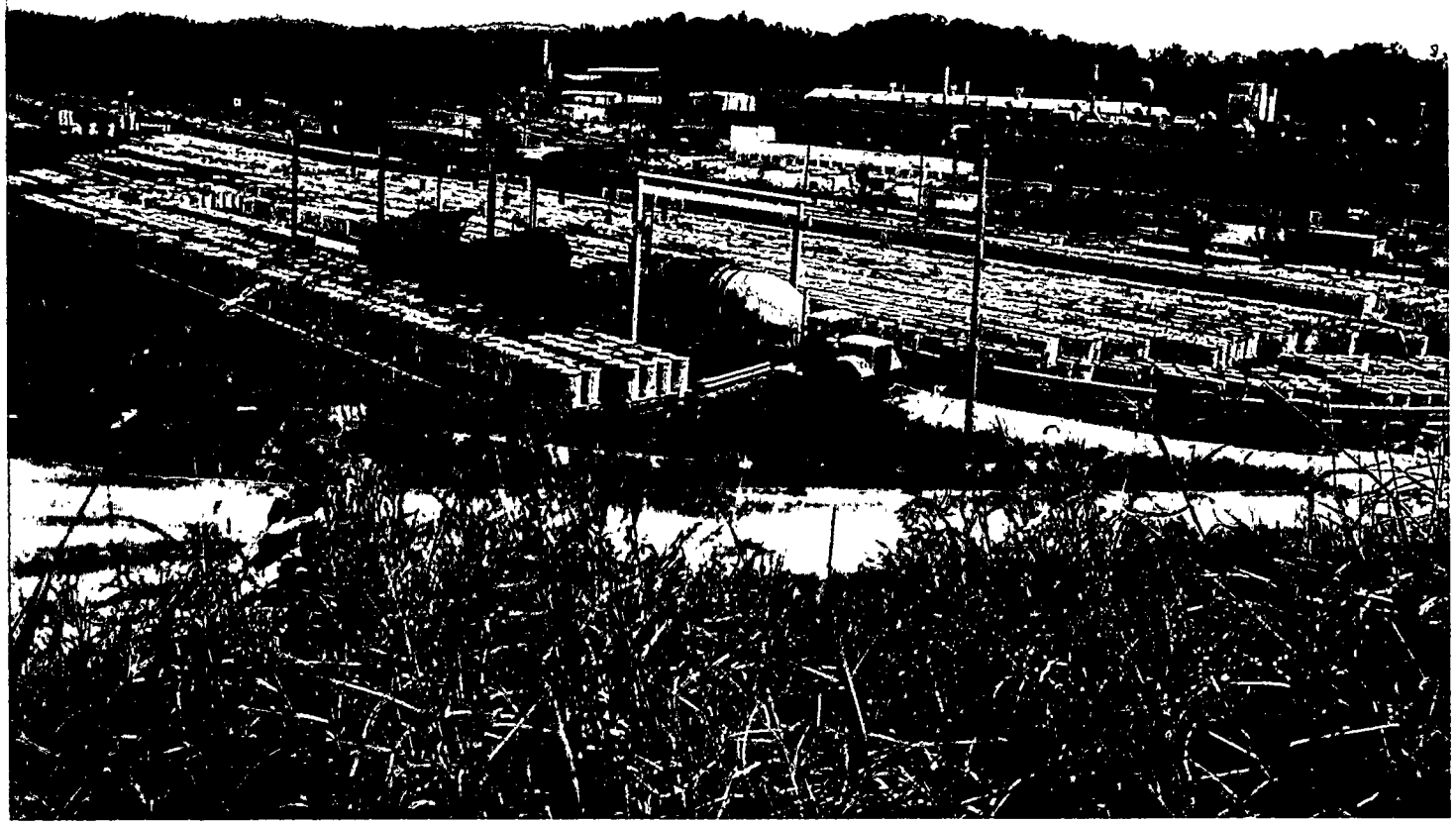
RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

P. D. Miller, J. L. Skiles, K. L. Michel, and R. K. White, *Qualitative Evaluation for K-1417 Drum Storage Facility*, ES/ER/TM-9, Martin Marietta Energy Systems, Inc., Oak Ridge K-25 Site, Oak Ridge, Tenn., February 1991.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-4183



K-1417 Block Casting/Storage Area

Unit Name: K-1417 Soil

Unit Number: K01-R012

Regulatory Status: Pending

Unit Location: Area 1, main plant area, immediately north of the K-1407-C Retention Basin (Map Ref. No. 25)

Approximate Dimensions and Capacity: The contours of the K-1417 Soil are indistinguishable from the K-1407-C Soil. The total combined dimensions of the K-1407-C and K-1417 Soil piles are 150 × 50 × 10 ft; the total combined volume of soil is estimated at 1535 m^3.

Dates Operated: 1983 to present

Present Function: Waste pile of soil contaminated with uranium

Life Cycle Operation: The contaminated soil was discovered during the construction of new facilities at ORGDP. Samples collected from the soil indicated very low concentrations of uranium.

Waste Characteristics: Uranium. It is estimated that total radiological activity from contaminants is 42 Ci.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned.

Media of Concern: Soil and groundwater

Comments:

References:

Date Prepared: April 1987

Date Revised: May 1991

Unit Name: K-1419 Sludge Fixation Plant

Unit Number: K01-R032

Regulatory Status: RCRA; Part B Application was submitted.

Area Number/Unit Location: Area 1, main plant area, north of the K-1420 building (Map Ref. No. 33)

Approximate Dimensions and Capacity: Sludge receiving hopper, 2,600 gal; high solids storage tank, 3,000 gal; waste sludge feed hopper, 1,500 gal; low solids storage tank, 15,000 gal; liquid waste feed tank, 1,500 gal; remedial sludge storage tank, 15,000 gal; neutralization tank, 550 gal; remedial sludge feed tank, 15,000 gal; TILT mixer, 10 yd^3; high energy mixer, 7.5 yd^3.

Dates Operated: 1987–1988

Present Function: Unused

Life Cycle Operation: The facility was used to fix sludge from the K-1407-B Holding Pond and K-1407-C Retention Basin in concrete. 45,776 barrels from the two ponds were treated at the site. Sludges from K-1232, TSCA Incinerator ash, and ORGDP thickener sludge were also treated at the facility, along with wastes from the Y-12 West End Treatment Facility and Central Pollution Control Facility.

Waste Characteristics: Waste treated at the facility included wastewater treatment sludges and D004 through D011 characteristically listed hazardous sludges. K-1232 sludges and TSCA Incinerator ash were derived from the treatment of listed wastes F001, F002, and F006. Other wastes were listed waste F006.

Release Data: There have been spills at this unit, but they have been cleaned up when they occurred.

Site Characterization Status: No further action is planned for this unit by K-25 ER.

Media of Concern: None

Comments:

References:

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0621

K-1419 Sludge Fixation Plant

Unit Name: K-1420 Contaminated Drum Storage

Unit Number: K01-C067

Regulatory Status: CERCLA

Area Number/Unit Location: Area 1, main plant area, northwest of the K-1420 building, near Portal 6 (Map Ref. No. 79)

Approximate Dimensions and Capacity: 20 by 20 ft; ~100 drums

Dates Operated: Mid-1970s to late 1980s

Present Function: Unused. The drums have been removed.

Life Cycle Operation: Drums of low-level radioactively contaminated metal scrap were stored at the site prior to disposal.

Waste Characteristics: Low-level radioactively contaminated scrap metal stored in drums

Release Data: There have been no releases from this unit.

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

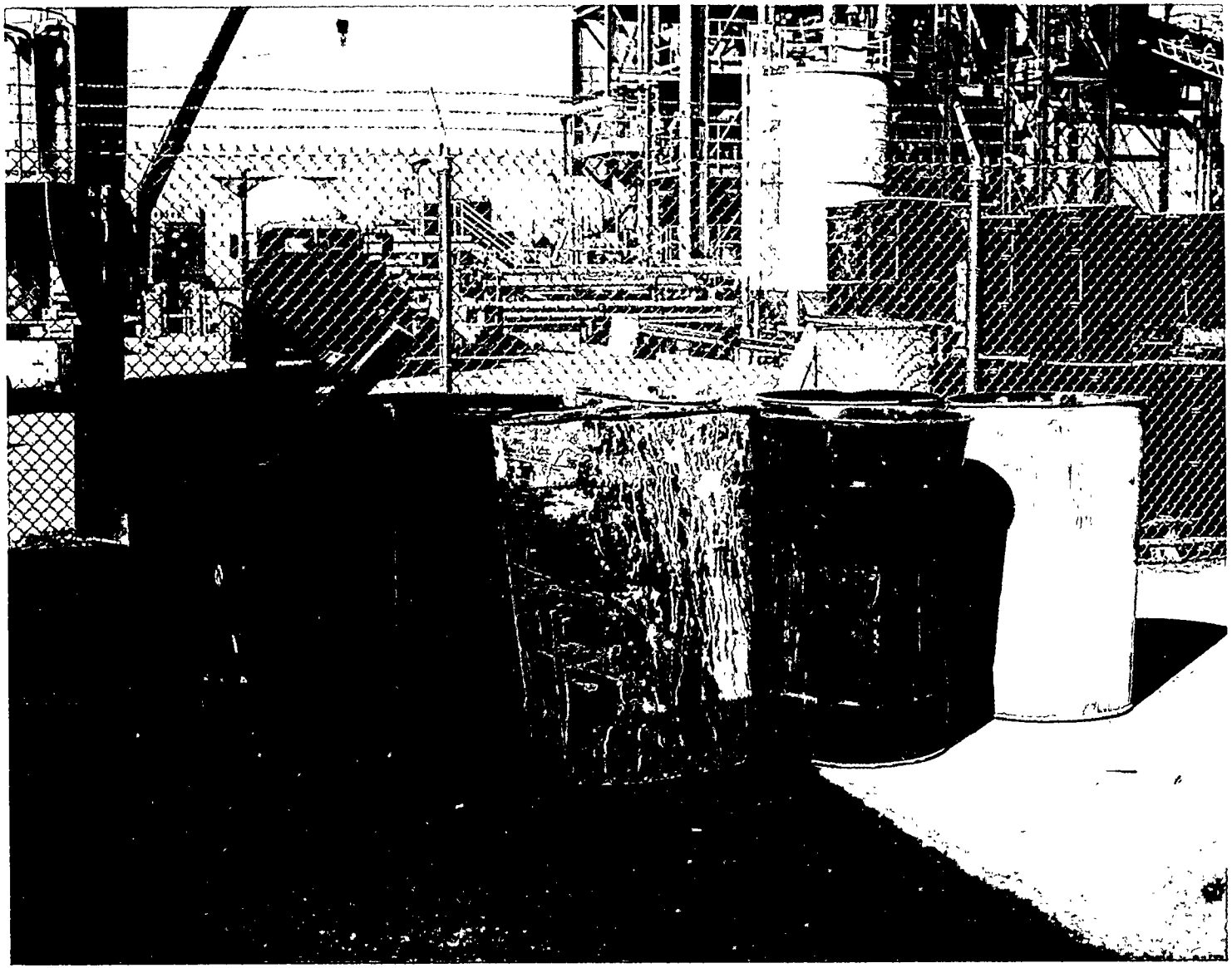
Comments: This area stored drums that contained solid contaminated scrap metal materials only.

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3113



K-1420 Contaminated Drum Storage

Unit Name: K-1420 Contaminated Scrap Metal Dumpster

Unit Number: K01-C069

Regulatory Status: CERCLA

Area Number/Unit Location: Area 1, main plant area. One dumpster was located outside building K-1420 at the quarter point from the southwest building corner. Another dumpster was located at the quarter point from the northwest building corner. (Map Ref. No. 81)

Approximate Dimensions and Capacity: 2 each: 7 × 4 × 3 ft; 40 ft^3 each

Dates Operated: Mid-1970s to early 1991

Present Function: The dumpsters have been removed.

Life Cycle Operation: The scrap metal dumpsters received contaminated solid metal scrap generated by K-1420 building operations. Beginning in 1991, contaminated scrap metal has been collected in B-25 metal containers maintained in a staging area east of K-1420. Metal is then picked up, stored, and disposed of in accordance with established waste management procedures.

Waste Characteristics: Low-level radioactively contaminated scrap metal

Release Data: There were no known releases from this unit.

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3118

K-1420 Contaminated Scrap Metal Dumpster

Unit Name: K-1420 Mercury Recovery Room

Unit Number: K01-R012

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, in the northwest section of the K-1420 building (Map Ref. No. 12)

Approximate Dimensions and Capacity: 15 by 15 ft

Dates Operated: 1960s to early 1980s

Present Function: Unused

Life Cycle Operation: This room contained equipment that was used to clean and recover used mercury.

Waste Characteristics: Mercury solutions on ventilation hoods, distillation equipment, and other equipment

Release Data: Mercury was found in the room's center floor drain when the line was accidently punctured. The line was grouted and capped where the line exits the K-1420 building, and the floor drain was sealed. Contents of the floor drain had previously flowed through the building's north side process lines to the K-1407-B Holding Pond.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Equipment and air

Comments: This site is part of the K-1420 OU.

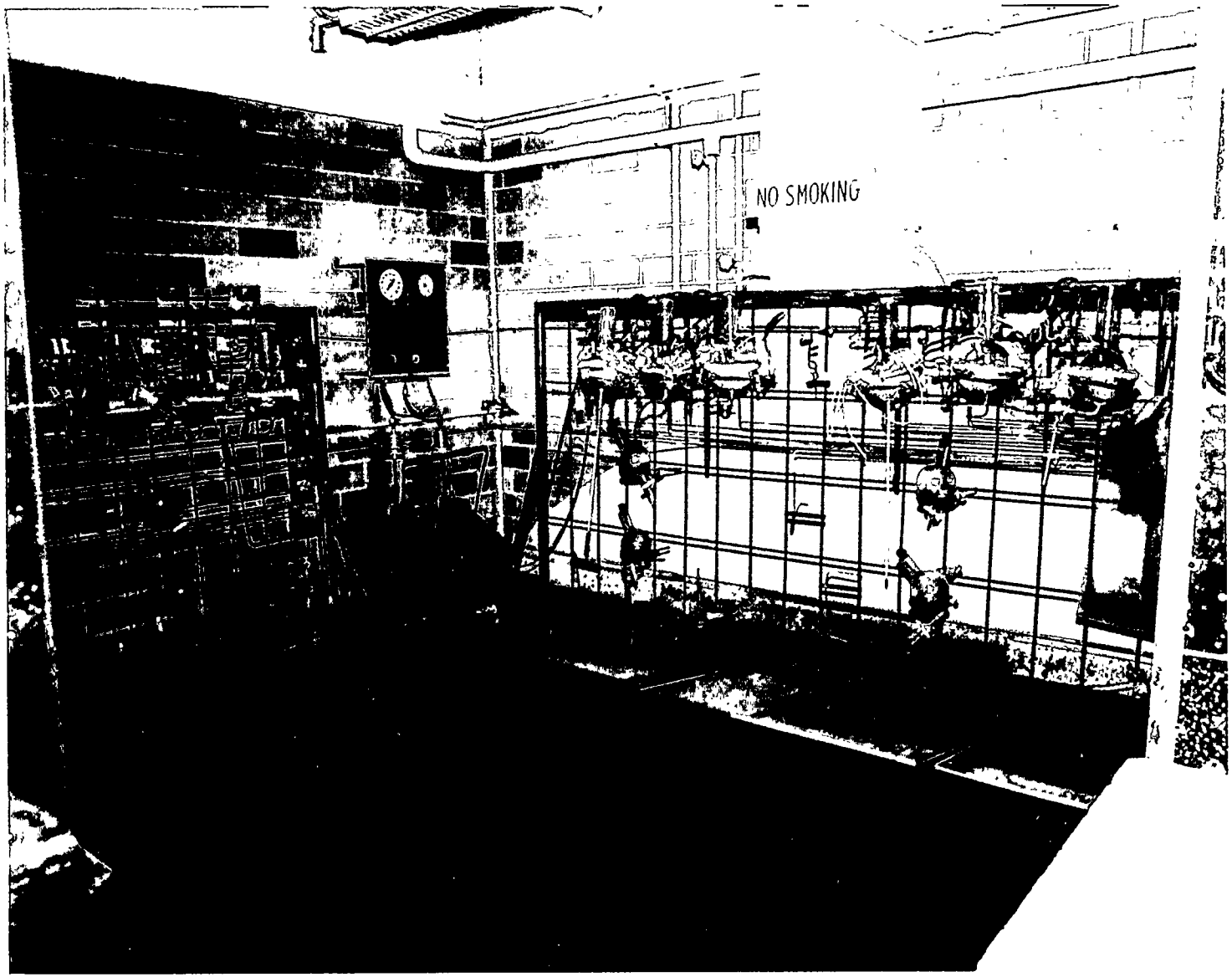
References:

RFI Plan for the K-1420 Mercury Recovery Room, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-139, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., November 1987.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0723



K-1420 Mercury Recovery Room

Unit Name: K-1420 Oil Decontamination and Recovery Facility

Unit Number: K01-0073

Regulatory Status: 3004.u

Unit Location: Area 1, northwest section of K-1420 building (Map Ref. No. 92)

Approximate Dimensions and Capacity: The unit occupies ~225 ft^2 of floor area within a 15- by 15-ft cubicle. When in operation, the unit processed ~500 lb/month of contaminated Miller's Fluorinated Lubricating (MFL) Oil.

Dates Operated: Mid–late 1950s through the late 1960s

Present Functions: In shutdown mode

Life Cycle Operations: The MFL oil decontamination and reclamation facility consists of two similar in-line but separate mixing tank and pressure tank assemblies, both housed in one cubicle. Each assembly consists of a mixing tank, a pressure filter tank, strip heating elements, exhaust ducts, and auxiliary units. Drawing K-1420-951 M shows the placement of the process equipment within its cubicle. Drawing K-1420-947 M provides details of the MFL recovery process equipment.

During the early years of plant operations, MFL oil was mostly obtained from the uranium enrichment process buildings' cold trap rooms (Beech-Russ Pumps). Initially, the MFL oil was processed in the K-1303 building. Later, the recovery process was moved to K-1420 when the facility became available (~1953–1954). This facility handled much lesser quantities of contaminated oil once use of the cold trap rooms ceased operations in the mid-1940s. Thereafter, isolated generators of contaminated oil supported a reduced need for an MFL recovery capability.

Process-wise, contaminated oil was charged to the mixing tank and mixed with carbon tetrachloride to decrease the oil's viscosity. From the mixing tank, the oil flowed to the pressure filter tank, where the uranium-contaminated oil sludge was separated from the oils' clean component. The sludge was packaged in drums pending eventual treatment through the K-1420 uranium recovery process. The clean oil was transferred to the mixing tank of the second equipment assembly, where cobalt fluoride was added to refluorinate the oil and restore its inertness to fluorination agents in the uranium enrichment cascade. The resultant mixture moved to the pressure filter tank, where the cobaltous fluoride component was removed and stored for later treatment. The clean MFL oil was reclaimed for continued use.

Waste Characteristics: The volume of contaminated oil processed through the subject unit was minimal because of reduced generation. The oil recovery batch process handled uranium-bearing oil, carbon tetrachloride, and cobalt fluoride.

Release Data: No documented incidents of uncontrolled waste release(s) exist. Any release would have been contained within the cubicle enclosure and cleaned. If not cleaned, the release would have been via the floor drain within the cubicle flow to the K-1407-B Holding Pond. All continuing flows from K-1420 are now processed through the Central Neutralization Facility.

Site Characterization Status: The underground drain system that served the north area of K-1420 and includes the oil decontamination/recovery facility is currently part of a site characterization activity. No further action by K-25 ER is planned for this site.

Media of Concern: Soil, groundwater

Comments:

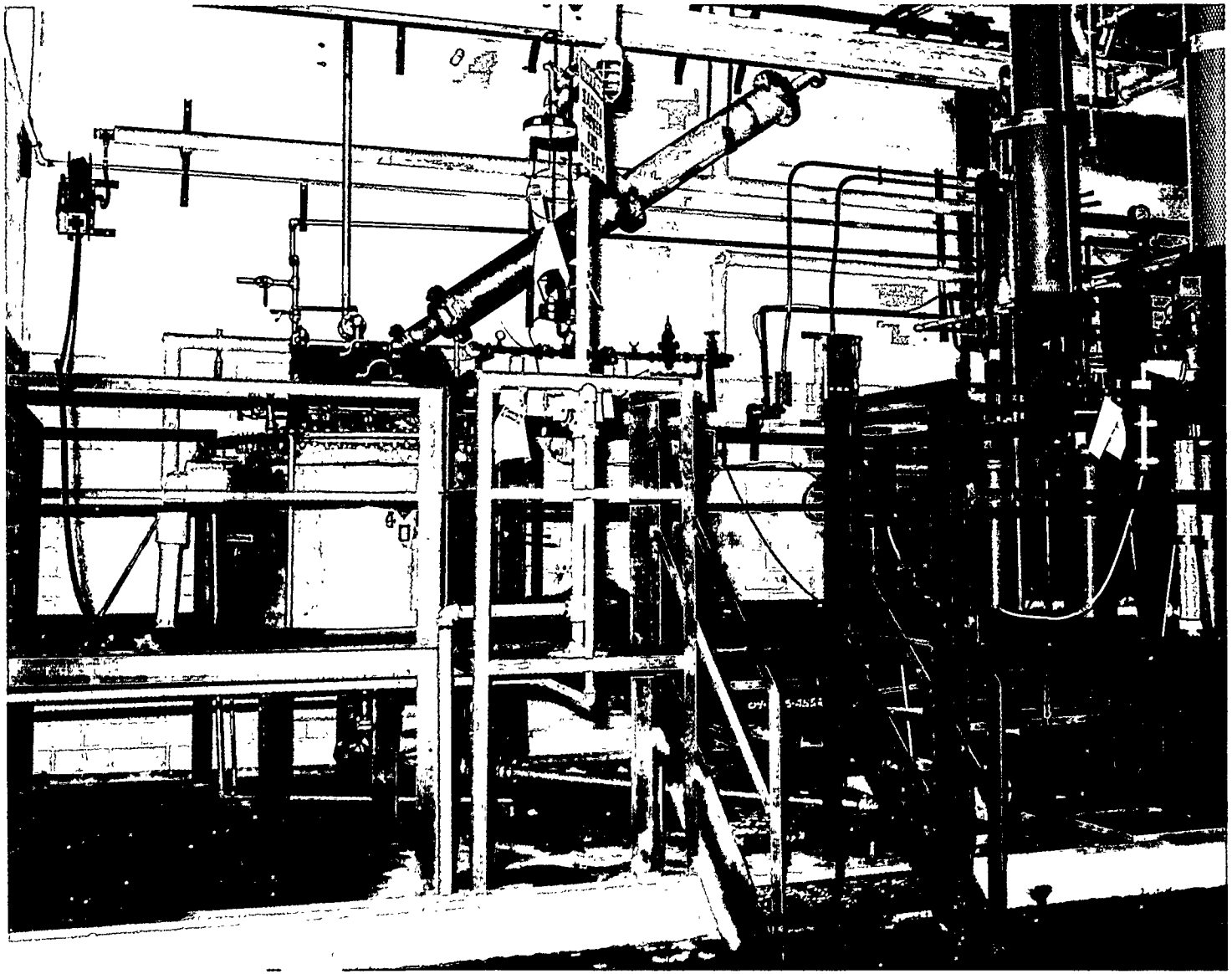
References:

RCRA Facility Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

RCRA Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: May 1991

PHOTO NO. K/PH-91-3119



K-1420 Oil Decontamination Facility

Unit Name: K-1420 Oil Storage

Unit Number: K01-R010

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, on the north side of the K-1420 building (Map Ref. No. 10)

Approximate Dimensions and Capacity: 275 by 50 ft

Dates Operated: Late 1950s to mid-1980s

Present Function: Unused for oil storage

Life Cycle Operation: Drums of waste uranium cascade motor lubricant oil, containing 2–3% uranium, have been stored in this area. Also, uranium solutions, stored in safe geometry dollies, were stored at the facility.

Waste Characteristics: Uranium-contaminated waste oil, including PCBs

Release Data: There is evidence of oil having leaked from the drums. Before the Northeast Patrol Road was asphalted, storm water runoff flowed directly from the oil storage site into the K-1700 Stream. Surface drainage from the site now goes into a storm drainage ditch running along the patrol road before discharging into the K-1700 Stream.

Site Characterization Status: A remedial investigation will be conducted for this unit.

Media of Concern: Soil and groundwater

Comments: This site is part of the K-1420 OU. The sampling plan for this site has undergone extensive revision since January 1991, when the last sampling plan was published. Revisions to the plan are being documented and will be submitted to the file for the record of activities that were conducted on this site.

References:

RCRA Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

Work Plan, Health and Safety Plan, and Quality Assurance Project Plan for K-1420 Waste Area Grouping, K/ER-34, Martin Marietta Energy Systems, Inc., Oak Ridge K-25 Site, Oak Ridge, Tenn., January 1991.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0728

K-1420 Oil Storage

Unit Name: K-1420 Process Lines

Unit Number: K01-R016

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, in the northeast quadrant of the plant, north of the K-1420 building and east of the K-25 building (Map Ref. No. 16)

Approximate Dimensions and Capacity: Several underground pipes ~300 ft long

Dates Operated: 1953 to present

Present Function: Transfer of wastewater from the K-1420 Decontamination Building to the Central Neutralization Facility

Life Cycle Operation: When opened in 1953, the following uses were made of the K-1420 building: furnace stand for converter conditioning and recovery, mercury recovery, MFL oil reclaiming, classified parts disassembly and cleaning, cascade and feed plant cleaning and decontamination, uranium recovery, aluminum leaching, and laboratory. In the 1960s a plating facility was operated. From the 1970s to 1987, a converter bundle cleaning and barrier removal facility was in operation for equipment from the enrichment cascades. In 1983 an MFL oil reclamation project that treated uranium-containing oil with quinoline was put into operation.

The building's south drain served the K-1420 "A" area, which includes the degreasing, stripping, rinsing, and plating areas. Effluent originally went to the K-1407-A Neutralization Pit and on to the K-1407-B Holding Pond but now goes the Central Neutralization Facility. The north drain served the "B" and "C" areas, which includes the mercury recovery and MFL oil reclamation facilities, along with the K-1421 Incinerator area.

Waste Characteristics: Uranium, metals, semivolatile organics, corrosives, detergents, and rinse waters. Transuranics were reportedly disposed of in both line systems. Abandoned process lines that were discovered during the construction of new facilities have been found to contain uranium, mercury, and PCBs. The north line system was originally composed of terra cotta lines, which were replaced by stainless steel because of severe leakage. The abandoned lines and the lines presently being used will be assessed to determine if hazardous constituents are being discharged.

Release Data: Tests conducted in 1987 showed that process line systems on both the north and south sides of the building were leaking.

Site Characterization Status: A remedial investigation has been initiated for this unit. Field operations are under way.

Media of Concern: Soil and groundwater

Comments: This unit is part of the K-1420 OU. It will be investigated along with K-1420 Oil Storage Pad and the K-1421 Incinerator.

References:

RCRA Facility Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0721

K-1420 Process Lines

Unit Name: K-1420-A Flammable Waste Storage Tank

Unit Number: K01-R037

Regulatory Status: RCRA; Part B Permit Application has been submitted.

Area Number/Unit Location: Area 1 (main plant area), at the northwest corner of 15th Street and Avenue C (Map Ref. No. 38)

Approximate Dimensions and Capacity: 70 by 8 ft; 22,000-gal capacity

Dates Operated: 1985 to the present

Present Function: Storage of flammable waste materials and other solvents

Life Cycle Operation: Beginning in the 1950s, the tank was used for classified purposes. Beginning in 1988, flammable waste was stored in the tank prior to incineration.

Waste Characteristics: Isopropyl alcohol, methylene chloride, acetone, toluene, ethyl alcohol, hexane, gasoline, paint waste, water, and acetonitrile

Release Data: The storage tank is within a dike that provides secondary containment. No releases have been observed from the tank, which is inspected on a weekly basis.

Site Characterization Status: No further action by K-25 ER is planned for this unit.

Media of Concern: None

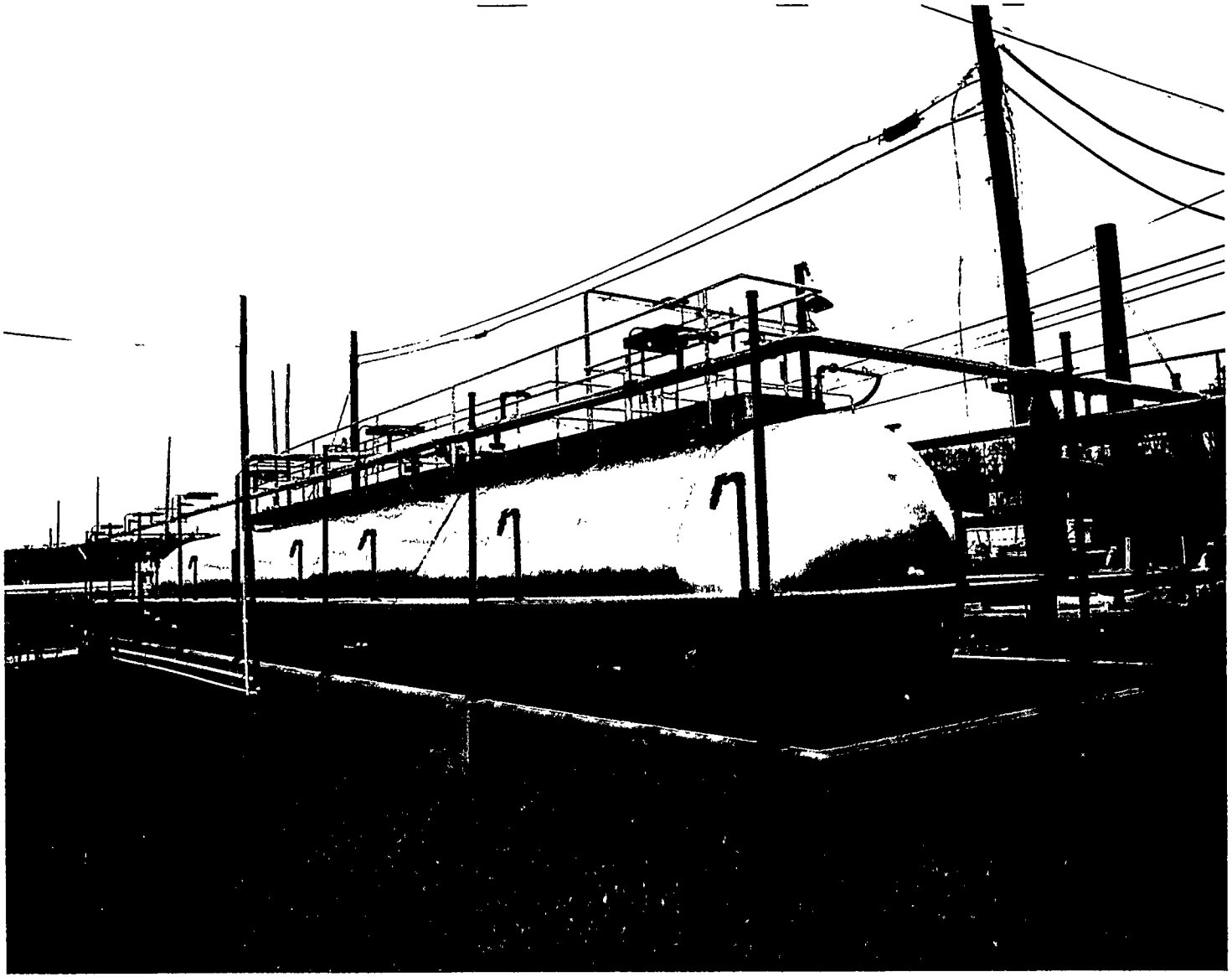
Comments:

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0018



K-1420-A Flammable Waste Storage Tank

Unit Name: K-1421 Incinerator

Unit Number: K01-RO57

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, east of the K-1421 building (Map Ref. No. 93)

Approximate Dimensions and Capacity: ~108 ft^3

Dates Operated: 1982–1986

Present Function: Unused

Life Cycle Operation: A brick incinerator was operated on the site from the 1950s to late 1960s to burn low-level contaminated combustible materials such as gloves, coveralls, wood, paper, plastic, and waste oil sludge. In the late 1960s, that unit was upgraded with a secondary burner and higher stack. In 1982, the upgraded unit was replaced with a unit modified to meet EPA standards. Ash was collected, and uranium was leached and processed through the K-1420 Recovery Facility. The K-1421 Incinerator was shut down in 1982 because emissions exceeded EPA standards for uranium. Uranium sludge from the MFL oil recycling project was burned in the incinerator during the 1980s.

Waste Characteristics: Low-level uranium wastes

Release Data: Windblown particulates and gases. Two floor drains inside the incinerator area and one outside are reportedly connected to the current drain line running either to the K-1407-A Neutralization Pit or the K-1407-B Holding Pond.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Surface soil

Comments: This unit is being investigated as part of the K-1420 OU, which includes the K-1420 Oil Storage Pad and the K-1420 Process Lines.

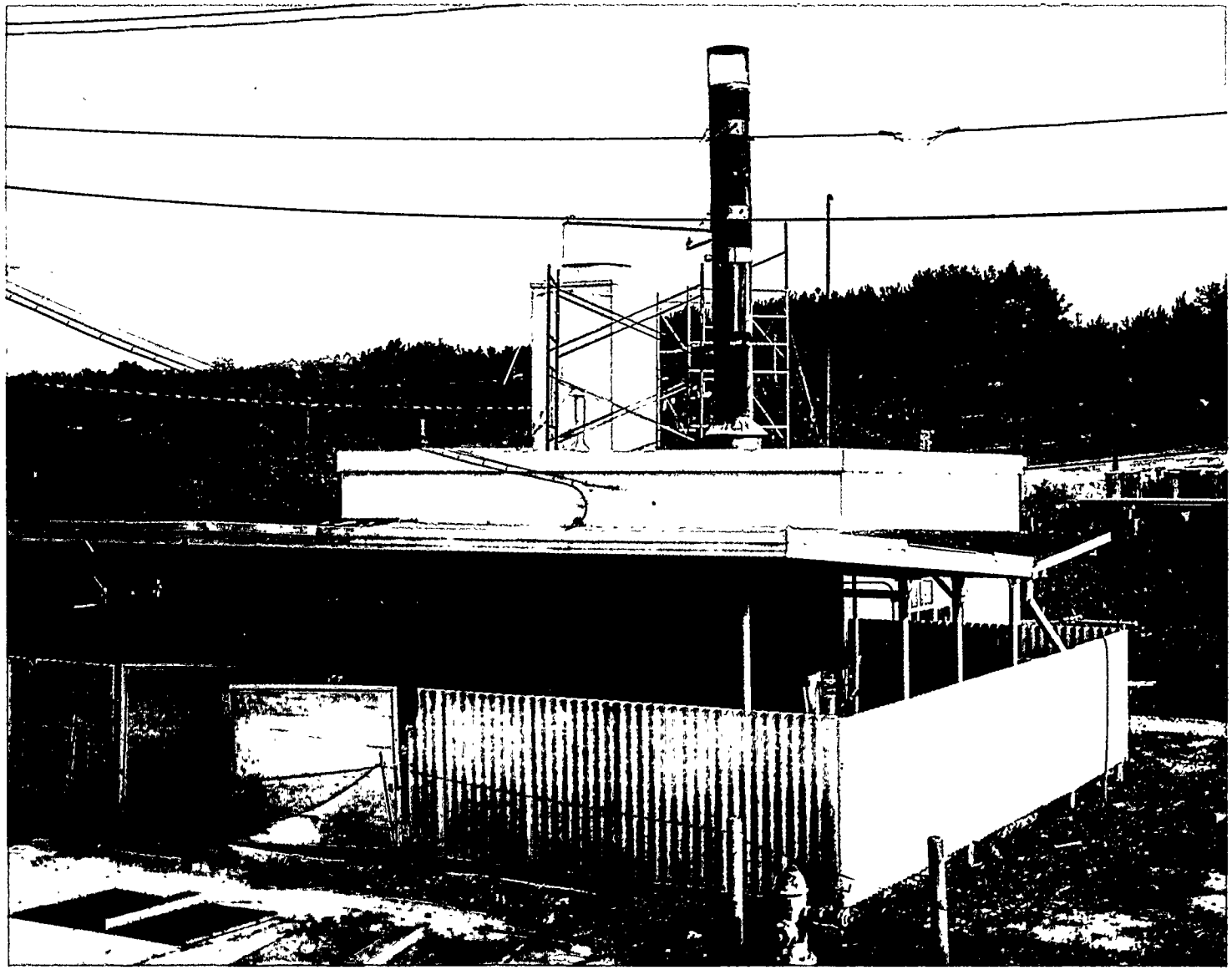
References:

RCRA Facility Investigation Plan K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

Date Prepared: June 1987

Date Revised: March 1991

PHOTO NO. K/PH-91-3121



K-1421 Incinerator

Unit Name: K-1425 Waste Oil, Hazardous Waste, and PCB Drum Storage

Unit Number: K01-R036

Regulatory Status: RCRA; Part B Permit Application was submitted.

Area Number/Unit Location: Area 1, main plant area, east of building K-1037 (Map Ref. No. 37)

Approximate Dimensions and Capacity: 2000 ft^2 of drum storage area containing 480 drums and four 22,500-gal tanks

Dates Operated: About 1983 to present

Present Function: Drum and tank storage of hazardous waste liquids

Life Cycle Operation: This facility has been operated according to RCRA requirements during its entire period of operation.

Waste Characteristics: Waste oils, spent chlorinated solvents, degreaser residues, and paint. These wastes may also contain EP-toxic metals.

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned for this unit.

Media of Concern: None

Comments: The drum and tank storage areas are diked. Any small spills that have occurred are immediately cleaned up. No materials have been spilled or released outside the diked area.

References:

Date Prepared: April 1987

Date Revised: August 1991

K-1425 Waste Oil/Hazardous Waste/PCB Drum Storage

Unit Name: K-1435 Hazardous Waste/PCB Incinerator

Unit Number: K01-R034

Regulatory Status: RCRA; RCRA Part B Permit Application was submitted.

Area Number/Unit Location: Area 1, main plant area. This unit is located just inside Portal 6 of the K-25 Site. (Map Ref. No. 35)

Approximate Dimensions and Capacity: 3000 lb/h

Dates Operated: Testing began in July 1990. Full-scale operations began in March 1991.

Present Function: Incineration of TSCA and RCRA hazardous wastes.

Life Cycle Operation:

Waste Characteristics: Wastes to be incinerated include various organic hazardous wastes generated at DOE facilities. The types of wastes to be disposed of include PCBs, sludges, chlorinated solvents, and waste oil.

Release Data: No uncontrolled releases of reportable quantity

Site Characterization Status: No futher action by K-25 ER is planned for this unit.

Media of Concern: None

Comments:

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0023

K-1435 Hazardous Waste/PCB Incinerator

Unit Name: K-1503 Neutralization Pit

Unit Number: K01-R047

Regulatory Status: 3004.u

Unit Location: Area 1, main plant area, immediately south of the K-1501 Steam Plant, west of K-1037 (Map Ref. No. 53)

Approximate Dimensions and Capacity: 15 × 18 × 15 ft; 16,000-gal capacity

Dates Operated: 1973 to 1980

Present Function: Since 1980 the pit has been used as a sump from which K-1501 discharge water is pumped in an aboveground line to the Central Neutralization Facility.

Life Cycle Operation: Beginning in the mid-1940s, the pit received waste from a chemical water softening process at the K-1501 Steam Plant. In 1973, a synthetic zeolite process was installed at the steam plant. The pit was upgraded, lined, and placed in operation as a neutralization pit. This unit also includes a trench line inside the K-1501 building and an underground line connecting the trench and pit.

Contents of the pit initially flowed to a nearby catch basin and then on to the K-1407-B Holding Pond. A pipe, which formerly drained from the pit to the storm drainage system, has now been capped at the pit.

Waste Characteristics: Corrosive wastewaters generated from the regeneration of the zeolite water softening system

Release Data: In 1987 a leak test revealed extensive leakage from the trench and underground line. The trench was stabilized by concrete backfill, and the underground line was replaced by an aboveground line.

Site Characterization Status: A remedial investigation is scheduled for this unit.

Media of Concern: Soil

Comments: A report on the data evaluation of this unit is currently being prepared. Preliminary findings indicate that there have been no releases to the environment.

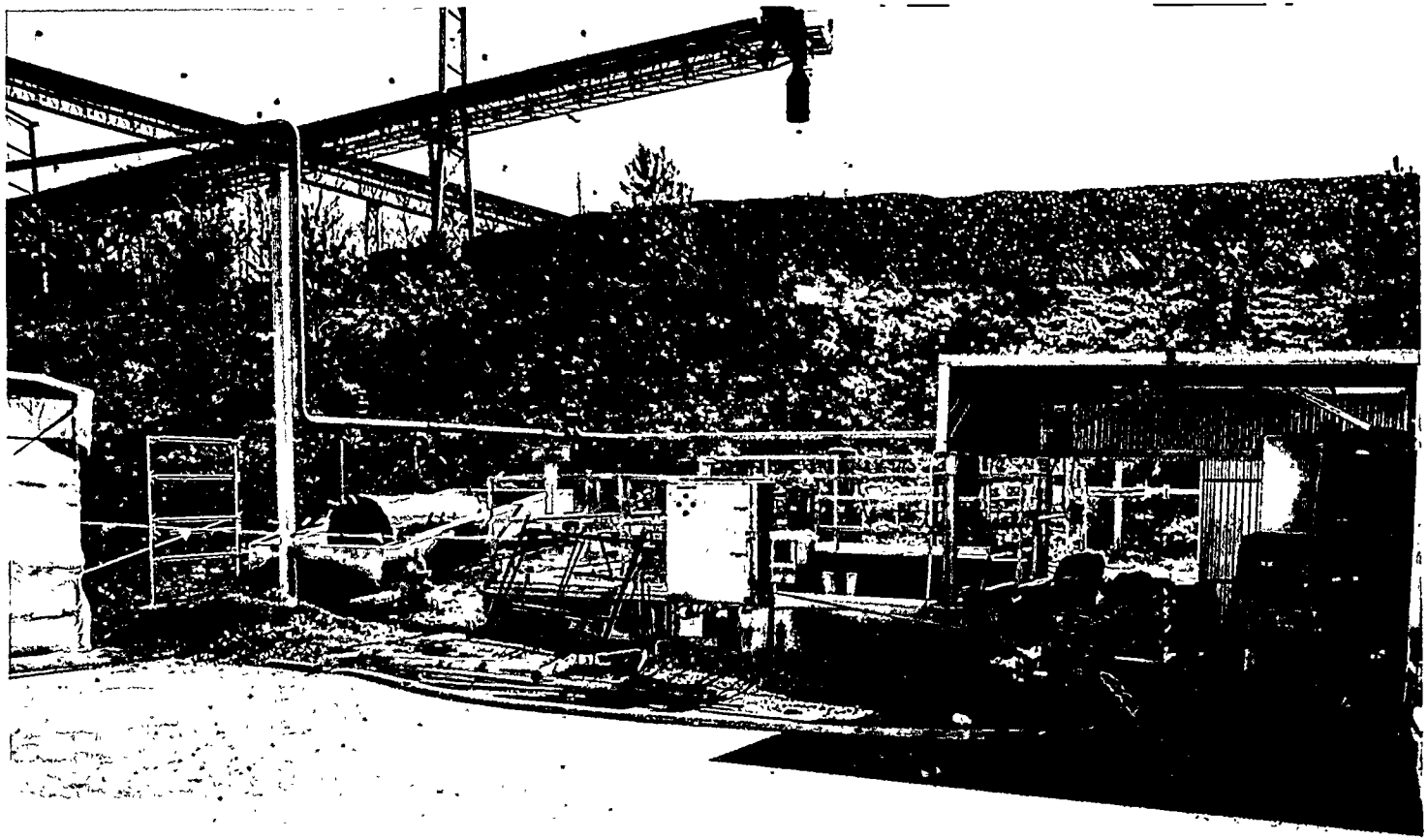
References:

RCRA Facility Investigation Plan, K-1503 Neutralization Pit, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-143, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0604



K-1503 Neutralization Pit

Unit Name: K-1700 Stream

Unit Number: K01-C002

Regulatory Status: CERCLA

Unit Location: Area 1, main plant area. This stream runs between the K-1407-B Holding Pond and the K-1407-C Retention Basin, continues on the north side of the main plant area, and empties into Poplar Creek. (Map Ref. No. 57)

Approximate Dimensions and Capacity: 3 ft wide and 0.75 mile long

Dates Operated: Natural stream

Present Function: This unit is a natural stream that receives treated wastewaters from various treatment facilities, including the K-1407-B Holding Pond and the K-1407-E and K-1407-F Settling Ponds. Samples taken from the stream indicate that the streambed sediments contain hazardous constituents that are found in sludges from the holding pond and retention basin mentioned above and the K-1420 OU.

Life Cycle Operation:

Waste Characteristics: Samples collected in June 1986 indicate the presence of heavy metals, including chromium, lead, nickel, arsenic, and uranium in streambed sediments.

Release Data: The stream has an NPDES permit at a point near its confluence with Poplar Creek. This permit has been in place since 1974. There have been occurrences when permitted parameters exceeded the discharge limits.

This stream is a transport mechanism for releasing hazardous and/or radioactive constituents into Poplar Creek since the stream collects wastewater from treatment units within the K-25 facility.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Water and sediment

Comments: This unit is part of the K-1407 OU. The K-1700 Stream is also known as Mitchell Branch.

References:

RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0608

K-1700 Stream

Unit Name: Area 1 Groundwater

Unit Number: K01-0012

Regulatory Status: 3004.u

Unit Location: Area 1 composes the northern half of the main plant area.

Approximate Dimensions and Capacity: Approximately 300 acres

Dates Operated: Operations for the ORGDP began in 1943, and some continue to the present.

Present Function: Various functions, as outlined in individual Area 1 reports, are carried out in this area.

Life Cycle Operation: This groundwater area includes the following operable units and individual waste management units:

K-1420 OU
- K-1420 Mercury Recovery Room
- K-1420 Oil Storage
- K-1420 Process Lines
- K-1421 Incinerator

K-1413 OU
- K-1413 Process Lines
- K-1413 Treatment Tank

K-1401 OU
- K-1401 Acid Line
- K-1401 Degreasers

K-1407 OU
- K-1070-B Old Classified Burial Ground
- K-1407-A Neutralization Pit
- K-1407-B Holding Pond
- K-1407-C Retention Basin
- K-1700 Stream
- K-1407 Soil
- K-1202 Hazardous Waste Storage Tanks

K-1095 Waste Accumulation Area
K-1070-G Burial Ground
K-1035 Acid Pits
K-822 Cooling Tower Basin
K-1037 Recirculating Cooling Water Lines
K-1503 Neutralization Pit
K-1420 Contaminated Drum Storage
K-1420 Contaminated Scrap Metal Dumpster
K-1420 Oil Decontamination Facility

K-1401-2W Contaminated Scrap Metal Dumpster
K-1401-3E Contaminated Scrap Metal Dumpster
K-1401-4W Contaminated Scrap Metal Dumpster
K-1095 Paint Shop
K-1425 Waste Oil/Hazardous Waste/PCB Drum Storage
K-1435 Hazardous Waste/PCB Incinerator
K-1302 Gas Cylinder Storage Area
K-1407-H Central Neutralization Facility
K-1417 Block Casting/Storage Area
K-1417 Soil
K-1419 Sludge Fixation Plant
K-1420-A Flammable Waste Storage Tank
K-1035-A Satellite Drum Storage Area

In addition, the K-1070-C/D Classified Burial Ground is on a groundwater divide between Areas 1 and 2.

Waste Characteristics: Since many different operations have taken place within this area, groundwater may be contaminated with some or all of the following: volatile and semivolatile organics, polynuclear aromatics, hydrocarbons, heavy metals, radioactivity, and PCBs.

Release Data: A total of 53 groundwater monitoring wells have been installed at several locations throughout Area 1. The wells are grouped around sites for which historical records indicated that groundwater contamination was most likely. Those sites are K-1070-B Old Classified Burial Ground, K-1401 Acid Line and Degreasers, K-1407-A Neutralization Pit, K-1407-B Holding Pond, K-1407-C Retention Basin, K-1407-C Soil, K-1413 Process Lines, K-1413 Treatment Tank, K-1420 Oil Decontamination Facility, K-1420 Oil Storage, K-1420 Process Lines, and K-1503 Neutralization Pit. A summary of groundwater monitoring data that have been collected to date is included as Table 2. The summary data indicate that mercury, uranium, and trichloroethene have been seen in high concentrations of samples collected so far.

Site Characterization Status: A remedial investigation is planned for 14 of the sites located in Area 1. Those 14 sites are each grouped in one of the following operable units: K-1420, K-1413, K-1401, and K-1407. A separate remedial investigation will be conducted for the Area 1 groundwater.

Media of Concern: Groundwater

Comments: Area 1 was formerly known as Groundwater Waste Area Grouping 1, or WAG 1.

References:

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: May 1991

Table 2. Groundwater monitoring data through 1990—K-25 Site Area 1

Parameter	Frequency detected	Values above detection limit Min	Max	Av
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	75/75	1	480	78
Chloride, mg/L	258/263	1	618	89
Fluoride by specific ion electrode, mg/L	36/56	0.1	2.4	0.33
Fluoride, mg/L	121/236	0.1	3.4	0.42
Nitrate, mg/L	85/292	0.12	7	1.2
Sulfate, mg/L	338/338	1.5	1400	79
Suspended solids, mg/L	77/81	1	1816	210
Total coliform, COL/100 mL	60/116	0	117	4
Total organic carbon (TOC), mg/L	994/1233	1	14.1	2.4
Total organic chloride (Tox), mg/L	23/32	0.01	0.042	0.027
Total organic halide (Tox), mg/L	600/762	0.01	29.74	0.89
Tox, mg/L	408/433	0.008	39.11	2.8
Uranium fluorometric, mg/L	190/481	0.001	0.235	0.0089
Metals and Elemental Analysis				
Aluminum, mg/L	511/658	0.02	210	5.5
Antimony, mg/L	15/646	0.051	0.18	0.094
Arsenic, mg/L	67/623	0.005	0.04	0.0086
Barium, mg/L	657/658	0.0027	4.6	0.17
Beryllium, mg/L	149/658	0.0003	0.017	0.0015
Boron, mg/L	579/658	0.0046	1.2	0.11
Cadmium, mg/L	129/658	0.003	0.037	0.0061
Calcium, mg/L	658/658	0.72	3900	100
Chromium, mg/L	152/658	0.01	0.35	0.048
Cobalt, mg/L	247/658	0.005	0.21	0.027
Copper, mg/L	289/658	0.004	0.42	0.021
Iron, mg/L	625/750	0.0041	1300	12
Lead, mg/L	250/686	0.004	0.34	0.021
Lithium, mg/L	322/658	0.0018	0.17	0.025
Magnesium, mg/L	658/658	0.032	210	15
Manganese, mg/L	736/750	0.001	33	4.1
Mercury, mg/L	30/594	0.0002	0.0051	0.00074
Molybdenum, mg/L	44/658	0.01	0.053	0.02
Nickel, mg/L	251/658	0.01	0.79	0.045
Niobium, mg/L	69/658	0.007	0.024	0.012
Phosphorous, mg/L	123/658	0.2	3.9	0.66
Potassium, mg/L	631/658	0.55	80	5.8
Selenium, mg/L	2/623	0.009	0.016	0.013
Silicon, mg/L	658/658	0.24	120	9.7
Silver, mg/L	7/658	0.0061	0.0086	0.0068
Sodium, mg/L	750/750	0.63	380	44
Strontium—Total, mg/L	64/64	0.028	0.93	0.19
Strontium, mg/L	594/594	0.022	6.8	0.32

Table 2. Groundwater monitoring data through 1990—K-25 Site Area 1

Parameter	Frequency detected	Values above detection limit Min	Max	Av
Titanium, mg/L	388/658	0.003	2	0.11
Uranium-235, wt %	26/119	0.34	3.05	1.2
Uranium-238, mg/L	99/193	0.001	0.043	0.007
Vanadium, mg/L	113/658	0.0051	0.18	0.031
Zinc, mg/L	494/658	0.001	1.1	0.057
Zirconium, mg/L	60/658	0.003	0.032	0.01
Radionuclides				
Alpha activity, pCi/L	299/315	-24	120	6.6
Beta activity, pCi/L	312/315	-64	1137.55	39
Cesium-137, pCi/L	6/8	-21.8	33.7	2.3
Strontium—Total, pCi/L	3/3	-20.36	63.31	8.4
Strontium, pCi/L	10/10	-131.17	84.01	10
Strontium-90, pCi/L	2/2	-6.92	-5.24	-6
Technetium-99, pCi/L	10/15	-400	994	250
Thorium-234, pCi/L	5/7	-27	90	20
Uranium alpha activity, pCi/L	2/2	26.9	30.7	29
Uranium-234, pCi/L	2/2	-33.4	-0.41	-20
Uranium-235, pCi/L	2/2	0	0.41	0.2
Uranium-238, pCi/L	2/2	0	0.82	0.41
BNA and Volatile Organic Analyses				
1,1,1-Trichloroethane, mg/L	37/299	0.006	0.37	0.051
1,1,2,2-Tetrachloroethane, mg/L	1/299	0.006	0.006	0.006
1,1,2-Trichloroethane, mg/L	2/299	0.005	0.015	0.01
1,1-Dichloroethane, mg/L	30/299	0.005	1.7	0.23
1,1-Dichloroethene, mg/L	30/299	0.005	0.51	0.08
1,2-Dichloroethane, mg/L	17/299	0.007	0.029	0.017
1,2-Dichloroethene (total), mg/L	76/202	0.005	3	0.35
2,4-D, mg/L	1/159	0.00031	0.00031	0.00031
4-Methyl-3-pentanone, mg/L	1/1	0.004	0.004	0.004
Acetone, mg/L	9/299	0.008	0.15	0.042
Benzene, mg/L	1/299	0.009	0.009	0.009
Butylbenzylphthalate, mg/L	1/299	0.023	0.023	0.023
Carbon tetrachloride, mg/L	4/299	0.026	0.05	0.042
Chloroethane, mg/L	1/299	0.015	0.015	0.015
Chloroform, mg/L	9/299	0.002	0.015	0.0083
Di-n-butylphthalate, mg/L	1/299	0.02	0.02	0.02
Diacetone alcohol, mg/L	3/43	0.007	0.2	0.081
Diethylphthalate, mg/L	1/298	0.095	0.095	0.095
Ethene, chlorofluoro, mg/L	1/1	0.028	0.028	0.028
Freon 123, mg/L	3/5	0.005	0.012	0.0073
Methylene chloride, mg/L	6/299	0.005	0.15	0.049
Phenol, mg/L	32/414	0.001	0.014	0.003

Table 2. Groundwater monitoring data through 1990—K-25 Site Area 1

Parameter	Frequency detected	Values above detection limit Min	Max	Av
Phenols—Total, mg/L	9/44	0.002	0.007	0.0052
Tetrachloroethane, mg/L	1/1	0.087	0.087	0.087
Tetrachloroethene, mg/L	25/299	0.006	3.6	0.48
Toluene, mg/L	7/299	0.008	0.011	0.009
Trichloroethene, mg/L	111/297	0.001	36	1.5
Unknown hydrocarbon, mg/L	1/3	0.015	0.015	0.015
Unknown, mg/L	12/36	0.008	0.19	0.056
Vinyl chloride, mg/L	60/299	0.006	0.78	0.11
bis(2-Ethylhexyl)phthalate, mg/L	14/299	0.01	0.095	0.031
n-Butyl benzenesulfonamide, mg/L	1/1	0.019	0.019	0.019
trans-1,2-Dichloroethene, mg/L	15/97	0.006	0.11	0.033

Area 2 Site Descriptions

Unit Name: K-1001-B Waste Accumulation Area

Unit Number: K02-R048

Regulatory Status: 3004.u

Area Number/Unit Location: Area 2, main plant area, in the K-1001 building, Wing B south, in the east bay (Map Ref. No. 44)

Approximate Dimensions and Capacity: 5 by 5 ft; 30-gal capacity

Dates Operated: March 1987 to October 1990

Present Function: Unused as a waste storage area

Life Cycle Operation: Prior to March 1987, wastewater from a silver-recovery unit was discharged through an NPDES-permitted location. From March 1987 until termination of the operation, the waste was accumlated for periodic pickup and subsequent handling in accordance with then-established waste management criteria.

Waste Characteristics: Photographic waste solutions containing silver

Release Data: There are no known releases from this unit.

Site Characterization Status: No further action is planned.

Media of Concern: None

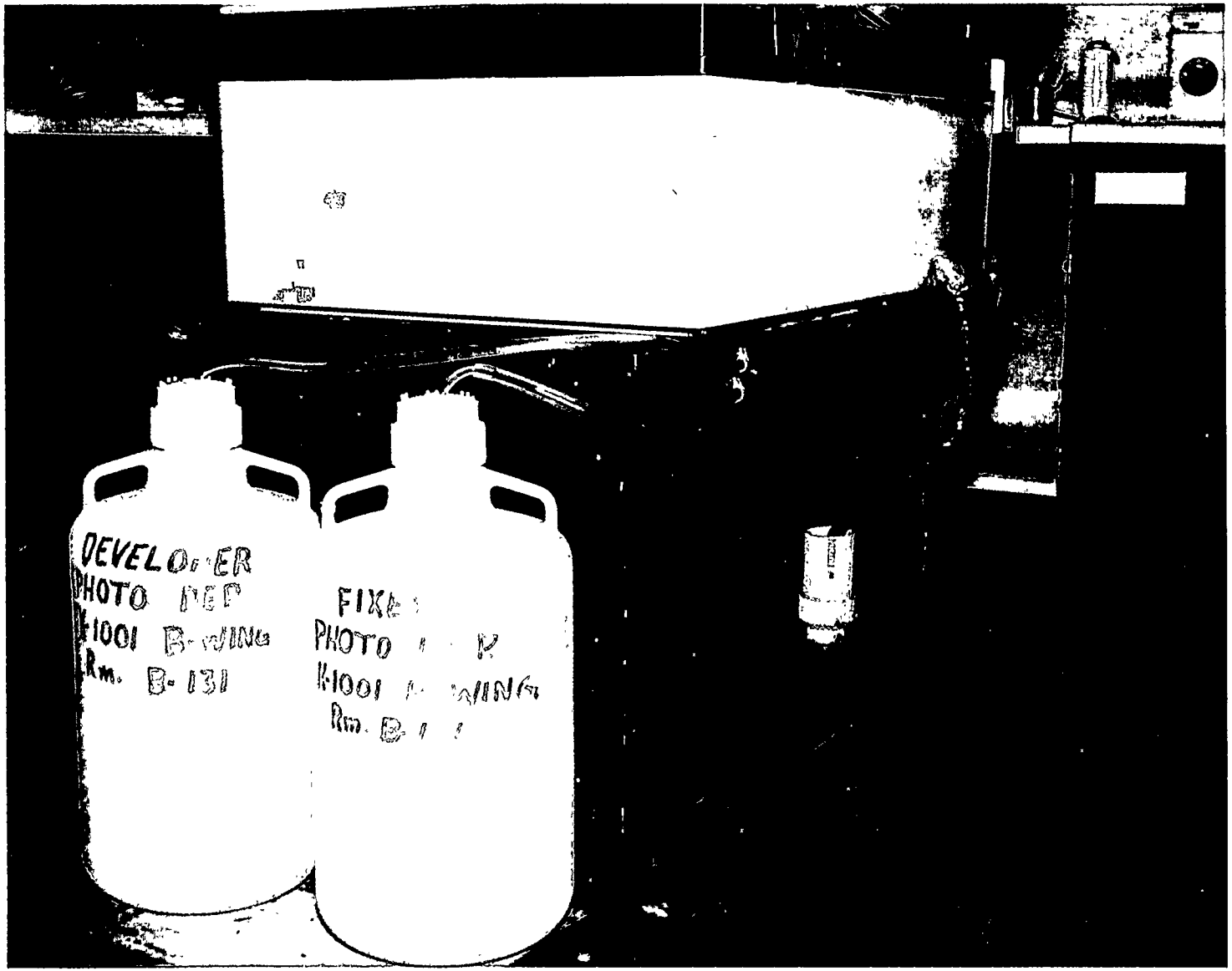
Comments:

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0730



K-1001-B Waste Accumulation Area

Unit Name: K-1001-C Waste Accumulation Area

Unit Number: K02-R049

Regulatory Status: 3004.u

Area Number/Unit Location: Area 2, main plant area, located in the K-1001 building, Wing C north, in the southeast corner (Map Ref. No. 45)

Approximate Dimensions and Capacity: 5 by 5 ft; 30-gal capacity

Dates Operated: March 1987 to December 1990

Present Function: The subject area is no longer used for photographic waste accumulation.

Life Cycle Operation: Prior to March 1987, wastewater from a silver-recovery unit was discharged through an NPDES-permitted location. From March 1987 until operations ceased, the waste has been collected for treatment.

Waste Characteristics: Photographic waste solutions containing silver

Release Data: There have been no releases from this unit.

Site Characterization Status: No further action is planned.

Media of Concern: None

Comments:

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0717

K-1001-C Waste Accumulation Area

Unit Name: K-1001-D Waste Accumulation Area

Unit Number: K02-R050

Regulatory Status: 3004.u

Area Number/Unit Location: Area 2, main plant area. This unit consists of two waste accumulation stations, both located in the K-1001 building, Wing D south. One station is in the east bay and the other in the west bay. The east bay is pictured. (Map Ref. No. 46)

Approximate Dimensions and Capacity: Each station encompases a floor area of 5 by 5 ft with a 30-gal capacity.

Dates Operated: March 1987 to the present

Present Function: Temporary storage of photographic waste solutions

Life Cycle Operation: Prior to March 1987, wastewater from a silver-recovery unit was discharged through facility drains to an NPDES-permitted location. Since March 1987, the waste has been collected for treatment.

Waste Characteristics: Photographic waste solutions containing silver

Release Data: There have been no releases from this unit.

Site Characterization Status: No further action by K-25 is planned.

Media of Concern: None

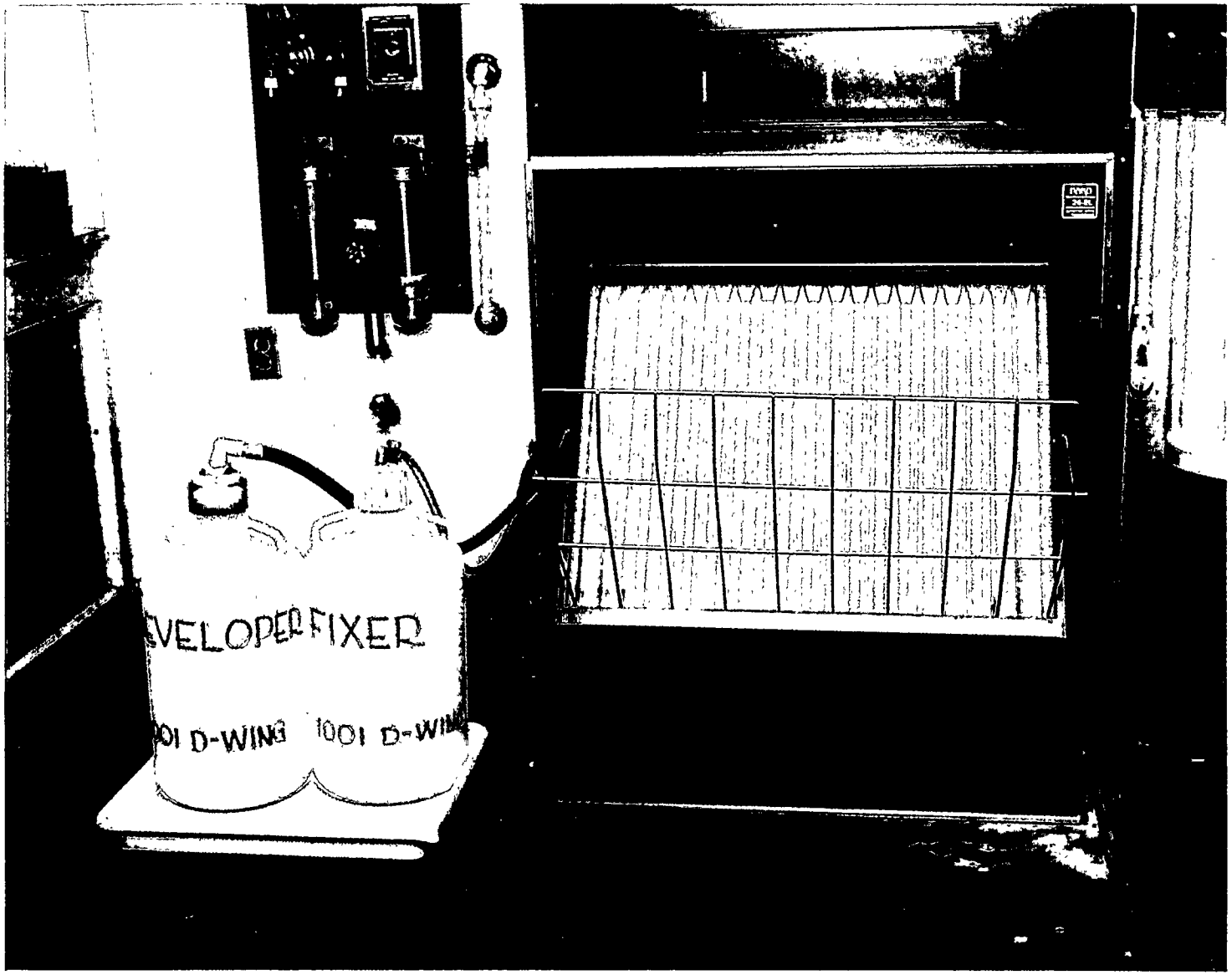
Comments:

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0776



K-1001-D Waste Accumulation Area

Unit Name: K-1003 Waste Accumulation Area

Unit Number: K02-R051

Regulatory Status: 3004.u

Area Number/Unit Location: Area 2, main plant area, in the north wing of the K-1003 Medical Center (Map Ref. No. 47)

Approximate Dimensions and Capacity: 4 by 5 ft; 30 gal

Dates Operated: March 1987 to present

Present Function: Temporary storage of silver-bearing photographic waste solutions.

Life Cycle Operation: Prior to March 1987, wastewater from a silver-recovery unit was discharged through an NPDES-permitted location. Since March 1987, the waste has been temporarily collected and stored at the unit pending period pickup, storage, and disposal in accordance with established waste management procedures.

Waste Characteristics: Photographic waste solutions including a developer (hydroquinoline, potassium hydroxide, acetic acid, and glutaraldehyde) and a fixer (ammonium bisulfate, acetic acid, and aluminum sulfate)

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

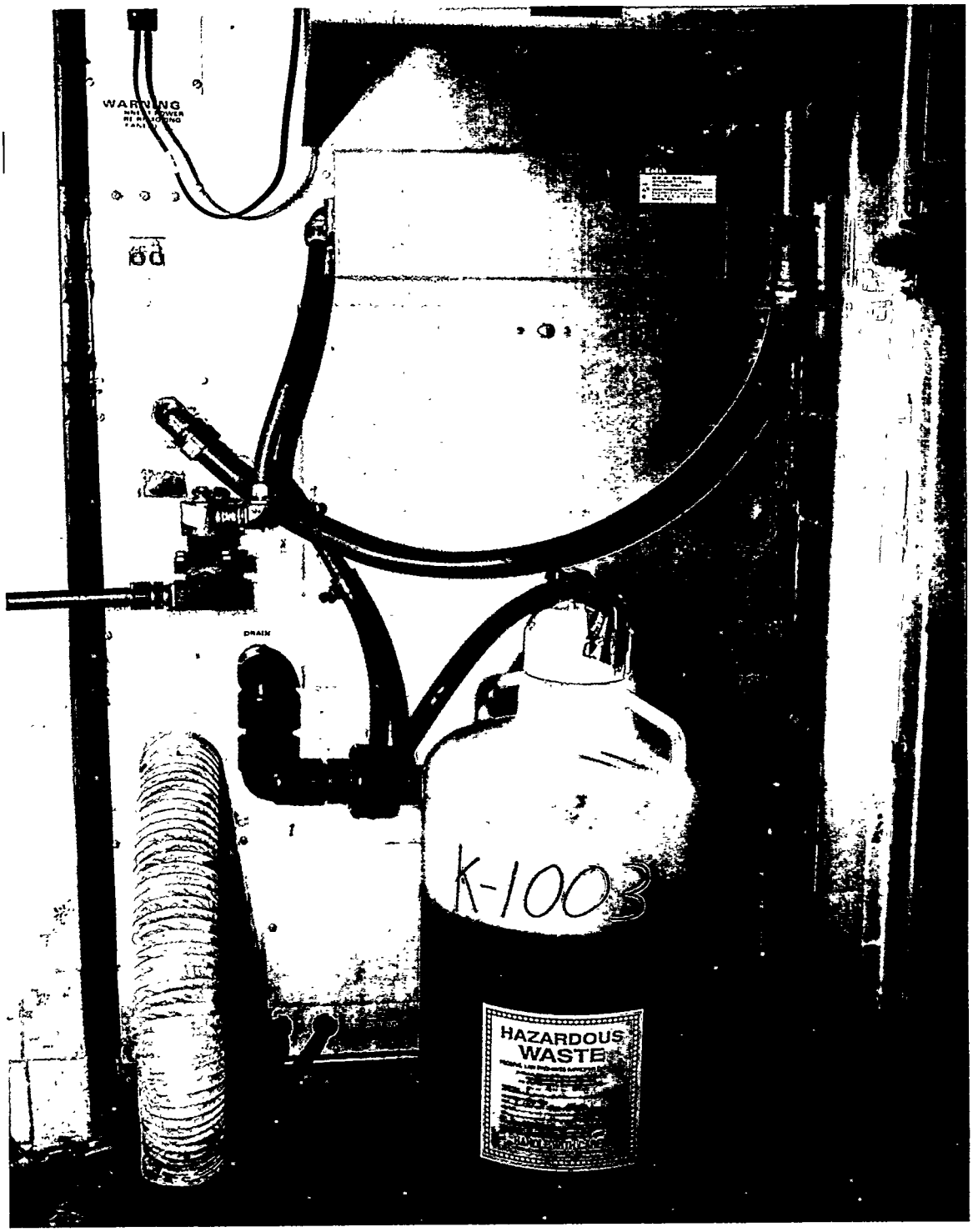
Comments:

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0716



K-1003 Waste Accumulation Area

Unit Name: K-1004 Area Lab Drain

Unit Number: K02-R017

Regulatory Status: 3004.u

Unit Location: Area 2, main plant area, running from the area of the K-1004 group of buildings southwest to the K-1007-P1 Holding Pond (Map Ref. No. 17)

Approximate Dimensions and Capacity: 24-in. drain, ~0.25 mile long

Dates Operated: 1940s to present

Present Function: Presently functions as a storm drain; also intercepts waste drains from nearby laboratory areas

Life Cycle Operation: Process drains from buildings K-1005, K-1006, and the K-1004 group drain into the Area Lab Drain, or SD-100 storm drain, which discharges into the K-1007-B Pond. All of those buildings originally contained chemical laboratories used in support of various uranium enrichment programs at ORGDP and have remained in use to support other programs. K-1003, in use as the plant medical center since the 1940s, also drains into SD-100.

Drainage from buildings K-1004-A, -B, -C, and -D entered retention pits prior to combining with the SD-100 system. Six of seven pits have reportedly been covered and filled. In 1985 a Lab Waste Disposal System was implemented whereby hazardous wastes from the labs are treated, stored, or disposed of only in RCRA permitted facilities. Water and soap from cleaning of glassware are currently the only lab chemicals permitted for disposal in the Area Lab Drain.

Waste Characteristics: An estimated 2200 gal of laboratory wastes were discharged through lab drains each year prior to 1985. The chemicals include solvents, acids, and bases and small quantities of the following:

Acetone	Diethylene glycol
Acetic acid	Dibutyl ether
Acetonitrile	Ethylene glycol
Benzene	Freons (all varieties)
Bromoform	Hexane
Cadmium	Hydrolodic acid
Carbon tetrachloride	Hydrofluoric acid
Dichloropropane	Hypophosphorous acid
Ethanol	Isopropyl alcohol
Ammonium hydroxide	Mercury
Chloroform	Methyl alcohol
Chloric acid	Methyl ethyl ketone
Chromates	Methylene chloride

Nickel compounds	Sodium hydroxide
Nitric acid	Sulfuric acid
Phosphoric acid	Technetium
PCB	Tetrachloroethylene
Photographic solutions	Toluene
Potassium dichromate	Trichloroethylene
Potassium hydroxide	Tungsten
Pyridine	Uranium
Rhenium	

Uranium-containing solutions from analytical labs were not routinely disposed of in the Area Lab Drain. Organic resins used for water treatment may have found their way into the drains.

Release Data: Clay pipes exiting K-1004-A, -B, and -C leaked and were replaced with polypropylene. No releases are recorded for the lab drain itself.

Site Characterization Status: A remedial investigation is planned.

Media of Concern: Soil and groundwater

Comments: This site is part of the K-1007 OU. This lab drain discharges into the K-1007-P1B Holding Pond (also known as K-1007-B), which is also being evaluated. The discharge of chemicals was discontinued in 1985 as required by the NPDES permit that required a Best Management Practice Plan for collecting the waste solutions. The effluent of the K-1007-P1 Pond is permitted under the NPDES program.

References:

RCRA Facility Investigation Plan, K-1004 Area Lab Drain and the K-1007-B Holding Pond, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-154, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

K-1004 Area Lab Drain

Unit Name: K-1004 Waste Accumulation Area

Unit Number: K02-R042

Regulatory Status: 3004.u

Area Number/Unit Location: Area 2, main plant area, on a loading platform between wings A and C of Building K-1004 (Map Ref. No. 43)

Approximate Dimensions and Capacity: 40 by 40 ft. The unit can accommodate 50 55-gal drums.

Dates Operated: 1985 to present

Present Function: 90-day storage area for hazardous wastes

Life Cycle Operation: The unit is a temporary storage area and includes a diked area that holds Toxic Substances Control Act (TSCA)-class waste.

Waste Characteristics: Flammables, solvents, acids, gases, and sludges that are generated during routine laboratory procedures.

Release Data: No known releases

Site Characterization Status: Wastes are stored in accordance with approved waste management practices. No further action by K-25 ER is planned.

Media of Concern: None

Comments: Any small spills that may occur during the transfer of materials in this storage area are immediately cleaned up.

References:

Date Prepared: April 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-0953

K-1004 Waste Accumulation Area

Unit Name: K-1004-J Vaults

Unit Number: K02-C046

Regulatory Status: CERCLA

Unit Location: Area 2, main plant area. The six vaults are located just east of the originial rear door of the K-1004-J Radiochemical Laboratory in what is now the Power Electronics Laboratory. (Map Ref. No. 52)

Approximate Dimensions and Capacity: Six vaults are ~30-in.-diam by ~8-ft-deep concrete pipe.

Dates Operated: Late 1940s to early 1960s

Present Function: Currently, the 1004-J Laboratory facility accommodates Applied Technology projects.

Life Cycle Operations: This unit has served the K-1004-J Laboratory, which, from the late 1940s to the mid-1950s, functioned as a research and development facility for the recovery of uranium; from the mid-1950s to the late 1950s, the laboratory served as a research and development facility for the conversion of UO_3 to UF_6. Use of the K-1004-J Laboratory for centrifuge development work began in November 1961. Major centrifuge development work terminated in 1985. Continuing centrifuge-related activities were directed to the transfer of gas centrifuge technology for applications other than uranium enrichment.

The K-1004-J Radiochemical Laboratory was originally designed as a facility to do research and development work on the recovery of uranium from spent fuel solutions from the Hanford reactor. Some experimental work may have been done on uranium irradiated at ORNL and on Hanford slugs; however, the majority of the work appears to have been done on Hanford solutions. The Hanford solutions were the by-product of the stripping of plutonium from the reactor spent fuel (probably by a phosphate process) and would have contained transuranics such as neptunium, californium, and traces of plutonium (α emitter); cesium (γ emitter) and technetium (β emitter). This project apparently began in the late 1940s and continued into the mid-1950s.

The uranium recovery from solutions of spent fuel project was followed by another research and development project for improving the conversion of UO_3 to UF_6 to improve Feed Plant production efficiencies. Some of the equipment used in the uranium recovery project was removed, and the area was decontaminated before the uranium oxide conversion project was initiated. The latter projects probably continued into the late 1950s.

The K-1004-J Radiochemical Laboratory is well described in a series of drawings that provide some insight into the hazardous waste handling equipment and from which a preliminary characterization of the site can be made.

An elaborate drain system for the K-1004-J Laboratory is tied to a 750-gal tank at the southeast corner of K-1004-J and to a 5500-gal underground storage tank due south of the entrance corridor to K-1004-J.

Storage wells were located just outside the center double doors at the back (east side) of the K-1004-J building and were used to store waste discards conveyed from the laboratory by a hoist on a monorail. Dispositions of potentially hazardous equipment and materials employed in the project for the recovery of uranium from spent fuel solutions were as follows:

Laboratory Area: Personnel associated with the project indicate that the laboratory was surveyed for radioactive contamination and that it was cleaned and decontaminated as it was being converted for the uranium oxide conversion project. The area wall and floors were painted (or tiled), and the requirement that personnel working in the laboratory wear special-issue clothing and shower before lunch and after work was rescinded.

Storage Vaults: Radioactive materials were conveyed to these storage wells in lead-shielded containers on a hoist run or a monorail, deposited, and covered with sand. Some of the material stored in the wells was high in cesium. Apparently, it was all waste discard and was not for later retrieval. No information has been obtained on how many of the wells were used. No inventory of the contents of the storage wells or records of monitoring by either Health Physics, Industrial Hygiene, or Nuclear Criticality after the uranium project was closed down has been found.

The K-1004-J Laboratory was taken over by the centrifuge project in November 1961. In 1962–1963, centrifuge project personnel expanded the facility, pouring a 4- to 6-in. concrete slab over the site of the wells; it is assumed that the wells remained. The contents of the wells may have been removed to ORNL; however, there is no certainty at this point, and so it must be assumed that they contain radioactive wastes. The top of one of the vaults is now visible in the floor of the Power Electronics Laboratory. A schematic of the K-1004-J vaults is shown in Fig. 7.

Waste Characteristics: Records of the specific quantities of solutions discharged through the process lines from the radiochemical laboratory operations are not available. No inventory of the contents of the storage wells during their usage has been found. Also, no information of any residual materials currently in the wells is available. However, the Hanford reactor spent fuel solutions would have contained the following radioactive elements:

Neptunium	Plutonium
Californium	Cesium
Technetium	Uranium

In the centrifuge process, there was no additional contribution of hazardous waste other than UF_6.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil, groundwater

Comments: This site is part of the K-1004 OU.

References:

RCRA Facility Investigation Plan, K-1004-L Vaults Area, K/HS-153, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., October 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Drawing AWS-7367, "Main Chemical Laboratory Drain for Building K-1004-J," March 26, 1948.

Drawing AWS-7428, "Radiochemical Waste Vault and Bar Schedule for Drains and Vault," April 3, 1948.

Drawing AW-A-7060-7, "General Architectural Plans—Radiochemical Laboratory," February 15, 1948.

Drawing AWS-7162, "Location Plan and Details for Monorail System—K-1004-J," March 2, 1948.

Drawing D-AW-A-13864, "Experimental Enclosure—Building K-1004-J," November 21, 1950.

Drawing D-AW-A-13865, "Experimental Enclosure—Building K-1004-J," November 21, 1950.

Drawing D-AWP-5056, "Building Drains—Radiochemical Laboratory, K-25 Area," February 15, 1948.

Date Prepared: April 1987

Date Revised: May 1991

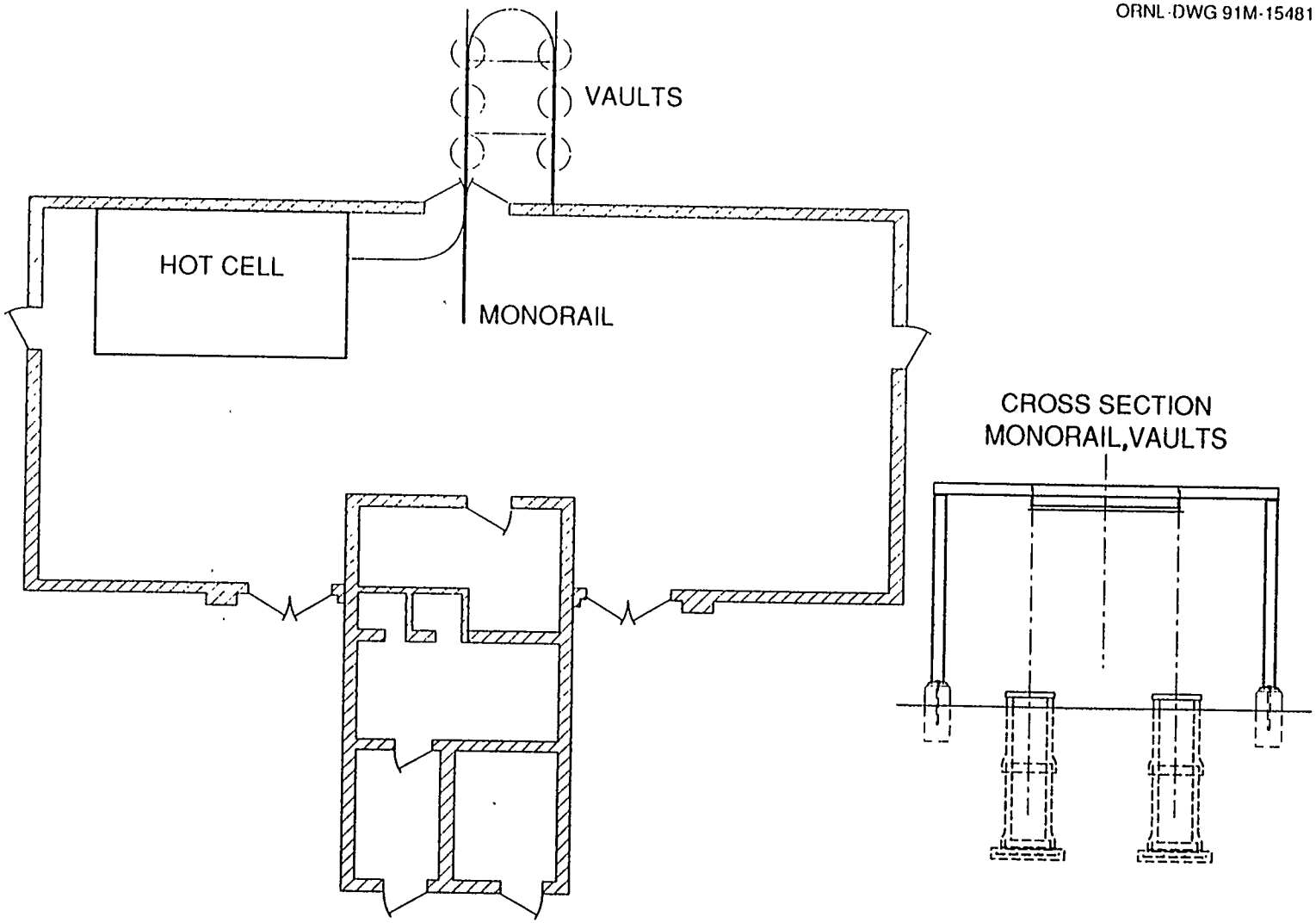


Fig. 7. K-1004-J monorail and hot vaults.

PHOTO NO. K/PH-91-3137

K-1004-J Vaults

Unit Name: K-1004-L Contaminated Scrap Metal Dumpster

Unit Number: K02-C061

Regulatory Status: CERCLA

Area Number/Unit Location: Area 2, main plant area, outside the southeast cornerof the K-1004-J building's east wing (Map Ref. No. 73)

Approximate Dimensions and Capacity: Two dumpsters, each with dimensions of 7 × 4 × 3 ft and capacity of 40 ft^3

Dates Operated: Mid-1970s to about 1988

Present Function: The contaminated scrap metal dumpsters have been removed. One dumpster at the site is now dedicated to the collection of clean glass containers.

Life Cycle Operation: The unit collected contaminated scrap metal generated by the K-1004-J building operations. Wastes generated at the building are currently being collected by category in B-25 closed containers.

Waste Characteristics: Low-level radioactively contaminated scrap metal

Release Data: No known releases

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

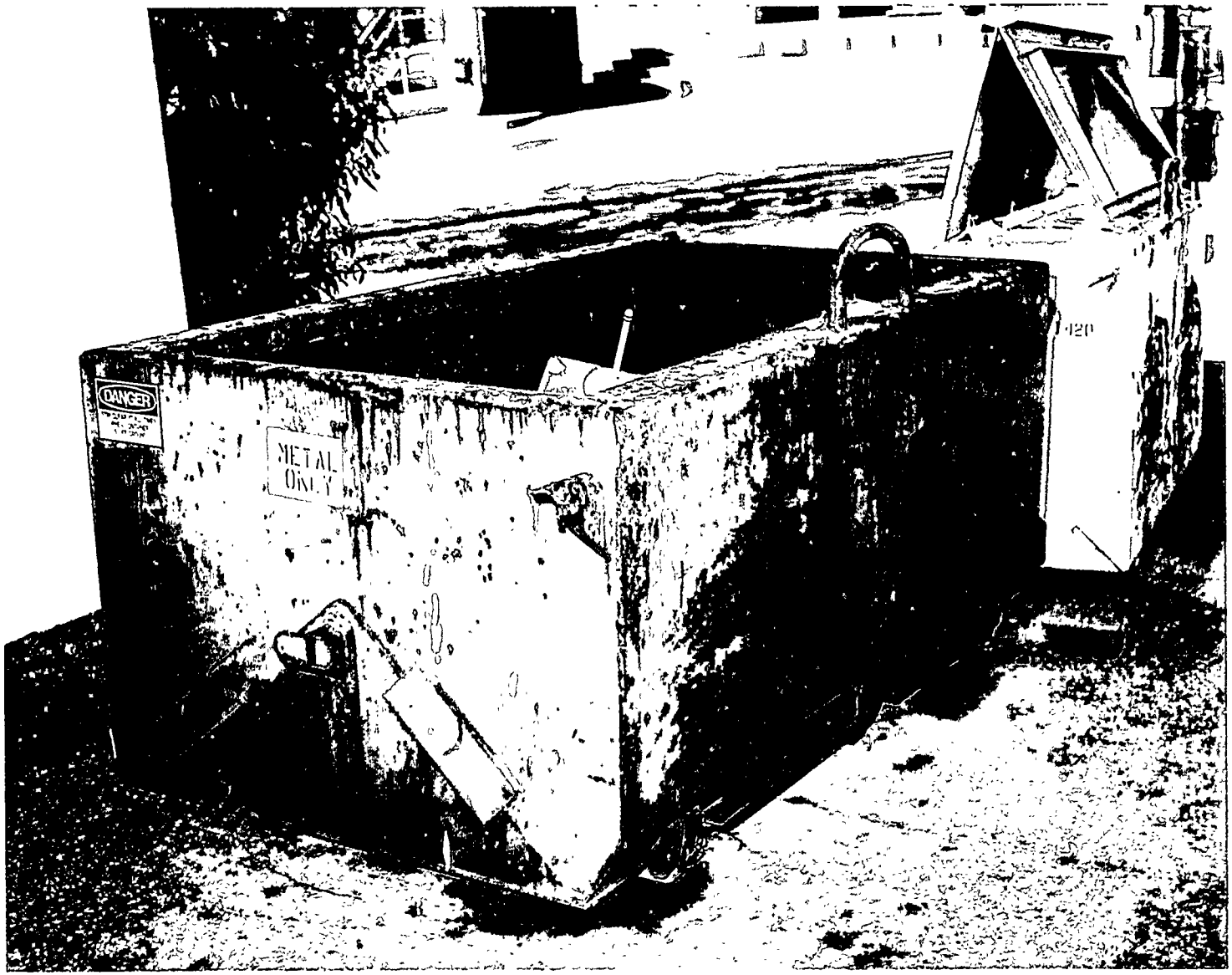
Comments: This dumpster handles solid metal material only.

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3115



K-1004-L Contaminated Scrap Metal Dumpster

Unit Name: K-1004-L Recirculating Cooling Water Lines

Unit Number: K02-C003c

Regulatory Status: CERCLA

Area Number/Unit Location: Area 2, main plant area, south of the K-1004 building and west of Portal 3 (Map Ref. No. 58)

Approximate Dimensions and Capacity: Supply header: 10-in. diam by 168 ft; return header: 10-in. diam by 170 ft; makeup water: 4-in. line by 173 ft

Dates Operated: Mid-1950s to 1984

Present Function: Unused

Life Cycle Operation: K-1004-L RCW lines served the K-1004-L Cascade Pilot Plant. Makeup water came from the firewater system.

Waste Characteristics: Makeup water contained a chromate/zinc/phosphate treatment until 1977, when it was replaced by a phosphate treatment system.

Release Data: No leaks are recorded at this site.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater

Comments: K-1004-L Cooling Tower is also known as K-1004-N.

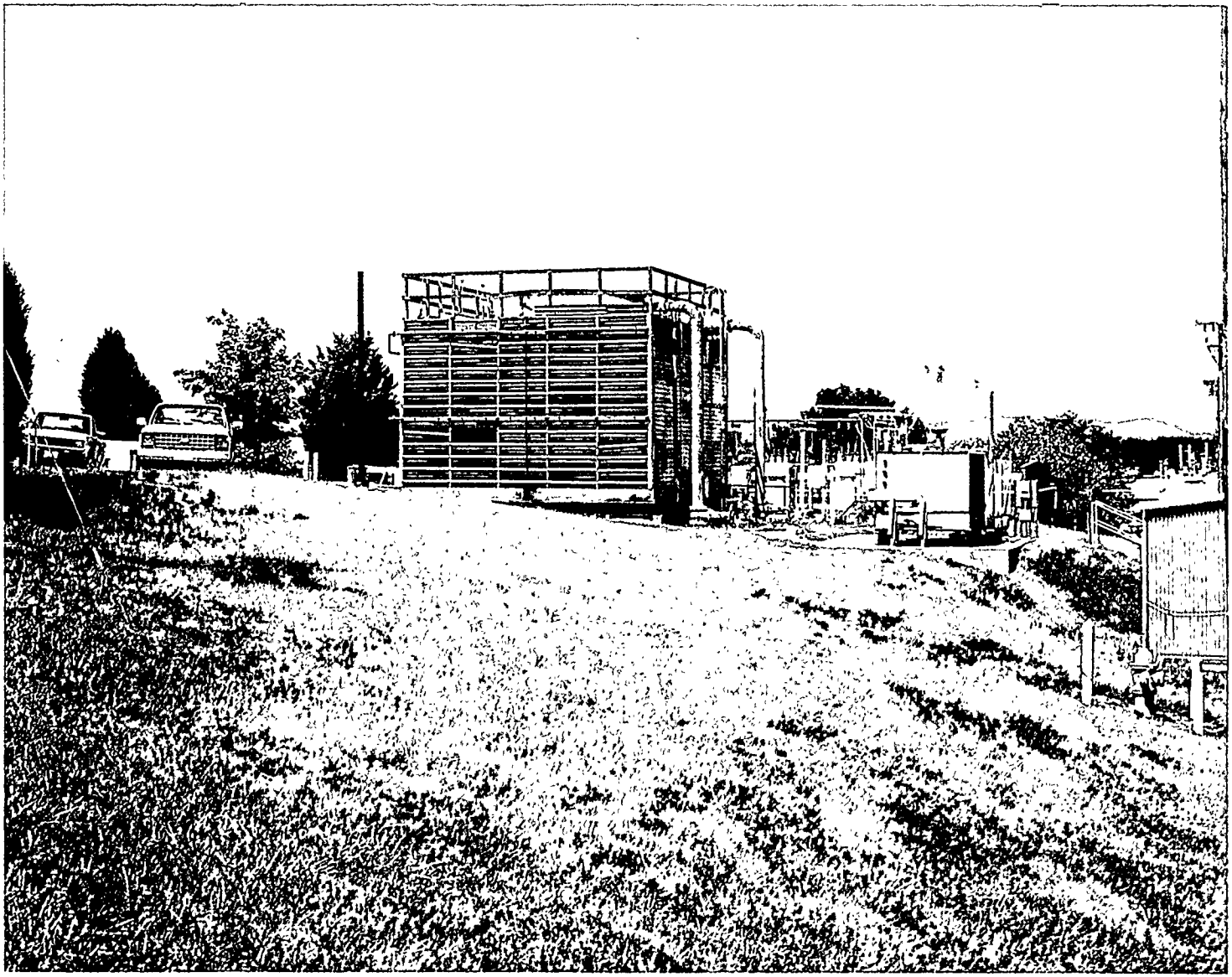
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3118



K-1004-L Recirculating Cooling Water Lines

Unit Name: K-1004-L Underground Tank

Unit Number: K02-R074

Regulatory Status: 3004.u.

Unit Location: Area 2 (main plant area). The pit that once housed a 750-gal radioactivity "hot tank" is located outside the southeast corner of the old K-1004-J Radiochemical Laboratory. A larger, 5500-gal low-level waste tank is located outside the southwest corner of the old K-1004-J. (Map Ref. No. 94)

Approximate Dimensions and Capacity: 5500-gal storage tank: 6-ft diam by 26 ft; 750-gal tank: ~4.5-ft diam by 7-ft. "Hot tank" sat in 6.5- × 6.5- × 12-ft concrete vault.

Dates Operated: Late 1940s to present

Present Function: Currently, the 1004-J Laboratory facility accommodates Applied Technology projects.

Life Cycle Operations: This unit has served the K-1004-J Laboratory, which, from the late 1940s to the mid-1950s, functioned as a research and development facility for the recovery of uranium; from the mid-1950s to the late 1950s, the laboratory served as a research and development facility for the conversion of UO_3 to UF_6. Use of the K-1004-J Laboratory for centrifuge development work began in November 1961. Major centrifuge development work terminated in 1985. Continuing centrifuge-related activities were directed to the transfer of gas centrifuge technology for applications other than uranium enrichment.

The K-1004-J Radiochemical Laboratory was originally designed as a facility to do research and development work on the recovery of uranium from spent fuel solutions from the Hanford reactor. Some experimental work may have been done on uranium irradiated at ORNL and on Hanford slugs; however, the majority of the work appears to have been done on Hanford solutions. The Hanford solutions were the by-product of the stripping of plutonium from the reactor spent fuel (probably by a phosphate process) and would have contained transuranics such as neptunium, californium, and traces of plutonium (α emitter); cesium (γ emitter) and technetium (β emitter). This project apparently began in the late 1940s and continued into the mid-1950s.

The uranium recovery from solutions of spent fuel project was followed by another research and development project for improving the conversion of UO_3 to UF_6 to improve Feed Plant production efficiencies. Some of the equipment used in the uranium recovery project was removed, and the area was decontaminated before the uranium oxide conversion project was initiated. The latter projects probably continued into the late 1950s.

The K-1004-J Radiochemical Laboratory is well described in a series of drawings that provide some insight into the hazardous waste handling equipment and from which a preliminary characterization of the site can be made.

An elaborate drain system for the K-1004-J Laboratory is tied to the 750-gal tank in the vault at the southeast corner of K-1004-J and to the 5500-gal underground storage tank due south of the entrance corridor to K-1004-J. The laboratory's process drainage went to SD-100 for eventual discharge into the K-1007-P1 pond.

Storage wells were located just outside the center double doors at the back (east side) of the K-1004-J building and were used to store waste discards conveyed from the laboratory by a hoist on a monorail.

Dispositions of potentially hazardous equipment and materials employed in the project for the recovery of uranium from spent fuel solutions were as follows:

Hot Cell or Reactor Vessel: It is assumed that the hot cell located in the laboratory's northeast interior would have been decontaminated to permit dismantling and removal. It was dismantled by breaking up its basic concrete structure with hydraulic jacks. The remains of the cell and its appurtenances were apparently hauled to the "Y" disposal area formed near the intersection of Tennessee State Highways 58 and 95.

Drain Lines and Trenches: It is assumed that the drain lines were flushed, to minimize exposure to personnel in handling, and then removed to a burial or disposal area. Where the removal was not possible, the trenches would have been decontaminated and left in place.

Interviews with personnel associated with the project indicate that the highly radioactive drains from the laboratory discharged to the vault (hot tank), while lower-level wastes discharged to the large, 5500-gal underground storage tank. Wastes from both of these tanks were hauled to ORNL for disposal.

Hot Tank: Personnel associated with the operations say that the 750-gal hot tank was removed and taken to the K-1064 Peninsula Area and later removed to the "Y" disposal area formed near the intersection of Tennessee State Highways 58 and 95. The concrete vault and appurtenances were probably taken to the same place. It might be expected that the ground and any foundation remains in this area would be contaminated.

Large (5500 gal) Storage Tank: This tank was flushed and decontaminated to a level at which it was decided to weld caps or flanges to its access lines and leave it buried. Around 1980, during excavation for a road to access centrifuge facilities behind K-1004-J, this tank was partially uncovered. Gas samples were first taken, followed by samples of the residue from the bottom of the tank. Analyses of these samples were negative; the tank was filled with sand, the openings welded shut, and the tank covered with fill. This implies either that the tank was effectively decontaminated or that the tank did not contain any highly radioactive materials.

Laboratory Area: Personnel associated with the operation indicate that the laboratory was surveyed for radioactive contamination and that it was cleaned and decontaminated as it was being converted for the uranium oxide conversion project. The area wall and floors were painted (or tiled), and the requirement that personnel working in the laboratory wear special-issue clothing and shower before lunch and after work was rescinded.

A schematic of the K-1004-L underground tank is shown in Fig. 8.

Waste Characteristics: Records of the specific quantities of solutions discharged through the process lines from the radiochemical laboratory operations are not available. However, the Hanford reactor spent fuel solutions would have contained the following radioactive elements:

Neptunium	Plutonium
Californium	Cesium
Technetium	Uranium

In the centrifuge process, there was no additional contribution of hazardous waste other than UF_6.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned.

Media of Concern: Soil, groundwater

Comments: This site is part of the K-1004 OU. The possibility of pit or pipe leakage from the drain systems and from chemical solutions in the holding pits, vaults, and tanks suggests some potential for soil and groundwater contamination.

References:

RCRA Facility Investigation Plan, K-1004-L Vaults Area, K/HS-153, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., October 1988.

Drawing AWS-7367, "Main Chemical Laboratory Drain for Building K-1004-J," March 26, 1948.

Drawing AWS-7428, "Radiochemical Waste Vault and Bar Schedule for Drains and Vault," April 3, 1948.

Drawing AW-A-7060-7, "General Architectural Plans—Radiochemical Laboratory," February 15, 1948.

Drawing AWS-7162, "Location Plan and Details for Monorail System—K-1004-J," March 2, 1948.

Drawing D-AW-A-13864, "Experimental Enclosure—Building K-1004-J," November 21, 1950.

Drawing D-AW-A-13865, "Experimental Enclosure—Building K-1004-J," November 21, 1950.

Drawing D-AWP-5056, "Building Drains—Radiochemical Laboratory, K-25 Area," February 15, 1948.

Date Prepared: May 1991

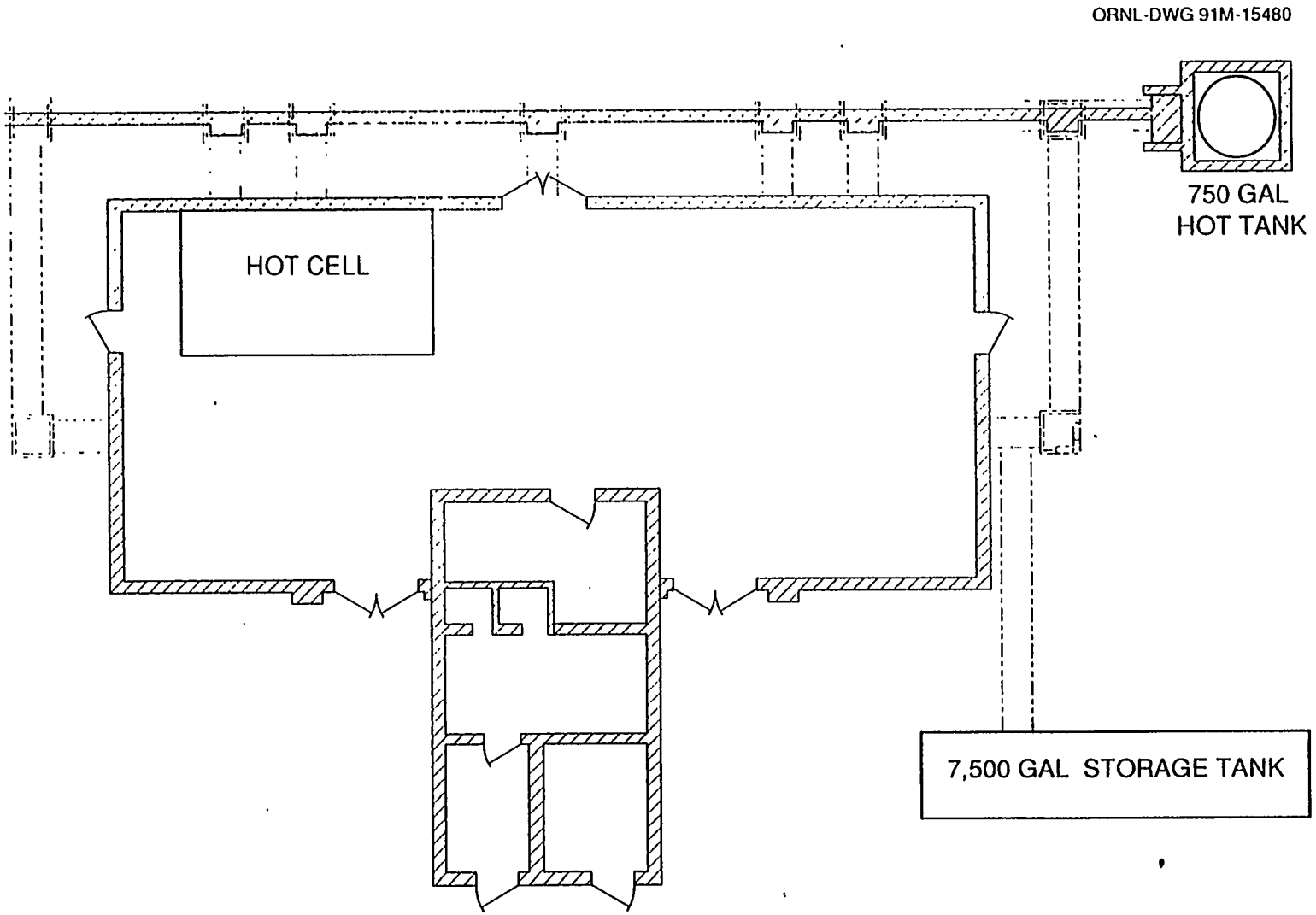


Fig. 8. K-1004-L hot drains and underground storage tanks.

PHOTO NO. K/PH-87-0726

K-1004-L Underground Tank

Unit Name: K-1006 Contaminated Scrap Metal Dumpster

Unit Number: K02-C062

Regulatory Status: CERCLA

Area Number/Unit Location: Area 2, main plant area, at the Building K-1006 west face landing dock area (Map Ref. No. 54)

Approximate Dimensions and Capacity: $3 \times 3 \times 2$ ft; 20 ft^3

Dates Operated: Mid-1970s to present

Present Function: Collection of low-level radioactively contaminated scrap metal material prior to disposal

Life Cycle Operation: Since the mid-1970s, the unit has collected contaminated scrap metal generated by the K-1006 operations.

Waste Characteristics: Low-level radioactively contaminated scrap metal

Release Data: There have been no known releases from this unit.

Site Characterization Status: The scrap metal is collected, stored, and disposed of in accordance with established waste management procedures. No further action by K-25 ER is planned.

Media of Concern: None

Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3119

K-1006 Contaminated Scrap Metal Dumpster

Unit Name: K-1007 Gas Tank

Unit Number: K02-U007

Regulatory Status: UST

Unit Location: Area 2, near the K-1007 building in the southernmost part of the main plant area (Map Ref. No. 71)

Approximate Dimensions and Capacity: 200 gal

Dates Operated: 1950s–1986

Present Function: The tank has been removed.

Life Cycle Operation: Gasoline storage

Waste Characteristics: Gasoline components

Release Data: On August 28, 1986, the tank was discovered to be leaking. The gasoline that leaked from the tank entered into a sanitary sewer lift station. The gasoline was removed from the lift station. The tank was removed following cleanup of the spill; however, a residual of gasoline remains in the soil around the tank.

Site Characterization Status: A remedial investigation is planned.

Media of Concern: Soil

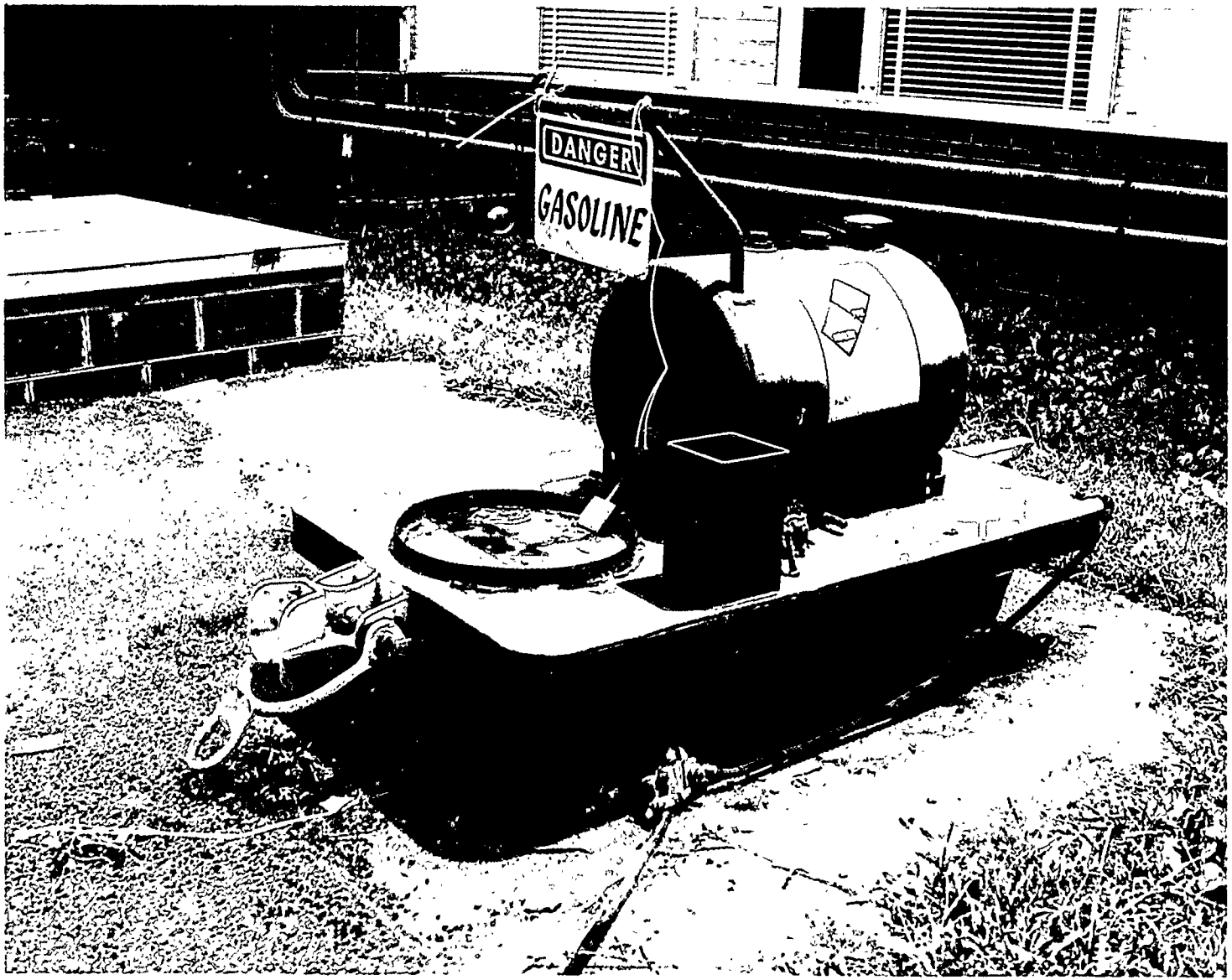
Comments: This site is part of the K-1007 OU.

References:

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3136



K-1007 Gas Tank

Unit Name: K-1007 Waste Accumulation Area

Unit Number: K02-R052

Regulatory Status: 3004.u

Area Number/Unit Location: Area 2, main plant area, in Building K-1007, Room 1042-A (Map Ref No. 48)

Approximate Dimensions and Capacity: Photo process room floor dimensions are ~24 by 24 ft. Black-and-white process section is ~5 by 6 ft, with a 30-gal capacity. Color process section has an area of ~7 by 12 ft and 7 containers, each with a 30-gal capacity.

Dates Operated: 1978–1991 for black-and-white process and 1980–1991 for color process.

Present Function: The K-1007 film process station is in a shutdown mode, and equipment is scheduled to be removed.

Life Cycle Operation: Prior to 1987, wastes from the processing operation were discharged to the K-1007 P1 pond. Downstream pond waters pass through a permitted NPDES effluent monitoring station located east of Burchfield Road. After 1987 the waste was collected by the Waste Management group and stored on-site in a permitted storage facility (K-301-2). Photographic wastes were temporarily stored at the processing operation pending long-term storage.

Waste Characteristics: Photographic waste solutions included compounds of silver, formaldehyde-methanol, and sodium dichromate.

Release Data: There have been no releases from this unit.

Site Characterization Status: No further action is planned.

Media of Concern: None

Comments:

References:

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0722

K-1007 Waste Accumulation Area

Unit Name: K-1007-P1 Holding Pond

Unit Number: K02-R044

Regulatory Status: 3004.u

Unit Location: Area 2, south end of the K-25 Site, bounded by Oak Ridge Turnpike, Burchfield Road, and Contractors' Road (Map Ref. No. 50)

Approximate Dimensions and Capacity: 44 acres

Dates Operated: 1950s to present

Present Function: Stormwater retention

Life Cycle Operation: The K-1007-P1 Holding Pond receives storm drainage, along with wastes, from the K-1004 Area Lab Drain. Since 1985, discharges from the Area Lab Drain have been limited to water and soap from the cleaning of glassware. Outflow into Poplar Creek has been NPDES permitted since 1974.

Waste Characteristics: An estimated 2200 gal of laboratory wastes were discharged through lab drains each year. The chemicals included solvents, acids, and bases and small quantities of the following:

Acetone	Ethylene glycol	PCB
Acetic acid	Freons (all varieties)	Photographic solutions
Acetonitrile	Hexane	Potassium dichromate
Benzene	Hydrolodic acid	Potassium hydroxide
Bromoform	Hydrofluoric acid	Pyridine
Cadmium	Hypophosphorous acid	Rhenium
Carbon tetrachloride	Isopropyl alcohol	Sodium hydroxide
Dichloropropane	Mercury	Sulfuric acid
Ethanol	Methyl alcohol	Technetium
Ammonium hydroxide	Methyl ethyl ketone	Tetrachloroethylene
Chloroform	Methylene chloride	Toluene
Chloric acid	Nickel compounds	Trichloroethylene
Chromates	Nitric acid	Tungsten
Diethylene glycol	Phosphoric acid	Uranium
Dibutyl ether		

Uranium-containing solutions from analytical labs were not routinely disposed of in the Area Lab Drain. Organic resins used for water treatment may have found their way into the drains. The discharge of these chemicals into the pond was discontinued in 1985.

Release Data: The only known release from the unit is through the outfall permitted under NPDES.

Site Characterization Status: A remedial investigation will be conducted for this unit. Sludge samples will be collected and analyzed to determine whether or not hazardous constituents are present.

Medial of Concern: Soil, groundwater (see Table 3)

Comments: This site is part of the K-1007 OU. Discharge from the holding pond is permitted under the NPDES program.

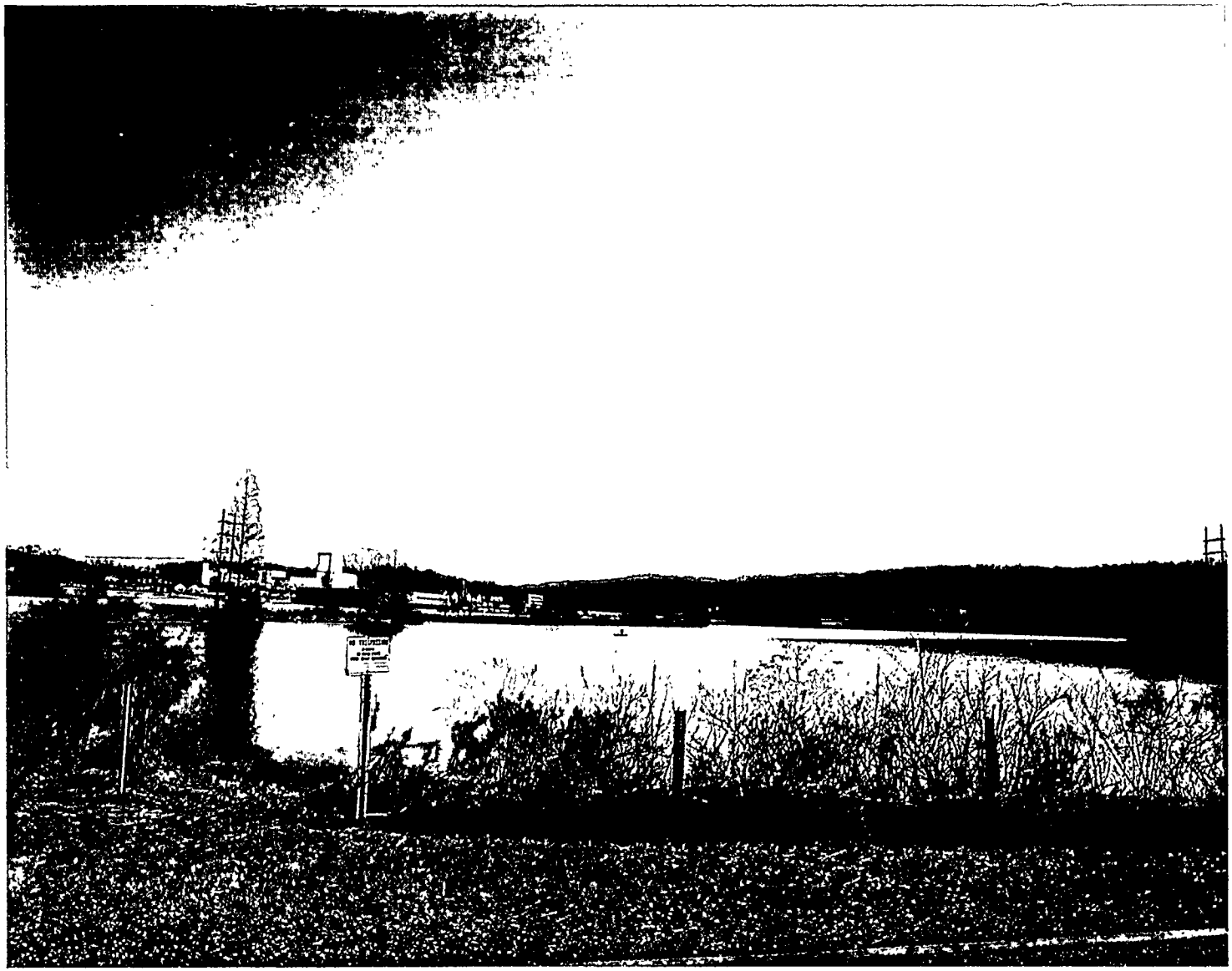
References:

RCRA Facility Investigation Plan, K-1004 Area Lab Drain and the K-1007-B Holding Pond, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-154, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0630



K-1007-P1 Holding Pond

Unit Name: K-1210 Recirculating Cooling Water Lines

Unit Number: K02-C003f

Regulatory Status: CERCLA

Area Number/Unit Location: Area 2, main plant area, immediately east of the K-1210/1220 building (Map Ref. No. 59)

Approximate Dimensions and Capacity: 550 lin ft; 2–5 in. deep, 4–12 in. in diameter

Dates Operated: 1975–1985

Present Function: Unused

Life Cycle Operation: The K-1210 RCW lines provided cooling water to Buildings K-1200, K-1210, K-1210-A, K-1220, and K-1052. Sanitary water was used for makeup, treated with Dearborne 321 Biocide, Dearborne 4622 Corrosion Inhibitor, and Zimmite Chemtrol 19 Biocide.

Waste Characteristics: In a telephone conversation, representatives of Dearborne said that the 321 Biocide and 4622 Corrosion Inhibitor contained no chromates, volatile or semivolatile organics. Components of the Zimmite Chemtrol 19 Biocide could not be obtained.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater

Comments: This unit is also known as K-1004-N1 Recirculating Cooling Water Lines.

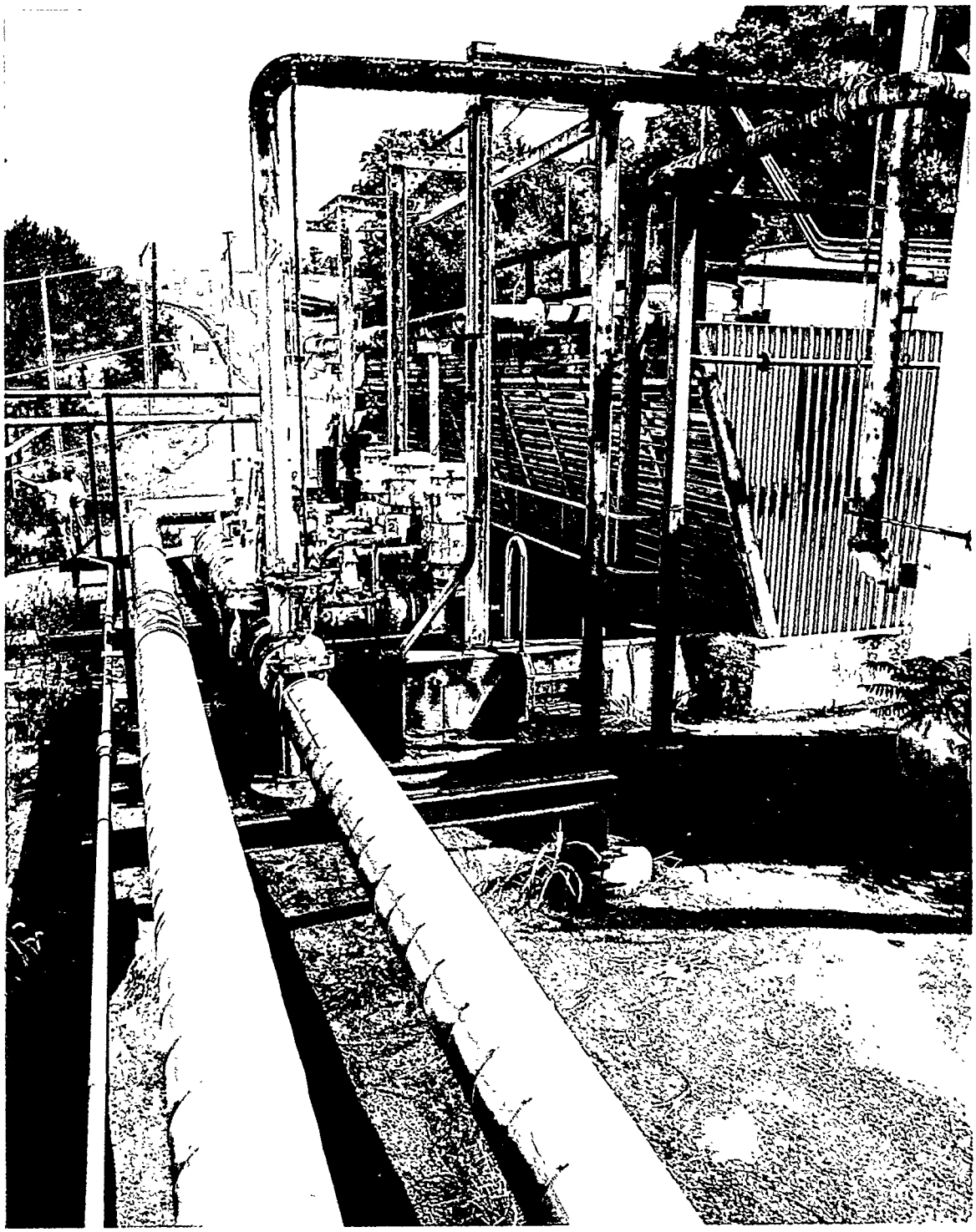
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3152



K-1210 Recirculating Cooling Water Lines

Unit Name: K-1225 Contaminated Scrap Metal Dumpster

Unit Number: K02-C060

Regulatory Status: CERCLA

Area Number/Unit Location: Area 2, main plant area, positioned within a three-sided chain-link enclosure adjoining Building K-1008-F (Map Ref. No. 72)

Approximate Dimensions and Capacity: $7 \times 4 \times 3$ ft; 40 ft^3

Dates Operated: Mid-1970s to about 1988

Present Function: The unit has been removed.

Life Cycle Operation: The dumpster received solid metal scrap generated by various centrifuge program operations in a nearby complex. The dumpster was removed following a halt in the intensive, ongoing centrifuge program.

Waste Characteristics: Low-level radioactively contaminated scrap metal

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action is planned.

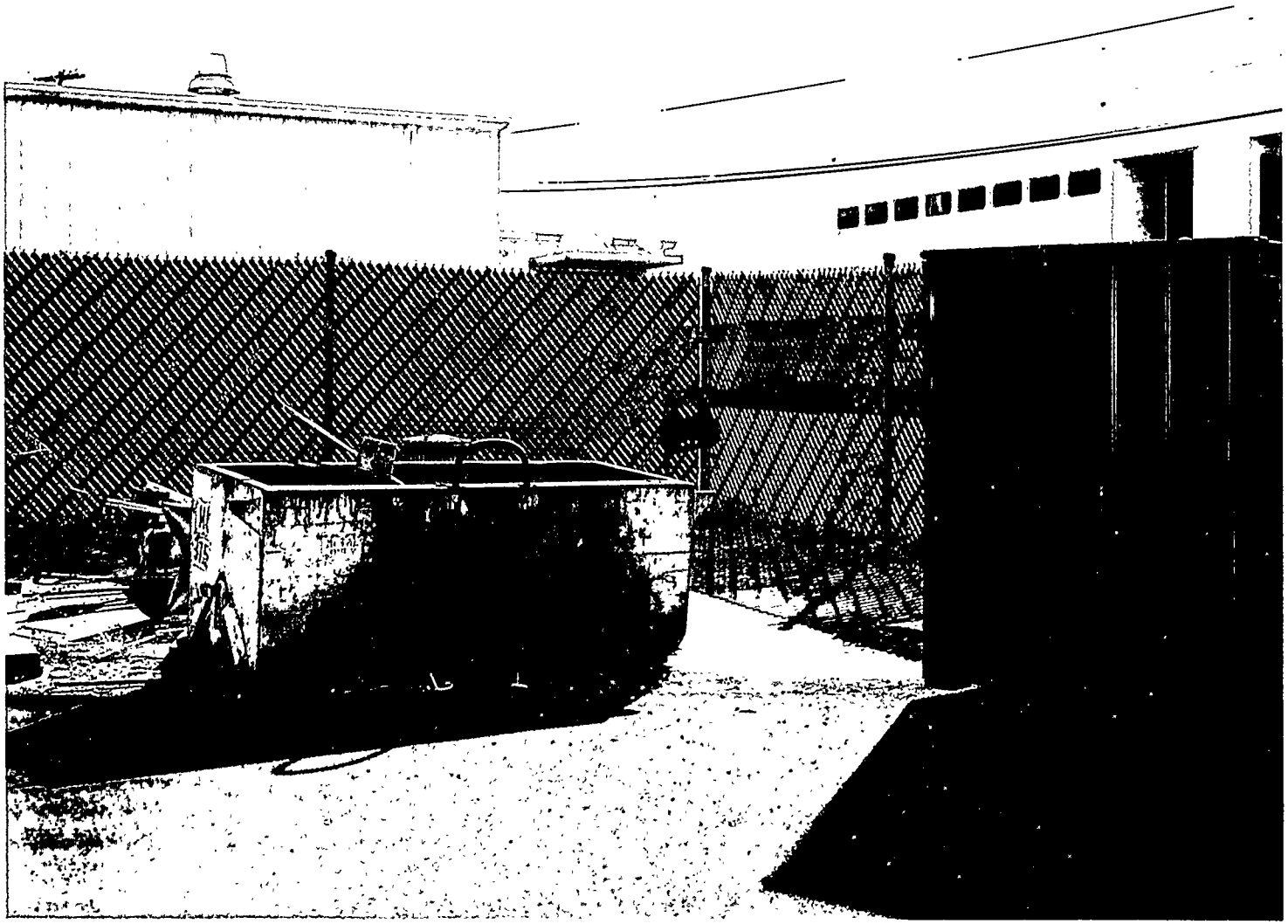
Media of Concern: None

Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991



K-1225 Contaminated Scrap Metal Dumpster

Unit Name: K-1414 Gas Tanks

Unit Number: K02-U001

Regulatory Status: UST

Unit Location: Area 2, main plant area, north of the K-1414 garage (Map Ref. No. 56)

Approximate Dimensions and Capacity: Three underground fuel storage tanks: unleaded gasoline, 22,000 gal; methane/gas, 12,600 gal; diesel, 9,000 gal

Dates Operated: 1950s to present

Present Function: Storage of unleaded gasoline and diesel fuel

Life Cycle Operation:

Waste Characteristics: Unleaded gasoline and diesel fuel

Release Data: In February 1987, the diesel tank leaked fuel into the ground. The tank was removed and the leaked fuel was cleaned up. This is the only known release of material from this unit.

Site Characterization Status: This unit is being dealt with under the UST program.

Media of Concern: Soil and groundwater

Comments:

References:

Preliminary Assessment of the K-1414 Diesel Fuel Release Oak Ridge Gaseous Diffusion Plant, K/SUB/22224C/8, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1988.

Environmental Assessment for In Situ Bioremediation of Diesel Fuel Contamination at the K-1414 Tank Site, Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-36, Martin Marietta Energy Systems, Inc., Oak Ridge K-25 Site, Oak Ridge, Tenn., November 1990.

Operation and Maintenance Manual, Petroclean Bioremediation System, Model Number: BR 4000, K/ER/Sub-90/QU129/8, Martin Marietta Energy Systems, Oak Ridge K-25 Site, Oak Ridge, Tenn., October 1990.

Environmental Assessment Report for the K-1414 Leaking Underground Storage Tank Remedial Investigation, K/SUB/88-AB317V/1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, January 1989.

Quality Assurance/Quality Control (QA/QC) Project Plan for the Bioremediation of the K-1414 UST Site at Plant K-25, Oak Ridge Gaseous Diffusion Plant, in Oak Ridge, Tennessee, K/ER/Sub-90/QU129/7, Martin Marietta Energy Systems, Oak Ridge -25 Site, Oak Ridge, Tenn., October 1990.

Project Health and Safety Plan for the Biological Remediation of the K-1414 UST Site at the Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER/Sub-90/QU129/6, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., Sept. 11, 1990.

Final Report, Design of In Situ Bioreclamation System at the Oak Ridge Gaseous Diffusion Plant, K-1414 Site, Oak Ridge, Tennessee, K/ER/Sub-90/QU129/5, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1990.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0724

K-1414 Gas Tanks

Unit Name: Area 2 Groundwater

Unit Number: K02-0004

Regulatory Status: 3004.u

Unit Location: Area 2 comprises the southern half of the main plant area.

Approximate Dimensions and Capacity: Approximately 320 acres

Dates Operated: Several of the units in Area 2 began operating when the K-25 Plant was built in 1942–1943. Specific operations are outlined in individual site reports.

Present Function: Present operations are outlined in individual site reports.

Life Cycle Operation: Area 2 contains the following OUs and individual SWMUs.

K-1004 OU
- K-1004-L Recirculating Cooling Water Lines
- K-1004-L Underground Tank
- K-1004-J Vaults
- K-1004-N1 Recirculating Cooling Water Lines

K-1007 OU
- K-1004 Lab Area Drain
- K-1007 Gas Tank
- K-1007-P1 Holding Pond

K-1001-B Waste Accumulation Area
K-1001-C Waste Accumulation Area
K-1001-D Waste Accumulation Area
K-1003 Waste Accumulation Area
K-1004 Waste Accumulation Area
K-1004-L Contaminated Scrap Metal Dumpster
K-1006 Contaminated Scrap Metal Dumpster
K-1007 Waste Accumulation Area
K-1225 Contaminated Scrap Metal Dumpster
K-1414 Gas Tanks

Waste Characteristics: Based on the facilities and operations in Area 2, groundwater contaminants that may yet be encountered are volatile organics, polynuclear aromatic hydrocarbons, metals, radioactivity, and PCBs.

Release Data: Groundwater quality in Area 2 has been monitored by 44 wells. A summary table of the data collected through the last quarter of 1990 is presented in Table 3. The table indicates that no contaminants above suspected background levels have been detected.

Site Characterization Status: Remedial investigations are planned for the K-801-H Cooling Tower Basins, K-1004 Area Lab Drain, K-1004-L Recirculating Cooling Water Lines, K-1004-L Underground Tank, K-1004-L Vaults, K-1004-N1 Recirculating Cooling Water Lines, K-1007 Gas Tank, K-1007-P1 Holding Pond, and the K-1210 Recirculating Cooling water Lines, as well as the Area 2 groundwater.

Media of Concern: Groundwater

Comments: This area was formerly known as WAG 2.

References:

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Sytems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: May 1991

Table 3. Groundwater monitoring data through 1990, K-25 Site Area 2

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field measurements and physical characteristics				
Chloride IC, mg/L	5/5	11	34	22
Chloride, mg/L	33/33	1	529	56
Dissolved oxygen—I, ppm	36/38	0.9	8.1	2.9
Dissolved oxygen, ppm	38/38	0.8	9.8	4.1
Dissolved solids, mg/L	5/5	300	492	370
Fluoride by specific ion electrode, mg/L	3/3	0.2	0.2	0.2
Nitrate, mg/L	7/38	0.5	2.4	1.2
Sulfate, mg/L	38/38	7	112	38
Suspended solids, mg/L	5/5	3	246	100
Total organic carbon (TOC), mg/L	143/152	1	7.1	2.3
Tox, mg/L	63/108	0.013	0.764	0.2
Uranium fluorometric, mg/L	24/36	0.001	0.009	0.0026
pH—I, N/A	38/38	5.5	11.9	7.7
pH, N/A	190/190	5.4	10.3	7.1
Metals and Elemental Analysis				
Aluminum, mg/L	38/38	0.056	57	11
Barium, mg/L	38/38	0.022	0.74	0.2
Beryllium, mg/L	15/38	0.0003	0.018	0.0036
Boron, mg/L	33/38	0.012	0.92	0.17
Cadmium, mg/L	9/38	0.003	0.0061	0.0052
Calcium, mg/L	38/38	5	220	97
Chromium, mg/L	17/38	0.011	0.65	0.089
Cobalt, mg/L	12/38	0.009	0.059	0.03
Copper, mg/L	25/38	0.0045	0.19	0.042
Iron, mg/L	38/38	0.04	79	16
Lead, mg/L	25/38	0.0043	0.12	0.025
Lithium, mg/L	31/38	0.0045	0.12	0.033
Magnesium, mg/L	38/38	0.78	88	21

Table 3 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Manganese, mg/L	38/38	0.0019	11	1.4
Nickel, mg/L	21/38	0.015	0.29	0.083
Phosphorous, mg/L	11/38	0.32	0.58	0.47
Potassium, mg/L	30/38	1.1	17	7.4
Silicon, mg/L	38/38	3.3	51	13
Sodium, mg/L	38/38	1.9	110	22
Strontium—Total, mg/L	5/5	0.12	0.98	0.4
Strontium, mg/L	33/33	0.03	1.1	0.27
Titanium, mg/L	31/38	0.0032	0.51	0.093
Uranium-238, mg/L	3/3	0.003	0.003	0.003
Vanadium, mg/L	10/38	0.0099	0.088	0.053
Zinc, mg/L	31/38	0.0034	1.009	0.12
Zirconium, mg/L	6/38	0.01	0.017	0.015
Radionuclides				
Alpha activity, pCi/L	28/38	-1.2	15.8	2.9
Beta activity, pCi/L	36/38	-2	608.8	41
BNA and Volatile Organic Analyses				
Methylene chloride, mg/L	6/38	0.008	0.05	0.029
Trans-1,2-Dichloroethene, mg/L	3/27	0.23	0.23	0.23

Area 3 Site Description

Unit Name: K-1099 Blair Quarry

Unit Number: K03-R019

Regulatory Status: 3004.u

Unit Location: Area 3, plant exterior, north of Blair Road, ~1000 ft east of the Poplar Creek Bridge (Map Ref. No. 20)

Approximate Dimensions and Capacity: 0.1 acre for quarry; 3 acres for groundwater

Dates Operated: 1945 to 1957

Present Function: Unused

Life Cycle Operation: The site ceased operation as a quarry in 1945, when it began to be used for burning and burying trash and debris. The majority of debris included such items as construction trash, cleaning rags, and cafeteria garbage. According to a former worker, noncombustibles such as metal drums and rubble were buried to fill pits, including those containing water.

Waste Characteristics: Combustible wastes such as paper, wood, and construction rubble, contaminated with uranium, were burned on the site. There is some indication that waste oils, which may have contained PCBs, were burned at the site. Administrative policy directed that no contaminated material, as defined in the 1940s and early 1950s, be burned or buried in the quarry.

Release Data: A groundwater sample collected from a characterization well at the unit indicated alpha activity above the drinking water standard of 15 pCi/L. Groundwater monitoring data from well BRW-1 have been collected at this site. A summary of these data is presented in Table 4.

Site Characterization Status: A site inspection that includes limited sampling analysis and evaluation of samples from all media is planned for this unit.

Media of Concern: Groundwater, soil (see Table 4)

Comments: This unit is also known as Blair Road Quarry and Blair Hollow Quarry.

References:

RCRA Facility Investigation Plan, K-1099 Blair Road Quarry, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-157, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

RCRA Investigation Plan, K-1099 Blair Road Quarry, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-157, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1988.

Date Prepared: April 1987

Date Revised: May 1991

Table 4. Groundwater monitoring data through 1990—K-25 Site Area 3

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	14/14	2	154	56
Chloride, mg/L	58/58	1.3	260	68
Dissolved oxygen—I, ppm	78/78	0	15	2.4
Dissolved oxygen, ppm	78/78	0	11	2.7
Dissolved solids, mg/L	14/14	108	828	420
Fluoride by specific ion electrode, mg/L	1/14	0.1	0.1	0.1
Fluoride, mg/L	19/33	0.1	2.8	0.34
Nitrate, mg/L	15/47	0.32	7	2.7
Sulfate, mg/L	72/72	2.5	300	73
Suspended solids, mg/L	14/14	1	105	19
Total organic carbon (TOC), mg/L	185/233	1	12	2.7
Total organic chloride (Tox), mg/L	22/28	0.01	0.042	0.027
Total organic halide (Tox), mg/L	128/180	0.01	0.221	0.037
Tox, mg/L	19/28	0.011	0.043	0.023
Uranium fluorometric, mg/L	28/56	0.001	0.006	0.0024
Metals and Elemental Analysis				
Aluminum, mg/L	85/100	0.02	210	8.4
Antimony, mg/L	1/94	0.13	0.13	0.13
Arsenic, mg/L	27/94	0.005	0.009	0.0065
Barium, mg/L	100/100	0.012	4.6	0.22
Beryllium, mg/L	24/100	0.0003	0.017	0.0027
Boron, mg/L	73/100	0.0063	0.41	0.04
Cadmium, mg/L	26/100	0.003	0.017	0.0049
Calcium, mg/L	100/100	17	170	85
Chromium, mg/L	26/100	0.01	0.35	0.048
Cobalt, mg/L	49/100	0.0055	0.21	0.038
Copper, mg/L	37/100	0.0041	0.19	0.023

Table 4 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Iron, mg/L	142/150	0.0045	1300	27
Lead, mg/L	45/114	0.004	0.089	0.023
Lithium, mg/L	23/100	0.0018	0.13	0.022
Magnesium, mg/L	100/100	2	42	12
Manganese, mg/L	150/150	0.0027	33	6.9
Mercury, mg/L	9/94	0.0002	0.0051	0.001
Molybdenum, mg/L	3/100	0.012	0.013	0.013
Nickel, mg/L	37/100	0.01	0.45	0.035
Niobium, mg/L	12/100	0.0082	0.017	0.011
Phosphorous, mg/L	20/100	0.21	2	0.62
Potassium, mg/L	100/100	1.1	80	6.4
Silicon, mg/L	100/100	1.4	68	7.7
Silver, mg/L	2/100	0.0061	0.0065	0.0063
Sodium, mg/L	150/150	0.63	380	70
Strontium, mg/L	100/100	0.022	0.27	0.13
Strontium, pCi/L	2/2	23.31	38.79	31
Titanium, mg/L	67/100	0.0033	1	0.098
Uranium-238, mg/L	25/50	0.001	0.019	0.0046
Vanadium, mg/L	19/100	0.0053	0.18	0.047
Zinc, mg/L	79/100	0.0012	0.51	0.053
Zirconium, mg/L	14/100	0.0052	0.022	0.012
	Radionuclides			
Alpha activity, pCi/L	38/38	-21	15	0.92
Beta activity, pCi/L	38/38	-26	55.76	18
Cesium-137, pCi/L	2/2	3.34	28.5	16
Technetium-99, pCi/L	2/2	-400	40	-200
	BNA and Volatile Organic Analyses			
1,2-Dichloroethene (total), mg/L	11/28	0.005	0.013	0.0086

Table 4 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Acetone, mg/L	1/28	0.01	0.01	0.01
Freon 123, mg/L	1/1	0.005	0.005	0.005
Phenols—total, mg/L	9/38	0.002	0.007	0.0052
Trichloroethene, mg/L	6/28	0.005	0.019	0.012
Unknown, mg/L	7/23	0.008	0.19	0.08

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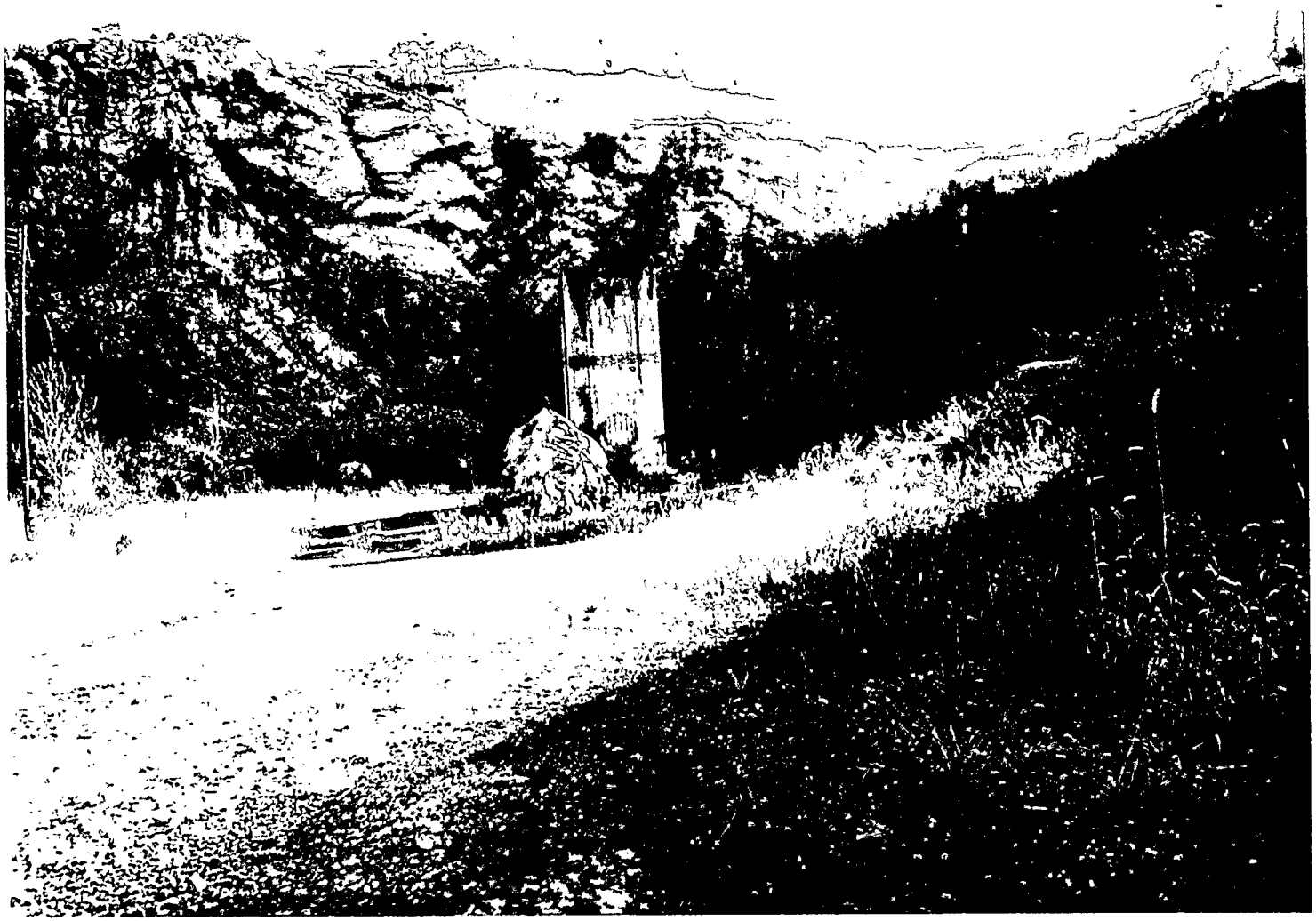


K-1099 Blair Quarry

Area 4 Site Descriptions

Unit Name: K-801-H Cooling Tower Basin

Unit Number: K04-C003e

Regulatory Status: CERCLA

Unit Location: Area 4, process area, northwest of the K-25 building (Map Ref. No. 67)

Approximate Dimensions and Capacity: Basin dimensions are 435 × 63 × 14 ft. Tower currently has a capacity of 60,000 gal/min for the remaining five cells. Tower contained 18 cells prior to 1979.

Dates Operated: 1944 to present

Present Function: Tower in use for air-conditioning system for K-1201 Air Nitrogen Plant and for Building K-1401.

Life Cycle Operation: Eighteen-cell tower originally provided RCW for the K-25 building uranium enrichment cascade. When cascade was shut down in 1962, RCW system continued to serve auxiliary plant and development facilities. In 1978–1979, five cells were rebuilt, and the remaining 13 were demolished.

Waste Characteristics: A nonchromate, Calgon Coraid polyphosphate water treatment was used prior to the late 1950s, when it was replaced by a Betz zinc/chromate/phosphate treatment. After the tower was demolished in 1979, the K-801-H Basin was used for fire fighting water makeup. The firewater system has used a nonchromate treatment system since 1977.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 5)

Comments: This site is part of the K-1064 OU. It is also a part of the K-25 building RCW system, which includes the following locations:

1. K-801 water intake from Poplar Creek,
2. K-801-H Cooling Tower (also known as K-802-A),
3. K-802-H Cooling Tower (also known as K-802-B), and
4. K-802 Pumphouse for K-801-H and K-802-H cooling towers.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenne., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

Table 5. Groundwater monitoring data through 1990—K-25 Site Area 4

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride, mg/L	26/26	2	150	35
Dissolved oxygen—I, ppm	44/44	0.6	10.1	3
Dissolved oxygen, ppm	44/44	0.5	12.7	3.5
Fluoride, mg/L	36/36	0.2	7	1.1
Nitrate, mg/L	22/26	0.13	9.58	1.7
Sulfate, mg/L	26/26	35	960	160
Total coliform, COL/100 mL	24/27	0	55	9.5
Total organic carbon (TOC), mg/L	121/130	1	9.2	2.6
Total organic halide (Tox), mg/L	127/130	0.008	0.246	0.079
Uranium fluorometric, mg/L	75/83	0.001	0.144	0.031
pH—I, N/A	44/44	4.9	9.2	7.2
pH, N/A	183/183	5	8.9	7.2
Metals and Elemental Analysis				
Aluminum, mg/L	59/83	0.02	380	7.1
Antimony, mg/L	4/83	0.055	0.1	0.076
Arsenic, mg/L	22/83	0.011	0.32	0.077
Barium, mg/L	83/83	0.0045	1.4	0.07
Beryllium, mg/L	9/83	0.0003	0.0007	0.00043
Boron, mg/L	83/83	0.038	6	0.84
Cadmium, mg/L	17/83	0.0032	0.011	0.005
Calcium, mg/L	83/83	1	3400	160
Chromium, mg/L	21/83	0.01	0.047	0.016
Copper, mg/L	25/83	0.0049	1.9	0.097
Iron, mg/L	52/81	0.0044	300	6.4
Lead, mg/L	24/83	0.004	0.084	0.011
Lithium, mg/L	66/83	0.004	0.91	0.097
Magnesium, mg/L	83/83	0.24	400	20
Manganese, mg/L	68/81	0.0011	5.7	0.22

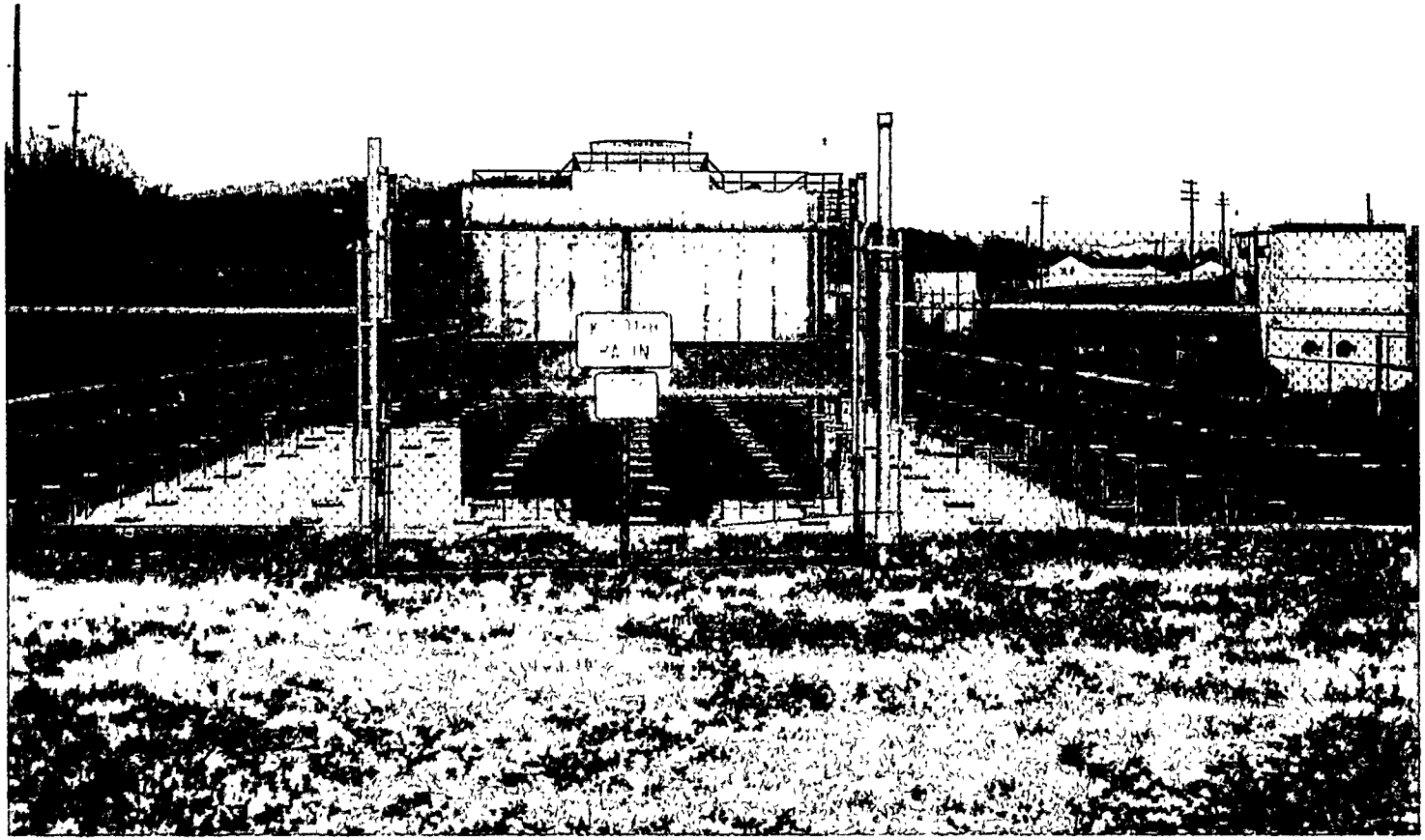
Table 5 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Mercury, mg/L	1/52	0.0003	0.0003	0.0003
Molybdenum, mg/L	12/83	0.01	0.039	0.024
Nickel, mg/L	13/83	0.01	0.045	0.022
Niobium, mg/L	23/83	0.0072	0.047	0.024
Phosphorous, mg/L	11/83	0.24	0.9	0.49
Potassium, mg/L	80/83	0.68	190	8.9
Silicon, mg/L	83/83	2.2	510	11
Silver, mg/L	9/83	0.007	0.15	0.026
Sodium, mg/L	81/81	5.8	870	120
Strontium, mg/L	83/83	0.021	6.9	0.38
Titanium, mg/L	39/83	0.0032	8	0.22
Uranium-235, wt %	16/26	0.79	1.52	1.1
Vanadium, mg/L	8/83	0.0065	0.082	0.027
Zinc, mg/L	56/83	0.0011	1.6	0.049
Zirconium, mg/L	7/83	0.0056	0.016	0.0086
	Radionuclides			
Alpha activity, pCi/L	36/36	-220	64	13
Beta activity, pCi/L	36/36	-17	298	51
Technetium-99, pCi/L	4/4	-1113	613	-40
Thorium, pCi/L	4/4	4	29	14
	BNA and Volatile Organic Analyses			
1,1,1-Trichloroethane, mg/L	20/37	0.005	0.15	0.07
1,1,2-Trichloroethane, mg/L	10/37	0.008	0.024	0.015
1,1-Dichloroethane, mg/L	19/37	0.007	0.048	0.018
1,1-Dichloroethene, mg/L	18/37	0.005	0.022	0.012
Aroclor-1254, mg/L	1/37	0.0049	0.0049	0.0049
Diacetone alcohol, mg/L	5/16	0.57	2	1.1
Phenols—Total, mg/L	11/27	0.002	0.009	0.0035

Table 5 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Probable Freon 113, mg/L	1/1	0.005	0.005	0.005
Trichloroethene, mg/L	9/37	0.006	0.051	0.018
bis(2-Ethylhexyl)phthalate, mg/L	1/37	0.075	0.075	0.075
trans-1,2-Dichloroethene, mg/L	4/27	0.01	0.018	0.012

PHOTO NO. K/PH-87-0741



K-801-H Cooling Tower Basin

Unit Name: K-802-H Cooling Tower Basin

Unit Number: K04-C003g

Regulatory Status: CERCLA

Unit Location: Area 4, process area/immediately north of the K-25 building (Map Ref. No. 66)

Approximate Dimensions and Capacity: 340 × 63 × 14 ft

Dates Operated: 1945 to present

Present Function: Basin is used for makeup for firewater.

Life Cycle Operation: Beginning in 1945, system provided RCW for K-25 cascade. When cascade was shut down in 1962, system continued to serve auxiliary plant and development facilities. K-802-H tower was demolished in 1979, but basin was put to use for fire water makeup.

Waste Characteristics: A nonchromate, Calgon Coraid polyphosphate treatment was used until the late 1950s, when it was replaced by a Betz zinc/chromate/phosphate treatment.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 5)

Comments: This site is part of the K-1064 OU. It is also part of the K-25 building RCW system which, includes the following locations:

1. K-801 water intake from Poplar Creek,
2. K-801-H Cooling Tower (also known as K-802-A),
3. K-802-H Cooling Tower (also known as K-802-B), and
4. K-802 Pumphouse for K-801-H and K-802-H cooling towers.

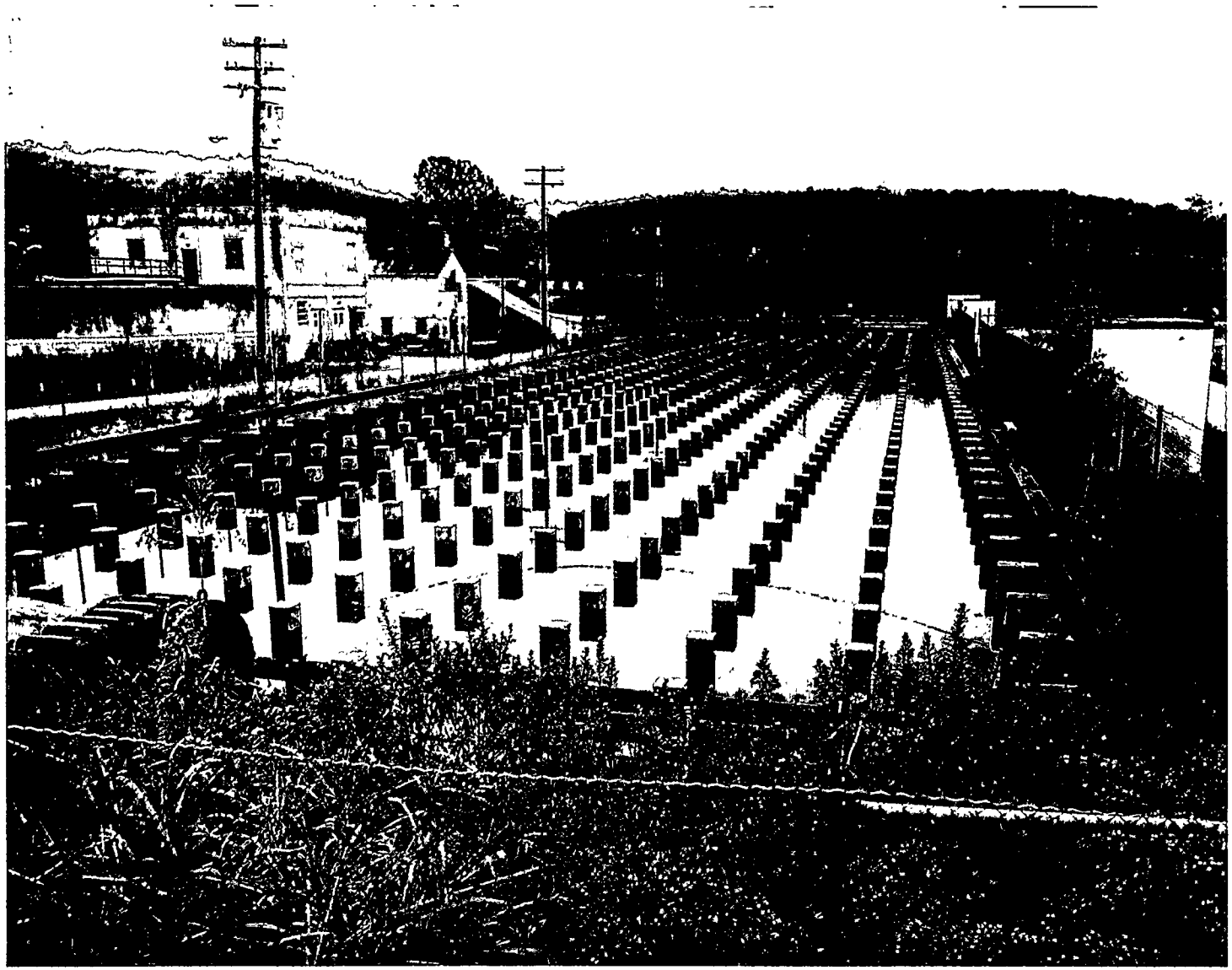
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3784



K-802-H Cooling Tower Basin

Unit Name: K-1064 Drum Storage and Burn Area

Unit Number: K04-R007

Regulatory Status: 3004.u

Unit Location: Area 4, northwest of K-801-H Cooling Tower Basin on a peninsula formed by a meander of Poplar Creek (Map Ref. No. 7)

Approximate Dimensions and Capacity: 1 acre

Dates Operated: 1950s–1979

Present Function: Unused for storage of waste oils or other chemicals

Life Cycle Operation: Open burning of waste solvents took place from the 1950s to 1960. From 1960 to 1979, the area was used for drum storage of waste solvents.

Waste Characteristics: Wastes burned at the site include waste paints, organic wastes, and radiologically contaminated waste oils. Wastes stored include solvents, organics, including PCBs, and radioactively contaminated waste oils. Records indicate that 1838 drums with a total capacity of 90,000 gal were stored at the facility prior to discontinuing drum storage in the area.

Release Data: No known releases of stored waste

Site Characterization Status: A remedial investigation will be conducted for this unit.

Media of Concern: Soil and groundwater (see Table 5)

Comments: This site is part of the K-1064 OU.

References:

RCRA Facility Investigation Plan, K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., July 1987.

RCRA Facility Investigation Plan, K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0603

K-1064 Drum Storage and Burn Area

Unit Name: K-1064-G Drum Deheading Facility

Unit Number: K04-R020

Regulatory Status: 3004.u

Unit Location: Area 1, northwest of K-801-H Cooling Tower Basin (Map Ref. No. 21)

Approximate Dimensions and Capacity: 75 by 50 ft plus a 1000-gal-capacity underground storage tank (UST)

Dates Operated: 1970–1979

Present Function: Unused; tank has been removed.

Life Cycle Operation: Storage of waste liquids from used drums

Waste Characteristics: The residual quantities of various solvents and aqueous materials were poured from 55-gal drums in order to remove the tops from the drums so that they could be used to store other materials.

Release Data: There have been no known releases from this unit. This operation was discontinued in 1979. Material in the underground tank was removed, and the tank has not been used since that time. In the summer of 1986, samples were taken of the soil around the tank and of water that was in the tank and analyzed according to the EP Toxicity Procedure.* The tank was removed.

Site Characterization Status: The results of the samples collected from the unit indicated that the soil surrounding the underground storage tank was not contaminated during operation of this facility. However, a remedial investigation is planned as part of the K-1064 OU.

Media of Concern: None

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*A waste sample is considered to have the characteristic of EP toxicity if analysis of the leachate resulting from Extraction Procedure (EPA Method 1310) reveals that the concentration of any of the 14 regulated contaminants (As, Ba, Cd, C, Pb, Hg, Se, Ag, Endrin, Lindane, Methoxychlor, Toxaphene, 2,4-D, 2,4,5-TP) exceeds the maximum concentration as specified in the method. The concentration of contaminants in the final leachate is dependent on two factors: (1) the absolute concentration of the analyte in the waste and (2) the extractability of the analyte from the waste. In order to maximize the information while keeping analytical costs to a minimum, soil samples were analyzed for the inorganic EP Toxicity contaminants after a quantitative dissolution of the soil sample (equivalent to the analyte being 100% extractable). This analysis protocol eliminates the time-consuming Extraction Procedure and evaluates factor 1 above. If, on the basis of this analysis, the individual contaminant is found to be absent or at such low concentrations that the appropriate regulatory thresholds could not possibly be exceeded, then the Extraction Procedure need not and will not be performed (40 CFR 261, Appendix II 1.2). If, on the other hand, some or all of the inorganic contaminants are present at or above a concentration that could possibly exceed appropriate regulatory thresholds, then the Extraction Procedure will be carried out.

Comments: This site is part of the K-1064 OU, which also includes the K-801-H and K-802-H Cooling Tower Basins and the K-1064 Drum Storage and Burn Area.

References:

RCRA Facility Investigation Plan, K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., July 1987.

RCRA Facility Investigation Plan, K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0613

K-1064-G Drum Deheading Facility

Area 5 Site Descriptions

Unit Name: K-1031 Waste Paint Accumulation Area

Unit Number: K05-R055

Regulatory Status: 3004.u

Unit Location: Area 5, north of K-1410 building, west of south end of K-25 building, 30 ft east of K-1031 building (Map Ref. No. 55)

Approximate Dimensions and Capacity: 50 by 50 ft

Dates Operated: 1960s–1985

Present Function: Unused

Life Cycle Operation: Temporary storage of waste paints and solvents in 55-gal drums

Waste Characteristics: Metals; volatile organics; gross alpha, beta, and gamma radioactivity

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this site as part of the K-1410 OU.

Media of Concern: Soil

Comments: This site is part of the K-1410 OU.

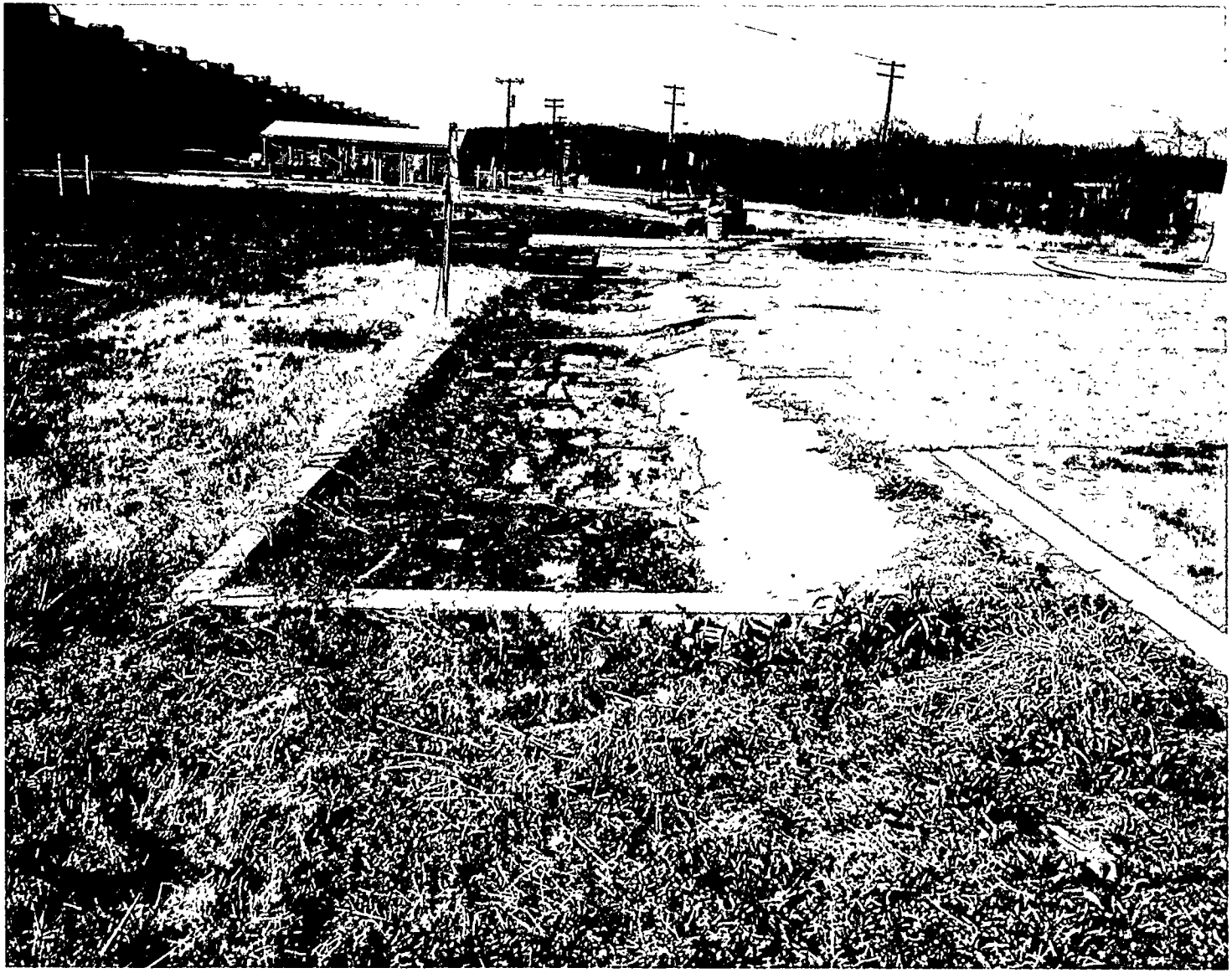
References:

RCRA Investigation Plan, K-1031 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-160, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., October 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0950



K-1031 Waste Paint Accumulation Area

Unit Name: K-1410 Neutralization Pit

Unit Number: K05-R011

Regulatory Status: 3004.u

Unit Location: Area 5, across East Poplar Creek Patrol Road from the K-1401 Plating Facility west of the south end of the K-25 building (Map Ref. No. 11)

Approximate Dimensions and Capacity: 10 × 10 × 20 ft; capacity, ~15,800 gal

Dates Operated: 1963–1979

Present Function: Unused

Life Cycle Operation: Neutralization of corrosive wastewaters from the nickel plating process. This site includes the following five parts: the concrete neutralization pit; the limestone pit; the pipe leading from the K-1410 building to the concrete pit; the pipe leading from the concrete pit to the limestone pit; and the bank from the limestone pit to the creek. The limestone pit was installed in 1963 to neutralize discharges from plating activities. The 15,800-gal concrete neutralization pit was installed upgrade of the original pit in 1975. Discharges from this newer, concrete pit discharged into the original pipeline and exited into Poplar Creek at the older limestone pit. The neutralized discharge that flowed into Poplar Creek was permitted under the NPDES program during the entire operation of the newer concrete pit.

Waste Characteristics: Acids and bases used in the nickel plating process

Release Data: No uncontrolled releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Groundwater and soil (see Table 6)

Comments: This site is part of the K-1410 OU.

References:

RCRA Facility Investigation Plan, K-1410 Neutralization Pit, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-138, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

RCRA Investigation Plan, K-1031 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant Oak Ridge, Tennessee, K/HS-160, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., October 1988.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

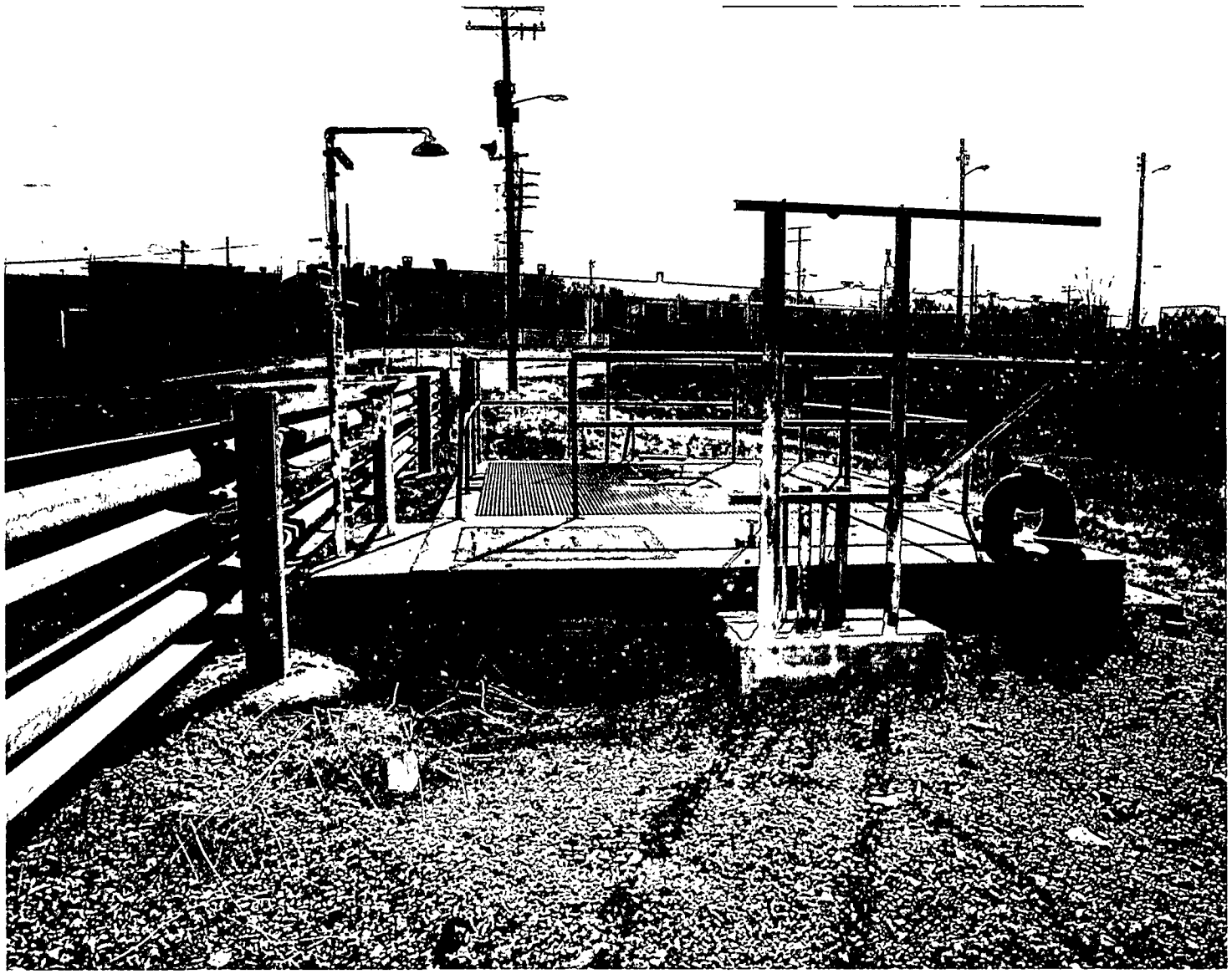
Table 6. Groundwater monitoring data through 1990—K-25 Site Area 5

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	1/1	18	18	18
Chloride, mg/L	1/1	16	16	16
Dissolved oxygen—I, ppm	2/2	1.1	1.6	1.4
Dissolved oxygen, ppm	2/2	4.8	7.6	6.2
Dissolved solids, mg/L	1/1	388	388	390
Fluoride, mg/L	2/2	0.2	0.5	0.35
Sulfate, mg/L	2/2	26	42	34
Suspended solids, mg/L	1/1	50	50	50
Total organic carbon (TOC), mg/L	8/8	1	4	2.3
Total organic halide (Tox), mg/L	8/8	0.088	0.169	0.12
Trichloroethene, mg/L	2/2	0.064	0.11	0.087
Uranium fluorometric, mg/L	1/4	0.001	0.001	0.001
pH—I, N/A	2/2	7.4	7.6	7.5
pH, N/A	10/10	6.4	7.6	6.9
Metals and Elemental Analysis				
Aluminum, mg/L	4/4	0.038	24	6.2
Barium, mg/L	4/4	0.032	0.13	0.059
Beryllium, mg/L	1/4	0.0021	0.0021	0.0021
Boron, mg/L	4/4	0.037	0.083	0.068
Calcium, mg/L	4/4	42	560	210
Chromium, mg/L	1/4	0.043	0.043	0.043
Cobalt, mg/L	1/4	0.016	0.016	0.016
Copper, mg/L	3/4	0.0072	0.052	0.025
Iron, mg/L	2/4	0.74	36	18
Lead, mg/L	2/4	0.0065	0.034	0.02
Lithium, mg/L	3/4	0.0055	0.052	0.021
Magnesium, mg/L	4/4	7.7	28	14
Manganese, mg/L	4/4	0.033	1.4	0.88

Table 6 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Molybdenum, mg/L	2/4	0.034	0.045	0.04
Nickel, mg/L	3/4	0.011	0.083	0.045
Niobium, mg/L	2/4	0.0076	0.012	0.0098
Phosphorous, mg/L	1/4	0.71	0.71	0.71
Potassium, mg/L	4/4	2.9	19	10
Silicon, mg/L	4/4	4.1	24	10
Sodium, mg/L	4/4	4.2	7.6	5.8
Strontium, mg/L	4/4	0.19	0.76	0.36
Titanium, mg/L	2/4	0.013	0.19	0.1
Vanadium, mg/L	1/4	0.026	0.026	0.026
Zinc, mg/L	4/4	0.0013	0.13	0.044
Zirconium, mg/L	1/4	0.008	0.008	0.008
Radionuclides				
Alpha activity, pCi/L	2/2	2.07	3.9	3
Beta activity, pCi/L	2/2	6.05	19	13
BNA and Volatile Organic Analyses				
1,2-Dichloroethene (total), mg/L	2/2	0.057	0.08	0.069
2,4,5-TP (Silvex), mg/L	1/2	0.00007	0.00007	0.00007

PHOTO NO. K/PH-87-0620



K-1410 Neutralization Pit

Unit Name: K-1410 Plating Facility

Unit Number: K05-C006

Regulatory Status: CERCLA

Unit Location: Area 5, process plant area, just west of the south end of the K-25 building (Map Ref. No. 70)

Approximate Dimensions and Capacity: 100 by 75 ft

Dates Operated: 1944–1979

Present Function: Unused

Life Cycle Operation: From 1944 to 1946 and from 1955 to 1962, the K-1410 building was used for receiving, emptying, and refilling spent cascade traps from the K-25 building. From 1946 to 1962, K-1410 was used for decontamination of uranium-contaminated equipment and for recovery of uranium from feed plant ash. From 1963 to 1979 the building was used for nickel plating. During uranium decontamination work, two spray facilities were in use on the west end of the building. The spray facilities had two stainless steel tanks measuring 8 × 2 × 25 ft in separate pits with floor pans. The pits were filled with concrete in 1963.

Waste Characteristics: Wastes generated from uranium decontamination and recovery operations included nitric acid; organic degreasers, including carbon tetrachloride, trichloroethylene, and perchloroethylene; MFL oil; and uranium compounds and transuranics. Cleaning solutions were routinely discharged into the building's process drains. Degreasers were occasionally discharged down the drains. Wastes generated from the plating process include alkaline cleaners, acids, and nickel sulfate and fluoride.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Equipment surfaces

Comments: The equipment will be tested to determine if residual quantities of hazardous substances remain on or in the equipment. This site is part of the K-1410 OU.

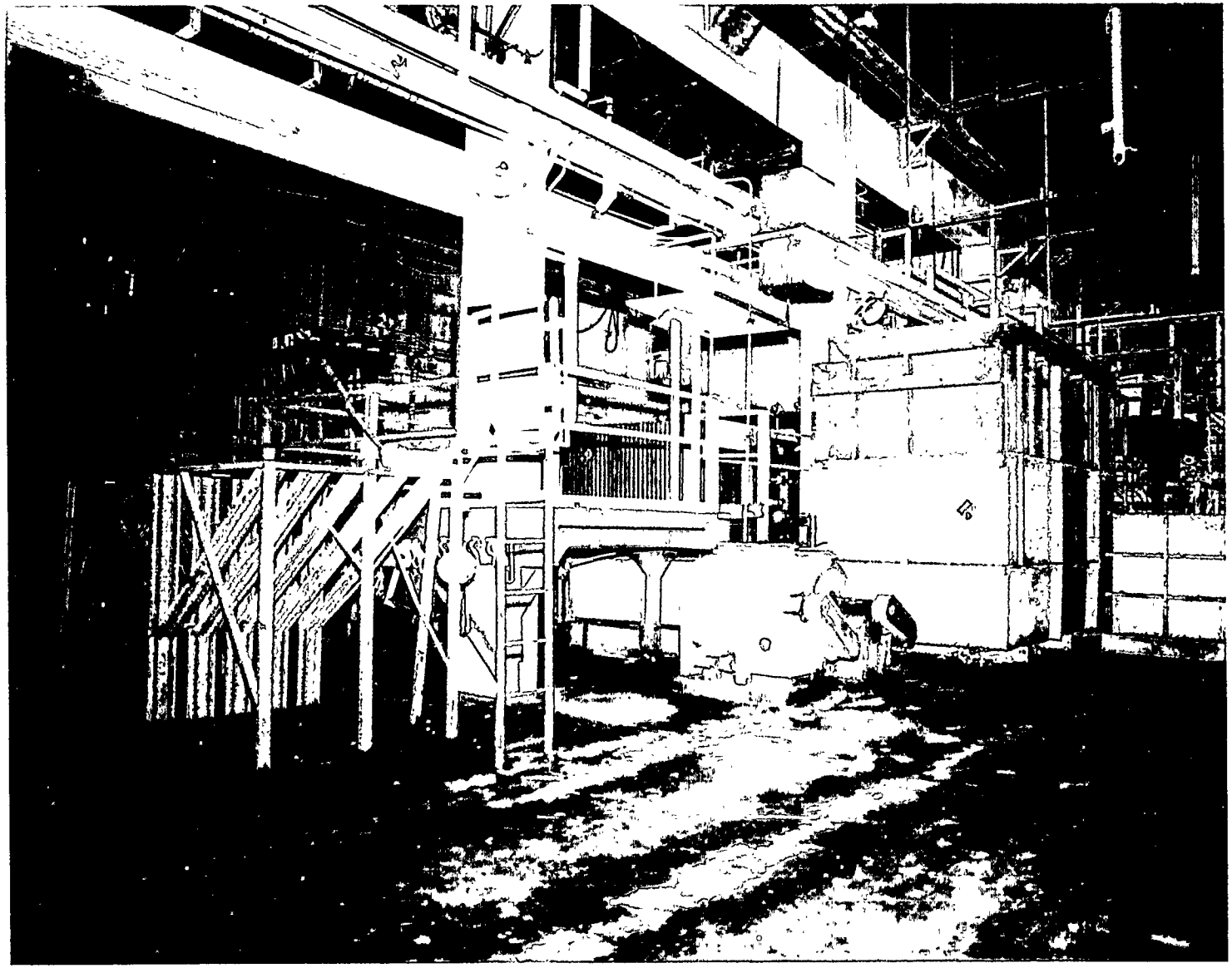
References:

RCRA Facility Investigation Plan, K-1410 Building, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-155, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0611



K-1410 Plating Facility

PHOTO NO. K/PH-92-1221

K-631 Contaminated Soil

Unit Name: K-631 Contaminated Soil

Unit Number: K07-C075

Regulatory Status: CERCLA

Unit Location: Groundwater Area 7, around a roof drain at the southwest corner of building K-631

Approximate Dimensions and Capacity: 4 sq ft at surface; size of underground contamination unknown

Dates Operated: 1946-85

Present Function: Unused

Life Cycle Operation: The K-631 building was used to remove isotopically depleted gaseous UF_6 tails inventory from the enrichment cascade and convert it to a liquid by compression/liquefaction for transfer into transport cylinders. The facility was built in 1945 and served as a tails withdrawal facility from 1946 to 1962. Gas storage tanks were used from the 1970s until 1985 for storage and distribution of chlorine trifluoride and fluorine.

Gases inside the building were vented above the roof, causing partial deposition on the roof's surface. Rainwater runoff carries the surface contaminants to the building's roof drainage leaders with eventual discharge to the area's storm water drains. The drain leader immediately above the contaminated soil is separated from its scupper, allowing rainwater to cascade on the ground rather than be conducted to the area's normal storm water collection channels.

Waste Characteristics: Uranium. On a routine radiological survey, elevated radiation counts were detected on a 2 by 2 ft ground area. The deeper the hole was dug, the higher the radiation counts, up to 90,000 dpm.

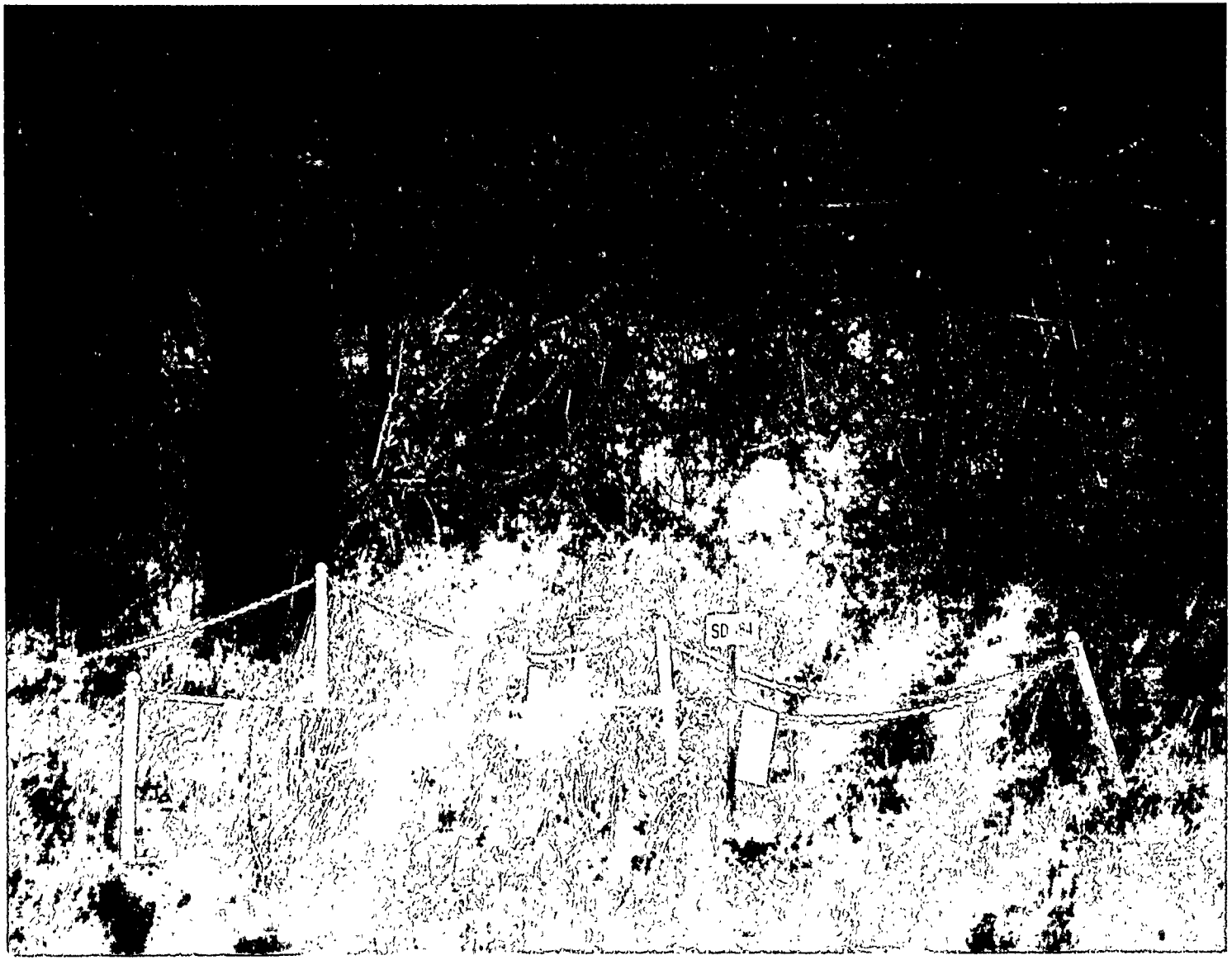
Release Data: The area is subject to infiltration by surface water.

Site Characterization Status: A preliminary assessment/site inspection is planned for this unit.

Media of Concern: Soil, groundwater, surface water

Date Prepared: April 1992

PHOTO NO. K/PH-92-1223



K-1131 Neutralization Pile

Unit Name: K-1131 Neutralization Pile

Unit Number: K07-C074

Regulatory Status: CERCLA

Unit Location: Groundwater Area 7, north of the K-631/K-131 complex, just south of Poplar Creek

Approximate Dimensions and Capacity: Stone pile is ~45 ft in diameter with vertical side projections from ~8 to 20 ft. The 2-in. Monel line runs ~74 from a tie point with a hydrous HF mainline north of 9th Street.

Dates Operated: 1952-1962

Present Function: Unused

Life Cycle Operation: This facility was built as an emergency side stream drain line from the main hydrous hydrogen fluoride line connecting the K-1131 hydrofluorination process to rubber-lined storage tanks at the K-1132 tank farm. The hydrous HF contained uranium at concentrations less than ~10 ppm. The emergency drain line was used to handle infrequent abnormal process operations. The stone pile consisted of three gradations of stone: gravel, sand, and fines.

Waste Characteristics: Uranium

Release Data: Since its construction, the neutralization pile has been subject to infiltration by surface water.

Site Characterization Status: A preliminary assessment/site inspection will be performed for this unit.

Media of Concern: Soil, surface water

References:

C.C.C.C. Drawing C-AWP-12626, "Drain Line from K-1131 to Neutralization Pile."

UCNC Drawing D-P-21111C Rev. A, "Low Excess HF System Flow Diagram."

UCNC Drawing E-P-22811S, "Hydrofluorination Process Flow Sheet."

Date Prepared: April 1992

Area 6 Site Description

Unit Name: K-1232 Chemical Recovery Facility

Unit Number: K06-R014

Regulatory Status: RCRA; Part B Permit Application has been submitted.

Unit Location: Area 6 at the intersection of 7th Street and Avenue P (Map Ref. No. 14)

Approximate Dimensions and Capacity: 150 ft by 100 ft; capacity of batch operation, 1000–2000 gal

Dates Operated: 1984 to present

Present Function: Treatment of drummed laboratory waste from ORNL by manual operation

Life Cycle Operation: From 1972 to 1980, K-1232 was used to process classified material. The products and by-products used in the process were kept under tight controls and are considered nonhazardous. Beginning in 1984, the facility was used to treat corrosive wastewaters from the Y-12 Plant by neutralization, metal removal, and carbon filtration for aqueous waste with organic constituents. In 1987, facilities for handling Y-12 wastes were completed and placed in operation at that plant.

Waste Characteristics: The operations conducted at the facility indicate the possibility of volatile organics, polynuclear aromatic hydrocarbons, and heavy metals contaminating groundwater.

Release Data: No known releases

Site Characterization Status: A site assessment is planned for this unit. The underground tanks will be assessed according to the regulations of 40 CFR 264.191.

Media of Concern: Groundwater (see Table 7)

Comments: This unit is also referred to as the K-1232 Treatment Facility.

References:

RCRA Facility Investigation Plan, K-1232 Treatment Facility, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-145, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

RCRA Facility Investigation Plan, K-1232 Treatment Facility, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-145, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1988.

Date Prepared: February 1988

Date Revised: May 1991

Table 7. Groundwater monitoring data through 1990—K-25 Site Area 6

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride, mg/L	23/23	2.6	152	29
Dissolved oxygen—I, ppm	36/36	1.1	15.8	4.6
Dissolved oxygen, ppm	36/36	1	15.2	5
Dissolved solids, mg/L	4/4	142	746	310
Fluoride, mg/L	24/32	0.1	11.5	4.5
Nitrate, mg/L	13/23	0.14	1.3	0.61
Sulfate, mg/L	20/23	1.9	61	26
Suspended solids, mg/L	4/4	7	4260	1100
Total coliform, COL/100 mL	11/22	0	64	5.9
Total organic carbon (TOC), mg/L	72/108	1	4	1.8
Total organic halide (Tox), mg/L	17/20	0.011	1.275	0.34
Uranium fluorometric, mg/L	28/66	0.001	0.016	0.0045
pH—I, N/A	36/36	5.2	11.5	7.9
pH, N/A	153/153	5	11.8	7.7
Metals and Elemental Analysis				
Aluminum, mg/L	49/66	0.024	100	10
Antimony, mg/L	3/66	0.058	0.091	0.073
Arsenic, mg/L	6/47	0.006	0.025	0.013
Barium, mg/L	66/66	0.0041	0.95	0.21
Beryllium, mg/L	25/66	0.0003	0.023	0.0044
Boron, mg/L	54/66	0.0046	0.23	0.048
Cadmium, mg/L	13/66	0.003	0.0089	0.0047
Calcium, mg/L	66/66	2.6	78	36
Chromium, mg/L	27/66	0.011	0.14	0.033
Cobalt, mg/L	16/66	0.0053	0.071	0.019
Copper, mg/L	28/65	0.0057	0.18	0.046
Iron, mg/L	49/66	0.0041	150	16
Lead, mg/L	35/66	0.004	0.47	0.043

Table 7 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Lithium, mg/L	61/66	0.0048	0.26	0.032
Magnesium, mg/L	65/66	0.063	60	14
Manganese, mg/L	58/66	0.0013	9.9	0.75
Mercury, mg/L	6/47	0.0002	0.0015	0.00058
Molybdenum, mg/L	4/66	0.01	0.022	0.014
Nickel, mg/L	28/66	0.011	0.24	0.089
Niobium, mg/L	13/66	0.0074	0.018	0.011
Phosphorous, mg/L	14/66	0.25	3.3	1.1
Potassium, mg/L	66/66	1.5	25	9.4
Selenium, mg/L	1/47	0.023	0.023	0.023
Silicon, mg/L	66/66	0.84	79	13
Sodium, mg/L	66/66	0.86	61	22
Strontium—Total, mg/L	13/13	0.048	0.098	0.073
Strontium, mg/L	53/53	0.01	0.37	0.084
Titanium, mg/L	38/66	0.0036	0.73	0.15
Uranium-235, wt %	5/20	0.73	1.07	0.83
Vanadium, mg/L	19/66	0.0046	0.15	0.044
Zinc, mg/L	47/66	0.0026	2.2	0.16
Zirconium, mg/L	19/66	0.0011	0.051	0.014
Radionuclides				
Alpha activity, pCi/L	26/32	0.3	19	5.8
Beta activity, pCi/L	31/32	4	197	56
Strontium, pCi/L	1/1	9	9	9
Technetium-99, pCi/L	3/3	-117	568	190
Thorium-234, pCi/L	3/3	-30	11	-8
BNA and Volatile Organic Analyses				
1,1,1-Trichloroethane, mg/L	1/32	0.024	0.024	0.024
1,1-Dichloroethene, mg/L	2/32	0.005	0.006	0.0055

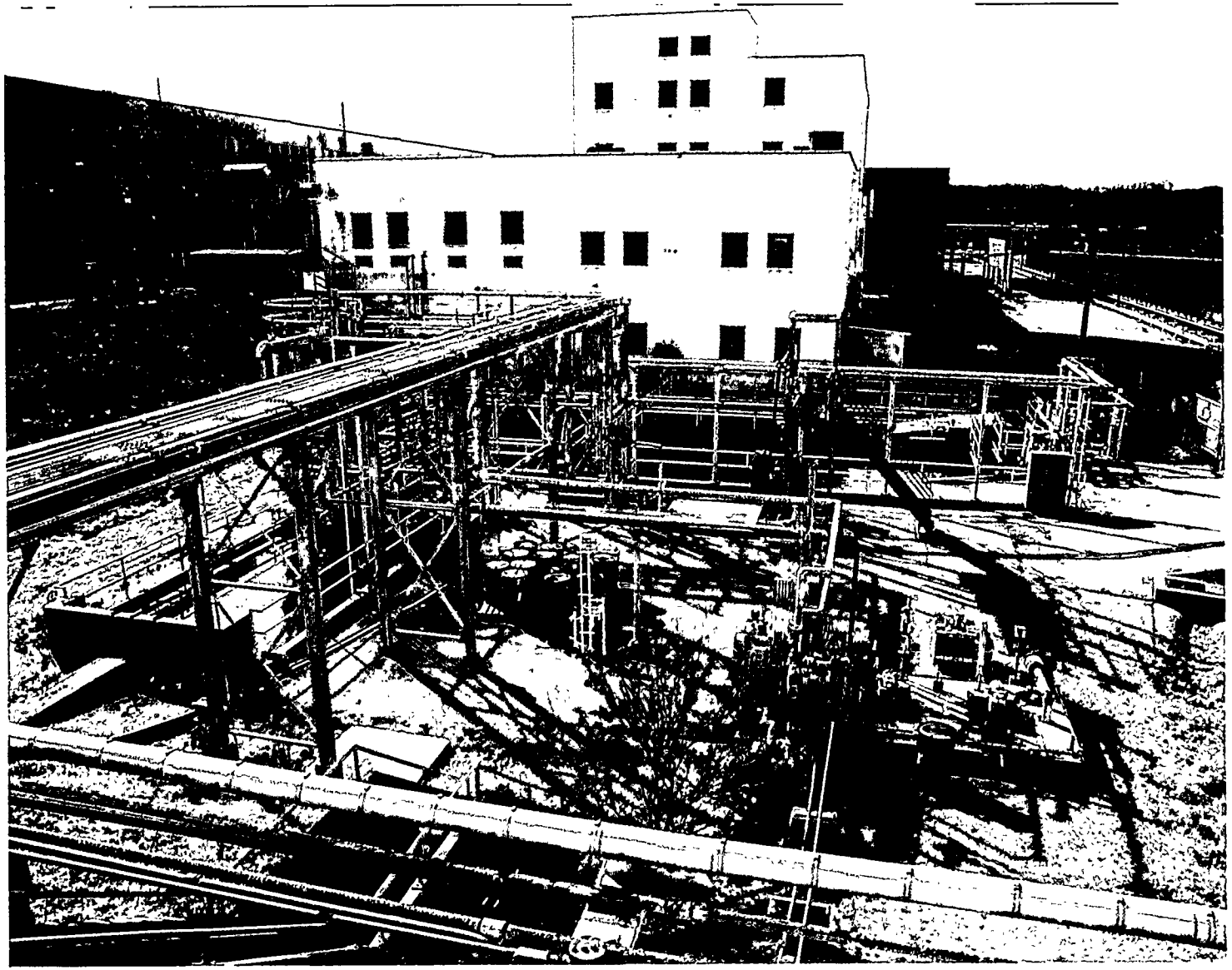
Table 7 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
1,2-Dichloroethene (total), mg/L	3/11	0.006	0.008	0.007
2-Butanone, mg/L	1/32	0.019	0.019	0.019
Acetone, mg/L	1/32	0.014	0.014	0.014
Carbon tetrachloride, mg/L	4/32	0.005	0.013	0.009
Chloroform, mg/L	7/32	0.005	0.017	0.011
Diacetone alcohol, mg/L	1/9	0.003	0.003	0.003
Phenols—Total, mg/L	7/22	0.002	0.02	0.006
Trichloroethene, mg/L	17/32	0.006	0.18	0.054
bis(2-Ethylhexyl)phthalate, mg/L	1/32	0.026	0.026	0.026
di-n-Octylphthalate, mg/L	1/32	0.043	0.043	0.043

PHOTO NO. K/PH-87-0634

K-1232 Chemical Recovery Facility

PHOTO NO. K/PH-87-0600



K-1232 Chemical Recovery Facility (Lagoon Area)

Area 7 Site Descriptions

Unit Name: K-27/-29 Recirculating Cooling Water Lines

Unit Number: K07-C003h

Regulatory Status: CERCLA

Unit Location: Area 7, process area, west of the K-27/-29 buildings (Map Ref. No. 109)

Approximate Dimensions and Capacity: 2900 lin ft, 3–10 ft deep, 16–54 in. in diameter; 55,000 gal/min

Dates Operated: 1945–1985

Present Function: Unused

Life Cycle Operation: Recirculation cooling process waters to cool heat transfer systems

Waste Characteristics: A chromate/zinc/phosphate treatment was used to prevent RCW system scaling.

Release Data: There have been five known releases of potentially hazardous materials from different operating parts of the K-27/-29 RCW lines. In 1958 a supply header sank sufficiently to break a building header in K-27. In 1968, riser pipes developed leaks at and below ground level. Repairs included welding on steel sleeves, taping, painting, and backfilling with clay instead of gravel to prevent external corrosion. In 1969 a header break occurred, caused by subjection to excessively high pressure and probably promoted by the use of concentrated acid cleaning of K-27 coolers earlier. In 1975 a supply header developed a leak, caused by attack from galvanic corrosion. Gravel was replaced by clay to arrest corrosion. In 1979 the 54-in. header supplying the tower risers developed a leak. A cover sleeve was welded over the pipe, and clay backfill was added.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 8)

Comments: This site is part of the K-29 OU. It is also part of the K-27/-29 RCW system, which also includes the K-832 Pumphouse and K-832-H Cooling Tower.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

Table 8. Groundwater monitoring data through 1990—K-25 Site Area 7

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	33/33	9	27	18
Chloride, mg/L	21/21	9	25	19
Dissolved oxygen—I, ppm	54/54	0.4	7.8	3.5
Dissolved oxygen, ppm	54/54	1.2	10.3	4.7
Dissolved solids, mg/L	33/33	166	424	250
Fluoride by specific ion electrode, mg/L	14/16	0.1	2	0.41
Fluoride, mg/L	21/38	0.1	2.2	0.35
Nitrate, mg/L	44/54	0.2	4	1.1
Sulfate, mg/L	54/54	4	100	29
Suspended solids, mg/L	32/33	1	960	130
Total coliform, COL/100 mL	6/33	1	22	7.8
Total organic carbon (TOC), mg/L	104/216	1	4	1.6
Total organic halide (Tox), mg/L	178/216	0.01	0.524	0.072
Uranium fluorometric, mg/L	22/108	0.001	0.006	0.0016
pH—I, N/A	54/54	3.3	9.2	7.3
pH, N/A	270/270	1.9	9.3	7
Metals and Elemental Analysis				
Aluminum, mg/L	86/108	0.022	20	1.8
Arsenic, mg/L	1/108	0.006	0.006	0.006
Barium, mg/L	108/108	0.014	0.18	0.043
Benzene, mg/L	1/54	0.006	0.006	0.006
Beryllium, mg/L	22/108	0.00032	0.003	0.00088
Boron, mg/L	87/108	0.0052	2.3	0.22
Cadmium, mg/L	24/108	0.003	0.027	0.0066
Calcium, mg/L	108/108	3.3	100	48
Chromium, mg/L	61/108	0.01	1.5	0.095
Cobalt, mg/L	16/108	0.0052	0.023	0.012

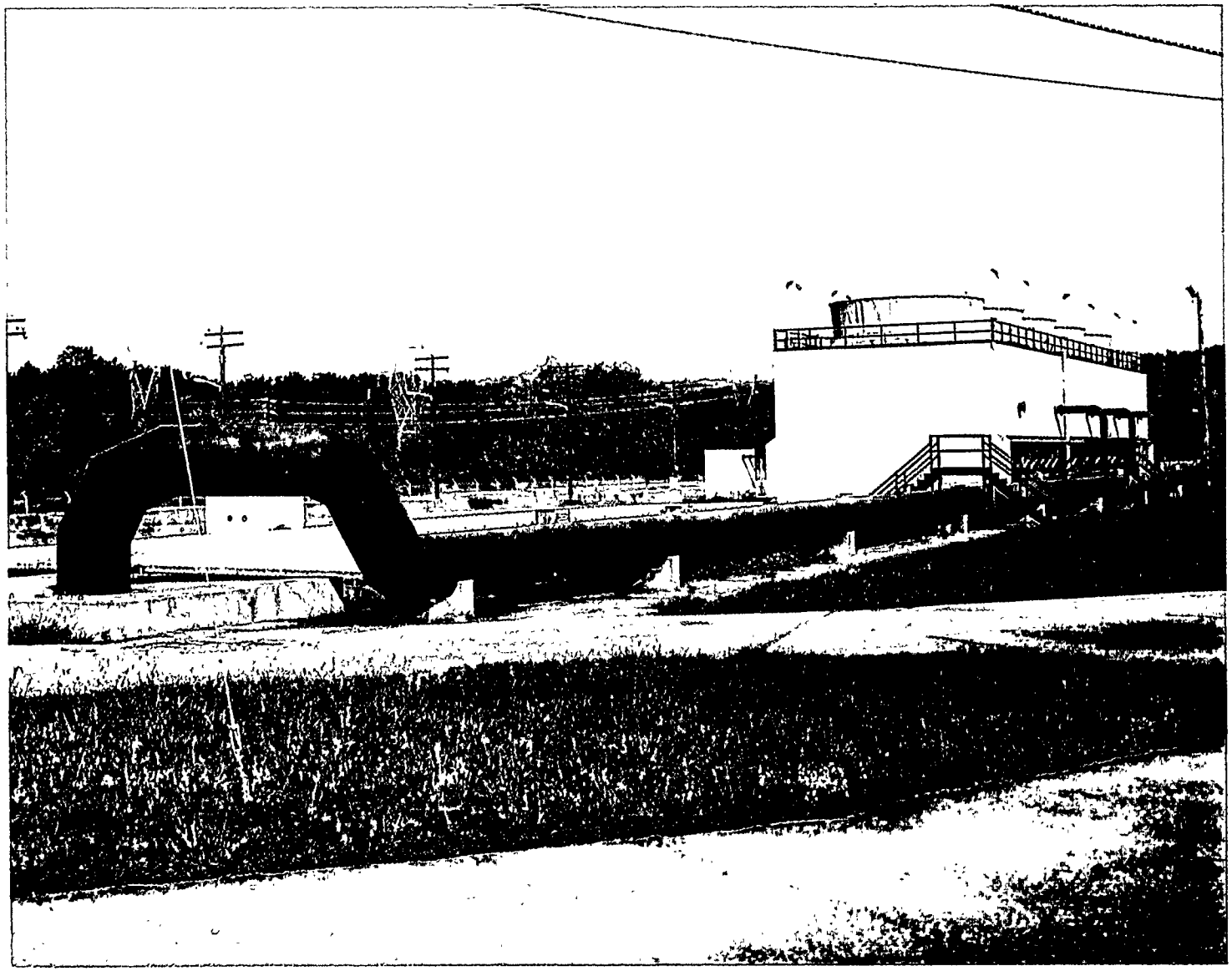
Table 8 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Copper, mg/L	44/108	0.0042	0.067	0.018
Iron, mg/L	84/108	0.0043	31	3.1
Lead, mg/L	30/108	0.004	0.03	0.011
Lithium, mg/L	64/108	0.004	0.051	0.013
Magnesium, mg/L	108/108	2.4	60	19
Manganese, mg/L	101/108	0.0014	15	1.6
Mercury, mg/L	2/108	0.00029	0.00034	0.00032
Molybdenum, mg/L	17/108	0.011	0.043	0.02
Nickel, mg/L	63/108	0.011	0.15	0.031
Niobium, mg/L	13/108	0.0071	0.014	0.0093
Phosphorous, mg/L	17/108	0.21	0.74	0.34
Potassium, mg/L	108/108	0.8	31	4.3
Silicon, mg/L	108/108	1.3	29	5.1
Sodium, mg/L	108/108	1.6	140	19
Strontium, mg/L	108/108	0.02	0.92	0.085
Titanium, mg/L	81/108	0.0031	0.19	0.025
Uranium-235, wt %	4/40	0.38	0.76	0.64
Vanadium, mg/L	18/108	0.0052	0.032	0.013
Zinc, mg/L	80/108	0.0011	0.13	0.022
Zirconium, mg/L	2/108	0.0059	0.0063	0.0061
Radionuclides				
Alpha activity, pCi/L	61/61	-1	6	1.5
Beta activity, pCi/L	61/61	0.9	48	21
BNA and Volatile Organic Analyses				
1,2-Dichloroethene (total), mg/L	11/54	0.006	0.055	0.026
Carbon tetrachloride, mg/L	1/54	0.011	0.011	0.011
Chloroform, mg/L	5/54	0.002	0.01	0.0064
Tetrachloroethene, mg/L	1/54	0.001	0.001	0.001

Table 8 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Trichloroethene, mg/L	35/54	0.009	0.4	0.069
Unknown siloxane, mg/L	15/15	0.026	0.11	0.049
Unknown, mg/L	9/9	0.01	0.052	0.02
Vinyl chloride, mg/L	1/54	0.02	0.02	0.02
bis(2-Ethylhexyl)phthalate, mg/L	5/54	0.011	0.75	0.24

PHOTO NO. K/PH-91-3125



K-27/-29 Recirculating Cooling Water Lines

Unit Name: K-732 Switchyard

Unit Number: K07-R075b

Regulatory Status: RCRA

Unit Location: Area 7, process area, west of the K-27/-29 buildings (Map Ref. No. 110)

Approximate Dimensions and Capacity: 400 by 500 ft

Dates Operated: 1945 to present

Present Function: Transfer of electrical power to the K-25 Site

Life Cycle Operation: The K-732 Switchyard was originally built to serve the K-27/-29 cascades and now serves as the primary power center for the K-25 Site. A series of French drains was installed immediately under the gravel beds in 1975. In 1980–1981, oil skimmers were installed for runoff water.

Waste Characteristics: PCBs are the only known contaminants from this unit.

Release Data: In 1982, equipment failure at the K-732 switchyard resulted in the release of ~2900 gal of PCB-containing oil. Several days later, an oily film was observed on Poplar Creek. The film was traced to a valve sump pump that drained to Poplar Creek via a storm drain to the west of the switch house. The drain was rerouted to a skimmer pit.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Surface water, soil, and sludge

Comments: This site is also known as the K-27 substation. It is part of the K-29 OU.

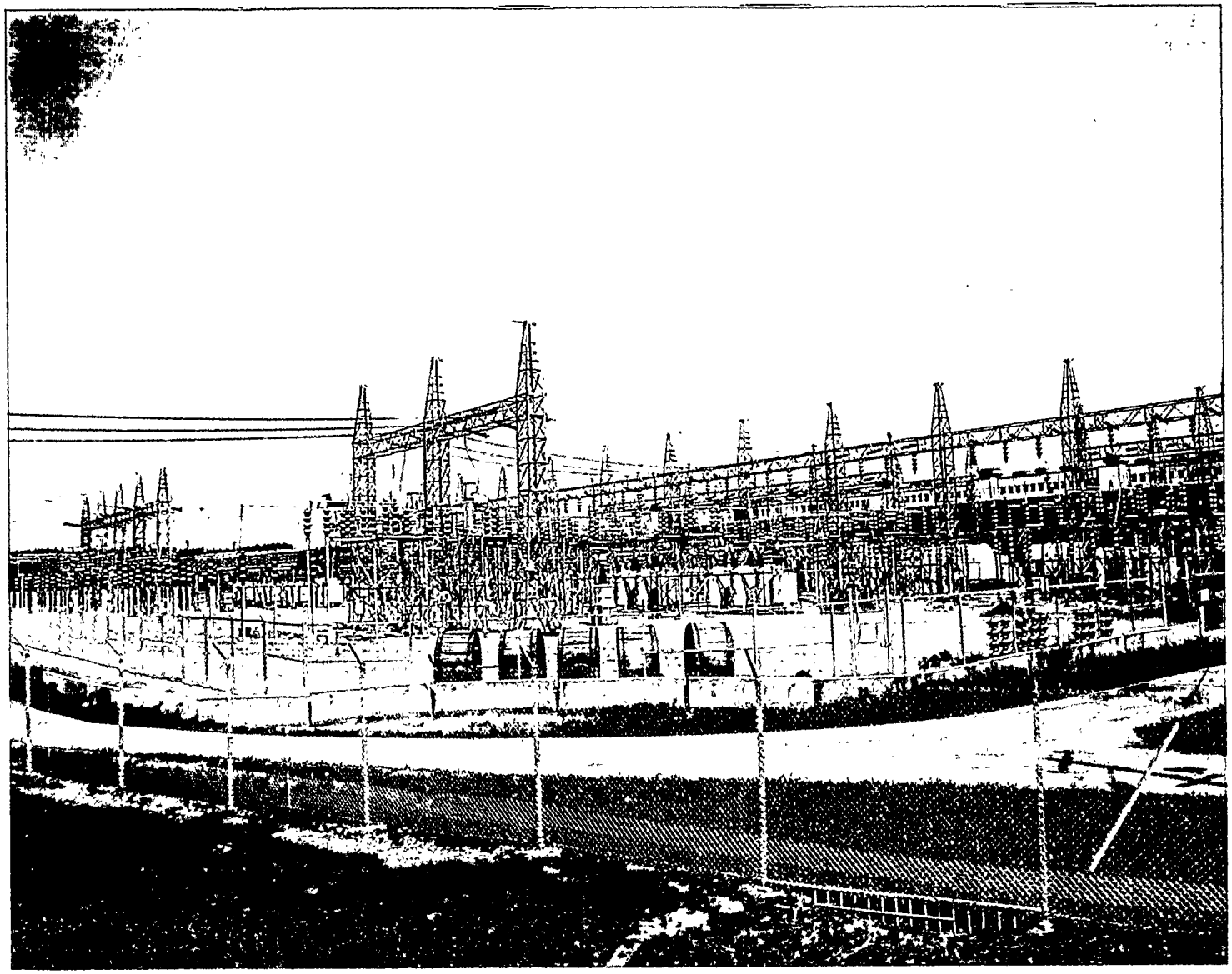
References:

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, Martin Marietta Energy Systems, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3155



K-732 Switchyard

Unit Name: K-832-H Cooling Tower Basin

Unit Number: K07-C003i

Regulatory Status: CERCLA

Unit Location: Area 7, process plant area, west of the K-27/-29 buildings (Map Ref. No. 61)

Approximate Dimensions and Capacity: Basin dimensions are 350 × 65 × 13 ft. Original tower had 55,000-gal/min capacity, and new tower had 25,000-gal/min capacity at shutdown.

Dates Operated: 1945–1985

Present Function: Unused

Life Cycle Operation: Began operation in 1945 as part of K-29 cascade RCW system. The original 14-cell tower was replaced with a 5-cell tower in 1985, two months before the tower was shut down at the cessation of ORGDP operations.

Waste Characteristics: A chromate/zinc/phosphate treatment was used to prevent RCW system scaling.

Release Data: In 1958 a supply header sank sufficiently to break a building header in K-27. In 1968, riser pipes developed leaks at and below ground level. Repairs included welding on steel sleeves, taping, painting, and backfilling with clay instead of gravel to prevent external corrosion. In 1969 a header break occurred, caused by subjection to excessively high pressure and probably promoted by the use of concentrated acid cleaning of K-27 coolers earlier. In 1975 a supply header developed a leak, caused by attack from galvanic corrosion. Gravel was replaced by clay to arrest corrosion. In 1979 the 54-in. header supplying the tower risers developed a leak. A cover sleeve was welded over the pipe, and clay backfill was added.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 8)

Comments: This unit is part of the K-29 OU. The cooling tower basin is part of the K-27/-29 RCW system, which also includes the K-832 Pumphouse. The K-832-H Cooling Tower is also known as the K-832-C.

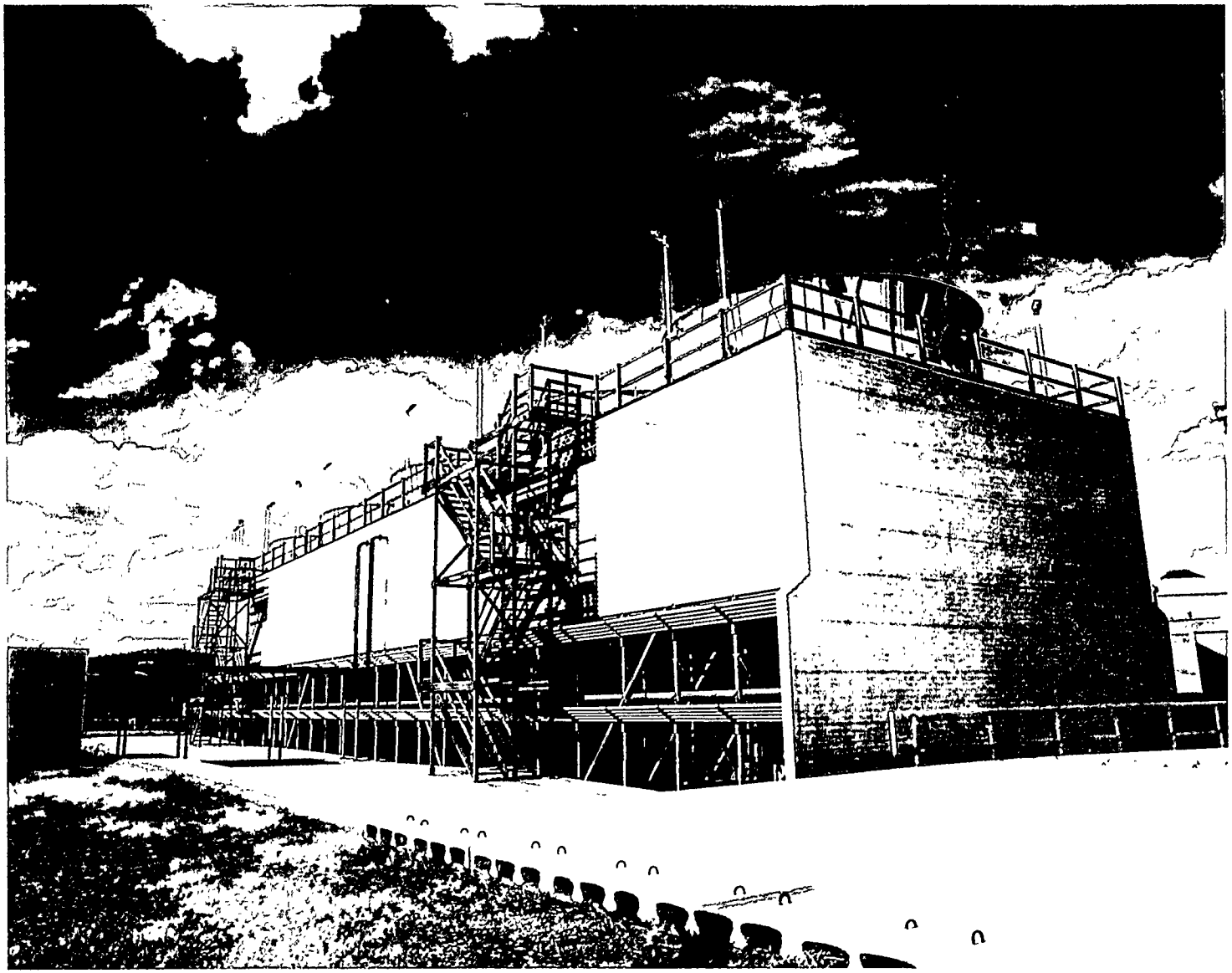
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0627



K-832-H Cooling Tower Basin

Unit Name: K-1203 Sewage Treatment Plant

Unit Number: K07-R085

Regulatory Status: 3004.u

Unit Location: Area 7, process area, southwest of the K-27 Uranium Enrichment Building complex and south of the K-633 Test Loop Facility (Map Ref. No. 96)

Approximate Dimensions and Capacity: The K-1203 Sewage Treatment Plant occupies a land area of ~3 acres. The capacities of the clarifier/aeration unit are 600,000-gal/d average flow and 1,800,000-gal/d maximum flow.

Dates Operated: Original plant configuration 1943–1976; present plant configuration 1976 to present

Present Function: Processes the treatment of the K-25 area sanitary sewage flows prior to discharge into Poplar Creek

Life Cycle Operation: The K-1203 Sewage Treatment Plant in its original configuration was placed in service in 1943. The plant consisted of two Imhoff tanks, a pump house, a battery of sludge-drying beds, a chlorine contact basin with a chlorine feed/control system, a sewage lift station, and a high-water lift station.

In September 1976, the present configuration was placed in service. The Imhoff tanks were removed and replaced with a 420-gal/min clarifier/aeration unit. This unit, 98 ft in diameter and 15 ft deep, is designed for an average flow of 600,000 gal/d and a maximum flow of 1.8 million gal/d. The process consists of two main stages: aeration and clarification (settling). Within the aeration compartment, the raw sewage is mixed with return sludge to form a mixed liquor, which is aerated for ~24 h. Then the mixed liquor flows into the clarification compartment, where the suspended solids and liquid are separated by gravity. The separated solids, consisting mainly of active organisms, are returned to the aeration compartment, while the clarified liquid flows out of the unit to the chlorination contact basin.

In the present configuration, chlorine is fed at the contact basin inlet to maintain a 0.7- to 1.2-ppm chlorine level in the basin at a retention rate of ~30 min, for disinfection of all pathogenic bacteria. At the basin outlet, the flow is dechlorinated to meet the maximum permissible chlorine residual of 0.24 ppm before discharge into Poplar Creek.

At one time the K-1203 sludge was given the drying-bed treatment and then disposed of at the K-1070-B and K-1070-C/D Classified Burial Grounds, but this practice was discontinued because of findings of uranium in the sludge. Currently, the sludge is containerized, awaiting probable processing through the TSCA Incinerator.

The main Imhoff tank (95,000-gal capacity) of the original configuration remains on standby. It is valved in during heavy rains as a side stream emergency holding basin to

minimize the hydraulic overloading of the K-1203 extended aeration treatment facility (present configuration). Its contents are then pumped into the normal treatment plant influent line as conditions permit. The east Imhoff tank is inoperable.

Waste Characteristics: The treatment facility is provided for handling sanitary sewage.

The Environmental Monitoring Station equipment at K-1203-B assures compliance with the effluent limitations and monitoring requirement as set forth in the NPDES permit (TN 0002950). The effluent samples for dissolved oxygen, suspended solids, and pH are taken at the discharge end of the chlorine contact tank.

Release Data: No known releases. The potential did exist for trace quantities of radioactive contamination to get into the sewage system via the laundry or change house facilities. The resulting contamination will be evaluated in the PA/SI. At one time the largest contributor was ^{99}Te, and the maximum release rate was judged to be 4.7×10^{-2} Ci/year. The treated effluent from K-1203 is monitored for uranium and technetium.

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Area stream—Poplar Creek

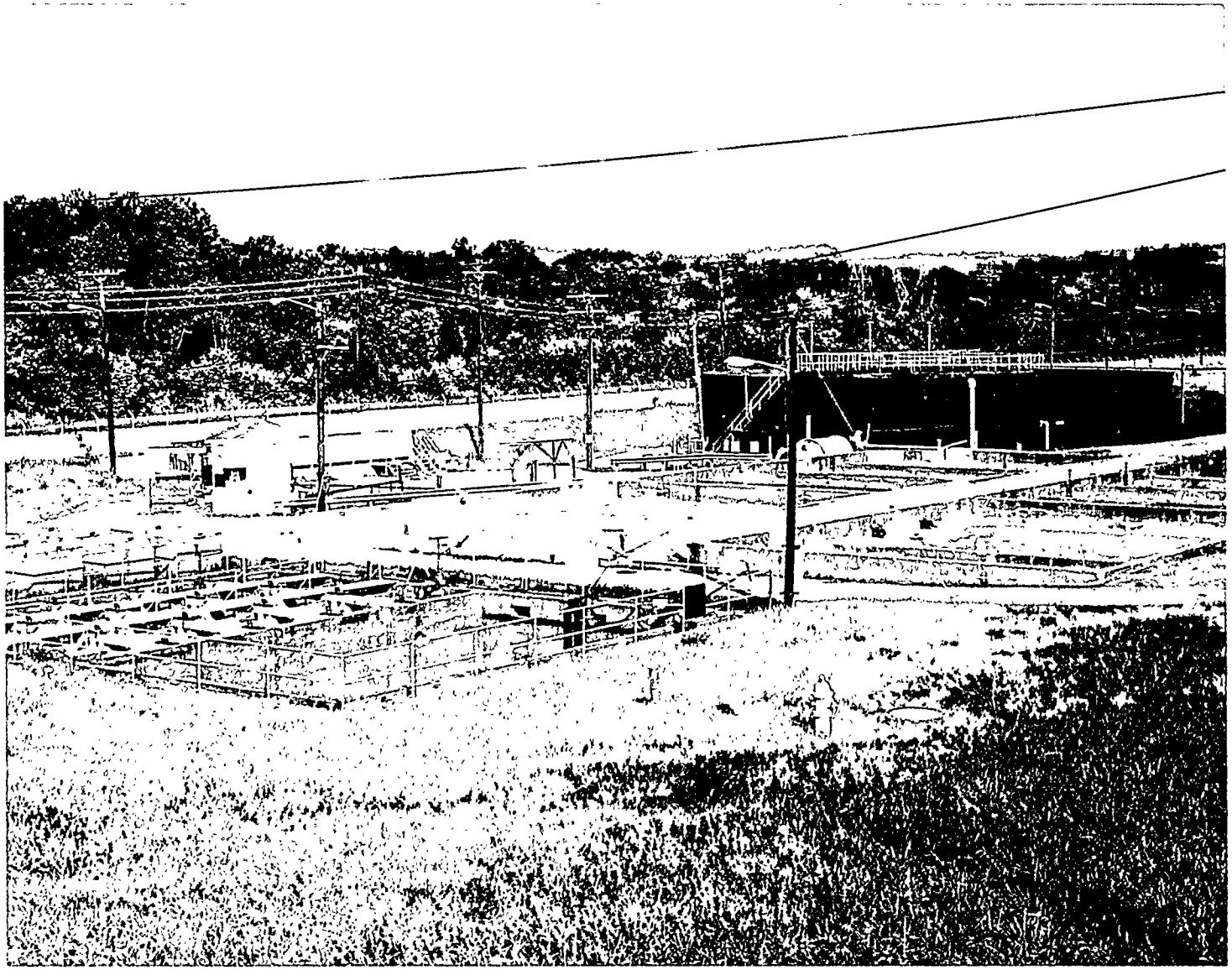
Comments: The K-1203 Sewage Treatment Plant adjoins Poplar Creek. In the event of a maximum possible flood situation, the complex could be inundated. Under this condition, an uncontrolled release of sewage is likely to occur. The shutdown of the uranium enrichment operations has much reduced the chance for release of toxic, chemical, and radioactive liquid wastes into the sewage system. The K-1203 Sewage Treatment Plant is part of the K-29 OU.

References:

Final Safety Analysis Report, Oak Ridge Gaseous Diffusion Plant, K/D 5604, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1985.

Date Prepared: May 1991

PHOTO NO. K/PH-91-3123



K-1203 Sewage Treatment Plant

Area 8 Site Descriptions

Unit Name: Duct Island Road

Unit Number: K08-0002

Regulatory Status: 3004.u

Unit Location: Area 8, exterior plant area, on the peninsula formed by Poplar Creek before its confluence with the Clinch River (Map Ref. No. 97)

Approximate Dimensions and Capacity: 2800 ft long

Dates Operated: Mineral oil was sprayed on the road in 1982.

Present Function: This road is still in use.

Life Cycle Operation: Oil was sprayed on the road to suppress dust in 1982. The oil was applied with sprayers attached to drums that were carried by trucks.

Waste Characteristics: The oils used for dust suppression had been tested and rejected if they contained uranium, chlorinated hydrocarbons above the 1% level, or PCBs greater than 5 ppm.

Release Data: The mineral oil used for dust suppression had been used as a cascade diffusion motor lubricant and thus may have contained residual metal contamination.

Site Characterization Status: A preliminary assessment/site inspection has been conducted for this unit. The result of the study indicated that the site poses no risk to human health or the environment; consequently, no further action will be taken to characterize the site.

Media of Concern: Soil

Comments: This site is grouped in a SWMU with the K-1070-F Construction Spoil Area, K-900 Bottle Smasher, and Area 8 Groundwater.

References:

Remedial Site Investigation Report on Duct Island Road, Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-16&D0, Martin Marietta Energy Systems, Inc., Oak Ridge K-25 Site, Oak Ridge, Tenn., January 1991.

Date Prepared: May 1991

PHOTO NO. K/PH-91-3131

Duct Island Road

Unit Name: K-900 Bottle Smasher

Unit Number: K08-R025

Regulatory Status: RCRA

Unit Location: Area 8, plant exterior, in the K-1070-F SWMU cluster near the confluence of Poplar Creek and the Clinch River (Map Ref. No. 26)

Approximate Dimensions and Capacity: 3- × 5- × 2-ft box

Dates Operated: 1980 to about 1988

Present Function: Disposal of bottles of organic materials

Life Cycle Operation: Bottles of organic chemicals were crushed in the bottle smasher; then the contents of the bottles were reacted using a heating element. The operation was controlled from a bunker 150 ft from the smasher unit.

Waste Characteristics: Waste chemicals that have been disposed of at this unit include methyl ethyl ketone peroxide; anhydrous ether; isopropyl ether; 1,4 dioxane; and 2,4 dinitrophenyldydrazine. These materials and other sensitive materials were generated in small quantities on a very infrequent basis.

Release Data: The only release of material from this site would be during the ignition of the waste materials.

Site Characterization Status: A sampling plan was written and implemented to verify that organic constituents had not been released from this unit. Because the wastes disposed of at the unit were primarily organic compounds, an organic analysis was performed. The results of the analysis are shown in document referenced below. A preliminary assessment/site investigation is planned for this site.

Media of Concern: Soil

Comments: This site is located within the K-1070-F Construction Spoil Area.

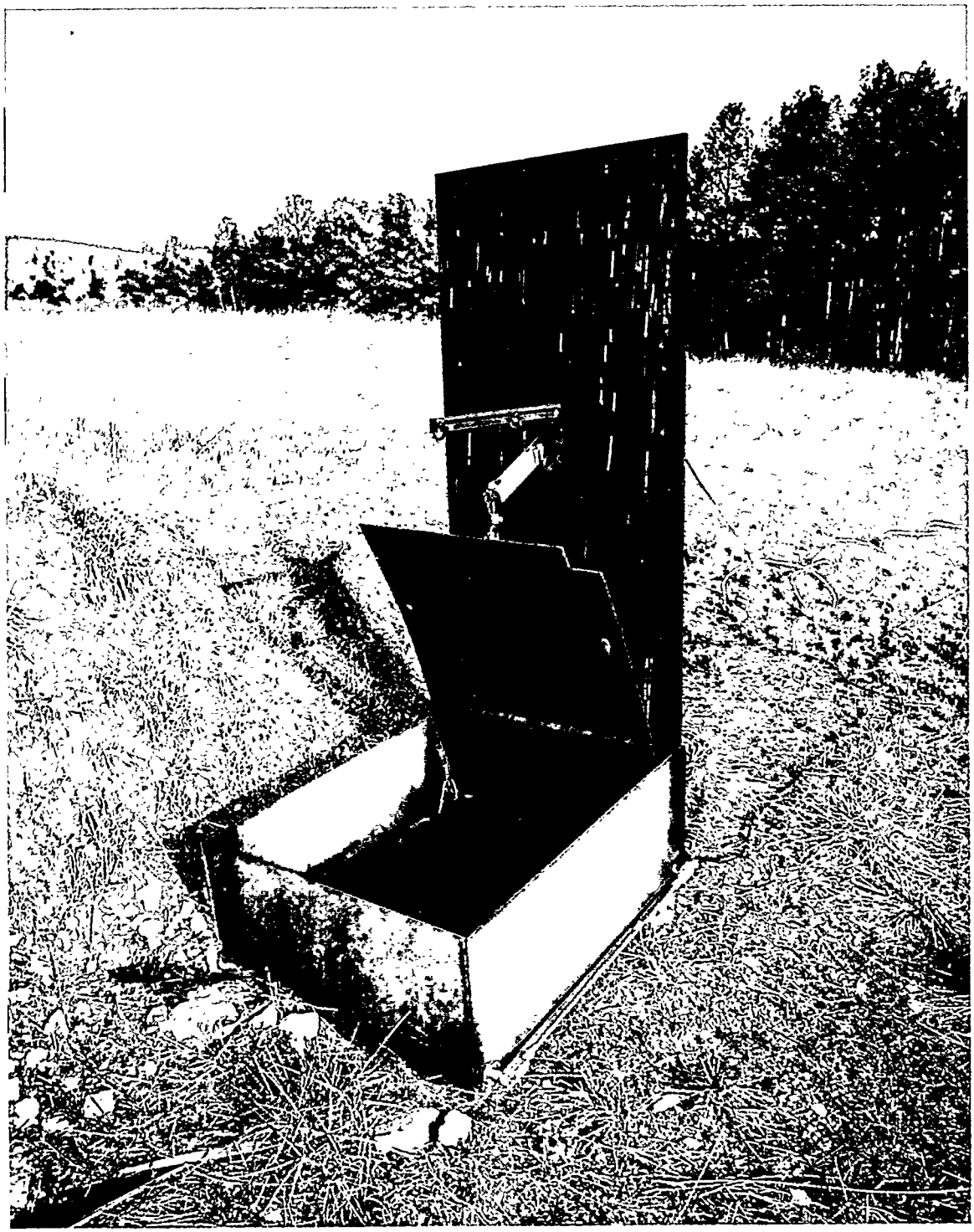
References:

RCRA Facility Investigation Plan, K-1070-F Old Contractors' Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-146, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0624



K-900 Bottle Smasher

Unit Name: K-1070-F Construction Spoil Area

Unit Number: K08-R018

Regulatory Status: 3004.u

Unit Location: Area 8, plant exterior, in the K-1070-F SWMU cluster near the confluence of Poplar Creek and the Clinch River (Map Ref. No. 18)

Approximate Dimensions and Capacity: ~5 acres

Dates Operated: Early 1970s to 1978

Present Function: Unused

Life Cycle Operation: Burial of construction rubble

Waste Characteristics: Wood, concrete, roofing, soil, asphalt, and general construction rubble. There is no evidence that hazardous or radioactive constituents were buried at this unit. However, records are not available for the materials buried in the early 1970s.

Release Data: No known releases

Site Characterization Status: A preliminary assessment/site inspection is planned for this site.

Media of Concern: Groundwater (see Table 9)

Comments: This site is also known as the K-1070-F Old Contractors Burial Ground.

References:

RCRA Facility Investigation Plan, K-1070-F Old Contractors' Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-146, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusin Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

Table 9. Groundwater monitoring data through 1990—K-25 Site Area 8

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride, mg/L	24/24	1	8.4	1.9
Dissolved oxygen—I, ppm	34/34	0.3	6.5	2.7
Dissolved oxygen, ppm	34/34	1	10.2	4.5
Fluoride, mg/L	19/29	0.1	21	1.9
Nitrate, mg/L	12/24	0.11	0.56	0.31
Sulfate, mg/L	24/24	4.5	34	13
Total coliform, COL/100 mL	14/18	0	15	5.2
Total organic carbon (TOC), mg/L	87/121	1	4	2.1
Total organic halide (Tox), mg/L	19/29	0.013	0.062	0.027
Uranium fluorometric, mg/L	30/58	0.001	0.014	0.0039
pH—I, N/A	34/34	5	9.9	7.7
pH, N/A	150/150	6.2	9.9	7.9
Metals and Elemental Analysis				
Aluminum, mg/L	43/58	0.022	26	1.8
Antimony, mg/L	3/58	0.059	0.15	0.093
Arsenic, mg/L	3/48	0.006	0.018	0.011
Barium, mg/L	57/58	0.0018	0.56	0.087
Beryllium, mg/L	10/58	0.0003	0.0018	0.0007
Boron, mg/L	53/58	0.0066	2.3	0.51
Cadmium, mg/L	7/58	0.0034	0.011	0.0058
Calcium, mg/L	58/58	0.74	1500	120
Chromium, mg/L	9/58	0.01	0.037	0.021
Cobalt, mg/L	3/58	0.0054	0.015	0.009
Copper, mg/L	24/58	0.004	0.092	0.023
Iron, mg/L	49/58	0.007	45	2.4
Lead, mg/L	17/58	0.004	0.106	0.024
Lithium, mg/L	33/58	0.0043	0.11	0.05
Magnesium, mg/L	58/58	0.21	52	13

Table 9 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Manganese, mg/L	55/58	0.001	1.3	0.089
Mercury, mg/L	1/48	0.0002	0.0002	0.0002
Molybdenum, mg/L	11/58	0.01	0.033	0.019
Nickel, mg/L	19/58	0.011	0.095	0.038
Niobium, mg/L	12/58	0.0071	0.022	0.011
Phosphorous, mg/L	6/58	0.28	0.47	0.34
Potassium, mg/L	55/58	0.68	54	9.9
Silicon, mg/L	58/58	0.73	36	6.1
Silver, mg/L	3/58	0.0065	0.022	0.012
Sodium, mg/L	58/58	0.94	210	51
Strontium—Total, mg/L	6/6	0.12	0.61	0.28
Strontium, mg/L	52/52	0.011	1.6	0.42
Sulfur, mg/L	1/1	0.002	0.002	0.002
Titanium, mg/L	42/58	0.0032	0.49	0.034
Uranium-235, wt %	2/3	0.71	0.72	0.71
Vanadium, mg/L	13/58	0.004	0.044	0.013
Zinc, mg/L	44/58	0.0017	0.35	0.036
Zirconium, mg/L	4/58	0.0052	0.016	0.0096
Radionuclides				
Alpha activity, pCi/L	22/29	-4	13	2.9
Beta activity, pCi/L	24/29	-8	34	10
BNA and volatile organic analyses				
2-Heptanone, mg/L	2/11	0.028	0.14	0.084
Acetone, mg/L	3/24	0.024	0.043	0.031
Aliphatic hydrocarbons, mg/L	16/16	0.001	0.005	0.0025
Alkyl substituted phenol, mg/L	2/2	0.024	0.041	0.033
Bromodichloromethane, mg/L	1/24	0.006	0.006	0.006
Diacetone alcohol, mg/L	2/10	0.028	0.14	0.084

Table 9 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Freon 113, mg/L	3/3	0.001	0.051	0.032
Hexamethylcyclotrisiloxane, mg/L	4/5	0.002	0.003	0.0023
Methylene chloride, mg/L	1/24	0.012	0.012	0.012
Palmitic acid, mg/L	1/1	0.018	0.018	0.018
Phenols—Total, mg/L	15/23	0.001	0.018	0.0063
Phthalate ester, mg/L	1/2	0.007	0.007	0.007
Probable hydrocarbon, mg/L	7/9	0.005	0.06	0.033
Probable siloxane, mg/L	1/1	0.007	0.007	0.007
Trichloroethene, mg/L	3/24	0.009	0.031	0.017
Unknown acid, mg/L	2/2	0.006	0.019	0.013
Unknown alcohol, mg/L	1/1	0.039	0.039	0.039
Unknown ester, mg/L	1/1	0.11	0.11	0.11
Unknown, mg/L	15/15	0.004	0.015	0.0082
bis(2-Ethylhexyl)phthalate, mg/L	5/24	0.006	0.051	0.027
trans-1,2-Dichloroethene, mg/L	1/22	0.005	0.005	0.005

PHOTO NO. K/PH-87-0623

K-1070-F Construction Spoil Area

Area 9 Site Descriptions

Unit Name: K-31 Recirculating Cooling Water Lines

Unit Number: K09-C003j

Regulatory Status: CERCLA

Unit Location: Area 9, process area, immediately northwest of the K-25 building (Map Ref. No. 98)

Approximate Dimensions and Capacity: 10,000 lin ft, 3–7 ft deep, 24–48 in. in diameter; 87,000 gal/min

Dates Operated: 1951–1985

Present Function: Unused

Life Cycle Operation: System provided RCW for K-31 cascade. System has been out of use since ORGDP ceased operations in 1985.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control throughout operations. In 1969, the Martreat treatment was used to control biological attack in the system's cooling tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate.

Release Data: In 1956, a leak caused by localized galvanic action occurred in the south K-862 supply header. Cathodic protection systems were installed. In 1968, seepage occurred at ground level.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 10)

Comments: This site is part of the K-33 OU. The entire K-31 RCW system includes the K-862 pumphouse and the K-861 Cooling Tower Basin. The pumphouse is in the decontamination and decommissioning program.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

Table 10. Groundwater monitoring data through 1990—K-25 Site Area 9

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	34/34	1	69	21
Chloride, mg/L	24/24	5	74	26
Dissolved oxygen—I, ppm	58/58	0.6	8.5	2.9
Dissolved oxygen, ppm	58/58	0.7	7.7	3
Dissolved solids, mg/L	34/34	158	866	350
Fluoride by specific ion electrode, mg/L	19/23	0.1	0.4	0.19
Fluoride, mg/L	9/35	0.2	0.3	0.23
Nitrate, mg/L	46/58	0.3	2	0.78
Sulfate, mg/L	58/58	5	559	100
Suspended solids, mg/L	25/34	1	296	50
Total coliform, COL/100 mL	8/34	1	262	68
Total organic carbon (TOC), mg/L	166/232	1	6	1.9
Total organic halide (Tox), mg/L	116/232	0.01	0.059	0.02
Uranium fluorometric, mg/L	38/115	0.001	0.009	0.0022
pH—I, N/A	58/58	5.3	9.9	7.7
pH, N/A	289/289	5.5	8.2	6.8
Metals and Elemental Analysis				
Aluminum, mg/L	96/115	0.021	61	1.5
Arsenic, mg/L	10/115	0.0055	0.018	0.012
Barium, mg/L	115/115	0.017	0.28	0.076
Beryllium, mg/L	14/115	0.0003	0.0054	0.00087
Boron, mg/L	100/115	0.0062	0.21	0.051
Cadmium, mg/L	26/115	0.003	0.019	0.0062
Calcium, mg/L	115/115	17	190	92
Chromium, mg/L	62/115	0.011	0.71	0.11
Cobalt, mg/L	29/115	0.005	0.12	0.022
Copper, mg/L	56/115	0.0041	0.089	0.012

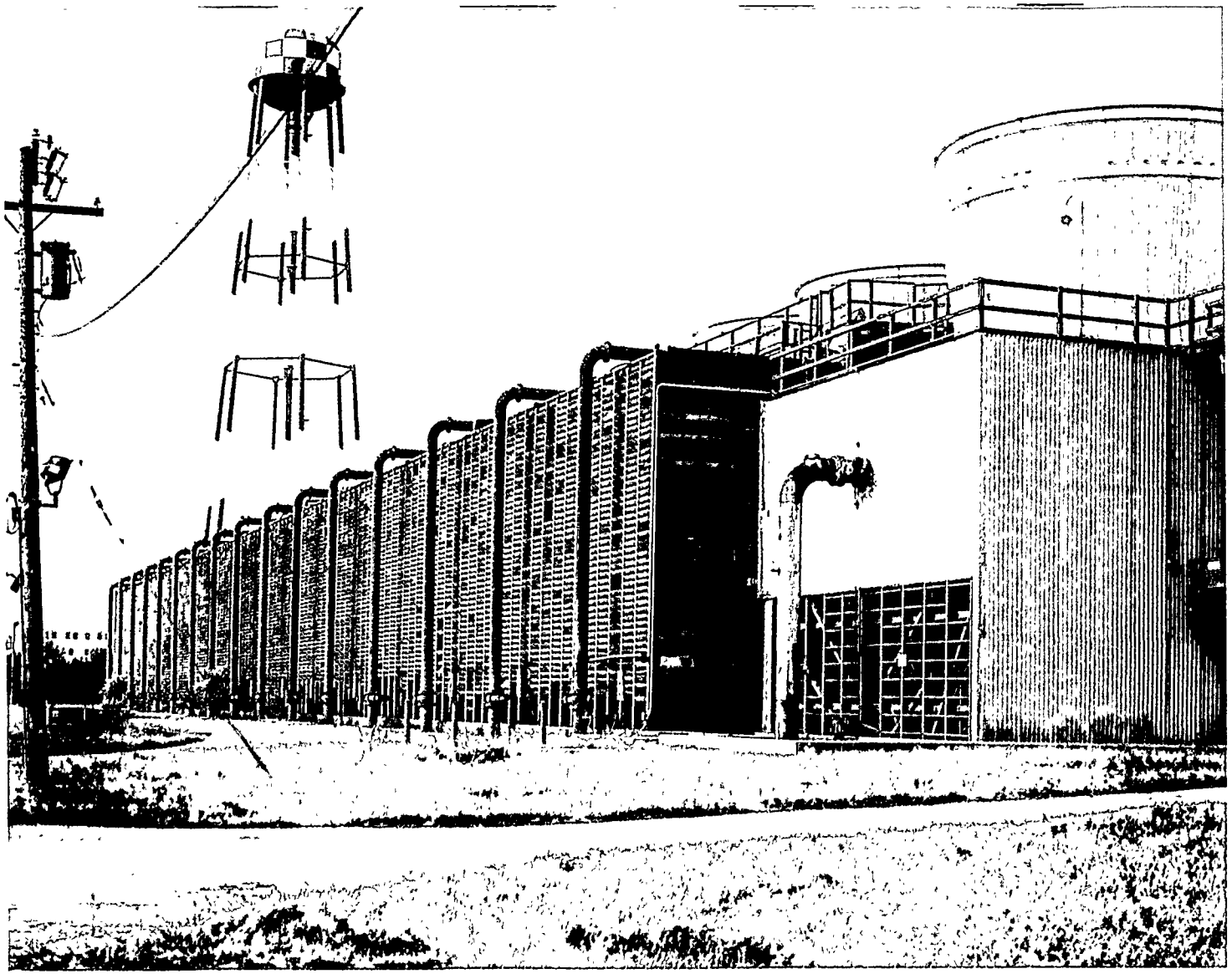
Table 10 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Iron, mg/L	71/115	0.0042	76	3.6
Lead, mg/L	25/115	0.0041	0.044	0.0079
Lithium, mg/L	23/115	0.004	0.063	0.013
Magnesium, mg/L	115/115	2.3	27	14
Manganese, mg/L	104/115	0.001	9.9	1.2
Mercury, mg/L	1/115	0.00043	0.00043	0.00043
Molybdenum, mg/L	11/115	0.01	0.047	0.02
Nickel, mg/L	34/115	0.01	0.98	0.17
Niobium, mg/L	25/115	0.0073	0.019	0.011
Phosphorous, mg/L	23/115	0.21	2	0.49
Potassium, mg/L	112/115	0.64	16	3.8
Silicon, mg/L	115/115	0.87	28	4.8
Silver, mg/L	3/115	0.0072	0.0081	0.0077
Sodium, mg/L	115/115	2.6	110	21
Strontium—Total, mg/L	15/15	0.099	0.24	0.19
Strontium, mg/L	100/100	0.027	0.39	0.15
Titanium, mg/L	69/115	0.003	0.14	0.018
Uranium-235, wt %	1/43	1.39	1.39	1.4
Vanadium, mg/L	5/115	0.006	0.07	0.029
Zinc, mg/L	99/115	0.0015	0.26	0.027
Zirconium, mg/L	1/115	0.0098	0.0098	0.0098
	Radionuclides			
Alpha activity, pCi/L	64/64	-5	6.8	1.4
Beta activity, pCi/L	64/64	-1.2	44.23	13
BNA and Volatile Organic Analyses				
1,1,1-Trichloroethane, mg/L	3/58	0.007	0.017	0.012
1,2-Dichloroethene (total), mg/L	3/58	0.019	0.041	0.027
2-Butanone, mg/L	1/58	0.011	0.011	0.011

Table 10 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Chloroform, mg/L	2/58	0.0008	0.006	0.0034
Trichloroethene, mg/L	9/58	0.002	0.052	0.018
Unknown, mg/L	2/5	0.009	0.013	0.011
bis(2-Ethylhexyl)phthalate, mg/L	2/57	0.012	0.013	0.013

PHOTO NO. K/PH-91-3128



K-31 Recirculating Cooling Water Lines

Unit Name: K-33 ANDCO Water Treatment Unit

Unit Number: K09-R041

Regulatory Status: 3004.u

Unit Location: Area 9, plant exterior, near the K-33 building in the process area of the K-25 Site (Map Ref. No. 42)

Approximate Dimensions and Capacity: Rated capacity, 864,000 gal/d

Dates Operated: 1970s to 1986

Present Function: Unused

Life Cycle Operation: Reduction of hexavalent chromium to trivalent chromium

Waste Characteristics: Wastewater consists of cooling water used in the enrichment process. The water contains chromium, which was used as a corrosion inhibitor. The waste was reduced from the soluble Cr^{6+} to the insoluble Cr^{3+} in the ANDCO unit.

Release Data: The treatment unit is in an enclosed building, and no releases have been known to occur.

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

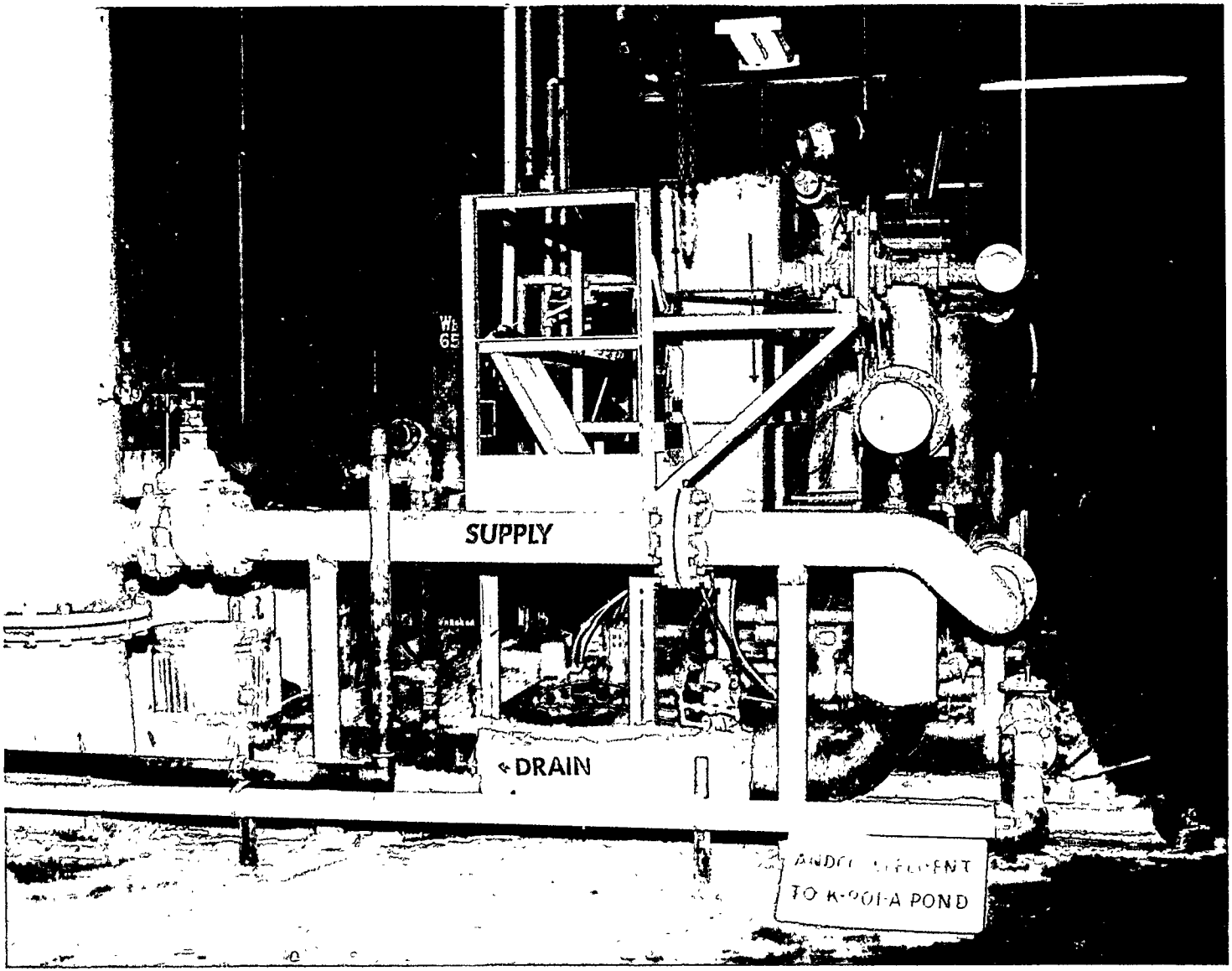
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0740



K-33 ANDCO Water Treatment Unit

Unit Name: K-33 Recirculating Cooling Water Lines

Unit Number: K09-C003k

Regulatory Status: CERCLA

Unit Location: Area 9, process plant area, immediately east of the K-33 and K-31 buildings (Map Ref. No. 108)

Approximate Dimensions and Capacity: 12,500 lin ft, 3–7 ft deep, 12–60 in. in diameter; 347,000 gal/min

Dates Operated: 1954 to 1985

Present Function: Unused

Life Cycle Operation: Recirculation cooling process waters to cool heat transfer systems

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. In 1963 and 1973, the Martreat system was used to control biological attack. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate. In the early 1960s, the Steam Chem system, which contains semivolatile organics, was used to fight biological attack.

Release Data: In 1968, seepage occurred around the K-892 risers which was caused by gravel backfill permitting oxygen to penetrate underground. In 1970 a large leak occurred in the north supply header of K-892 which was caused by galvanic action of the building ground grid laying on top of the header.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 10)

Comments: This site is part of the K-33 OU. The site is also part of the total RCW system that includes the following units:

1. K-891 Water intake from Poplar Creek
2. K-892 Pumphouse for K-892-G and K-892-H cooling towers
3. K-892-G Cooling Tower
4. K-892-H Cooling Tower
5. K-892-J Cooling Tower
6. K-892-A Makeup water clarifier
7. K-892-B Makeup water clarifier
8. K-892-C Makeup water clarifier
9. K-896-A Blowdown facility
10. K-896-B Blowdown facility
11. K-901 Water intake from the Clinch River

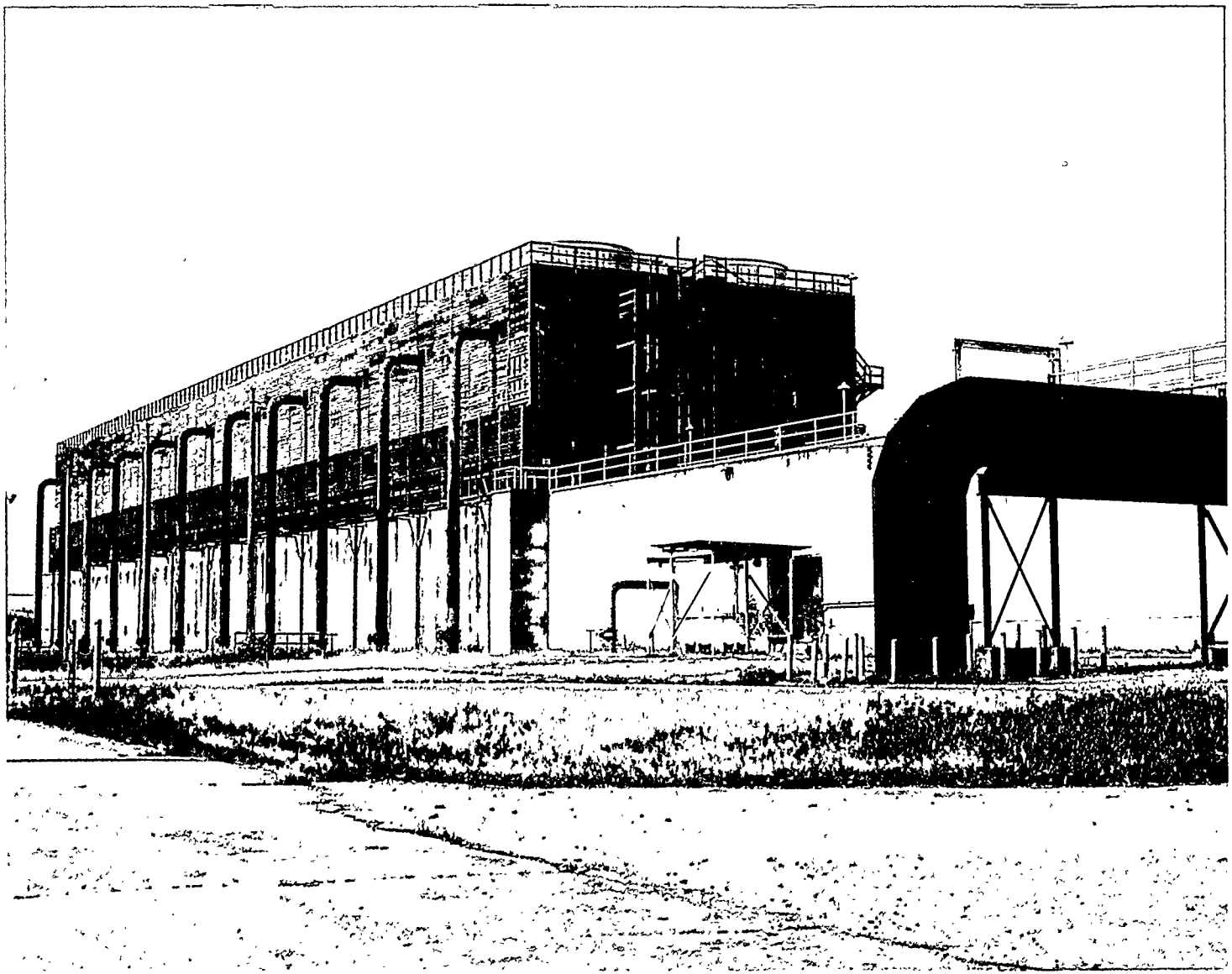
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

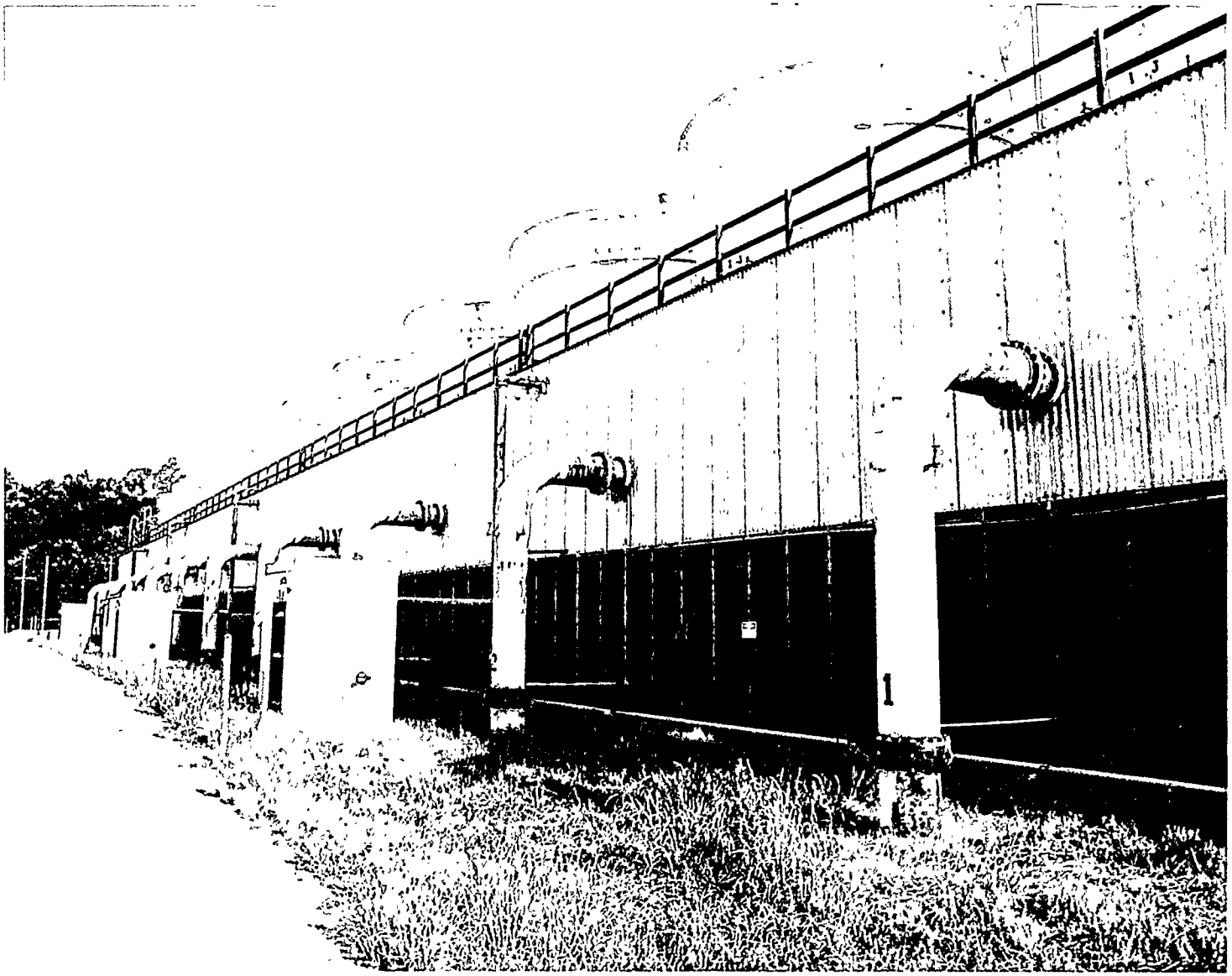
Date Revised: May 1991

PHOTO NO. K/PH-91-3122



K-33 Recirculating Cooling Water Lines (G&H Towers)

PHOTO NO. K/PH-91-3145



K-33 Recirculating Cooling Water Lines (J Tower)

Unit Name: K-762 Switchyard

Unit Number: K09-R075c

Regulatory Status: RCRA

Unit Location: Area 9, process plant area, just west of the K-31 building (Map Ref. No. 99)

Approximate Dimensions and Capacity: 500 by 500 ft

Dates Operated: 1950–1988

Present Function: Switchyard is in shutdown mode.

Life Cycle Operation: The unit transferred electrical power from the TVA system to the K-31 cascade operation. At construction, a series of French drains was installed immediately below the switchyard's gravel bed. An oil skimmer for runoff water was installed in 1980–1981.

Waste Characteristics: PCBs are the only known contaminants from this unit.

Release Data: In 1951, two related transformer explosions and subsequent fire resulted in the release of PCBs.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Surface water, soil, and sludge

Comments: This unit is also known as the K-31 substation. It is part of the K-33 OU.

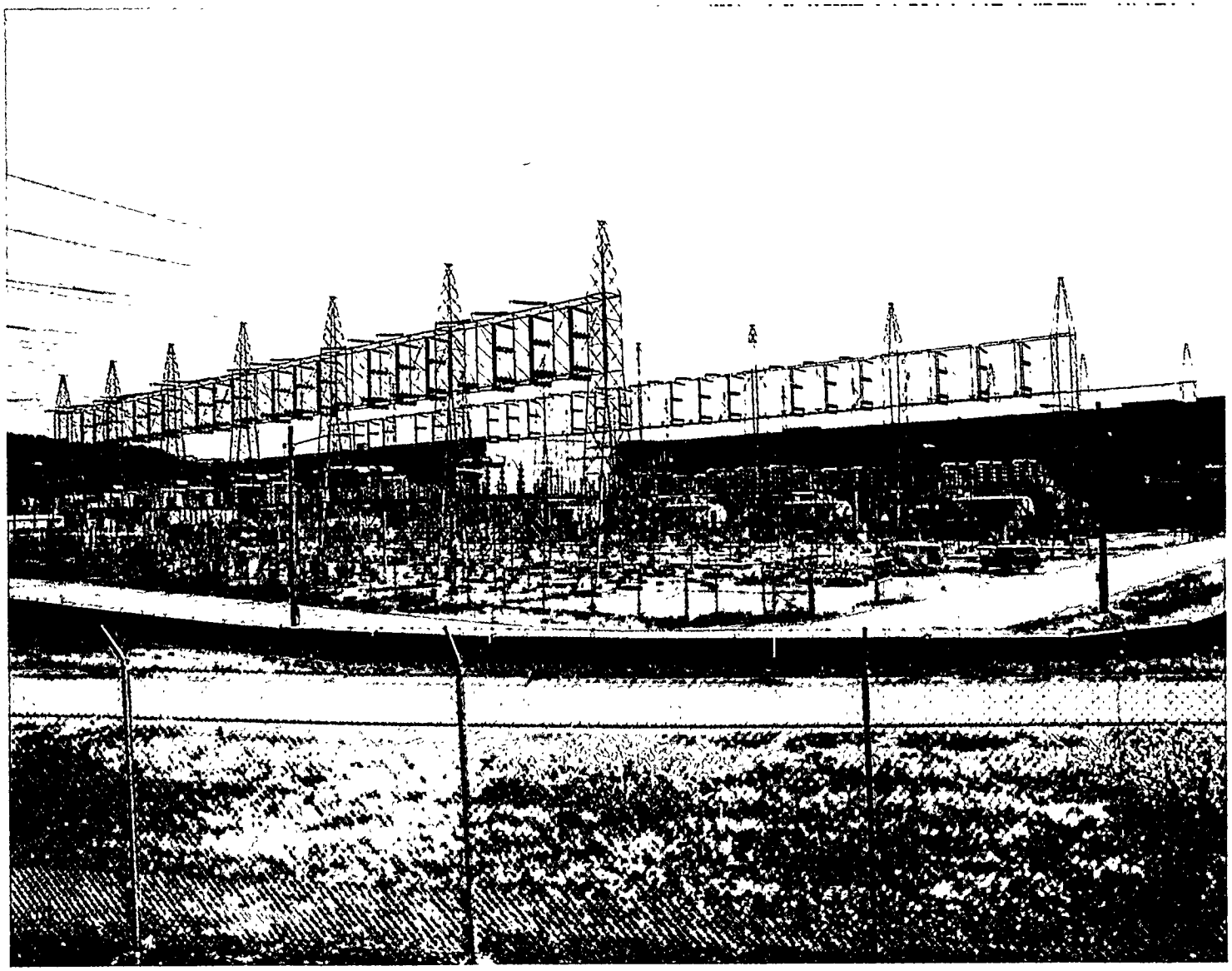
References:

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3161



K-762 Switchyard

Unit Name: K-792 Switchyard

Unit Number: K09-R075d

Regulatory Status: RCRA

Unit Location: Area 9, process area, west of the K-33 building (Map Ref. No. 100)

Approximate Dimensions and Capacity: 1000 by 300 ft

Dates Operated: 1950–1988

Present Function: Unused

Life Cycle Operation: The unit transferred electrical power from local facilities to the K-33 cascade operations. A series of French drains was installed at construction immediately under the switchyard's gravel bed. An oil skimmer for runoff water was installed in 1980–1981.

Waste Characteristics: PCBs are the only known contaminants from this unit.

Release Data: Oil stains have been found on soil outside the K-794 Oil Pump/Oil Storage Building inside the switchyard.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Surface water, soil, and sludge

Comments: This site is also known as the K-33 substation. It is part of the K-33 OU.

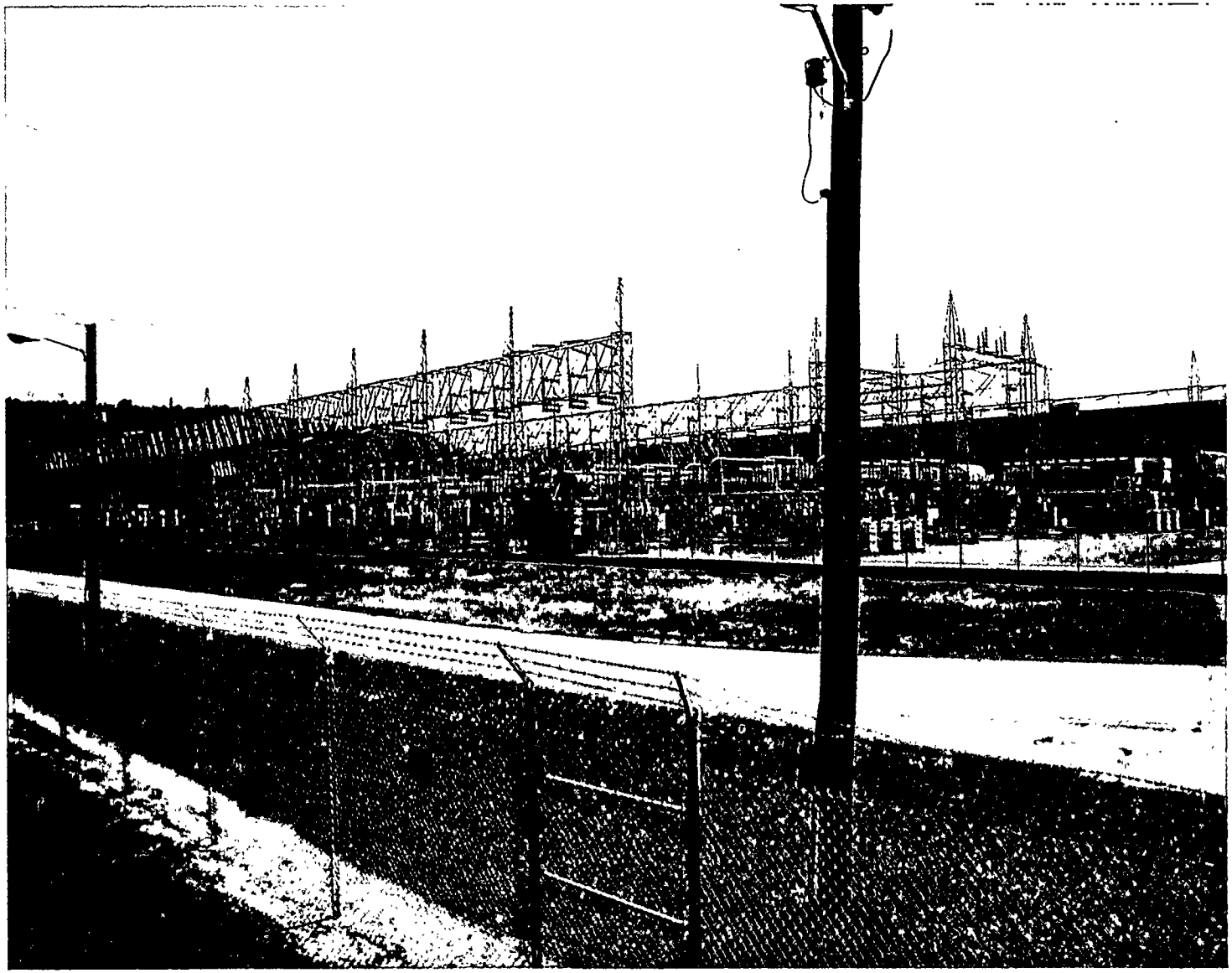
References:

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3141



K-792 Switchyard

Unit Name: K-861 Cooling Tower Basin

Unit Number: K09-C0031

Regulatory Status: CERCLA

Unit Location: Area 9, process plant area, immediately east of the K-33 and K-31 buildings (Map Ref. No. 60)

Approximate Dimensions and Capacity: Cell 17 had a capacity of 7100 gal/min and basin dimensions of 33 × 45 × 4 ft. Cells 1–16 had a combined capacity of 80,000 gal/min and basin dimensions of 387 × 63 × 19 ft.

Dates Operated: 1951–1985

Present Function: Unused

Life Cycle Operation: System provided RCW for K-31 cascade. A 17th cell was added to the 16-cell cooling tower in 1977–1979. System has been out of use since ORGDP ceased operations in 1985.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control throughout operations. In 1969, the Martreat treatment was used to control biological attack in the cooling tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate.

Release Data: In 1956 a leak caused by localized galvanic action occurred in the south K-862 supply header. Cathodic protection systems were installed. In 1968, seepage occurred at ground level.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 10)

Comments: This site is part of the K-31 RCW system, which also includes the K-862 pumphouse. The pumphouse is in the decontamination and decommissioning program. Cooling tower K-861 is also known as K-862-E. The K-861 Cooling Tower Basin is part of the K-33 OU.

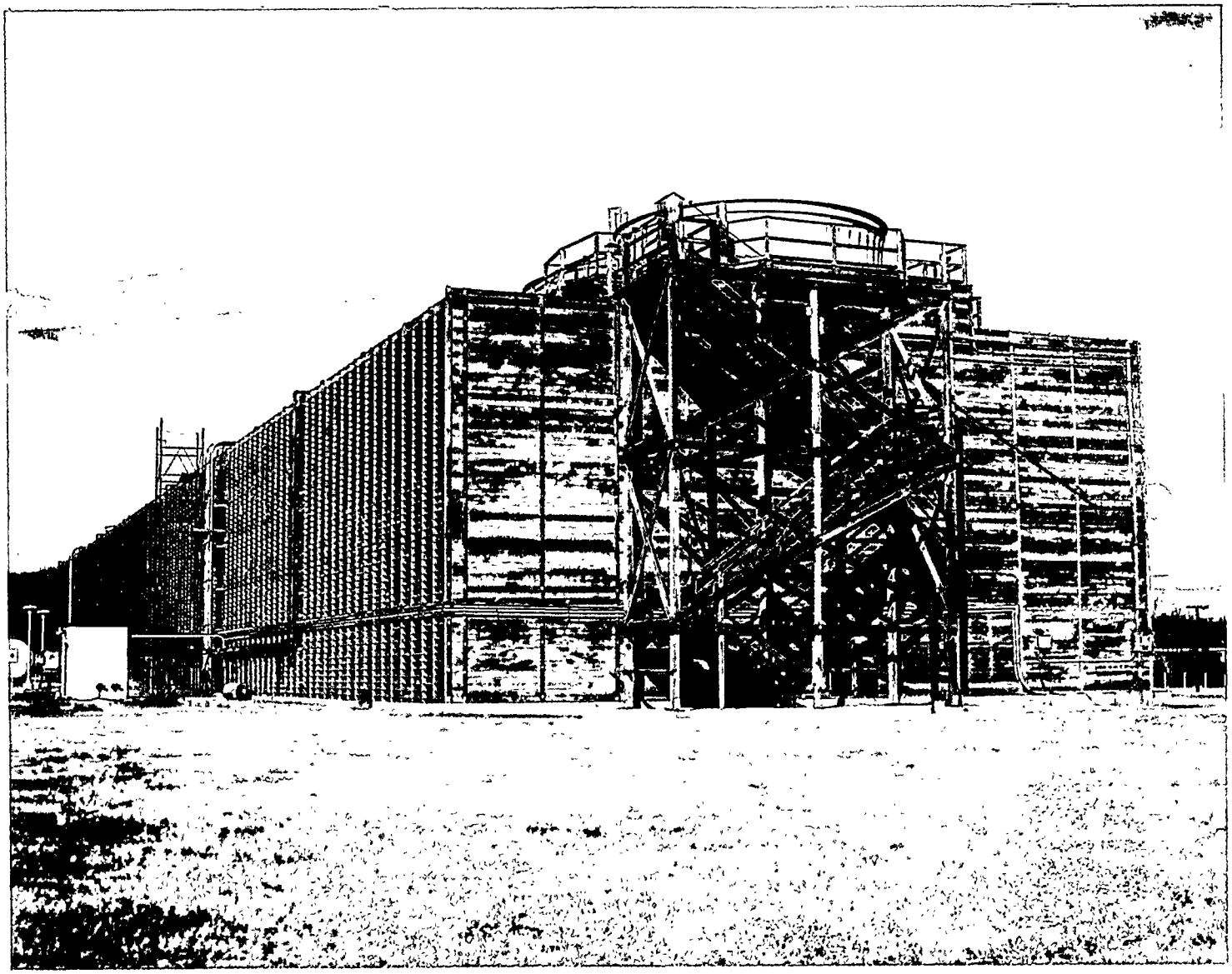
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0625



K-861 Cooling Tower Basin

Unit Name: K-892-G Cooling Tower Basin

Unit Number: K09-C003m

Regulatory Status: CERCLA

Unit Location: Area 9, process plant area, immediately east of the K-33 and K-31 buildings (Map Ref. No. 64)

Approximate Dimensions and Capacity: The K-892-G Cooling Tower has a capacity of 170,000 gal/min and basin dimensions of 700 × 63 × 27 ft.

Dates Operated: 1954–1985

Present Function: Unused

Life Cycle Operation: K-892-G provided RCW for the K-33 cascade before the shutdown of ORGDP in 1985.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. In 1963 and 1973, the Martreat system was used to control biological attack in the cooling tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate. In the early 1960s, the Steam Chem system, which contains semivolatile organics, was used to fight biological attack.

Release Data: In 1968, seepage occurred around the K-892 risers which was caused by gravel backfill permitting oxygen to penetrate underground. In 1970 a large leak occurred in the north supply header of K-892 which was caused by galvanic action of the building ground grid lying on top of the header.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 10)

Comments: The K-892-G Cooling Tower is also known as the K-33-G Cooling Tower. This unit is part of the K-33 RCW system that includes the following units:

1. K-891 Water intake from Poplar Creek
2. K-892 Pumphouse for K-892-G and K-892-H cooling towers
3. K-892-G Cooling Tower
4. K-892-H Cooling Tower
5. K-892-J Cooling Tower
6. K-892-A Makeup water clarifier
7. K-892-B Makeup water clarifier
8. K-892-C Makeup water clarifier
9. K-896-A Blowdown facility

10. K-896-B Blowdown facility
11. K-901 Water intake from the Clinch River

The K-892-G Cooling Tower Basin is a part of the K-33 OU.

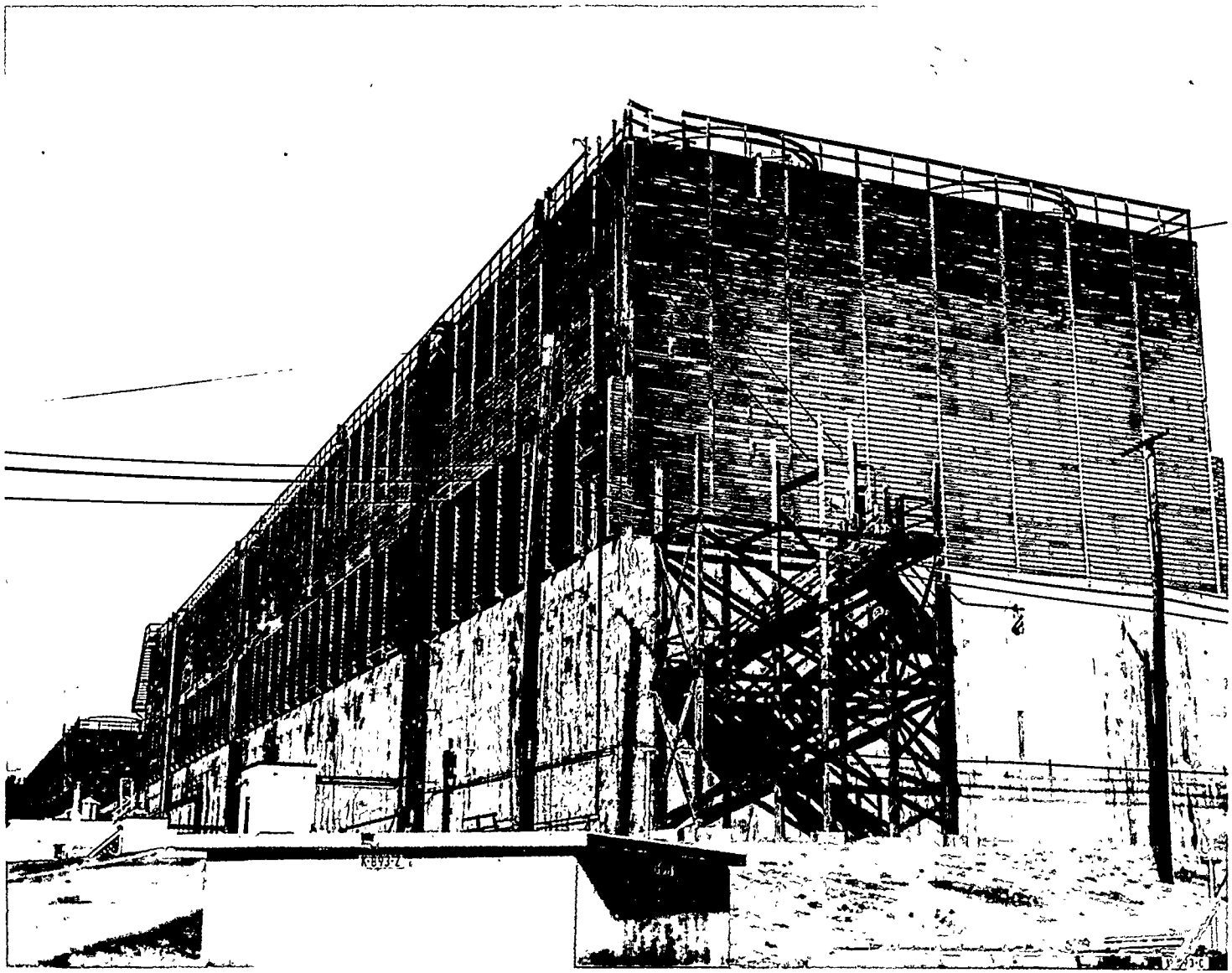
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0617



K-892-G/H Cooling Tower Basins

Unit Name: K-892-H Cooling Tower Basin

Unit Number: K09-C003n

Regulatory Status: CERCLA

Unit Location: Area 9, process plant area, immediately east of the K-33 and K-31 buildings (Map Ref. No. 64)

Approximate Dimensions and Capacity: The K-892-H cooling tower has a capacity of 170,000 gal/min and basin dimensions of 700 × 65 × 27 ft.

Dates Operated: 1954–1985

Present Function: Unused

Life Cycle Operation: K-892-H Cooling Tower provided RCW cooling water for the K-33 cascade.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. In 1963 and 1973, the Martreat system was used to control biological attack in the tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate.

Release Data: In 1968, seepage occurred around the K-892 risers which was caused by gravel backfill permitting oxygen to penetrate underground. In 1970 a large leak occurred in the north supply header of K-892 which was caused by galvanic action of the building ground grid lying on top of the header.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 10)

Comments: The K-892-H Cooling Tower is also known as the K-33-H Cooling Tower. This unit is part of the K-33 RCW system that includes the following units:

1. K-891 Water intake from Poplar Creek
2. K-892 Pumphouse for K-892-G and K-892-H cooling towers
3. K-892-G Cooling Tower
4. K-892-H Cooling Tower
5. K-892-J Cooling Tower
6. K-892-A Makeup water clarifier
7. K-892-B Makeup water clarifier
8. K-892-C Makeup water clarifier
9. K-896-A Blowdown facility
10. K-896-B Blowdown facility
11. K-901 Water intake from the Clinch River

The K-892-H Cooling Tower Basin is part of the K-33 OU.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

Unit Name: K-892-J Cooling Tower Basin

Unit Number: K09-C003o

Regulatory Status: CERCLA

Unit Location: Area 9, process plant area, immediately east of the K-33 and K-31 buildings (Map Ref. No. 63)

Approximate Dimensions and Capacity: The K-892-J Cooling Tower has a capacity of 7100 gal/min and a basin size of 333 × 45 × 4 ft.

Dates Operated: 1977–1978 to 1985

Present Function: Unused

Life Cycle Operation: K-892-J was part of the RCW system for the K-33 cascade.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil and groundwater (see Table 10)

Comments: This unit is part of the K-33 RCW system that includes the following units:

1. K-891 Water intake from Poplar Creek
2. K-892 Pumphouse for K-892-G and k-892-H cooling towers
3. K-892-G Cooling Tower
4. K-892-H Cooling Tower
5. K-892-J Cooling Tower
6. K-892-A Makeup water clarifier
7. K-892-B Makeup water clarifier
8. K-892-C Makeup water clarifier
9. K-896-A Blowdown facility
10. K-896-B Blowdown facility
11. K-901 Water intake from the Clinch River

The K-892-J Cooling Tower Basin is part of the K-33 OU.

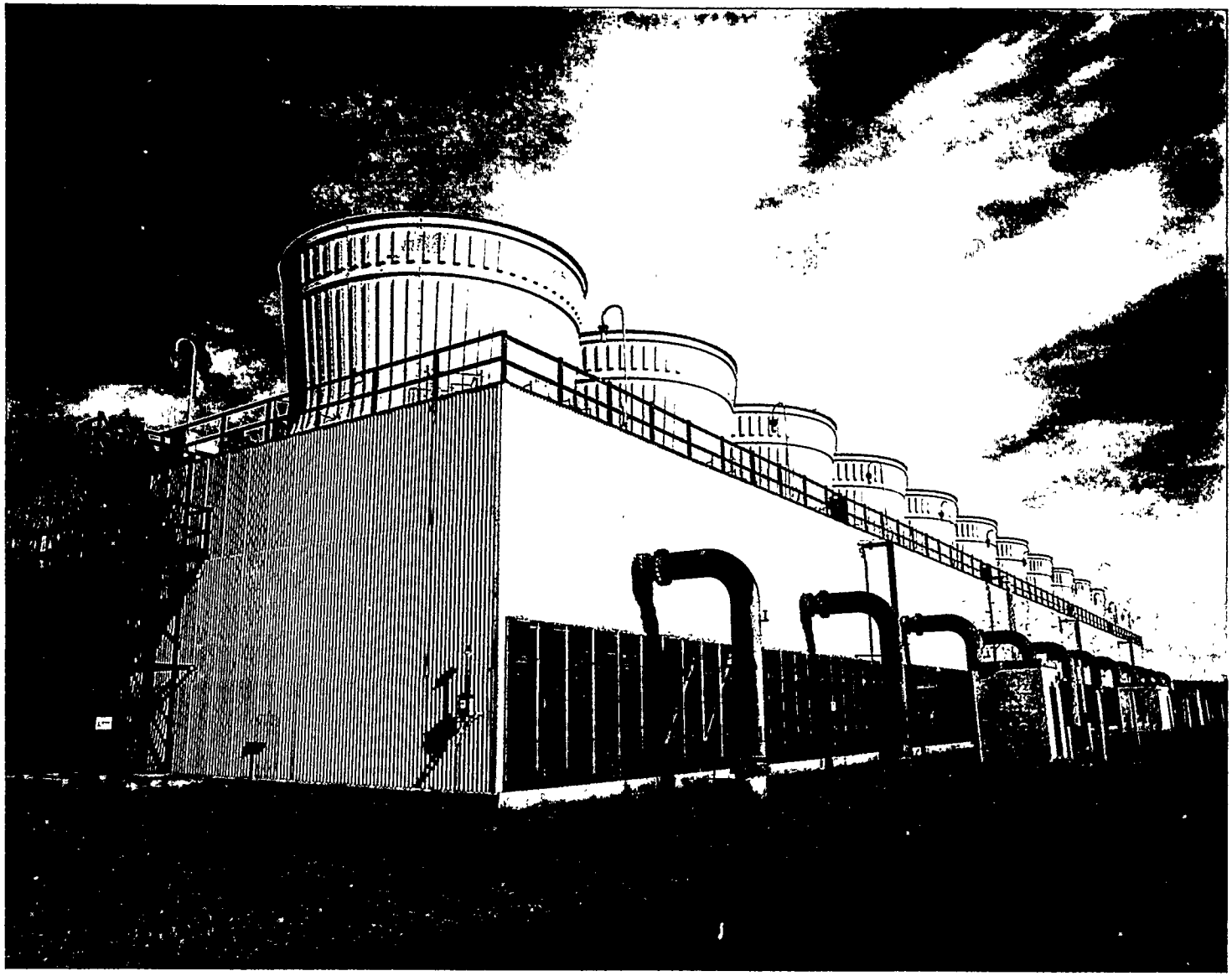
References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-151, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0626



K-892-J Cooling Tower Basin

Area 10 Site Descriptions

Unit Name: K-901 Waste Disposal Area

Unit Number: K10-R077

Regulatory Status: 3004.u

Unit Location: Area 10, plant exterior, south of the K-901-A Holding Pond (Map Ref. No. 101)

Approximate Dimensions and Capacity: Surface area of ~0.5 acre. Depth of buried waste extends from the original land topography to some minimal dimension below the present disposal area contours. Precise depth is unknown.

Dates Operated: Early 1950s to mid-1970s

Present Function: Unused grassy area

Life Cycle Operation: Over their periods of use, the K-901 Waste Disposal Area, along with the K-901-A Sanitary Waste Disposal Area, received waste from on-site contractors and maintenance activities. At different times the two sites received varying quantities of road bedding materials, paint cans and buckets, wallboard, lumber, soil, rock, roofing and guttering materials, piping, concrete, asphalt, steel, etc.

Waste Characteristics: Indisputable characterizations of materials disposed of at the K-901 Waste Disposal Area are not available. Assessments of materials disposed of at the site reflect interviews with ORGDP personnel and site observations. The disposed waste consisted generally of common construction materials interlaced with incidental amounts of low-level uranium-contaminated roofing removed from the enrichment buildings. Chemically treated wood removed from repaired cooling towers also may have been disposed of at the site.

Release Data: No known releases

Site Characterization Status: A remedial investigation is planned for this unit as part of the Area 10 OU.

Media of Concern: The proximity of units in the Area 10 OU suggests that a detailed study of the resultant cross-migration of each site's contaminants is needed (see Table 11).

Comments: This unit is also known as the K-901-A Contractors' Waste Disposal Area. It is part of the Area 10 OU, along with the K-1070-A Old Contaminated Burial Ground, the K-1070-A Landfarm, the K-901-A Holding Pond, and the K-901-A Sanitary Disposal Area.

References:

RCRA Facility Investigation Plan, K-901-A Waste Disposal Area, Oak Ridge Gaseous Diffusion Plant, K/HS-131, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., October 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: May 1991

Table 11. Groundwater monitoring data through 1990—K-25 Site Area 10

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	20/20	1	18	4.8
Chloride, mg/L	38/48	1	32	5.5
Dissolved oxygen—I, ppm	99/99	0.5	12.8	5.5
Dissolved oxygen, ppm	99/99	0.6	12.1	5.7
Dissolved solids, mg/L	25/25	16	420	220
Fluoride by specific ion electrode, mg/L	8/11	0.1	0.8	0.26
Fluoride, mg/L	37/57	0.1	0.9	0.23
Nitrate, mg/L	48/68	0.2	1.04	0.55
Sulfate, mg/L	65/68	1	108	21
Suspended solids, mg/L	24/25	1	9080	500
Total coliform, COL/100 mL	24/46	0	27	3.8
Total organic carbon (TOC), mg/L	192/308	1	30	2.3
Total organic chloride (Tox), mg/L	4/8	3.36	8.1	4.8
Total organic halide (Tox), mg/L	105/180	0.01	5.92	0.43
Uranium fluorometric, mg/L	102/185	0.001	0.029	0.004
pH—I, N/A	99/99	4.7	10.1	7.3
pH, N/A	429/429	5.3	10.2	7.1
Metals and Elemental Analysis				
Aluminum, mg/L	127/183	0.02	110	5.9
Antimony, mg/L	10/183	0.052	0.19	0.12
Arsenic, mg/L	11/136	0.005	0.04	0.014
Barium, mg/L	185/185	0.0024	1.2	0.076
Beryllium, mg/L	36/185	0.0003	0.0094	0.0016
Boron, mg/L	168/185	0.004	0.25	0.038
Cadmium, mg/L	28/185	0.0031	0.016	0.0057
Calcium, mg/L	183/183	1.9	920	43
Chromium, mg/L	30/183	0.01	1.2	0.075

Table 11 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Cobalt, mg/L	23/183	0.0052	0.097	0.026
Copper, mg/L	78/185	0.0041	0.34	0.022
Iron, mg/L	127/185	0.0043	130	6.5
Lead, mg/L	64/185	0.004	0.56	0.059
Lithium, mg/L	72/183	0.004	0.081	0.015
Magnesium, mg/L	183/183	0.5	120	14
Manganese, mg/L	166/183	0.0011	10	0.26
Mercury, mg/L	11/134	0.0002	0.0012	0.0005
Molybdenum, mg/L	29/183	0.01	0.074	0.023
Nickel, mg/L	47/183	0.01	0.81	0.049
Niobium, mg/L	38/183	0.007	0.034	0.013
Phosphorous, mg/L	27/183	0.2	6.8	0.71
Potassium, mg/L	143/183	0.6	12	3.3
Silicon, mg/L	183/183	1.6	94	6.5
Silver, mg/L	4/183	0.0075	0.012	0.01
Sodium, mg/L	183/185	0.47	31	5.8
Strontium—Total, mg/L	7/7	0.0079	0.057	0.036
Strontium, mg/L	177/178	0.0005	2.1	0.1
Titanium, mg/L	106/185	0.003	1.2	0.065
Uranium-235, wt %	12/62	0.51	1.25	0.76
Vanadium, mg/L	33/185	0.0052	0.2	0.04
Zinc, mg/L	141/185	0.0012	7.1	0.11
Zirconium, mg/L	17/183	0.0053	0.04	0.015
	Radionuclides			
Alpha activity, pCi/L	81/92	-2	44	3.7
Beta activity, pCi/L	91/92	-3	1040.3	190
Strontium, pCi/L	12/12	-70	46	-30
Technetium-99, pCi/L	18/18	-491	1850	260

Table 11 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Thorium, pCi/L	6/6	-14	39	-1
Thorium-234, pCi/L	12/12	-14	47	11
BNA and Volatile Organic Analyses				
1,1,1-Trichloroethane, mg/L	25/90	0.0009	3.4	0.36
1,1,2-Trichloroethane, mg/L	9/90	0.005	0.027	0.01
1,1-Dichloroethane, mg/L	9/90	0.008	0.057	0.036
1,1-Dichloroethene, mg/L	24/90	0.005	1.5	0.19
1,2-Dichloroethene (total), mg/L	5/58	0.005	0.033	0.011
Acetone, mg/L	2/90	0.005	0.11	0.058
Carbon tetrachloride, mg/L	26/90	0.005	0.18	0.055
Chloroform, mg/L	12/90	0.006	0.038	0.015
Methylene chloride, mg/L	2/90	0.008	0.031	0.02
Phenol, mg/L	19/121	0.001	0.013	0.0043
Toluene, mg/L	1/90	0.007	0.007	0.007
Tetrachloroethene, mg/L	17/90	0.005	0.16	0.02
Trichloroethene, mg/L	33/90	0.005	2.8	0.34
Unknown hydrocarbon, mg/L	2/2	0.032	0.034	0.033
Unknown, mg/L	1/1	0.009	0.009	0.009
bis(2-Ethylhexyl)phthalate, mg/L	7/89	0.005	0.19	0.044
delta-BHC, mg/L	2/68	0.0005	0.0012	0.00085
trans-1,2-Dichloroethene, mg/L	6/32	0.005	0.023	0.012

PHOTO NO. K/PH-91-3157

K-901 Waste Disposal Area

Unit Name: K-901-A Holding Pond

Unit Number: K10-R006

Regulatory Status: 3004.u

Unit Location: Area 10, plant exterior, west of K-31 and K-33 uranium enrichment buildings and complex (Map Ref. No. 6)

Approximate Dimensions and Capacity: 5-acre surface, varying in depth to a maximum of ~10 ft

Dates Operated: Discharge of wastewater into the K-901-A Holding Pond area started in the late 1950s. A dam was constructed to create the holding pond in 1965–1966. Discharge into the holding pond was discontinued in 1985.

Present Function: The holding pond contains sludge from past RCW discharges and receives surface water and groundwater. Since the shutdown of the RCW system due to the standby mode of the gaseous diffusion process, a Betz 1100 polymer is pumped into the blowdown discharge line along with raw water one day a week. This discharge to the K-901-A Holding Pond aids in the flocculation and settling of any suspended sediments in the pond.

Life Cycle Operations: Over most of its operating cycle, the K-901-A Holding Pond received chemicals and sludge from the uranium enrichment operations. This discharge consisted largely of sludge and blowdown from the ORGDP RCW system. The holding pond also served as a disposal ground for the contents of select cylinders. Each of these types of waste is discussed below.

The heat of compression generated by the gaseous diffusion process was transferred to the RCW system via copper-tubed heat exchangers and then dissipated into the environment through mechanical draft cooling towers. The ORGDP RCW system recirculation rate was up to 300,000 gal/min, requiring treatment of 12,000 gal/min makeup water. The average water intake from the Clinch River for the RCW system was 11 million gal/d, with 10.3 million gal/d lost because of evaporation in the cooling towers. The evaporation resulted in the concentration of salts in the RCW system, which could potentially cause corrosion in the heat-exchange tubing. To control the salt concentration, it was necessary to remove part of the RCW from the system as "blowdown" and replace it with softened "makeup" water. The softened water was treated with lime, soda, ash, and organic coagulants for the removal of calcium, magnesium, and suspended solids.

The RCW at ORGDP was also treated with a corrosion inhibitor consisting of chromate, zinc, and a polyphosphate (a proprietary material marketed by Betz Laboratories, Inc.). While the resoftening and recycling of cooling tower blowdown was effective in eliminating this discharge to the surface, a substantial quantity of dissolved solids, such as sulfates, remained in the resoftened water. Sulfates were concentrated not only by

evaporation but by the addition of sulfuric acid for pH control. RCW was discharged from the system as blowdown to the K-901-A Holding Pond and replaced with fresh makeup water to avoid exceeding the Ca^{2+} and SO_4^{2-} product solubility limits and forming scale in the cascade heat exchangers. The chromium level in the RCW was maintained at 9 ppm (18–20 ppm chromate). Since the NPDES permit at ORGDP limits discharge from the K-901-A Holding Pond into the Clinch River to 0.05 ppm total chromium, disposal of the blowdown was of major concern. This led to the installation of the electrochemical metal reduction unit and the use of the Betz 1100 anionic polymer.

The electrochemical reduction unit, made by ANDCO Environmental Process, uses a patented process for reduction of chromium and precipitation of metals. The ANDCO unit uses the principle of consumable iron electrodes. The blowdown passes between the electrode plates where the soluble hexavalent chromium is reduced to insoluble trivalent chromium. A ferric hydroxide and chromic hydroxide sludge was produced that separated from the blowdown in the settling pond. The unit has successfully and consistently treated blowdown to below 0.05 ppm hexavalent chromium.

The following is a chronology of events related to the discharge of RCW into the K-901-A Holding Pond.

Late 1950s: ORGDP began the discharge of RCW softening sludges and blowdown to the marsh-like K-901-A area.

1965–1966: A dam was constructed to create the K-901-A Holding Pond.

1969: Prior to installation of permanent facilities, ORGDP began to test recycling of RCW blowdown to the makeup water softeners for resoftening and reuse. Blowdown and sludges from resoftening process were discharged to K-901-A.

1974: A 100-gal/min ANDCO electrochemical metal reduction unit was obtained for the purpose of testing its feasibility for the removal of chromium from the RCW blowdown.

1976: A separate blowdown resoftener was installed. Resoftener sludges were discharged to the K-901-A Holding Pond.

1977: Two 100-gal/min ANDCO electrochemical reduction units were put into service. Effluent from the process was discharged to the K-901-A Holding Pond.

1978 (summer): A 600-gal/min ANDCO electrochemical reduction unit, with the capacity of being expanded to 800 gal/min, was purchased.

1979: Investigations of methods for the reduction of the chromium levels from the K-901-A Holding Pond led to the use of a high-molecular-weight anionic polymer, Betz 1100.

1979 (August): The 600-gal/min ANDCO unit was placed in service. The two 100-gal/min units were retained as backup. Twenty-four million gal of blowdown were processed from

August 1979 through March 1980 with no discharge violations. Average chromium concentration in the holding pond discharge was 0.04 ppm.

1980: A second blowdown softener was installed to improve blowdown resoftening capability and to increase capacity. Resoftener sludges were discharged to the K-901-A Holding Pond.

1985 (September): Gaseous diffusion process was placed in standby operation. Discharge of effluents from the RCW system to the K-901-A Holding Pond was discontinued.

In addition to RCW blowdown, various sizes and types of steel cylinders that were used in laboratory work, research, and operations at ORGDP were disposed of in the K-901-A Holding Pond. Cylinder contents included uranium hexafluoride, hydrogen fluoride, combinations of halides (bromine, fluorine, chlorine) and various fluorinated/chlorinated hydrocarbons. Cylinder sizes included the 400-lb, 12-in.-diam UF_6 cylinder, as well as various sample containers (A, B, C, S-1, and S-2 types).

Many of these full cylinders were eventually stored in the K-1025 Storage Building. Five hundred and thirty-three cylinders were removed from the building along with cylinders from other locations requiring disposal. The inability to dispose of the contents of these cylinders because of inoperable valves led to an operation that involved suspending the cylinders over the K-901-A Pond, shooting them from a distance with a high-powered rifle to empty them of their contents, and then immersing them in the pond. It is estimated that from the mid 1960s to 1975 the contents of ~200 of the 533 cylinders stored at K-1025 were discharged into the K-901-A Pond in this fashion. At the onset of this disposal operation, the cylinders were simply suspended by a rope over the pond, but a cylinder chute was later built for better control. Cylinders were retrieved after the contents were released.

Waste Characteristics: Primarily discharges and releases to the holding pond came from the ORGDP RCW system.

Release Data: The K-901-A Holding Pond operations are known to have received contaminants. Table 12 tabulates the leachate analysis of the ANDCO sludge effluent. Tables 13 to 15 tabulate data pertinent to sediment contamination in the K-901-A Holding Pond.

Site Characterization Status: A remedial investigation is planned for this unit.

Media of Concern: Soil, groundwater, surface water, biota

Comments:

References:

RCRA Facility Investigation Plan, K-901-A Holding Pond, Oak Ridge Gaseous Diffusion Plant, K/HS-136, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., August 1987.

Table 12. ANDCO sludge leachate analyses (ppm)[a]

Toxic material	Sample 1	Sample 2	Current EP toxicity guidelines
Ag	0.05	0.05	5.0
As	0.5	0.5	5.0
Ba	1.15	1.23	100.0
Cd	0.02	0.02	1.0
Cr (Total)	0.09	0.10	5.0
Pb	0.25	0.38	5.0
Se	0.1	0.1	1.0
Hg	0.0005	0.0002	0.2
U	4.0	14.0	-

[a]Analysis performed (1979) in accordance with procedures stipulated in *Environmental Protection Agency, Hazardous Waste: Proposed Guidelines and Proposal on Identification and Listing*, Section 250.13, *Federal Register*, Vol. 43, No. 243, December 18, 1978.

T. L. Ashwood et. al., *Sediment Contamination in Streams Surrounding the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-9791, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., Oak Ridge, Tenn., May 1986.

Date prepared: April 1987

Date Revised: May 1991

Table 13. Metal contamination exceeding 50% of K-25 mean

Metals	High value (mg/kg)	Low value (mg/kg)	Average value (mg/kg)	Regulatory limits (mg/kg)
Ag	1.8	<0.6	0.9	100
As	9.0	<5.0	1.6	100
Cd	<0.3	<0.3	<0.3	20
Cr	3300	250	1600	100
Cu	28	0	13	-
Hg	1.1	<0.1	0.6	4
Ni	39	2.0	17	-
Pb	24	5.0	12	100
Se	120	<5.0	56	20
Zn	990	140	476	-

Source: T. L. Ashwood et al., *Sediment Contamination in Streams Surrounding the Oak Ridge Gaseous Diffusion Plant*, ORNL/TM-9791, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., Oak Ridge, Tenn., May 1986.

Table 14. Results of GC-MS analyses

Target parameter	Sample 1 (mg/kg)	Sample 2 (mg/kg)
Arochlor 1254	<1.0	<1.0
Arochlor 1260	<1.0	<1.0
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzo(a) anthracene	ND	ND
Bis (2-ethylhexyl) phthalate	2.9	3.5
Chrysene	ND	ND
Di-n-Butylphthalate	ND	ND
Fluoranthene	1.6	0.7
Phenanthrene	1.1	0.6
Pyrene	1.4	1.0
TOC (%)	1.9	3.6

Source: T. L. Ashwood et. al., *Sediment Contamination in Streams Surrounding the Oak Ridge Gaseous DiffusionPlant*, ORNL/TM-9791, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., Oak Ridge, Tenn., May 1986.

Table 15. K-901-A radioisotopes data

Sample	^{7}Be	^{137}Cs	^{60}Co	^{238}U	^{235}U
1	1.78	1.74	0.20	2.7	ND
2	1.00	0.49	ND	ND	ND
3	2.65	1.13	0.15	4.7	ND
4	ND	1.09	0.17	ND	ND
5	ND	1.21	0.15	ND	ND
6	ND	0.06	ND	2.6	ND
7	0.98	1.33	0.19	ND	ND
8	2.96	0.69	ND	ND	ND
9	0.57	0.40	ND	ND	ND
10	1.46	1.94	0.19	ND	ND
11	ND	0.63	ND	3.8	ND
12	3.04	1.40	ND	ND	ND

Source: T. L. Ashwood et. al., *Sediment Contamination in Streams Surrounding the Oak Ridge Gaseous Diffusion Plant,* ORNL/TM-9791, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., Oak Ridge, Tenn., May 1986.

PHOTO NO. K/PH-87-0024

K-901-A Holding Pond

Unit Name: K-901-A Sanitary Disposal Area

Unit Number: K10-R081

Regulatory Status: 3004.u

Unit Location: Area 10, plant exterior, north-northeast of the K-901-A Holding Pond (Map Ref. No. 101)

Approximate Dimensions and Capacity: The K-901-A Sanitary Disposal Area occupies a land area of ~6 to 8 acres. The depth of buried waste extends from the original land topography to some minimal dimension below the present disposal area contours. The precise depth is unknown.

Dates Operated: Late 1940s to mid-1970s

Present Function: Unused grassy area

Life Cycle Operation: Over its periods of operation, the Sanitary Disposal Area received waste from on-site contractors and maintenance activities. At various times the site received varying quantities of road bedding materials, paint cans and buckets, wallboard, lumber, soil, rock, roofing and guttering materials, piping, concrete, asphalt, steel, etc.

Waste Characteristics: Indisputable characterizations of materials disposed of at the K-901-A Sanitary Disposal Area are not available. Assessments of materials disposed of at the site reflect interviews with ORGDP personnel and site observations. The disposed waste consisted generally of common construction materials interlaced with incidental amounts of low-level uranium-contaminated roofing removed from the enrichment buildings. Also, chemically treated wood removed from repaired cooling towers may have been disposed of at the site.

Release Data: No known releases

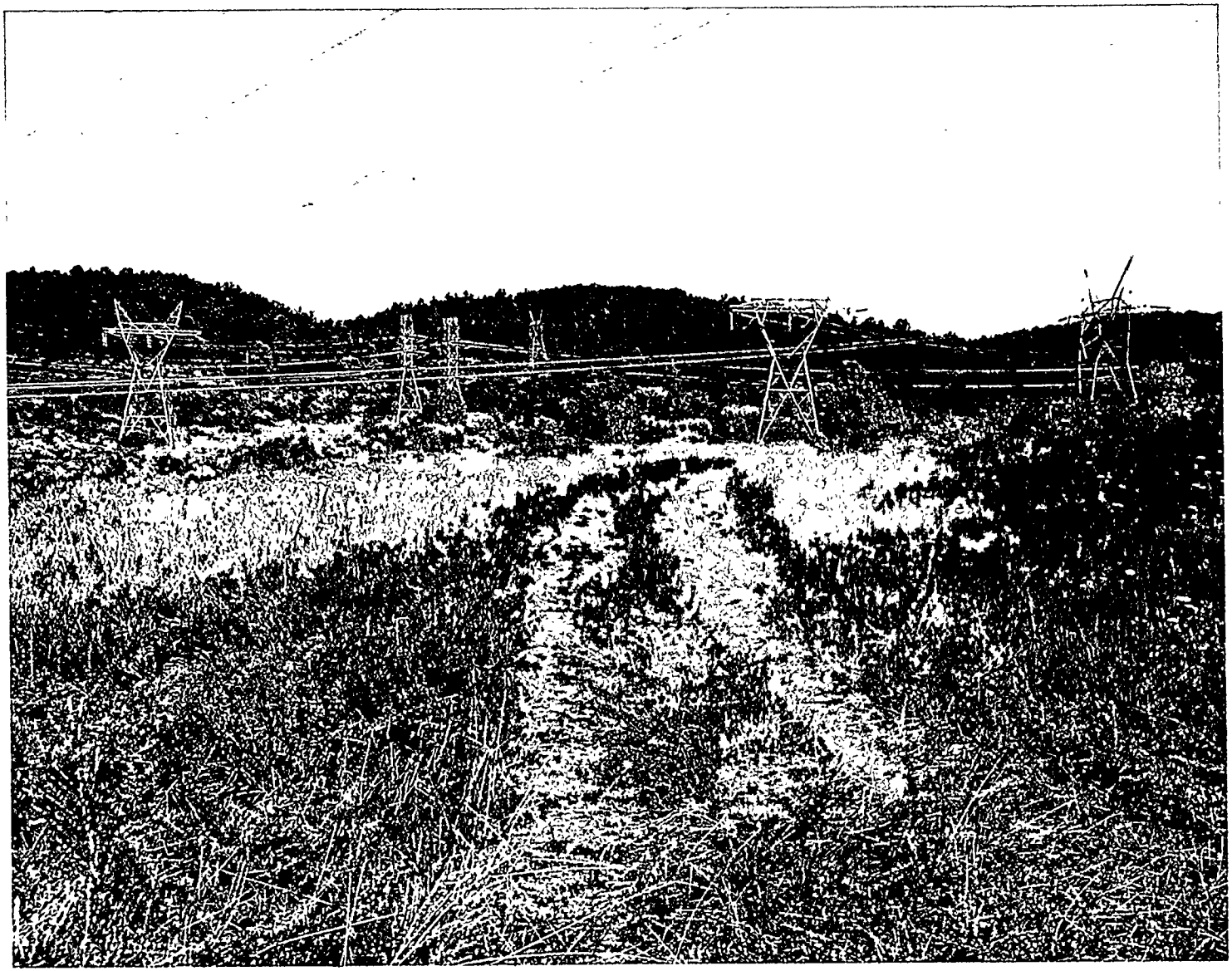
Site Characterization Status: A remedial investigation is planned for this unit as part of the Area 10 OU.

Media of Concern: Soil, groundwater, surface water, and biota (see Table 11)

Comments: This unit is part of the Area 10 OU; along with the K-1070-A Old Contaminated Burial Ground, the K-1070-A Landfarm, the K-901-A Holding Pond, and the K-901 Waste Disposal Area.

Date Prepared: May 1991

PHOTO NO. K/PH-91-3151



K-901-A Sanitary Disposal Area

Unit Name: K-1070-A Landfarm

Unit Number: K10-0004

Regulatory Status: 3004.u

Unit Location: Area 10, exterior plant area in the northwest corner of the K-25 property, south of the K-1070-A Old Contaminated Burial Ground (Map Ref. No. 102)

Approximate Dimensions and Capacity: 1.5 acres

Dates Operated: 1979–1985

Present Function: Unused

Life Cycle Operation: Between 1979 and 1985, ~190,000 gal of diffusion cascade lubricating oil from the K-33 diffusion process was recycled using 5000 ft^3 of Fuller's Earth as a filter aid. The Fuller's Earth served to remove concentrated acids, sludges, and other degradation products from the cascade oil. Once saturated, the Fuller's Earth was applied to the surface of the K-1070-A Landfarm.

Waste Characteristics: Fuller's Earth is composed of a naturally occurring clay to which metals, oils, and organic compounds adhere. Before being applied to the K-1070-A landfarm, the Fuller's Earth was sampled and analyzed for PCBs and was not used unless the analysis indicated a concentration of PCBs of less than 5 ppm.

Release Data: To determine the levels of other possible contaminants, samples from the K-1070-A Landfarm were analyzed for total petroleum hydrocarbons, total inorganic elements, and semivolatile organics. The analyses indicated that all levels of these are less than, equal to, or below background levels or less than any health-based guideline values.

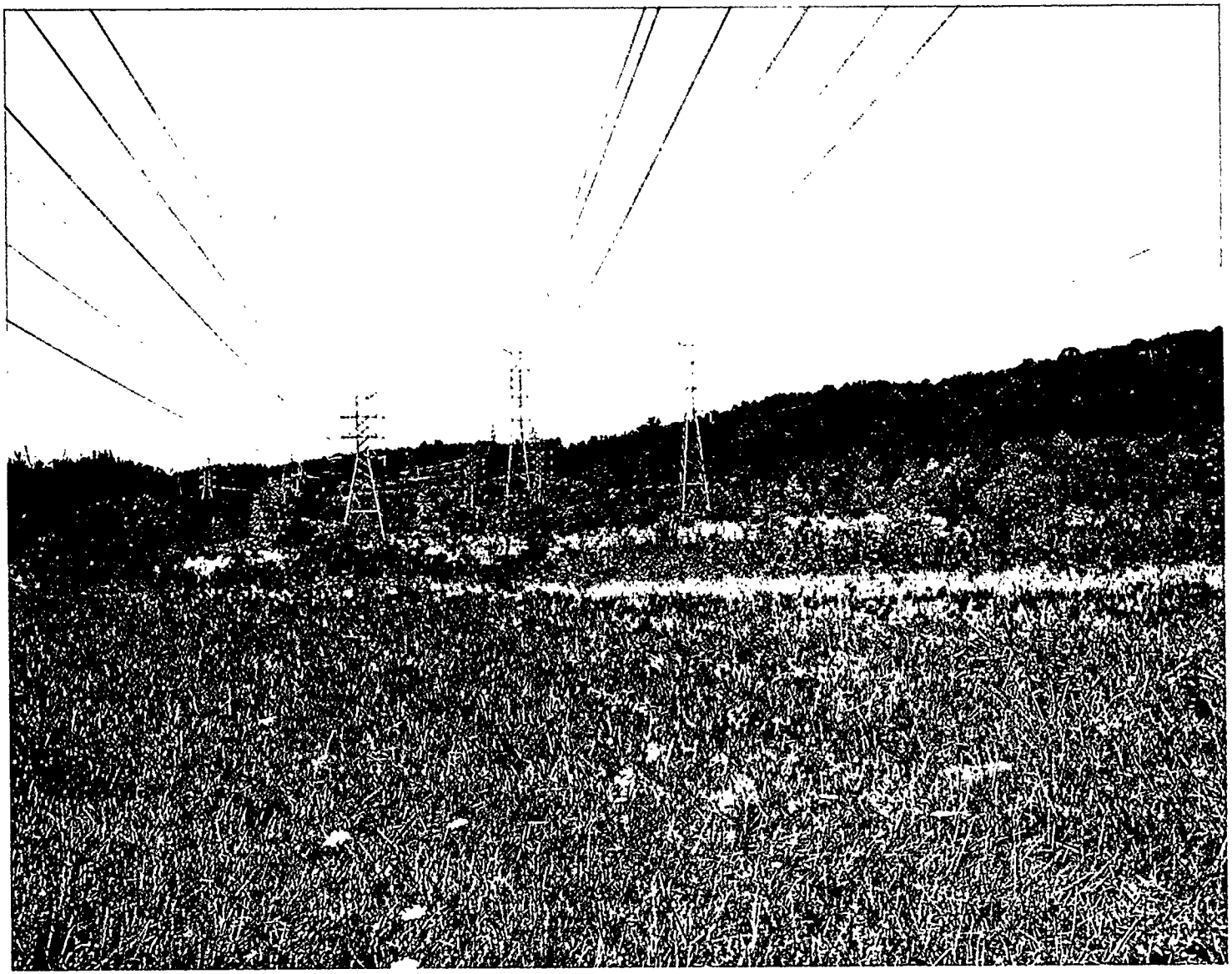
Site Characterization Status: A preliminary assessment/site inspection has been conducted for this unit. Results of the study indicate that the site poses no risk to human health or the environment; consequently, no further action should be taken to characterize the site. However, a remedial investigation will be performed for the entire Area 10 OU.

Media of Concern: Soil

Comments: This site is part of the Area 10 OU.

Date Prepared: May 1991

PHOTO NO. K/PH-91-3160



K-1070-A Landfarm

Unit Name: K-1070-A Old Contaminated Burial Ground

Unit Number: K10-R001

Regulatory Status: 3004.u

Unit Location: Area 10, plant exterior, east of the K-25 Site property protection area (Map Ref. No. 1)

Approximate Dimensions and Capacity: 1 acre

Dates Operated: Late 1940s through 1975

Present Function: Unused

Life Cycle Operation: This burial ground was used for disposal of low-level contaminated waste and mixed chemical waste.

Waste Characteristics: Detailed documentation exists for the type and location of wastes buried at K-1070-A. Wastes include MFL oil and a wide range of metals, including thorium, lead, and uranium. Much of the material, including scrap metal, empty barrels, and leached Al_2O_3, is contaminated with uranium.

Release Data: A soil sampling program conducted in 1989–1990 indicated that there has been no migration of contamination through the soil. Groundwater monitoring samples indicate that there has been leakage into the groundwater beneath the site.

Site Characterization Status: The soil sampling program of 1989–1990 was the first phase of the characterization of this unit. A study of the groundwater for the area is underway. A remedial investigation is planned as part of the Area 10 OU.

Media of Concern: Groundwater (see Table 11)

Comments: This site is part of the Area 10 OU.

References:

RCRA Facility Investigation Plan, K-1070-A Contaminated Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-133, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

K-25 Site Environmental Restoration Program, *Work Plan: Quality Assurance/Quality Control Health and Safety Plan for the Site Characterization of K-1070-A*, K/ER-5, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1990.

K-25 Site Environmental Restoration Program, *Field Observation Report for K-1070-A Contaminated Burial Ground RCRA Facility Investigation*, K/ER-7, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1990.

K-25 Site Environmental Restoration Program, *Data Evaluation Technical Memorandum on the K-1070-A Contaminated Burial Ground, Oak Ridge K-25 Site, Oak Ridge, Tennessee*, K/ER-42, Martin Marietta Energy Systems, Inc., Oak Ridge K-25 Site, Oak Ridge, Tenn., April 1991.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0605

K-1070-A Old Contaminated Burial Ground

Area 11 Site Descriptions

Unit Name: K-709 Switchyard

Unit Number: K11-R075a

Regulatory Status: 3004.u

Unit Location: Area 11, west of Hwy. 58, just off the property sales road (Map Ref. No. 103)

Approximate Dimensions and Capacity: ~250 by 400 ft

Dates Operated: Early 1940s to 1978

Present Function: Unused

Life Cycle Operation: This switchyard was built to serve the K-700 powerhouse area and K-25 cascade. It was stripped of most of its equipment at shutdown in 1978.

Waste Characteristics: As with most switchyards of its generation, the transformers were filled with PCBs.

Release Data: A transformer failure, which likely released PCB oil, is recorded for July 1950.

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Soil and surface water

Comments: This site is part of the K-770 OU and is also known as the K-25 substation.

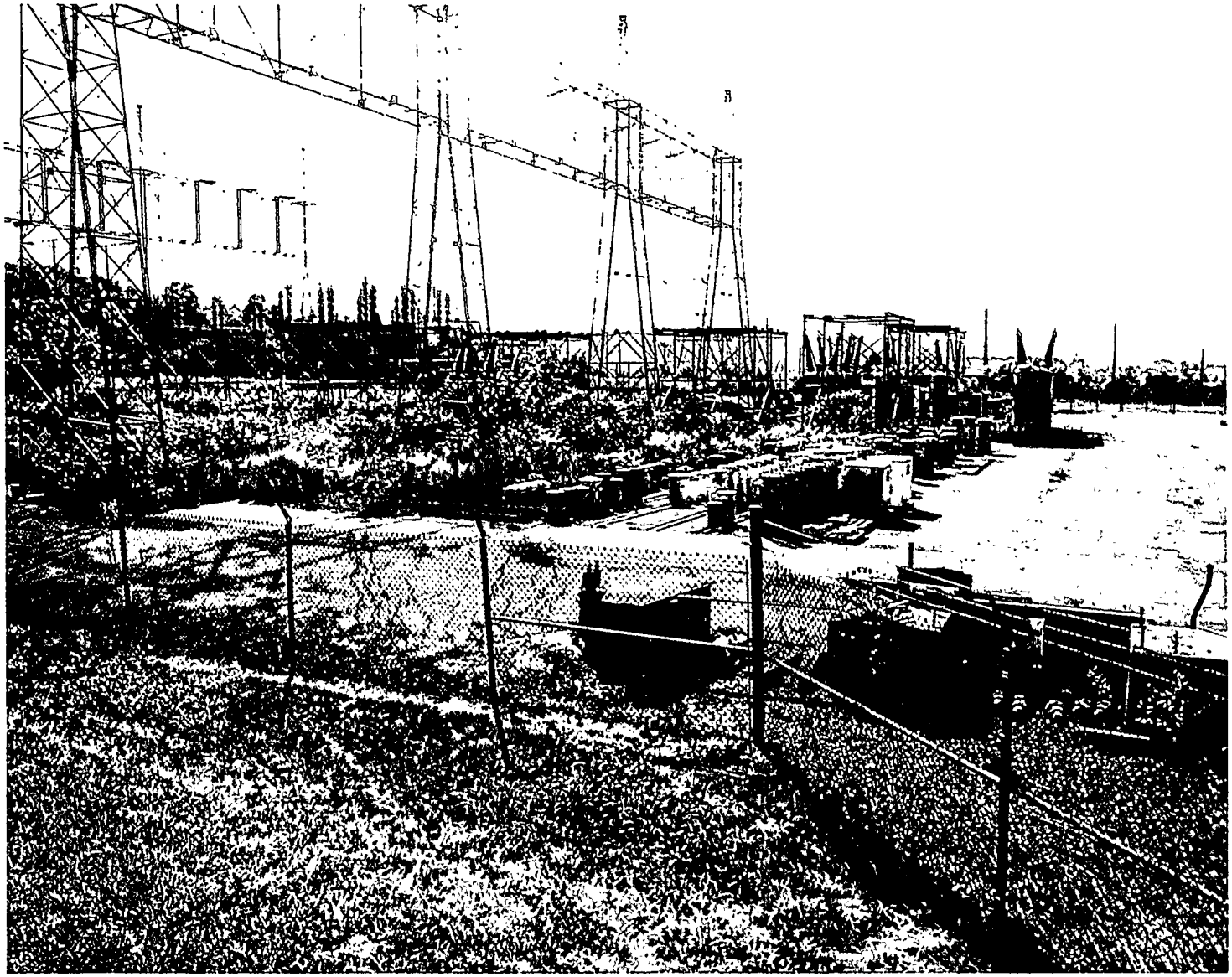
References:

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, December 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3159



K-709 Switchyard

Unit Name: K-710 Sludge Beds and Imhoff Tanks

Unit Number: K11-R076

Regulatory Status: RCRA

Unit Location: K-700 Powerhouse area (Map Ref. No. 104)

Approximate Dimensions and Capacity: 20,000 gal/d normal; 60,000 gal/d maximum

Dates Operated: 1943–1978

Present Function: Nonoperable

Life Cycle Operation: The original Powerhouse area sewage treatment system contained the K-710-A Lift Station, K-710-B Sludge Beds, K-710-C Imhoff Tank, and a chlorination system. In 1974–1975 the system was replaced with the current system downstream from the K-710-A Lift Station. The new treatment unit contained a sludge holding zone, aeration zone, two settling zones and two new sludge beds. The new unit received effluent from the original station and discharges through a chlorination contact tank into the K-700 Area Discharge Flume.

Waste Characteristics: Normal sewage contaminants

Release Data: No known releases other than treated sewage

Site Characterization Status: A remedial investigation is planned for this site as part of the K-770 OU.

Media of Concern: Sludge

Comments: This site is part of the K-770 OU.

References:

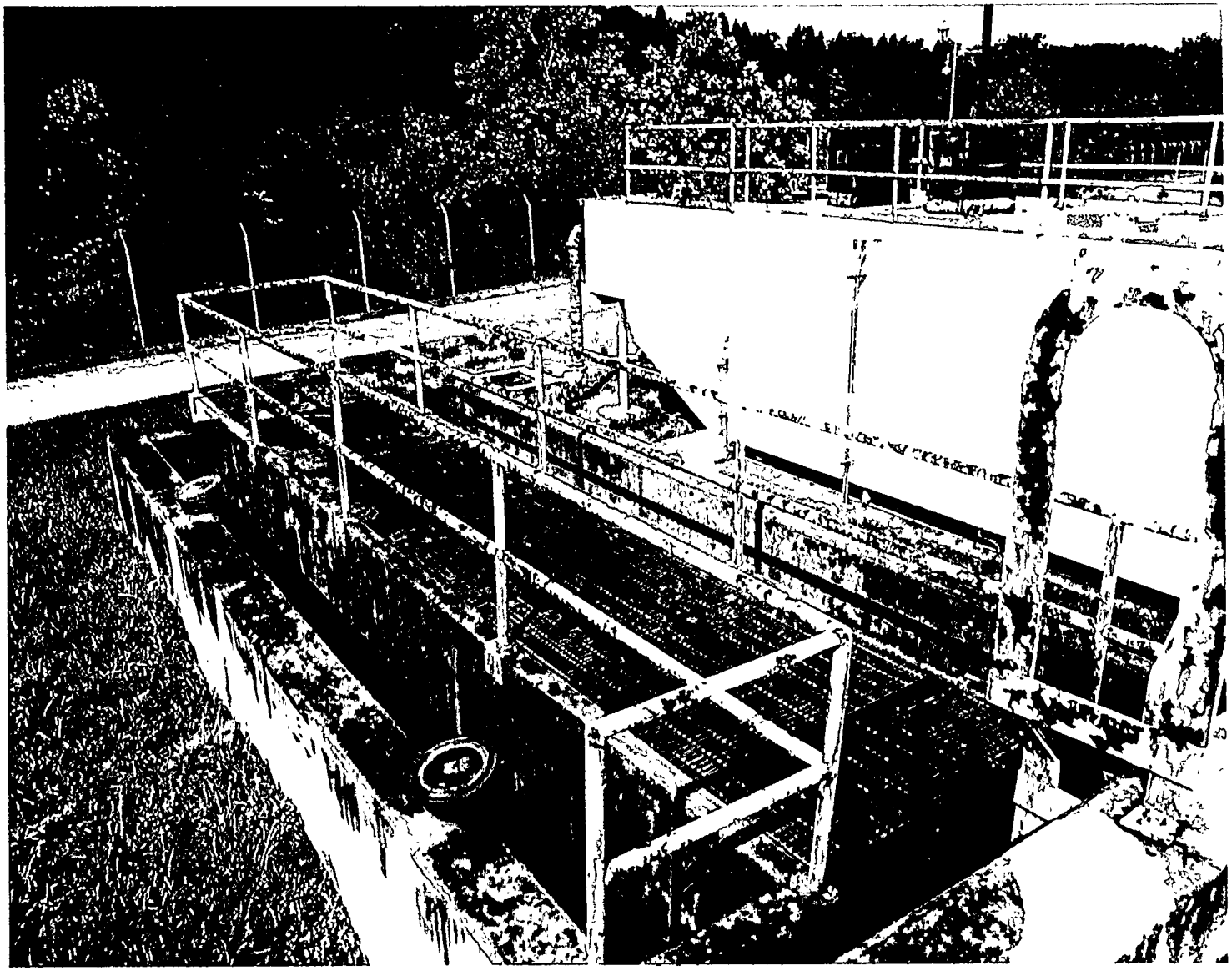
Date Prepared: April 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3147

K-710 Sludge Beds and Imhoff Tanks

PHOTO NO. K/PH-91-3158



K-710 Sludge Beds and Imhoff Tanks

Unit Name: K-711 Hazardous Waste Storage Facility

Unit Number: K11-R058

Regulatory Status: RCRA

Unit Location: Area 11, exterior plant area, near the K-25 Site property sales area (Map Ref. No. 105)

Approximate Dimensions and Capacity: 9000-ft^2 (58- by 162-ft) storage area

Dates Operated: Storage of wastes began in 1987.

Present Function: Storage of RCRA hazardous materials

Life Cycle Operation: In the 1940s, K-711 served as the ORGDP Power House Electrical Maintenenance and welding shop. By 1976, the building was used as a storage warehouse/gas heating boiler. In 1978 the building was known as the Wild Training Facility/Gas Heating Boiler. During the 1980s, the building was used for warehousing. Storage of hazardous wastes in accordance with RCRA standards began in 1987.

Waste Characteristics: Paint wastes, solvents, and waste oils

Release Data: On April 10, 1991, oil contamination was found in a storm drain serving K-711. Contamination was found from the building down to the storm drain's discharge point at the Clinch River.

Site Characterization Status: No further action is planned for this site by K-25 ER.

Media of Concern: Storm drains

Comments:

References:

Date Prepared: June 1987

Date Revised: May 1991

PHOTO NO. K/PH-91-3162

K-711 Hazardous Waste Storage Facility

Unit Name: K-722 Property Sales Building

Unit Number: K11-C073

Regulatory Status: CERCLA

Unit Location: Area 11, exterior plant area, K-700 Powerhouse area (Map Ref. No. 106)

Approximate Dimensions and Capacity: 153 by 83 ft; single story, 12,699 ft^2

Dates Operated: 1940s, as a thermal diffusion test facility

Present Function: Presently, the north end of the building houses the property sales operation offices. Approximately 90% of the building is warehouse space used to conduct public sales of excess government property. Excess materials from X-10, Y-12, DOE, Oak Ridge Associated Universities, and K-25 are included in these sales.

Life Cycle Operation: The facility was used as a thermal diffusion test facility before its conversion to the property sales building.

Waste Characteristics: Radioactivity

Release Data: No known releases

Site Characterization Status: A remedial investigation will be performed as part of the K-770 OU.

Media of Concern: To be determined

Comments: Because of the public access to the K-722 Building, a radiological survey of the building was conducted. During the survey, a few radioactively contaminated "spots" were discovered. Most of these areas were decontaminated at the time of the discovery; however, decontamination of a few areas was not possible. These areas were located near expansion joints in the concrete floor. In order to remove the contamination, the concrete was chipped away and removed. After chiseling about 5 in. through the floor, another floor, or subfloor, was encountered. The subfloor appeared to be the source of the radioactivity. The second floor appears to have holes in it, possibly from another sampling effort.

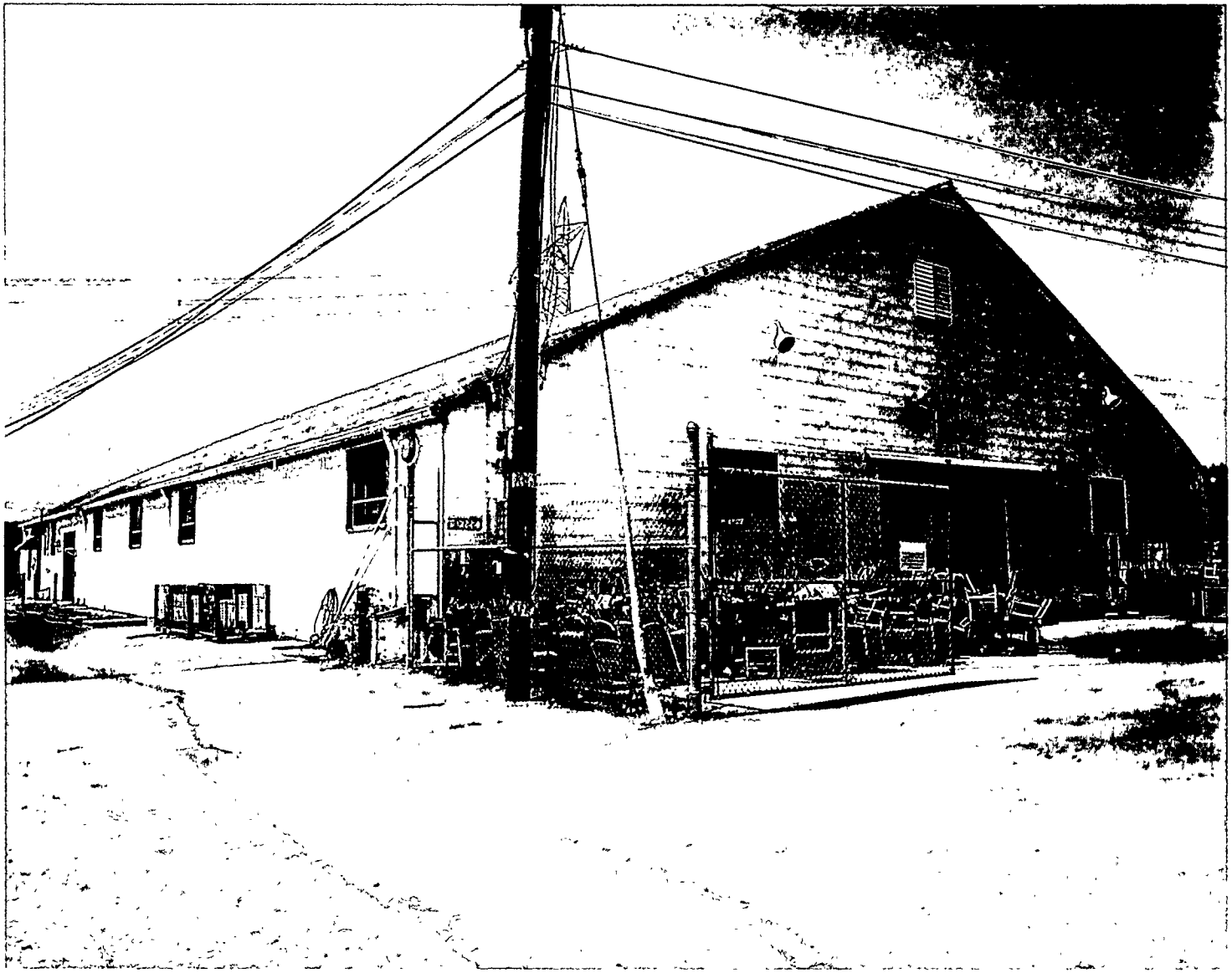
The floor surveys were conducted on June 4, 5, and 13, 1990. Decontamination efforts were performed on June 11, and 12, 1990, and July 9, 10, and 11, 1990. The subfloor contamination was discovered on July 11, 1990.

This site is part of the K-770 OU.

Date Prepared: August 1990

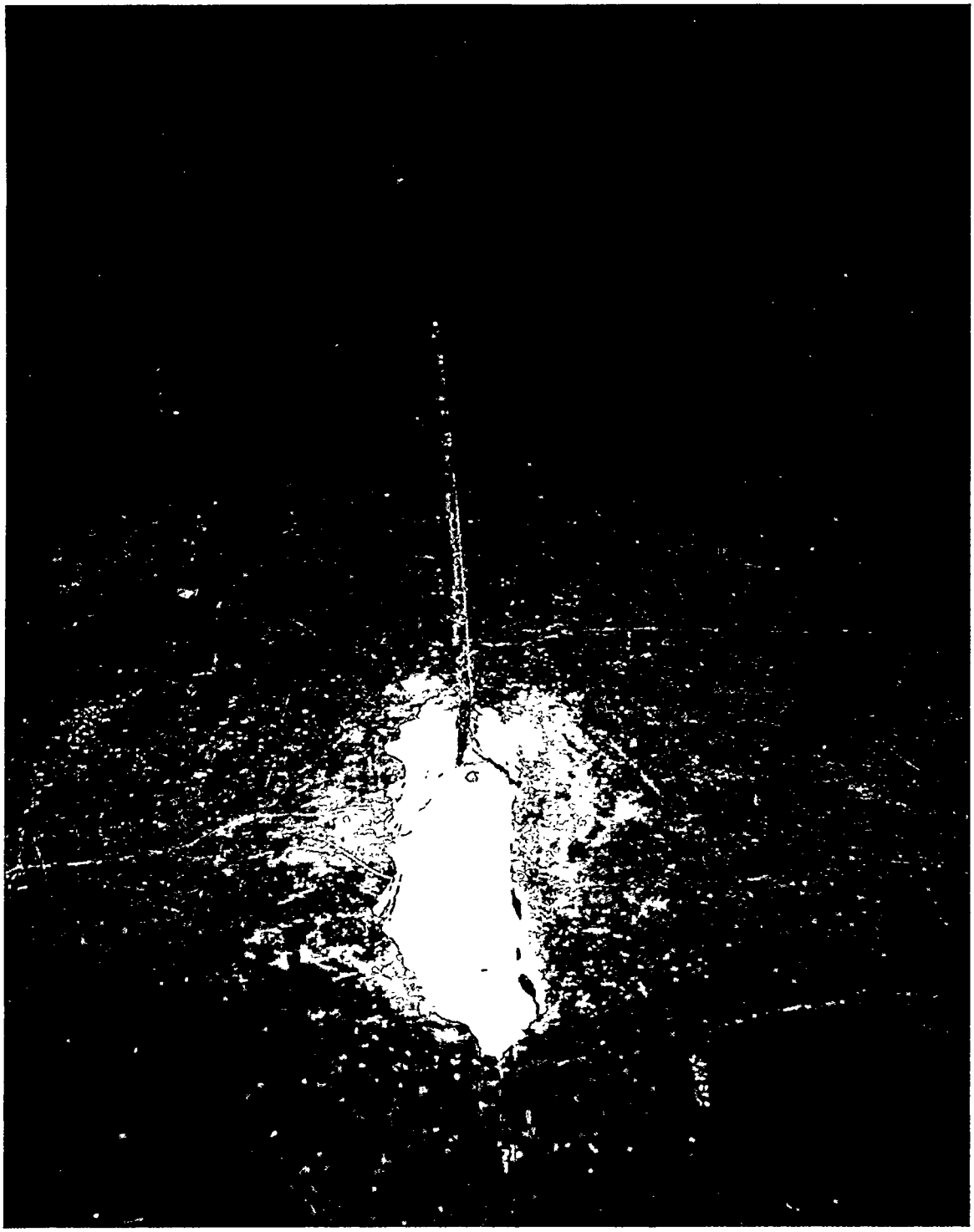
Date Revised: May 1991

PHOTO NO. K/PH-90-2495



K-722 Property Sales Building

PHOTO NO. K/PH-90-2496



K-722 Property Sales Building (Subfloor)

Unit Name: K-725 Beryllium Building

Unit Number: K11-C004

Regulatory Status: CERCLA

Unit Location: Area 11, exterior plant area (Map Ref. No. 68). This unit is located within the K-770 Scrap Metal Yard.

Approximate Dimensions and Capacity: 100 by 50 ft

Dates Operated: 1940s–1952

Present Function: Unused

Life Cycle Operation: The building was originally used as part of the S-50 thermal diffusion plant, which operated in 1944–1945. Early in the building's operations, a second concrete pad was placed over the original floor because of high alpha counts from depleted uranium handled in the building. After the S-50 project was discontinued in 1945, the building was used from 1946 to 1952 for the Nuclear Energy Propulsion Aircraft Project.

Waste Characteristics: Beryllium, uranium, and mercury. In the early 1970s, a Union Carbide chemical operations crew attempted to decontaminate the building by scrubbing walls, vacuum cleaning, and removing floor tiles and light fixtures. Ventilation and exhaust ducts were sealed, and no effort was made to decontaminate their internal surfaces. When the decontamination effort proved unacceptable, the building was closed.

Release Data: There is evidence that traps containing mercury occasionally released mercury, which was swept down the floor drains in the cleanup. It is also suspected that hazardous constituents could be in the dust collection system.

Site Characterization Status: A remedial investigation is planned for this site.

Media of Concern: Soil, equipment, and baghouse

Comments: This site is part of the K-770 OU. The Beryllium Building was once known as the F-10 building.

References:

RCRA Facility Investigation Plan, K-725 Building, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-148, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0602

K-725 Beryllium Building

Unit Name: K-726 PCB Storage Facility

Unit Number: K11-R040

Regulatory Status: 3004.u

Area Number/Unit Location: Area 11 (plant exterior), in the K-770 Scrap Metal Yard, which is on the banks of the Clinch River upstream of the confluence of Poplar Creek (Map Ref. No. 41)

Approximate Dimensions and Capacity: 75 by 50 ft. Facility holds ~500 55-gal drums.

Dates Operated: 1978 to present

Present Function: Drum storage of PCB liquids and solids. The facility is diked, and the concrete floor has been sealed. The area is inspected weekly, and no waste materials are being released from the diked area.

Life Cycle Operation: As above

Waste Characteristics: PCB wastes that include capacitors, kerosene, soil, and ballasts

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned for this unit.

Media of Concern: None

Comments:

References:

RCRA Facility Investigation Plan, K-770 Scrap Metal Yard and Contaminated Debris, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-137, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0020

K-726 PCB Storage Facility

Unit Name: K-770 Contaminated Debris

Unit Number: K11-C009

Regulatory Status: CERCLA

Unit Location: Area 11, plant exterior, on the east bank of the Clinch River, ~2000 ft upstream of the confluence of Poplar Creek (Map Ref. No. 9)

Approximate Dimensions and Capacity: 30 acres; ~40,000 tons of metal presently stored. [Includes both Scrap Metal Yard (Unit R008) and Contaminated Debris (Unit C009).]

Dates Operated: 1960s to the present

Present Function: Some scrap metal is still located in the scrap yard awaiting disposal.

Life Cycle Operation: Storage of low-level contaminated scrap metal.

Waste Characteristics: This waste consists of various types of metals generated from operations at the K-25 Site. The scrap metal is contaminated with radioactive materials, primarily uranium. Asbestos is present from pipe insulation.

Release Data: Samples collected in a storm drain in the storage area revealed detectable concentrations of radioactive constituents. Soil samples collected in the past also revealed detectable concentrations of radioactive constituents.

Site Characterization Status: The K-770 Contaminated Debris is a pile of miscellaneous metals that were disposed of during the cleanup of the K-770 Scrap Metal Yard. The Contaminated Debris and the Scrap Metal Yard are considered as one unit for a planned remedial investigation. A soil sampling program as described in the RFI plan referenced below was conducted during the summer of 1990. Analyses of the results are still being conducted.

Media of Concern: Soil, groundwater, and surface water (see Table 16)

Comments: This site is part of the K-770 OU.

References:

RCRA Facility Investigation Plan, K-770 Scrap Metal Yard and Contaminated Debris, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-136, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: May 1991

Table 16. Groundwater monitoring data through 1990—K-25 Site Area 11

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride, mg/L	28/29	1	4.5	2.8
Dissolved oxygen—I, ppm	48/48	0.5	11.1	4.1
Dissolved oxygen, ppm	48/48	0.4	12.6	3.5
Dissolved solids, mg/L	6/6	34	296	200
Fluoride, mg/L	11/29	0.1	1.4	0.27
Nitrate, mg/L	21/29	0.11	1.3	0.57
Sulfate, mg/L	29/29	1.7	106	40
Suspended solids, mg/L	4/6	1	83	27
Total coliform, COL/100 mL	24/29	0	10	1.3
Total organic carbon (TOC), mg/L	146/159	1	5	2.5
Total organic halide (TOX), mg/L	31/32	0.012	0.096	0.03
Uranium fluorometric, mg/L	41/85	0.001	0.023	0.0045
pH—I, N/A	48/48	4.5	9.4	6.5
pH, N/A	207/207	4	8.4	6.4
Metals and Elemental Analysis				
Aluminum, mg/L	64/85	0.021	150	7.7
Antimony, mg/L	4/85	0.065	0.13	0.096
Arsenic, mg/L	6/58	0.005	0.008	0.0067
Barium, mg/L	85/85	0.014	1.9	0.12
Beryllium, mg/L	20/85	0.0003	0.012	0.0024
Boron, mg/L	73/85	0.0041	0.3	0.048
Cadmium, mg/L	10/85	0.0034	0.01	0.0053
Calcium, mg/L	85/85	2.8	100	62
Chromium, mg/L	15/85	0.011	0.19	0.044
Cobalt, mg/L	12/85	0.0056	0.11	0.032
Copper, mg/L	35/85	0.0042	0.14	0.027
Iron, mg/L	69/85	0.0045	230	11
Lead, mg/L	29/85	0.004	0.14	0.022

Table 16 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Lithium, mg/L	16/85	0.0055	0.17	0.039
Magnesium, mg/L	85/85	0.76	55	13
Manganese, mg/L	85/85	0.0064	7.2	0.88
Mercury, mg/L	1/58	0.0004	0.0004	0.0004
Molybdenum, mg/L	7/85	0.014	0.026	0.018
Nickel, mg/L	21/85	0.01	0.21	0.056
Niobium, mg/L	23/85	0.0075	0.022	0.012
Phosphorous, mg/L	21/85	0.2	3.1	0.54
Potassium, mg/L	64/85	0.61	20	3.2
Silicon, mg/L	85/85	2.1	55	7.9
Sodium, mg/L	85/85	0.53	55	8.6
Strontium, mg/L	85/85	0.0057	0.38	0.093
Titanium, mg/L	49/85	0.0031	0.52	0.055
Uranium-235, wt %	5/29	0.78	1.24	0.98
Vanadium, mg/L	12/85	0.0051	0.21	0.048
Zinc, mg/L	61/85	0.001	0.78	0.061
Zirconium, mg/L	9/85	0.0062	0.028	0.014
Radionuclides				
Alpha activity, pCi/L	27/40	-4	19	3.2
Beta activity, pCi/L	37/40	-11	1588	250
Technetium-99, pCi/L	4/4	-527	1482	440
Thorium-234, pCi/L	4/4	-12	2	-7
BNA and Volatile Organic Analyses				
2-Butanone, mg/L	3/40	0.01	0.069	0.03
Acetone, mg/L	1/40	0.012	0.012	0.012
Phenols—Total, mg/L	9/29	0.001	0.019	0.0052

Table 16 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Tetrachloroethene, mg/L	2/40	0.021	0.05	0.036
bis(2-ethylhexyl)phthalate, mg/L	8/29	0.008	0.1	0.028

K-770 Contaminated Debris

Unit Name: K-770 Scrap Metal Yard

Unit Number: K11-R008

Regulatory Status: 3004.u

Unit Location: Area 11, plant exterior, on the east bank of the Clinch River, ~2000 ft upstream of the confluence of Poplar Creek (Map Ref. No. 8)

Approximate Dimensions and Capacity: 30 acres; ~40,000 tons of metal presently stored. [Includes both Scrap Metal Yard (Unit R008) and Contaminated Debris (Unit C009).]

Dates Operated: 1960s to present

Present Function: Some scrap metal is still located in the scrap yard awaiting disposal.

Life Cycle Operation: Storage of low-level contaminated scrap metal

Waste Characteristics: This waste consists of various types of metals generated from operations at the K-25 Site. The scrap metal is contaminated with radioactive materials, primarily uranium. Asbestos is present from pipe insulation.

Release Data: Samples collected in a storm drain in the storage area revealed detectable concentrations of radioactive constituents. Soil samples collected in the past also revealed detectable concentrations of radioactive constituents.

Site Characterization Status: The Contaminated Debris and the Scrap Metal Yard are considered as one unit for a planned remedial investigation. A soil sampling program as described in the RFI plan referenced below was conducted during the summer of 1990. Analyses of the results are still being conducted.

Media of Concern: Soil, groundwater, and surface water (see Table 16)

Comments: This site is part of the K-770 OU.

References:

RCRA Facility Investigation Plan, K-770 Scrap Metal Yard and Contaminated Debris, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-136, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1988.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0951

K-770 Scrap Metal Yard

Area 12 Site Description

Unit Name: K-720 Fly Ash Pile

Unit Number: K12-R045

Regulatory Status: 3004.u

Area Number/Unit Location: Area 12, plant exterior, south of the K-25 Site and north of the Highway 58 bridge over the Clinch River (Map Ref. No. 51)

Approximate Dimensions and Capacity: Fly ash pile, ~20 acres; 45 acres, affected groundwater area

Dates Operated: 1940s through 1960s

Present Function: Unused

Life Cycle Operation: Waste pile for fly ash

Waste Characteristics: Fly ash from the coal-fired steam plant

Release Data: Runoff and leachate from this fly ash pile have not been controlled. Groundwater quality has been monitored from four wells in Area 12. A summary table of the data is presented as Table 17. No contaminants above suspected background levels have been intercepted to date.

Site Characterization Status: A preliminary assessment/site inspection is planned for this unit.

Media of Concern: Fly ash, soil, and groundwater (see Table 17)

Comments:

References:

RCRA Facility Investigation Plan, K-720 Ash Pile, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-150, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant,* K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

Table 17. Groundwater monitoring data through 1990—K-25 Site Area 12

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride IC, mg/L	7/9	1	4	2.6
Chloride, mg/L	5/5	2	4	2.6
Dissolved oxygen—I, ppm	14/14	0.5	5.3	2.2
Dissolved oxygen, ppm	14/14	0.6	9.4	3.4
Dissolved solids, mg/L	9/9	38	2432	1200
Fluoride by specific ion electrode, mg/L	8/8	0.1	0.3	0.18
Sulfate, mg/L	14/14	4	17600	2300
Suspended solids, mg/L	9/9	2	232	62
Total organic carbon (TOC), mg/L	48/56	1	3	2.3
Total organic halide (Tox), mg/L	18/56	0.01	0.02	0.014
Uranium fluorometric, mg/L	3/28	0.001	0.006	0.0037
pH—I, N/A	14/14	4.8	7.1	6.1
pH, N/A	70/70	3.8	6.9	5.7
Metals and Elemental Analysis				
Aluminum, mg/L	28/28	0.02	12	1.5
Arsenic, mg/L	9/28	0.005	0.028	0.02
Barium, mg/L	28/28	0.014	0.19	0.077
Beryllium, mg/L	12/28	0.00031	0.0017	0.00089
Boron, mg/L	26/28	0.014	0.88	0.29
Cadmium, mg/L	15/28	0.003	0.018	0.0095
Calcium, mg/L	28/28	7.5	270	130
Chromium, mg/L	4/28	0.013	0.019	0.016
Cobalt, mg/L	14/28	0.14	1.1	0.85
Copper, mg/L	18/28	0.0044	0.04	0.016
Iron, mg/L	28/28	0.04	82	34
Lead, mg/L	7/28	0.0046	0.032	0.013
Lithium, mg/L	11/28	0.004	0.016	0.0078

Table 17 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Magnesium, mg/L	28/28	1.7	190	78
Manganese, mg/L	28/28	0.044	100	41
Nickel, mg/L	17/28	0.01	0.21	0.12
Niobium, mg/L	14/28	0.0088	0.056	0.028
Nitrate, mg/L	4/14	0.7	64	17
Phosphorous, mg/L	23/28	0.32	3.6	0.94
Potassium, mg/L	26/28	0.98	4.4	2.2
Silicon, mg/L	28/28	1.2	19	8.8
Silver, mg/L	13/28	0.0063	0.031	0.018
Sodium, mg/L	28/28	2.6	35	17
Strontium—Total, mg/L	6/6	0.023	0.3	0.14
Strontium, mg/L	22/22	0.018	0.38	0.19
Titanium, mg/L	20/28	0.0032	0.11	0.03
Uranium-235, wt %	1/7	0.39	0.39	0.39
Vanadium, mg/L	3/28	0.0058	0.0083	0.0072
Zinc, mg/L	22/28	0.0032	0.36	0.13
Radionuclides				
Alpha activity, pCi/L	17/17	-8.6	13.5	2.1
Beta activity, pCi/L	17/17	-39.6	13.1	2.2
BNA and Volatile Organic Analyses				
2,4,5-TP (Silvex), mg/L	1/14	0.00006	0.00006	0.00006
2,4-D, mg/L	1/14	0.0004	0.0004	0.0004
2-Butanone, mg/L	1/14	0.01	0.01	0.01
bis(2-Ethylhexyl)phthalate, mg/L	1/14	0.088	0.088	0.088

PHOTO NO. K/PH-87-0021

K-720 Fly Ash Pile

Area 13 Site Description

Unit Name: K-1085 Old Firehouse Burn Area

Unit Number: K13-R043

Regulatory Status: 3004.u

Area Number/Unit Location: Area 13, plant exterior, bounded by Oak Ridge Turnpike, Gallaher Road, and Powerhouse Road (Map Ref. No. 49)

Approximate Dimensions and Capacity: 0.1 acre; 20- × 25- × 15-ft pit dimensions

Dates Operated: 1946–1960

Present Function: Unused

Life Cycle Operation: An existing farmhouse on the site was converted to a fire hall in 1944 and served as such until 1951. A fuel station and garage were also used on the site from 1944 to 1947. Open burning of contaminated oil took place on the concrete pads of the three buildings until 1960. Also, waste oil was burned in an unlined pit until 1951, when the pit was filled.

Waste Characteristics: Details of the types and quantities of waste burned at this unit are unknown. Available information indicates that various waste solvents such as thrichloroethylene, acetone, perchloroethylene, carbon tetrachloride, tetrachloroethylene, methyl chloride, PCB-contaminated oil, and paint wastes were burned in an open container at the unit.

Release Data: The waste-handling operations at this unit were not controlled. Pit burning was extinguished with water at the end of each day, and water was periodically pumped from the pit.

Groundwater has been monitored from five wells in Area 13. No contaminants have been intercepted to date which were above suspected background levels. A summary of groundwater monitoring data collected to date is included in Table 18.

Site Characterization Status: A preliminary assessment/site inspection is planned for this unit.

Media of Concern: Soil and groundwater (see Table 18)

References:

RCRA Facility Investigation Plan, K-1085 Firehouse Burn Area, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-149, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., August 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990*, K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

Table 18. Groundwater monitoring data through 1990—K-25 Site Area 13

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Field Measurements and Physical Characteristics				
Chloride, mg/L	20/20	2	21	6
Dissolved oxygen—I, ppm	34/34	1.2	10.5	4.4
Dissolved oxygen, ppm	34/34	0.9	9.9	4.5
Dissolved solids, mg/L	2/2	260	268	260
Fluoride, mg/L	17/20	0.1	0.3	0.18
Nitrate, mg/L	20/20	0.36	5.1	2.2
Sulfate, mg/L	18/20	1	10	3.4
Suspended solids, mg/L	2/2	25	83	54
Total coliform, COL/100 mL	10/15	0	6	0.6
Total organic carbon (TOC), mg/L	55/112	1	4	1.7
Total organic halide (Tox), mg/L	25/32	0.012	0.072	0.03
Uranium fluorometric, mg/L	28/60	0.001	0.026	0.0046
pH—I, N/A	34/34	5.6	7.9	6.8
pH, N/A	146/146	5.5	8	6.9
Metals and Elemental Analysis				
Aluminum, mg/L	41/60	0.02	90	9.2
Antimony, mg/L	5/60	0.051	0.13	0.088
Arsenic, mg/L	3/60	0.005	0.059	0.028
Barium, mg/L	60/60	0.03	1.3	0.17
Beryllium, mg/L	21/60	0.0003	0.029	0.0036
Boron, mg/L	55/60	0.0062	0.15	0.04
Cadmium, mg/L	15/60	0.0033	0.0079	0.0053
Calcium, mg/L	60/60	21	230	53
Chromium, mg/L	13/60	0.011	0.25	0.077
Cobalt, mg/L	13/60	0.005	0.11	0.024
Copper, mg/L	25/60	0.0049	0.13	0.033
Iron, mg/L	46/60	0.0045	150	10
Lead, mg/L	30/60	0.004	0.45	0.052

Table 18 (continued)

Parameter	Frequency detected	Values above detection limit		
		Minimum	Maximum	Average
Lithium, mg/L	58/60	0.0042	0.23	0.022
Magnesium, mg/L	60/60	6.2	140	22
Manganese, mg/L	58/60	0.0033	24	1
Mercury, mg/L	2/40	0.0006	0.0006	0.0006
Molybdenum, mg/L	8/60	0.011	0.032	0.019
Nickel, mg/L	23/60	0.011	0.36	0.08
Niobium, mg/L	15/60	0.0071	0.023	0.011
Phosphorous, mg/L	22/60	0.2	3.5	0.9
Potassium, mg/L	59/60	1.2	22	5.5
Silicon, mg/L	60/60	2.9	110	13
Sodium, mg/L	60/60	0.71	16	4.4
Strontium—Total, mg/L	8/8	0.015	0.043	0.03
Strontium, mg/L	49/52	0.0007	0.22	0.037
Uranium-235, wt %	1/1	0.72	0.72	0.72
Vanadium, mg/L	17/60	0.0051	0.17	0.031
Zinc, mg/L	54/60	0.0019	0.57	0.064
Zirconium, mg/L	6/60	0.0061	0.012	0.01
Radionuclides				
Alpha activity, pCi/L	24/28	-3	70	7.4
Beta activity, pCi/L	25/28	0.31	102	25
BNA and Volatile Organic Analyses				
2-Butanone, mg/L	1/20	0.012	0.012	0.012
Methylene chloride, mg/L	2/20	0.008	0.16	0.084
Phenols—Total, mg/L	9/20	0.002	0.007	0.0038
Titanium, mg/L	39/60	0.0033	0.38	0.061
Trichloroethene, mg/L	1/20	0.008	0.008	0.008
bis(2-Ethylhexyl)phthalate, mg/L	1/20	0.024	0.024	0.024

PHOTO NO. K/PH-87-0019

K-1085 Old Firehouse Burn Area

Area 14 Site Descriptions

Unit Name: K-1070-C/D Classified Burial Ground

Unit Number: K14-R005

Regulatory Status: 3004.u

Area Number/Unit Location: Area 14, main plant area, on the east side of the K-25 Site, between the centrifuge area and the K-1037 area (Map Ref. No. 5)

Approximate Dimensions and Capacity: 22 acres

Dates Operated: 1972–1989

Present Function: K-1070-C/D is no longer used for waste disposal

Life Cycle Operation: Burial of classified equipment, oils, glass, and contaminated scrap metal

Waste Characteristics: The burial ground contains classified nonhazardous materials such as hardware and equipment. Also, located in the same general area are disposal trenches used to dispose of hazardous chemicals and solvents. Approximately 9100 gal of solvents and 1600 lb of chemicals were disposed of in these pits. Lead and uranium are among metals buried in the burial ground's trenches.

Release Data: A seep/spring near the burial ground has shown detectable concentrations of volatile organic compounds. The source of this material will be determined during the remedial investigation process.

Site Characterization Status: Soil samples were collected from this unit in 1989 as part of the remedial investigation. Additional soil samples will be collected.

Media of Concern: Groundwater and soil

Comments: The site straddles a groundwater divide, the same divide that separates groundwater Areas 1 and 2. The White Oak Mountain Fault runs along the south side of this unit. Its influence on groundwater flow will be studied in the investigation of this unit.

References:

RCRA Facility Investigation Plan, K-1070-C/D Classified Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-140, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

K-25 Site Environmental Restoration Program, *Work Plan: Quality Assurance/Quality Control Health and Safety Plan for the Site Characterization of K-1070-C/D*, K/ER-6, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1990.

K-25 Environmental Restoration Program, *Site Characterization Summary, K-1070-C/D Classified Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee,* K/ER-4&D1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1990.

K-25 Environmental Restoration Program, *Preliminary Risk Assessment for K-1070-C/D Classified Burial Ground at the Oak Ridge K-25 Site, Oak Ridge, Tennessee,* K/ER-32&D0, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1990.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0016

K-1070-C/D Classified Burial Ground

PHOTO NO. K/PH-87-0017

K-1070-C/D Classified Burial Ground (Pit Area)

Unit Name: K-1070-D1, -D2, and -D3 Storage Dikes

Unit Number: K14-R026

Regulatory Status: 3004.u

Area Number/Unit Location: Area 14, main plant area on the east side of the K-25 Site, between the centrifuge area and the AVLIS area (Map Ref. No. 27)

Approximate Dimensions and Capacity: Dike D1 covers 0.15 acre, Dike D2 covers 0.26 acre, and Dike D3 covers 0.21 acre. The storage total for all dikes was 912 drums.

Dates Operated: November 1980 through April 1985

Present Function: Unused, closed

Life Cycle Operation: Hazardous waste liquids were stored within the dikes, which have been removed from the site.

Waste Characteristics: The following inventory of waste types stored at the K-1070 dikes was generated from existing records:

1. Trichloroethane and water.
2. Waste oil >5 ppm PCBs, <50 ppm PCBs.
3. Paint waste.
4. Ethylene glycol and water.
5. Trichloroethylene and water.
6. Varsol.
7. Gasoline and water.
8. Methylene chloride.
9. Isopropyl alcohol.
10. Freon and water.
11. Freon contaminated with uranium.
12. Vartex.
13. Methyl ethyl ketone (MEK).
14. Dearborn 537.
15. Perchloroethylene.
16. Oil filters.
17. Sorb-all and oil.
18. Cimcool.
19. Sludge from wash rack in garage.
20. Acetone.
21. Xylene.
22. Classified liquid.
23. Rust ban.
24. Tolyl triazole and xylene.
25. Scintillation waste and xylene.

26. Oil and quinoline.
27. A and B refrigerant oil.
28. Tributyl/phosphate.
29. Dioctyl phthalate.
30. Classified oil.
31. Freon, oil, and water.
32. Freon trichloroethane, methylene chloride, and water.
33. Sulfonic acid.
34. Mictobiotreatment, Freon, and water.
35. Ethyl alcohol.
36. Classified materials (lab packs).
37. Paint thinner.
38. Uranium and hexane.
39. Uranium and penta-ether.
40. Nutek.
41. Non-PCB solvents and chemicals.
42. Degreaser residue.
43. Adsorbents.
44. Sweeping compound.
45. Non-PCB oils.

Release Data: No known releases

Site Characterization Status: The dikes are being investigated in conjunction with the K-1070-C/D Classified Burial Ground. The samples collected during analysis of the closure activity indicated no releases from the dikes. The sampling consisted of collecting 1- to 4-ft depth soil samples from the storage dikes and analyzing for toxic metals and organics. The closure plan consisted of a non-RCRA cap and revegetating the area.

Media of Concern: Soil and groundwater

Comments: A closure plan was submitted to and approved by the Tennessee Department of Health and Environment (TDHE). A sampling plan was implemented as specified in the closure plan, and the results were submitted to TDHE. Based upon the sample results, the proposed closure plan was implemented and accepted by TDHE.

References:

RCRA Facility Investigation Plan, K-1070-C/D Classified Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-140, Revision 1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., May 1989.

K-25 Site Environmental Restoration Program, *Work Plan: Quality Assurance/Quality Control Health and Safety Plan for the Site Characterization of K-1070-C/D*, K/ER-6, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., June 1990.

K-25 Environmental Restoration Program, *Site Characterization Summary, K-1070-C/D Classified Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee,* K/ER-4&D1, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., March 1990.

K-25 Environmental Restoration Program, *Preliminary Risk Assessment for K-1070-C/D Classified Burial Ground at the Oak Ridge K-25 Site, Oak Ridge, Tennessee,* K/ER-32&D0, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., September 1990.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant,* K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., December 1989.

J. M. Forstrom, *Oak Ridge Gaseous Diffusion Plant Groundwater Sampling and Analysis Plan, January–September 1990,* K/HS-286, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn., January 1990.

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0719

K-1070-D1 Storage Dike Area

PHOTO NO. K/PH-87-0739

K-1070-D2 Storage Dike Area

PHOTO NO. K/PH-87-0840

K-1070-D3 Storage Dike Area

Units Not Assigned to a Groundwater Area (Area "0")

Unit Name: Flannagan's Loop Road

Unit Number: K00-0001

Regulatory Status: 3004.u

Area Number/Unit Location: This unit is in an area that is not assigned to a groundwater area. It is located south of the K-25 Site and runs between Highway 58 and Bear Creek Road (Map Ref. No. 85)

Approximate Dimensions and Capacity: 4000 ft long

Dates Operated: Mineral oil was sprayed on the road in 1982 and 1983.

Present Function: The road is still in use.

Life Cycle Operation: In 1982 and 1983, ~18,000 gal of waste mineral oil was sprayed on the road for dust suppression. The oil was applied with sprayers attached to drums that were carried by trucks.

Waste Characteristics: The oil used for dust suppression had been used as a motor lubricant; consequently, the possiblility of residual metal contamination and petroleum hydrocarbons existed.

Release Data: The mineral oil was sampled for analysis of uranium, chlorinated hydrocarbons, and PCBs before it was approved for use as a dust suppressant.

Site Characterization Status: A preliminary assessment/site inspection has been conducted for this unit. The results of the study indicated that the site poses no risk to human health or the environment; consequently, no further action should be taken to determine the risk posed by this unit.

Media of Concern: Soil

Comments:

References:

Date Prepared: May 1991

PHOTO NO. K/PH-91-3130

Flannagan's Loop Road

Unit Name: K-301-1 Vault 4 Hazardous Waste Storage Facility

Unit Number: K00-R078

Regulatory Status: RCRA

Area Number/Unit Location: This unit is in an area that has not been assigned a groundwater area designation. It is located in the east side of the K-25 Building (Map Ref. No. 86)

Approximate Dimensions and Capacity: 158 by 291 ft; 15,200 drums

Dates Operated: 1988 to present

Present Function: Storage of RCRA waste materials

Life Cycle Operation: This is an existing facility that was modified in 1988 to store waste materials. The unit is diked, and the floor has been sealed with a compatible material. No material has been released from the storage area.

Waste Characteristics: Wastewater treatment sludges resulting from precipitation and neutralization operations. The sludge is generated at K-1232, K-1407-H, and K-1435.

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

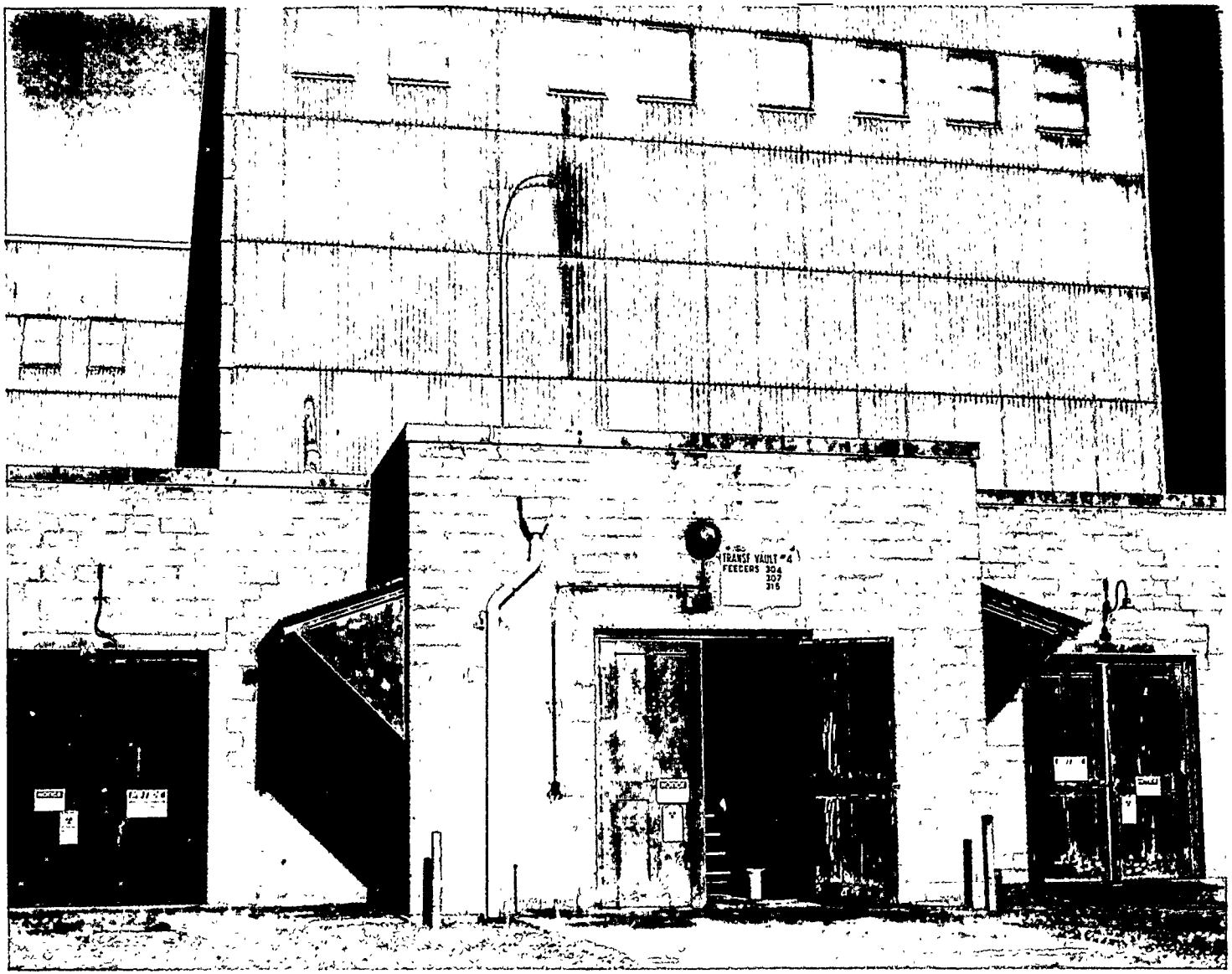
Comments:

References:

Date Prepared: November 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3127



K-301-1 Vault 4 Hazardous Waste Storage Facility

Unit Name: K-303-5 Low-Level Waste Storage

Unit Number: K00-C072

Regulatory Status: CERCLA

Area Number/Unit Location: This unit is in an area that has not been assigned a groundwater area designation. It is in the K-25 building (Map Ref. No. 84)

Approximate Dimensions and Capacity: 290 by 45 ft; 3000 drums

Dates Operated: Mid-1970 to present

Present Function: Used to store drums of low-level radioactively contaminated metal scrap material prior to disposal

Life Cycle Operation: See above.

Waste Characteristics: Low-level radioactively contaminated scrap metal stored in drums

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments: This area stores drums that contain solid contaminated scrap metal materials only

References:

Date Prepared: October 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-3112

K-303-5 Low-Level Waste Storage

Unit Name: K-305 Vaults 19 and 19A Hazardous Waste Storage Facility

Unit Number: K00-R079

Regulatory Status: RCRA

Area Number/Unit Location: This unit is in an area that has not been assigned a groundwater area designation. It is located on the east side of the K-25 building (Map Ref. No. 86)

Approximate Dimensions and Capacity: 374 by 90 ft; 3200 drums

Dates Operated: 1988 to present

Present Function: Storage of RCRA waste materials

Life Cycle Operation: This is a new facility that was modified in 1988 to store waste materials. The unit is diked, and the floor has been sealed with a compatible material. No material has been released from the storage area.

Waste Characteristics: Wastewater treatment sludges resulting from precipitation and neutralization operations

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments:

References:

Date Prepared: November 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3163

K-305 Vaults 19 and 19A Hazardous Waste Drum Storage

Unit Name: K-306-1 PCB/Hazardous Waste Drum Storage

Unit Number: K00-R031

Regulatory Status: RCRA

Unit Location: This unit is located in the basement floor of the K-306-1 unit of the K-25 process building (Map Ref. No. 32).

Approximate Dimensions and Capacity: Floor area dimensions are 360 by 58 ft.

Dates Operated: 1975 to present

Present Function: Managed storage of hazardous wastes

Life Cycle Operation: Prior to the mid-1960s, the K-25 basement areas were internal components of the K-25 uranium enrichment process operations. Following shutdown of K-25 building process operations in 1964, select basement areas were converted to storage of packaged materials. Since 1975, the K-306-1 basement area has stored PCB-contaminated materials, including light equipment, empty containers, cleanup materials, dirt, and PCB liquids. Various other types of hazardous wastes are also held at the unit.

Waste Characteristics: At present, 847 55-gal containers are stored at the site. The stored materials are primarily PCB-contaminated items. Other materials include TSCA ash/sludge and waste pyranol.

Release Data: The storage area is diked, and its floor surface has been sealed. The area is periodically inspected, and no releases have been found.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments:

References:

Date Prepared: August 1991

PHOTO NO. K/PH-87-0616

K-306-1 PCB/Hazardous Waste Drum Storage

Unit Name: K-306-1 Vault 23A Hazardous Waste Storage Facility

Unit Number: K00-R030

Regulatory Status: RCRA

Unit Location: This unit is located in the basement vault of the K-306-1 unit in the K-25 process building (Map Ref. No. 31).

Approximate Dimensions and Capacity: 312- by 49-ft total floor area

Dates Operated: 1984 to present

Present Function: Storage of RCRA waste materials and TSCA trash

Life Cycle Operation: Prior to the mid-1960s, the K-25 basement areas were internal components of the K-25 uranium enrichment process operations. Following shutdown of K-25 building process operations in 1964, select basement areas were converted to storage of packaged materials. Since 1984, Vault 23A has stored wastewater treatment sludges, spent carbon filtration media, TSCA trash, and solvents.

Waste Characteristics: Stored materials are primarily sludges and liquid wastes generated by various cleaning and/or chemical processes.

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned for this unit.

Media of Concern: None: the vault facility was modified in 1984 to provide a containment dike and a floor seal.

Comments:

References:

Date Prepared: August 1991

PHOTO NO. K/PH-87-0633

K-306-1 Vault 23A Hazardous Waste Storage Facility

Unit Name: K-310-1 Vaults 2, 2A, and 2B Hazardous Waste Storage Facility

Unit Number: K00-R080

Regulatory Status: RCRA

Area Number/Unit Location: This unit is in an area that has not been assigned a groundwater area designation. It is located in the east side of the K-25 building (Map Ref. No. 86).

Approximate Dimensions and Capacity: 158 by 216 ft; 11,200 drums

Dates Operated: 1988 to present

Present Function: Storage of RCRA waste materials

Life Cycle Operation: As above

Waste Characteristics: Wastewater treatment sludges resulting from precipitation and neutralization operations

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

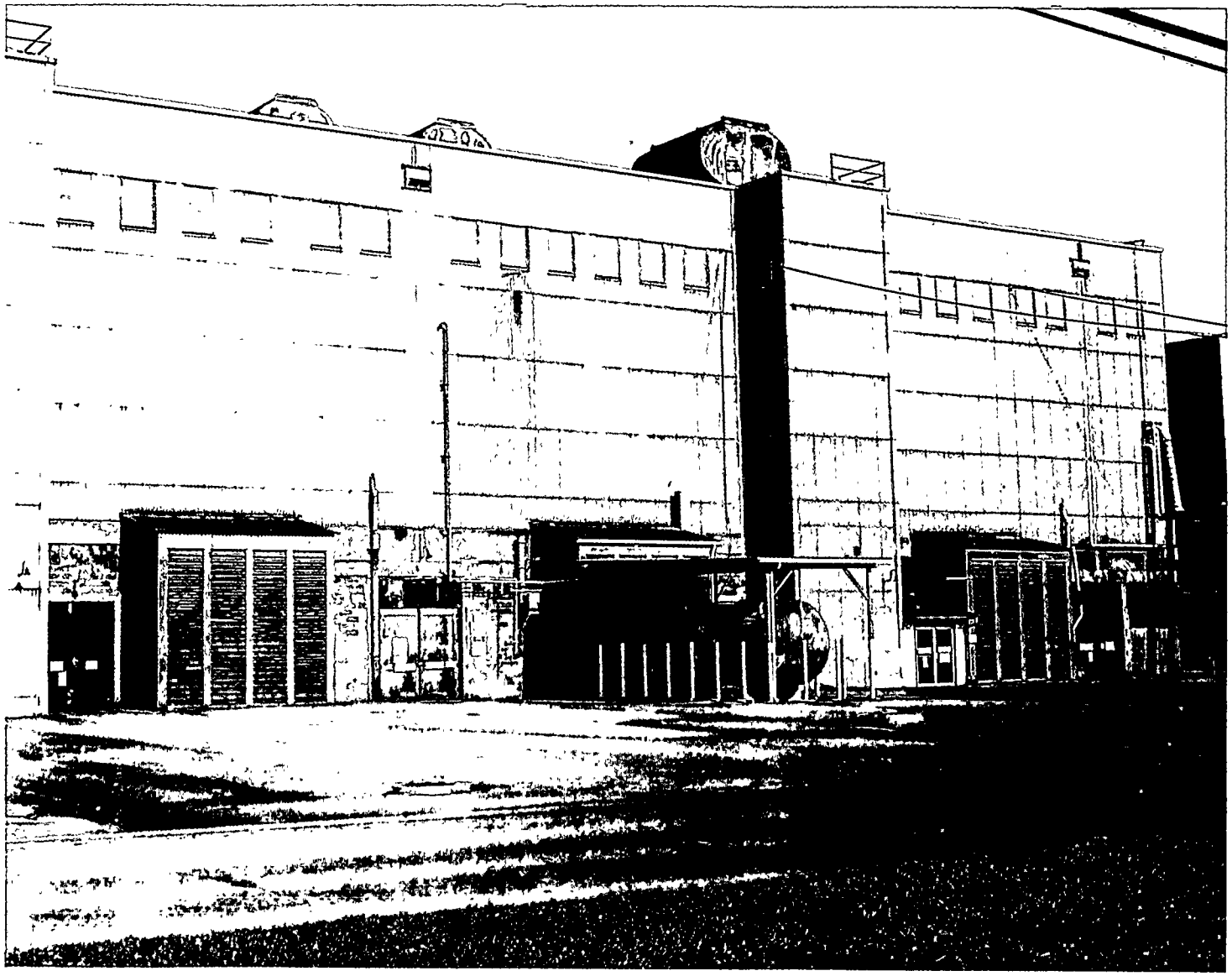
Comments:

References:

Date Prepared: November 1988

Date Revised: May 1991

PHOTO NO. K/PH-91-3138



K-310-1 Vaults 2, 2A, and 2B Hazardous Waste Storage

Unit Name: K-310-2 Low-Level Waste Storage

Unit Number: K00-C070

Regulatory Status: CERCLA

Area Number/Unit Location: This unit is in a area that has not been given a groundwater area designation. It is in the K-25 building (Map Ref. No. 82).

Approximate Dimensions and Capacity: 290 by 45 ft; 3000 drums

Dates Operated: Mid-1970s to present

Present Function: Storage of drums of low-level radioactively contaminated metal scrap material prior to disposal

Life Cycle Operation: As above

Waste Characteristics: Low-level radioactively contaminated scrap metal stored in drums

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments: This area stores drums that contain solid contaminated scrap metal materials only.

References:

Date Prepared: October 1987

Date Revised: March 1991

PHOTO NO. K/PH-87-3114

K-310-2 Low-Level Waste Storage

Unit Name: K-310-3 Low-Level Waste Storage

Unit Number: K00-C071

Regulatory Status: CERCLA

Area Number/Unit Location: This unit is in a area that has not been assigned a groundwater area designation. It is in the K-25 building (Map Ref. No. 83).

Approximate Dimensions and Capacity: 290 by 45 ft; 3000 drums

Dates Operated: Mid-1970s to present

Present Function: Storage of drums of low-level radioactively contaminated metal scrap material prior to disposal

Life Cycle Operation: As above

Waste Characteristics: Low-level radioactively contaminated scrap metal stored in drums

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments: This area stores drums that contain solid contaminated scrap metal materials only.

References:

Date Prepared: October 1987

Date Revised: March 1991

PHOTO NO. K/PH-87-3111

K-310-3 Low-Level Waste Storage

Unit Name: K-311-1 Radiogenic Lead Storage

Unit Number: K00-R029

Regulatory Status: 3004.u (RCRA Part B Permit application has been submitted)

Unit Location: This unit is located in the basement vault of the southeast unit of the K-25 process buildings (Map Ref. No. 30).

Approximate Dimensions and Capacity: Vault dimensions are 340- by 58-ft floor area; however, the subject unit uses ~3000 ft^2 of the total vault area.

Dates Operated: Mid-1960s to present

Present Function: Managed storage of radiogenic and nonradiogenic lead

Life Cycle Operation: Prior to the mid-1960s, basement vaults of the K-25 process buildings served as an internal component of the K-25 enrichment process operations. Following the shutdown of the K-25 process buildings in 1964, select sections of the building floors were converted for the storage of certain packaged materials. Since the mid-1960s, the K-311-1 basement vault has housed radiogenic and nonradiogenic lead.

Until June 20, 1989, the unit held 51 tons of radiogenic lead consisting of lead slag, ingots, and lead carbonate. From June 20, 1989, to June 24, 1991, additional lead materials were stored in the vault. These materials consisted of ~1100 lb of nonradiogenic lead bricks, lead cable, lead pot, and an additional 900 lb of radiogenic lead.

Waste Characteristics: Radiogenic lead in the form of ingots, slag, and powder. The lead is contained in 55-gal drums, 5-gal buckets, or plastic bags.

Release Data: No known releases

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments: There are no immediate plans to dispose of the lead in the K-311-1 vault. Since the material is in the form of metallic lead and powdered salts, no releases have occurred, and it is recommended that the subject unit be removed from the remedial action list.

Date Prepared: August 1991

PHOTO NO. K/PH-87-0729

K-311-1 Radiogenic Lead Storage

Unit Name: K-1024 Dilution Pit

Unit Number: K00-R082

Regulatory Status: 3004.u

Area Number/Unit Location: Area 0 (main plant area), near the center of the K-25 Uranium Enrichment Building Complex (Map Ref. No. 107)

Approximate Dimensions and Capacity: The inside dimensions of the pit are 5 × 4 × 5 ft. The mixed solution capacity is 80 ft^3.

Dates Operated: Served instrument shop operations from 1945 to 1963. Served centrifuge development laboratory operations from 1970 to 1985. On standby from 1985 to present.

Present Function: The dilution pit is on standby. The west wing of the K-1024 building is shut down; the east wing and center bay are used as a filter test facility and offices for the Equipment Test and Inspection Department.

Life Cycle Operations: Originally, the K-1024 Diluting Facility accommodated the ORGDP instrument maintenance shops. The acid/solvent stream was diluted by sanitary water entering the head of the acid waste line. The facility's sanitary flow and acid/solvent flow are each handled by independent drain lines. A 4-in. acid waste line flows through a diluting pit before discharge into the K-25 Site storm drain system.

With the exception of the initial facility acceptance test, which was probably conducted in 1944 or 1945, no records of any leak tests are available.

Prior to cessation of instrument maintenance operations in 1963, a central acid cleaning area was located at the south end of the west wing of Building K-1024. Available drawings indicate that this operation released process wastes to the building's original acid waste lines.

In instrument shop operations associated with the cleaning of process instruments, the acids used included hydrochloric acid, aqueous hydrofluoric acid, nitric acid, and chromic acid. The solvents were trichlorethylene, isopropyl alcohol, and Freon TF.

Waste Characteristics: The volume and composition of the chemical wastes handled by the diluting pit varied with time. The waste solutions were discharged in batch quantities. When processing recycled instruments from the uranium enrichment cascades, the cleaning cycle could have contributed uranium to the waste discharge from the instrument shops.

Release Data: No documented incidents of uncontrolled waste releases exist. However, releases via drain system failures or overload of pit capacity are conceivable.

Site Characterization Status: A preliminary assessment has been completed. In February 1989, three samples of the soil surrounding the diluting pit site were collected and analyzed for

uranium, metals, and volatile and semivolatile organics. The results of this sampling effort were inconclusive as to the origin and extent of contamination at the site. Additional soil sampling and analysis are planned.

Media of Concern: Soil, groundwater, surface water, storm drains

Comments: The K-1024 Dilution Pit is in close proximity to the shutdown K-25 uranium enrichment process buildings. Therefore, contamination at the pit may have originated from the K-25 building. The additional soil sampling may better identify the contamination source.

References:

Date Prepared: May 1991

PHOTO NO. K/PH-91-3135

K-1024 Dilution Pit Area

Unit Name: K-1025-C Storage Building

Unit Number: K00-R027

Regulatory Status: RCRA

Area Number/Unit Location: Area 0, main plant area, north of the K-25 Uranium Enrichment Building Complex (Map Ref. No. 28)

Approximate Dimensions and Capacity: 40- by 20-ft building with capacity to hold ~80 55-gal drums. The floor area is divided into quadrants to contain spills and permit the segregation of wastes by categories.

Dates Operated: 1945 to present

Present Function: Storage of hazardous waste containers

Life Cycle Operations: At present the facility consists of a diked building with an epoxy sealed floor. The original K-1025 building's floor slabs were not divided by dikes.

During 1945–1950, the K-1025-A through -E facilities housed UF_6 feed and tails material in 400-lb capacity cylinders and UF_6 enriched material in smaller cylinders.

From the early 1950s to the mid-1970s, the K-1025-C building served as a storage facility for uranium-bearing/radioactive containers of varying description. In the mid-1970s the contents of the building were transferred to K-1410, where they were processed and the units emptied of their contents under controlled conditions. Subsequently, K-1025-C was assigned to Waste Management activities and today continues to be used for hazardous waste storage.

Waste Characteristics: Acids, bases, oxidizers, organics, toxics, and flammables.

Release Data: No known releases

Site Characterization Status: No further action by K-25 ER is planned for this site.

Media of Concern: None

Comments:

References:

Date Prepared: May 1991

PHOTO NO. K/PH-87-0731

K-1025-C Storage Building

Unit Name: K-1030 Building Contaminated Scrap Metal Dumpster

Unit Number: K00-C064

Regulatory Status: CERCLA

Area Number/Unit Location: Inside the K-25 building loop (Map Ref. No. 76)

Approximate Dimensions and Capacity: 3 × 3 × 2 ft; 20 ft^3

Dates Operated: Mid-1970s to about 1985

Present Function: The dumpster has been removed.

Life Cycle Operation: The unit was a shop receptacle for scrap metal generated by maintenance shop operations. Because the unit received some radioactively contaminated scrap metal, all the scrap metal was classified as contaminated. Once filled, the dumpster would be emptied into one of two outdoor contaminated scrap metal dumpsters. The maintenance operation was relocated in 1985, and the building was converted into an office facility in 1987.

Waste Characteristics: Low-level radioactively contaminated scrap metal

Release Data: There have been no known releases from this unit.

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

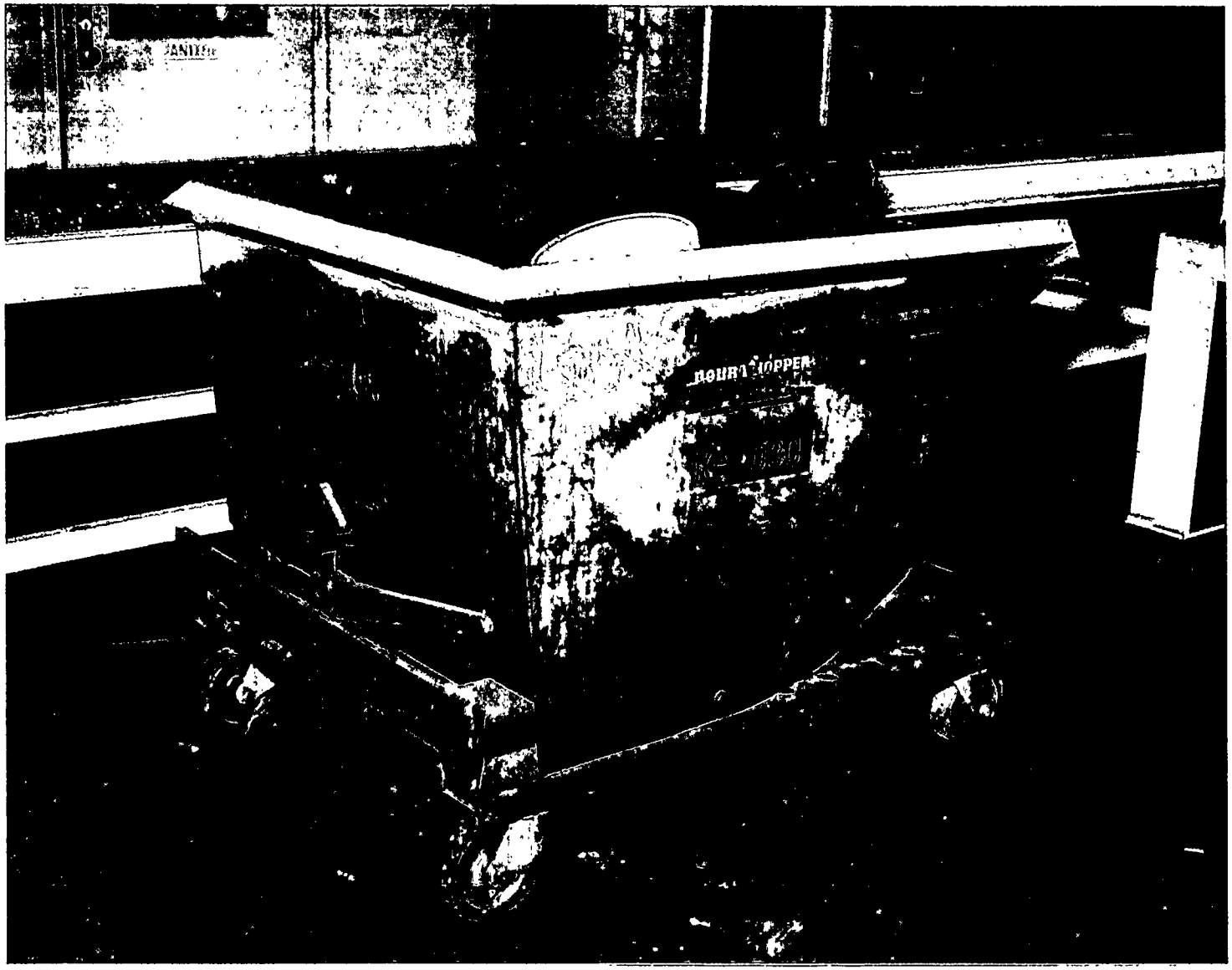
Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3120



K-1030 Building Contaminated Scrap Metal Dumpster

Unit Name: K-1030 Contaminated Scrap Metal Dumpster

Unit Number: K00-C063

Regulatory Status: CERCLA

Area Number/Unit Location: In the middle of the K-25 building loop (Map Ref. No. 75)

Approximate Dimensions and Capacity: 2 each: 7 × 4 × 3 ft; 40 ft^3 each

Dates Operated: Mid-1970s to about 1986

Present Function: The dumpsters have been removed.

Life Cycle Operation: The dumpsters collected contaminated scrap metal generated by the K-1030 building maintenance operations. The unit collection operation was stopped in about 1985, and the K-1030 building was converted into an office facility.

Waste Characteristics: Low-level radioactively contaminated scrap metal

Release Data: There were no known releases from this unit.

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

Comments:

References:

Date Prepared: October 1987

Date Revised: August 1991

PHOTO NO. K/PH-87-3117

K-1030 Contaminated Scrap Metal Dumpster

Unit Name: K-1515 Lagoon

Unit Number: K00-R022

Regulatory Status: 3004.u

Unit Location: This unit is located south of the K-25 Site, near the K-1515 water treatment facility on the Clinch River.

Approximate Dimensions and Capacity: 2.6 million gal (2 acres by 3 ft deep)

Dates Operated: 1943 to present

Present Function: The lagoon serves as a holding pond for sludge discharged from the flocculating and settling basins as well as the backwash water discharged from sand filters at the K-25 water treatment facility.

Life Cycle Operation: Since its inception, the lagoon has served as a sludge holding pond for the water treatment plant. Sludge is generated by the addition of a flocculating chemical to the incoming raw water from the Clinch River. Resultant solids are allowed to settle in the lagoon prior to discharge into the Clinch River. A corrosion inhibitor and chlorine system complete the water treatment process. See Fig. 9 for schematic of the K-1515 water treatment facility.

Waste Characteristics: Effluent from this unit is permitted by the TDEC under NPDES regulations. Aluminum sulfate is the flocculating agent. Chlorine is added at the mixing flume. The corrosion inhibitor is sodium hexa-meta-phosphate.

Release Data: Releases of sludge into the Clinch River are controlled.

Site Characterization Status: No further action by K-25 ER is planned.

Media of Concern: None

Comments:

References:

Date Prepared: May 1991

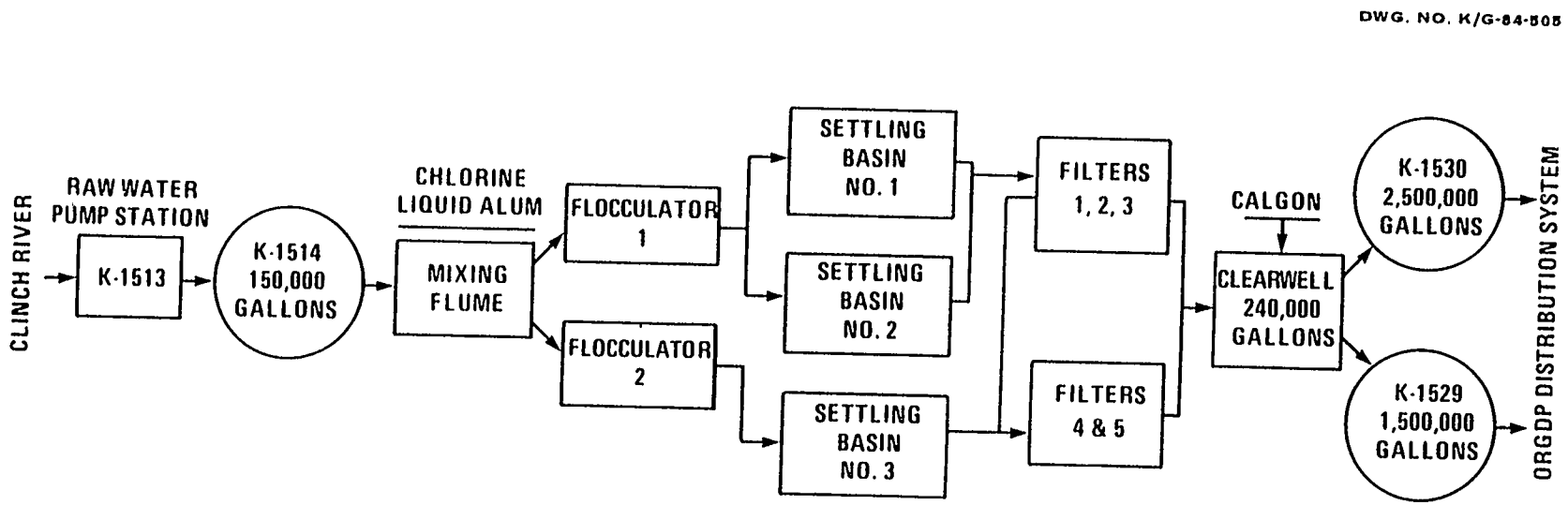
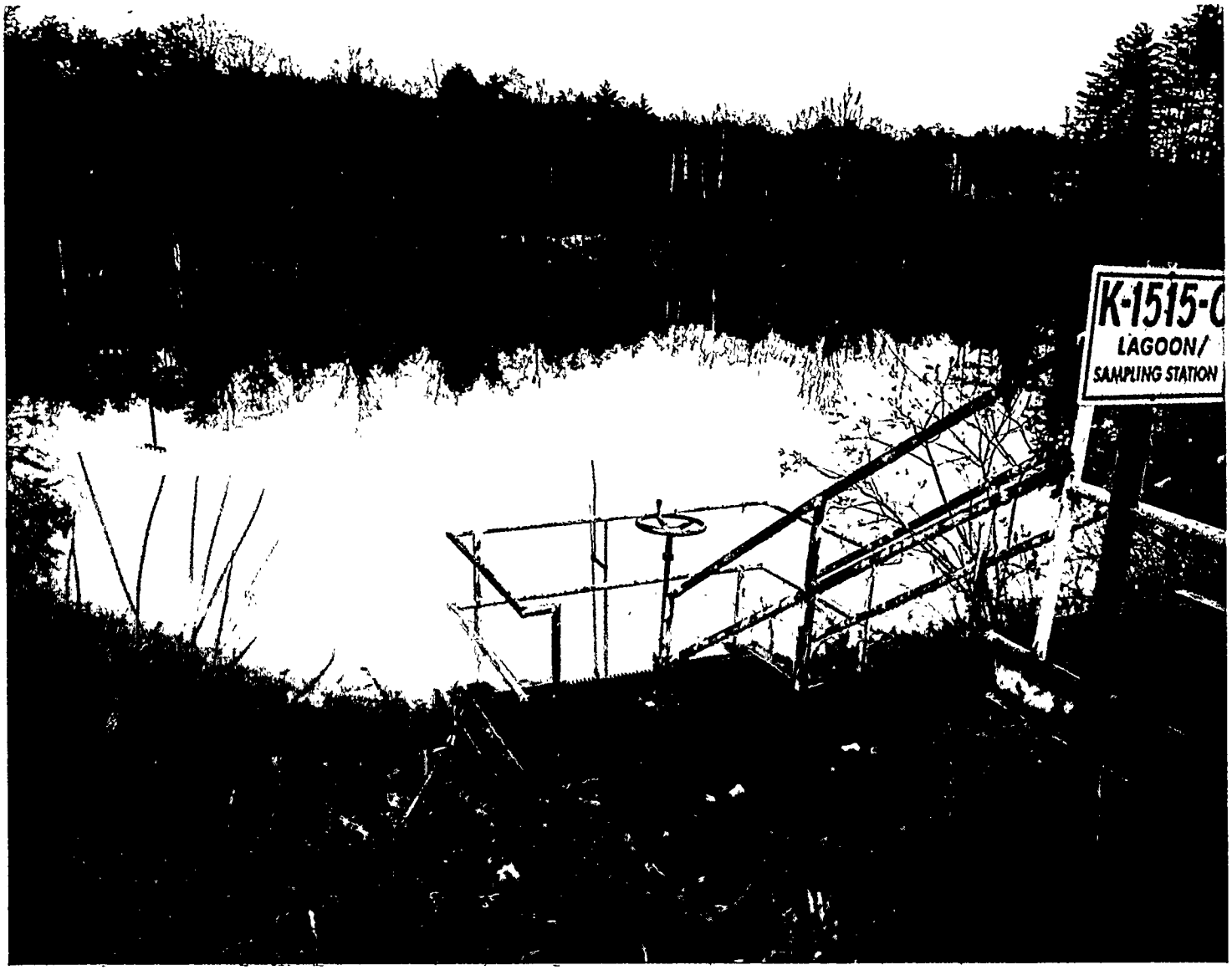


Fig. 9. K-1515 water treatment facilities.

PHOTO NO. K/PH-87-0022



K-1515 Lagoon

Unit Name: K-1515-F Land Treatment

Unit Number: K00-R021

Regulatory Status: 3004.u

Unit Location: This unit is located south of the K-25 Site, near the K-1515 Lagoon.

Approximate Dimensions and Capacity: Not applicable

Dates Operated: Not applicable

Present Function: Unused

Life Cycle Operation: Preliminary assessment work indicated that sludge from the K-1515 Lagoon had been spread over an area designated K-1515 Land Treatment. Subsequent investigation revealed, however, that the plan to use the area for spreading sludge was never implemented.

Waste Characteristics: Aluminum would be the primary metal contaminant from K-1515 Lagoon sludge. Soil samples at the K-1515 Land Treatment area reveal levels of aluminum comparable with levels at the entire K-25 area.

Release Data: Not applicable

Site Characterization Status: No further action is planned for this unit.

Media of Concern: None

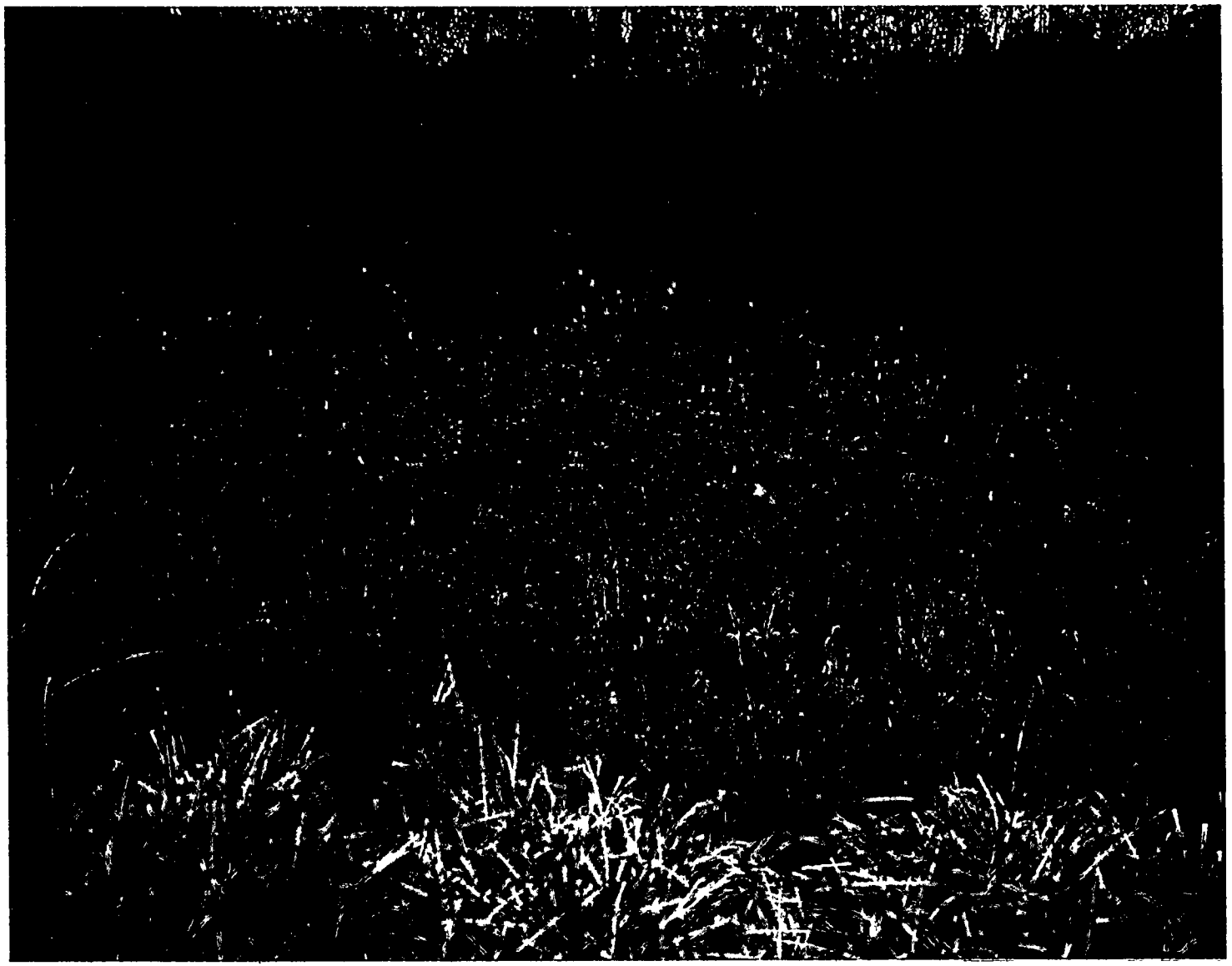
Comments:

References:

Date Prepared: April 1987

Date Revised: May 1991

PHOTO NO. K/PH-87-0015



K-1515-F Land Treatment

Unit Name: K-1654-A Waste Accumulation Tank

Unit Number: K00-R087

Regulatory Status: RCRA

Unit Location: External plant area, south of Building K-1654-A in the Central Training Facility

Approximate Dimensions and Capacity: Approximately 500 gal

Dates Operated: 1979 to present

Present Function: The tank is currently unused for new waste accumulation, but waste collected before late 1989 remains in the tank.

Life Cycle Operation: From 1979 to late 1989, the K-1654-A Waste Accumulation Tank received rinse water from the K-1654-A indoor firing range. Lead scraps collected on the floor of the building were washed down the floor drain and into the underground tank. Attached to the tank is a distribution box, which routed tank overflow to a nearby drain field. Firing range floor rinse water has not been sent to the tank since elevated lead levels were discovered in 1989.

Waste Characteristics: Lead was measured at 6300 ppm in the waste accumulation tank and 8639 ppm in the distribution box.

Release Data: Tank overflow was sent to a drain field prior to 1989. Lead levels have not yet been analyzed for the drain field.

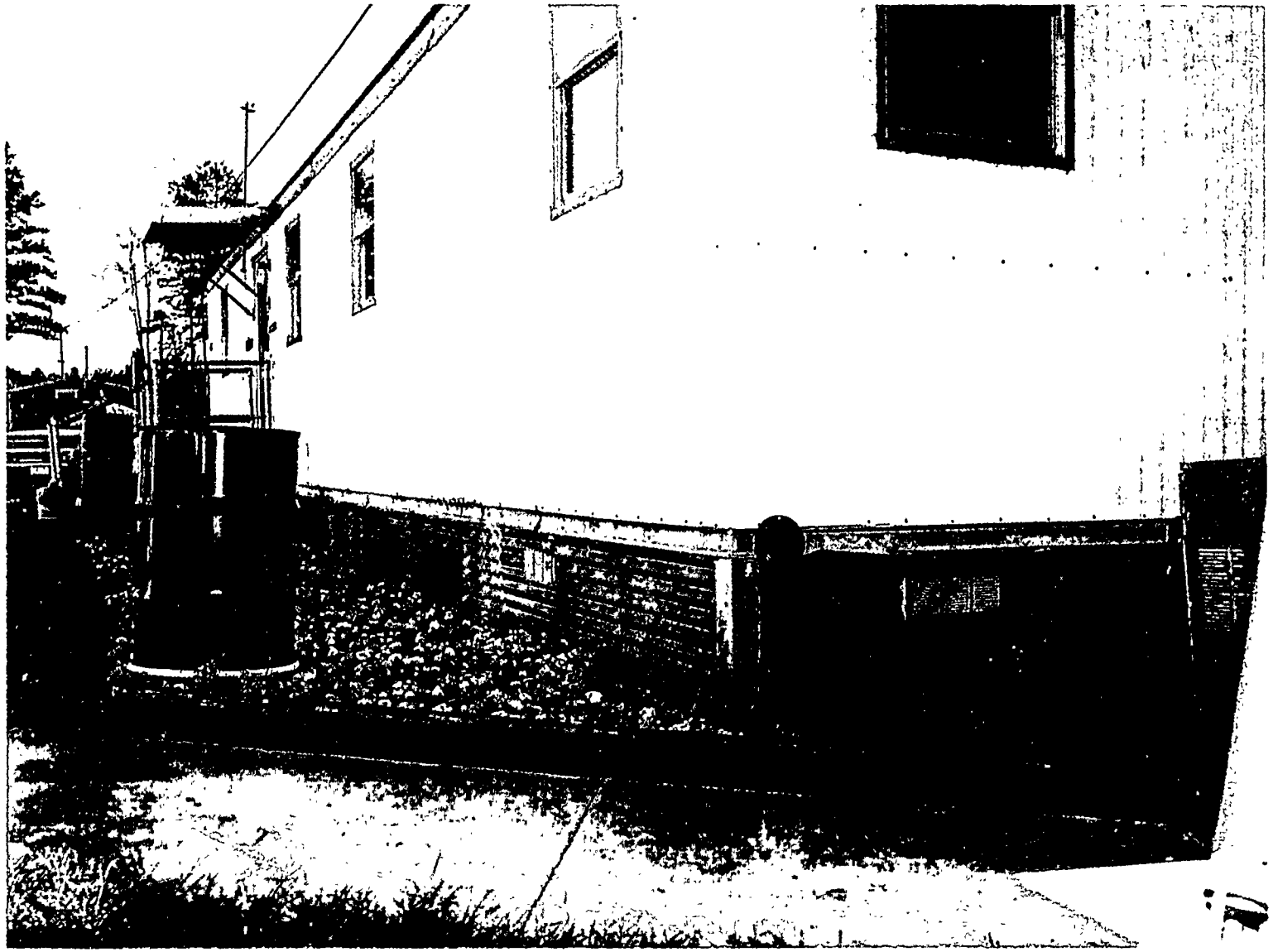
Site Characterization Status: Because K-1654-A is an active site, waste remediation will be conducted by officials of the K-25 Site. No further action is planned by the K-25 ER Program.

Media of Concern: Soil, groundwater, surface water

Comments:

References:

Date Prepared: October 1991



K-1654-A Waste Accumulation Tank

Appendix A

LIST OF SOLID WASTE MANAGEMENT UNITS

K-25 Solid Waste Management Units

UNIT	Submitted In	Regulatory Status	SWMU Cluster	Expected Contaminants	Hydro-geologic WAG No.	Unit Number	Action	Document Number	Document Submitted	Regulatory Comments Received	RI Approved	RI Initiated	Remarks
SITES NOT ASSIGNED TO A WAG													
K-1515 -F Land Treatment	2.A.1	3004.u			N/A	R021	Pending						Status and Action pending data to be sent to EPA
K-1515 Lagoon	2.A.1	3004.u			N/A	R022	No RI						
K-1030 Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			0	C063	No RI						Status change at 9/25/88 Mtg.
K-1030 Building Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			0	C064	No RI						Status change at 9/25/88 Mtg.
K- 310 -2 Low-Level Waste Storage	2 A 1	CERCLA			0	C070	No RI						Status change at 9/25/88 Mtg.
K- 310 -3 Low-Level Waste Storage	2.A.1	CERCLA			0	C071	No RI						Status change at 9/25/88 Mtg.
K- 303 -5 Low-Level Waste Storage	2.A.1	CERCLA			0	C072	No RI						Status change at 9/25/88 Mtg.
K-1025 -C Storage Building	2 A.1	RCRA			0	R027	No RI						
K- 311 -1 Radiogenic Lead Storage	2 A.1	RCRA			0	R029	No RI						
K- 306 -1 Vault 23A Hazardous Waste Storage Facility	2.A.1	RCRA			0	R030	No RI						
K- 306 -1 PCB/Hazardous Waste Drum Storage	2.A.1	RCRA			0	R031	No RI						
K- 301 -1 Vault 4 Hazardous Waste Storage Facility	11/11/86 ltr	RCRA			0	R078	No RI						
K- 305 Vaults 19 and 19A Hazardous Waste Storage Facility	11/11/86 ltr	RCRA			0	R079	No RI						
K- 310 -1 Vaults 2,2A,&2B Hazardous Waste Storage Facility	11/11/86 ltr	RCRA			0	R080	No RI						
K-1024 Dilution Pit	11/11/86 ltr	3004 u			0	R062	RI						

Page 1 Expected Contaminants - 1=Petro Hydrocarbons, 2=volatile Organics, 3=Polynuclear Aromatics, 4=Metals, 5=Radioactivity, 6=PCB's, 7=Asbestos

UNIT	Submitted In	Regulatory Status	SWMU Cluster	Expected Contaminants	Hydro-geologic WAG No.	Unit Number	Action	Document Number	Regulatory Document Submitted	Regulatory Comments Received	RI Approved	RI Initiated	Remarks
WAG 1 SITES													
K- 822 Cooling Tower Basin	2 A 1	CERCLA			1	C003a	PA/SI	K/HS-151	12/22/88				
K-1037 Recirculating Cooling Water Lines	2 A 1	CERCLA			1	C003b	PA/SI	K/HS-151	12/22/88				
K-1401 -3E Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			1	C065	No RI						Status change at 9/25/88 Mtg.
K-1401 -4W Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			1	C066	No RI						Status change at 9/25/88 Mtg.
K-1420 Contaminated Drum Storage	2 A 1	CERCLA	K-1420		1	C067	No RI						Status change at 9/25/88 Mtg.
K-1401 -2W Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			1	C068	No RI						Status change at 9/25/88 Mtg.
K-1420 Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			1	C069	No RI						Status change at 9/25/88 Mtg.
K-1407 -B Retention Basin	2 A 1	RCRA	K-1407		1	R004	RI	K/HS-135	12/22/88				
K-1035 -A Satellite Drum Storage Area	2 A 1	RCRA			1	R028	No RI						
K-1419 Sludge Fixation Plant	2.A.1	RCRA			1	R032	No RI						
K-1417 Block Casting/Storage Area	2 A.1	RCRA			1	R033	No RI						
K-1435 Hazardous Waste/PCB Incinerator	2 A.1	RCRA			1	R034	No RI						
K-1407 -H Central Neutralization Facility	2 A 1	RCRA			1	R035	No RI						
K-1425 Waste Oil/Hazardous Waste/PCB Drum Storage	2 A.1	RCRA			1	R036	No RI						
K-1420 -A Flammable Waste Storage Tank	2 A 1	RCRA			1	R037	No RI						
K-1302 Gas Cylinder Storage Area	2 A 1	RCRA			1	R038	No RI						
K-1095 Paint Shop	4/24/88 Ltr	3004 u			1	R056	No RI						
K-1420 Oil Decontamination Facility	1/14/88 Ltr	3004 u			1	R073	No RI						
K-1035 Acid Pits	11/11/88 ltr	3004 u		2,4 & 5	1	R083	PA/SI	ES/ER-2&D1					
K-1202 Hazardous Waste Storage Tanks	11/11/88 ltr	RCRA			1	R084	PA/SI						
K-1070 -G Burial Ground	2 A 1	3004 u		2,3,4,5 & 6	1	1	PA/SI	K/HS-152	05/23/87				
K-1095 Waste Accumulation Area	2 A.1	3004 u		2,3 & 4	1	2	PA/SI	K/HS-158	06/31/88				
K-1401 Acid Line	2 A 1	3004.u	K-1401	2,3 & 4	1	3	RI	K/HS-142	1987				
K-1401 Degreasers	2 A 1	CERCLA	K-1401	2,3 & 4	1	3	PA/SI	K/HS-142	1987				
K-1070 -B Old Classified Burial Ground	2.A 1	3004 u	K-1407	2,3,4 & 5	1	4	PA/SI	K/HS-135	12/22/88				
K-1407 -A Neutralization Pit	2 A 1	RCRA	K-1407		1	4	PA/SI	K/HS-135	12/22/88				
K-1700 Stream	2 A 1	CERCLA	K-1407	2,3,4 & 5	1	4	PA/SI	K/HS-135	12/22/88				
K-1407 -B Holding Pond		RCRA		2,3,4 & 5	1	5	Close	K/ER-26					
K-1407 -C Retention Basin	2.A 1	RCRA		4 & 5	1	6	Close	K/ER-27	12/22/88				
K-1407 -C Soil	2.A 1	Pending	K-1407-C up	4	1	7	PA/SI	K/HS-159	12/89				
K-1417 Soil	2 A.1	Pending	K-1407-C up		1	7	PA/SI						Status and Action pending data to be sent to EPA
K-1413 Process Lines	6/7/87 Ltr	3004.u	K-1413	2,3,4 & 5	1	8	PA/SI	K/HS-144	1987				
K-1413 Treatment Tank	2 A 1	RCRA	K-1413	2,3,4 & 5	1	8	PA/SI	K/HS-144	1987				
K-1420 Mercury Recovery Room	2 A.1	3004.u		Hg	1	9	PA/SI	K/HS-139	12/21/87				
K-1420 Process Lines	2.A 1	3004 u	K-1420	2,3,4,5 & 6	1	10	PA/SI	K/HS-147	09/13/88				
K-1420 Oil Storage	2 A 1	3004.u	K-1420	2,3,4,5 & 6	1	10	PA/SI	K/HS-147	09/13/88				
K-1421 Incinerator	6/25/87 Ltr	3004.u	K-1420	2,3,4,5 & 6	1	10	PA/SI	K/HS-147	09/13/88				
K-1503 Neutralization Pit	2 A 1	3004 u			1	11	PA/SI	K/HS-143	12/21/87	01/11/89			
WAG 1 Groundwater				2,3,4,5 & 6	1	12	PA/SI						

Page 2 Expected Contaminants - 1=Ptero Hydrocarbons, 2=volatile Organics, 3=Polynuclear Aromatics, 4=Metals, 5=Radioactivity, 6=PCB's, 7=Asbestos

K-25 Solid Waste Management Units

UNIT	Submitted In	Regulatory Status	SWMU Cluster	Expected Contaminants	Hydro-geologic WAG No.	Unit Number	Action	Document Number	Document Submitted	Regulatory Comments Received	RI Approved	RI Initiated	Remarks
WAG 2 SITES													
K-1210 Recirculating Cooling Water Lines	2 A 1	CERCLA		4	2	C003f	PA/SI	K/HS-151	12/22/88				
K-1225 Contaminated Scrap Metal Dumpster	2 A 1	CERCLA			2	C060	No RI						Status change at 9/25/88 Mtg.
K-1004 -L Contaminated Scrap Metal Dumpster'	2 A 1	CERCLA			2	C061	No RI						Status change at 9/25/88 Mtg.
K-1006 Contaminated Scrap Metal Dumpster	2 A.1	CERCLA			2	C062	No RI						Status change at 9/25/88 Mtg.
K-1200 -E Diesel Fuel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1210 -N1 Diesel Fuel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1210 -N2 Diesel Fuel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1210 -A Diesel Fuel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1220 -SE Diesel Fuel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1220 -NE Diesel Fuel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1414 -1 Unleaded Fuel Tank	NUST	UST		1 & 2	2	N/A	Remove						
K-1414 -2 Unleaded Fuel Tank	NUST	UST		1 & 2	2	N/A	Remove						
K-1414 Used Motor Oil Tank	NUST	UST		1	2	N/A	Remove						
K-1652 Diesel Tank	NUST	UST		1 & 3	2	N/A	Remove						
K-1004 Waste Accumulation Area	2.A 1	3004.u			2	R042	No RI						
K-1001 -B Waste Accumulation Area	2.A.1	3004.u			2	R048	No RI						
K-1001 -C Waste Accumulation Area	2.A.1	3004.u			2	R049	No RI						
K-1001 -D Waste Accumulation Area	2 A.1	3004.u			2	R050	No RI						
K-1003 Waste Accumulation Area	2.A 1	3004 u			2	R051	No RI						
K-1007 Waste Accumulation Area	2.A 1	3004.u			2	R052	No RI						
K-1414 Gas Tanks	2 A.1	UST		1 & 2	2	U001	UST	K/HS-141	1987				Contract issued 6/6/90, bioremediation to begin in FY '91
K-1004 Area Lab Drain	2 A 1	3004.u	K-1004 ALD	2,3,4,5 & 6	2	1	PA/SI	K/HS-154	12/22/88				
K-1007 -P1 Holding Pond	2.A.1	3004 u	K-1004-ALD		2	1	PA/SI	K/HS-154					
K-1007 Gas Tank	2 A.1	UST	K-1004-ALD	1 & 2	2	1	PA/SI	K/HS-156					Status change at 9/25/88 Mtg.
K-1004 -L Vaults	2 A.1	CERCLA	K-1004-L	5	2	2	PA/SI	K/HS-153	10/19/88				Status change at 9/25/88 Mtg.
K-1004 -L Underground Tank	2/10/88 Ltr	3004.u	K-1004-L		2	2	PA/SI	K/HS-153	10/19/88				
K-1004 -N1 Recirculating Cooling Water Lines	2.A.1	CERCLA	WAG 2 RCW	4	2	3	PA/SI	K/HS-151	12/22/88				
K-1004 -L Recirculating Cooling Water Lines	2.A.1	CERCLA	WAG 2 RCW	4	2	3	PA/SI	K/HS-151	12/22/88				
WAG 2 Groundwater				2,3,4,5 & 6	2	4	PA/SI						
WAG 3 SITES													
K-1099 Blair Quarry	2 A.1	3004.u		4 & 5	3	1	PA/SI	K/HS-157	09/29/88				
WAG 3 Groundwater				4 & 5	3	1	PA/SI						
WAG 4 SITES													
K-1064 -G Drum Deheading Facility	2 A.1	3004.u			4	R020	Pending						
K-1064 Drum Storage and Burn Area	2 A.1	3004.u		3,4, & 5	4	1	PA/SI	K/HS-134	1987	01/11/89			
K- 801 -H Cooling Tower Basin	2 A.1	CERCLA	WAG 4 C.T.	4	4	2	PA/SI	K/HS-151	12/22/88				
K- 802 -H Cooling Tower Basin	2.A 1	CERCLA	WAG 4 C.T.	4	4	2	PA/SI	K/HS-151	12/22/88				
WAG 4 Groundwater				3,4 & 5	4	3	PA/SI						

Page 3 Expected Contaminants - 1=Pterc Hydrocarbons, 2=volatile Organics, 3=Polynuclear Aromatics, 4=Metals, 5=Radioactivity, 6=PCB's, 7=Asbestos

UNIT	Submitted In	Regulatory Status	SWMU Cluster	Expected Contaminants	Hydro-geologic WAG No.	Unit Number	Action	Document Number	Document Submitted	Regulatory Comments Received	RI Approved	RI Initiated	Remarks
WAG 5 SITES													
K-1031 Waste Paint Accumulation Area	2 A 1	3004.u		2,3,4 & 5	5	1	PA/SI	K/HS-160	11/02/88				
K-1410 Neutralization Pit	2 A 1	3004 u	K-1410	2,3,4 & 5	5	2	PA/SI	K/HS-138	1987	01/11/89			
K-1410 Plating Facility	2 A 1	CERCLA	K-1410	2,3,4 & 5	5	2	PA/SI	K/HS-155	12/22/88				
WAG 5 Groundwater				2,3,4 & 5	5	3	PA/SI						
WAG 6 SITES													
K-1232 Chemical Recovery Facility	2 A 1	RCRA		2,3 & 4	6	1	PA/SI	K/HS-145	1987				
WAG 6 Groundwater				2,3 & 4	6	1	PA/SI						
WAG 7 SITES													
K-1203 Sewage Treatment Plant	11/11/88 ltr	3004 u			7	R065	SI						
K- 27 /29 Recirculating Cooling Water Lines	2 A 1	CERCLA	WAG 7 RCW	4	7	1	PA/SI	K/HS-151	12/22/88				
K- 832 -H Cooling Tower Basin	2 A 1	CERCLA	WAG 7 C.T	4	7	1	PA/SI	K/HS-151	12/22/88				
K- 732 Switchyard	4/25/88 Ltr	3004 u	WAG 7 S W.	6	7	2	PA/SI	K/HS-180	12/22/88				
WAG 7 Groundwater				4 & 6	7	3	PA/SI						
WAG 8 SITES													
K- 900 Bottle Smasher	2 A 1	RCRA	K-1070-F	2,3,4 & 5	8	1	PA/SI	K/HS-146	12/22/88				
K-1070 -F Construction Spoil Area	2 A 1	3004 u	K-1070-F	2,3,4 & 5	8	1	PA/SI	K/HS-146	12/22/88				
WAG 8 Groundwater				2,3,4 & 5	8	1	PA/SI						
WAG 9 SITES													
K- 33 -E Diesel Fuel Tank	NUST	UST		1 & 3	9		Remove						
K- 33 ANDCO Water Treatment Unit	2 A 1	3004 u			9	R041	No RI						
K- 31 Recirculating Cooling Water Lines	2 A 1	CERCLA	WAG 9 RCW	4	9	1	PA/SI	K/HS-151	12/22/88				
K- 33 Recirculating Cooling Water Lines	2 A 1	CERCLA	WAG 9 RCW	4	9	1	PA/SI	K/HS-151	12/22/88				
K- 861 Cooling Tower Basin	2 A 1	CERCLA	WAG 9 C.T.	4	9	1	PA/SI	K/HS-151	12/22/88				
K- 892 -H Cooling Tower Basin	2 A 1	CERCLA	WAG 9 C.T	4	9	1	PA/SI	K/HS-151	12/22/88				
K- 892 -G Cooling Tower Basin	2 A 1	CERCLA	WAG 9 C.T.	4	9	1	PA/SI	K/HS-151	12/22/88				
K- 892 -J Cooling Tower Basin	2 A 1	CERCLA	WAG 9 C.T.	4	9	1	PA/SI	K/HS-151	12/22/88				
K- 762 Switchyard	4/25/88 Ltr	3004.u	WAG 9 S.W.	6	9	2	PA/SI	K/HS-180	12/22/88				
K- 792 Switchyard	4/25/88 Ltr	3004.u	WAG 9 S.W.	6	9	2	PA/SI	K/HS-180	12/22/88				
WAG 9 Groundwater				1,3,4 & 6	9	3	PA/SI						
WAG 10 SITES													
K-1070 -A Old Contaminated Burial Ground	2.A 1	3004 u			10	1	PA/SI	K/HS-133	1987	01/13/89		01/16/89	
K- 901 Contractors Disposal Area	4/25/88 Ltr	3004.u	K-901	2,3,4 & 5	10	2	PA/SI	K/HS-161	10/19/88				
K- 901 -A Sanitary Disposal Area	11/11/88 ltr	3004 u	K-901	2,3,4 & 5	10	2	PA/SI						
K- 901 -A Holding Pond	2 A 1	3004.u	K-901	4 & 7	10	2	PA/SI	K/HS-136	1987	01/11/89			
WAG 10 Groundwater				2,3,4,5 & 7	10	3	PA/SI						

Page 4 Expected Contaminants - 1=Ptero Hydrocarbons, 2=volatile Organics, 3=Polynuclear Aromatics, 4=Metals, 5=Radioactivity, 6=PCB's, 7=Asbestos

K-25 Solid Waste Management Units

UNIT		Submitted In	Regulatory Status	SWMU Cluster	Expected Contaminants	Hydro-geologic WAG No.	Unit Number	Action	Document Number	Document Submitted	Regulatory Comments Received	RI Approved	RI Initiated	Remarks
	WAG 11 SITES													
K- 722	Property Sales Building	8/9/90 Ltr	CERCLA		5	11	C073	SI						
K- 726	PCB Storage Facility	2.A.1	3004.u		6	11	R040	No RI						
K- 711	Hazardous Waste Storage Facility	6/30/87 Ltr	RCRA			11	R058	No RI						
K- 710	Sludge Beds and Imhoff Tanks	4/25/88 Ltr	3004.u			11	R076	SI						
K- 725	Beryllium Building	2.A.1	CERCLA	K-770	4	11	1	PA/SI	K/HS-148	7/29/88				
K- 770	Contaminated Debris	2.A.1	CERCLA	K-770	2,3,4,5,6 & 7	11	1	PA/SI	K/HS-137	7/29/88				Status change at 9/25/88 Mtg.
K- 770	Scrap Metal Yard	2 A.1	3004.u	K-770	2,3,4,5,6 & 7	11	1	PA/SI	K/HS-137	7/29/88			08/14/90	
K- 709	Switchyard	4/25/88 Ltr	3004.u		6	11	2	PA/SI	K/HS-160	12/22/88				
	WAG 11 Groundwater				2,3,4,5,6 & 7	11	3	PA/SI						
	WAG 12 SITGES													
K- 720	Fly Ash Pile	2.A.1	3004.u		4	12	R045	RI	K/HS-150	5/23/88				
	WAG 12 Groundwater				4	12	1	PA/SI						
	WAG 13 SITES													
K-1065	Old Firehouse Burn Area	2.A 1	3004.u		2,3,4,5 & 6	13	R043	RI	K/HS-149	06/31/88				
	WAG 13 Groundwater				2,3,4,5 & 6	13	1	PA/SI						
	WAG 14 SITES													
K-1070	-C/D Classified Burial Ground	2.A 1	3004.u	K-1070-C/D	2,3,4,5 & 6	14	R005	RI	K/HS-140	12/21/87	01/11/89		01/24/89	
K-1070	-D1, D2, and D3 Storage Dikes	2.A 1	RCRA	K-1070-C/D	2,3,4,5 & 6	14	R026	RI						
	WAG 14 Groundwater				2,3,4,5 & 6	14	1	PA/SI						

Page 5 Expected Contaminants - 1=Piero Hydrocarbons, 2=volatile Organics, 3=Polynuclear Aromatics, 4=Metals, 5=Radioactivity, 6=PCB's, 7=Asbestos

Appendix B

SITE CHARACTERIZATIONS FOR THE OAK RIDGE RESERVATION

PRELIMINARY ASSESSMENT/SITE INVESTIGATION PHASE

DOE NUMBER	DESCRIPTION
K00-0001	FLANNAGAN'S LOOP ROAD
K00-R082	K-1024 DILUTION PIT
K01-0001	K-1070-G BURIAL GROUN
K01-0002	K-1095 WASTE ACCUMULATION AREA
K01-0007	K-1407-C UPGRADIENT AREA
K01-0011	K-1503 NEUTRALIZATION PIT
K01-R083	K-1035 ACID PITS
K01-R084	K-1202 HAZARDOUS WASTE STORAGE TANKS
K02-0003	WAG 2 COOLING TOWER & RCW LINES
K03-0001	K-1099 BLAIR QUARRY
K05-0001	K-1031 WASTE ACCUMULATION AREA
K07-R085	K-1203 SEWAGE TREATMENT PLANT
K08-0002	DUCT ISLAND ROAD
K10-0002	K-901 CLUSTER
K10-0004	K-1070-A LANDFARM
K11-C073	K-722 PROPERTY SALES BUILDING
K11-R076	K-710 SLUDGE BEDS AND IMHOFF.TANKS
U00-0001	ORAU LOCAL FACILITIES
U00-0002	SOUTH CAMPUS FACILITY
U00-0003	FREEL'S BEND AREA
U00-0004	CSX RAILROAD
X00-0001	ABANDONED BURN PIT
X00-0003	Cs-137, Co-60 CONTAMINATED FOREST AREA
X00-0004	Cs-137 CONTAMINATED FOREST FLOOR
X00-0005	Cs-137 CONTAMINATED FOREST UNDERSTORY
X00-0006	Cs-137 CONTAMINATED MEADOW
X01-0008	GRAPHITE REACTOR STORAGE CANAL OVERFLOW (3001/3009)
X01-0072	INACTIVE LLLW TANK 3001 SUSPECT
X04-0002	PILOT PITS 1, 2 (7811)
X07-0012	EQUIPMENT STORAGE TANK (7841)
X08-0013	CONTRACTORS SPOILS AREA - MELTON VALLEY, W-SW OF 7900
X08-0014	HFIR COOLING TOWER SURFACE IMPOUNDMENT
X08-0015	AIRCRAFT REACTOR EXPERIMENT SURFACE IMPOUNDMENT
X08-0016	MSRE STORAGE WELL
X08-0017	ABANDONED SANITARY WASTE PIPELINE AND SEPTIC TANK NORTH OF 7917
X08-A001G	HRE CONTAMINATED TOOL STORAGE
X09-0004	TRASH AREA EAST OF HRE PARKING LOT
X12-0001	CLOSED CONTRACTORS' LANDFILL (7658)
X15-0002	TRANSFORMERS (9201-2, 9204-1. 9204-3, SY 200)
X15-0003	CYCLOTRON PIT 9201-2
X15-A003	ORNL @ Y-12 CONTAMINATED EAST END BASEMENT 9204-1

PRELIMINARY ASSESSMENT/SITE INVESTIGATION PHASE

DOE NUMBER	DESCRIPTION
X16-0001	CESIUM-137 FOREST RESEARCH AREA (7759)
X16-0003	BURIED SCRAP METAL AREA
X18-0001A	EGCR PONDS (7600A)
X18-0001B	EGCR PONDS (7600B)
X18-0002	PAINT SOLVENTS STORAGE (7615)
X18-0004A	WASTE ACID STORAGE TANK 7602A
X20-0001	MUNICIPAL SEWAGE SLUDGE APPLICATION SITE (XF1226)
Y01-S131	CHESTNUT RIDGE MERCURY CONTAMINATED GULLY SOIL PILE
Y02-S401	RUST ENGINEERING STORAGE YARD
Y02-S402	RUST ENGINERING SLUDGE STORAGE AREA
Y03-D100	BETA-4 SECURITY PITS
Y03-D115	BUILDING 9418-3 URANIUM VAULT
Y03-P501	BUILDING 9401-1 OLD STEAM PLANT
Y03-P502	BUILDING 9766 BERYLLIUM CONTAMINATED DUCTS
Y03-P503	BUILDING 9720-2 DRUM STORAGE AREA
Y03-S017	BUILDING 9409-5 STORAGE FACILITY
Y03-S030	INTERIM DRUM YARD
Y03-S116	THIRD STREET SOIL PILE
Y03-S124	COOLING TOWER BASIN 9409-3
Y03-S126	TEMPORARY STORAGE AREA
Y03-S128	BUILDING 9201-2 TRANSFORMER AND CAPACITOR STORAGE AREA
Y03-S129	BUILDING 9204-1 TRANSFORMER STORAGE AREA
Y03-S130	BUILDING 9204-3 TRANSFORMER STORAGE AREA
Y03-S203	TANK 0690-U/TRANSFER STATION
Y03-S205	TANK 2064-U
Y03-S206	TANK 2069-U
Y03-S207	TANK 2070-U
Y03-S208	TANK 2071-U
Y03-S215	BUILDING 9204-4 TANK
Y03-S242	LAUNDRY SUMP
Y03-S245	BUILDING 9206 UNDERGROUND TANK
Y03-S310	DOCK 125
Y03-S313	DOCK 164
Y03-S331	BUILDING 9204-4 SOUTHWEST YARD
Y03-S341	BUILDING 9720-13 WEST YARD
Y03-S400	RUST CONSTRUCTION GARAGE AREA
Y03-S504	TANK 0134-U
Y03-S505	TANK 2068-U
Y03-S506	TANK 2073-U
Y03-S507	TANK 2074-U
Y03-S508	TANK 2075-U
Y03-S509	TANK 2076-U

DOE NUMBER	DESCRIPTION
Y03-S510	TANK 2077-U
Y03-S511	TANK 2078-U
Y03-S512	TANK 2079-U
Y03-S513	TANK 2080-U
Y03-S514	TANK 2081-U
Y03-S515	TANK 2089-U
Y03-S516	TANK 2090-U
Y03-S517	TANK 2091-U
Y03-S518	TANK 2092-U
Y03-S519	TANK 2117-U
Y03-S520	TANK 2284-U

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
C00-0001	OFF-SITE (CLINCH RIVER)
K01-0003	K-1401 ACID LINE
K01-0004	K-1407 SWMU CLUSTER
K01-0005	K-1407-B POND CLOSURE
K01-0006	K-1407-C CLOSURE
K01-0008	K-1413 SWMU CLUSTER
K01-0009	K-1420 MERCURY RECOVERY ROOM
K01-0010	K-1420 SWMU CLUSTER
K01-0012	WAG 1 GROUNDWATER
K01-C003	WAG 1 COOLING TOWER & RCW LINES
K02-0001	K-1004 AREA LAB DRAIN & K-1007-P1 POND
K02-0002	K-1004-L VAULTS
K02-0004	WAG 2 GROUNDWATER
K03-G001	WAG 3 GROUNDWATER
K04-0001	K-1064 DRUM STORAGE AND BURN AREA
K04-0002	WAG 4 COOLING TOWER & RCW LINES
K04-0003	WAG 4 GROUNDWATER
K05-0002	K-1410 SWMU CLUSTER
K05-0003	WAG 5 GROUNDWATER
K06-0001	K-1232 FACILITY
K06-0006	WAG 6 GROUNDWATER
K07-0001	WAG 7 COOLING TOWER & RCW LINES
K07-0002	K-732 SWITCHYARD
K07-0003	WAG 7 GROUNDWATER
K08-0001	K-1070-F SWMU CLUSTER
K08-0008	WAG 8 GROUNDWATER
K09-0001	WAG 9 COOLING TOWER & RCW LINES
K09-0002	WAG 9 ELECTRICAL SWITCHYARDS
K09-0003	WAG 9 GOUNDWATER
K10-0001	K-1070-A BURIAL GROUND
K10-0003	WAG 10 GROUNDWATER
K11-0001	K-770 SWMU CLUSTER
K11-0002	WAG 11 ELECTRICAL SWITCHYARDS
K11-0003	WAG 11 GROUNDWATER
K12-0001	K-720 FLY ASH PILE
K12-G001	WAG 12 GROUNDWATER
K13-0001	K-1085 FIREHOUSE BURN AREA
K13-G001	WAG 13 GROUNDWATER
K14-0001	K-1070-C/D BURIAL GROUND
X00-0007	TRITIUM TARGET FABRICATION FACILITY (7025)
X00-0008	TRITIUM LLLW TANK
X00-0009	THORIUM HANDLING FACILITY (7019)

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
X00-0010	THORIUM STORAGE WELLS
X01-0001	MERCURY CONTAMINATED SOIL (3503)
X01-0002	MERCURY CONTAMINATED SOIL (3592)
X01-0003	MERCURY CONTAMINATED SOIL (4501)
X01-0004	MERCURY CONTAMINATED SOIL (4508)
X01-0005A	LLLW LINES & LEAK SITES - SOUTH OF BUILDING 3020
X01-0005B	LLLW LINES & LEAK SITES - EAST OF BUILDING 3020
X01-0005C	LLLW LINES & LEAK SITES - WEST OF BUILDING 3082
X01-0005D	LLLW LINES & LEAK SITES - NORTH OF BUILDING 3019
X01-0005E	LLLW LINES & LEAK SITES - SOUTHWEST CORNER OF BUILDING 3019
X01-0005F	LLLW LINES & LEAK SITES - BETWEEN W-5 & WC-19
X01-0005G	LLLW LINES & LEAK SITES - UNDERNEATH BUILDING 3047
X01-0005H	LLLW LINES & LEAK SITES, GENERAL ISOTOPES AREA (3037,3038,3034)
X01-0005I	LLLW LINES & LEAK SITES - BUILDING 3092 AREA
X01-0005J	LLLW LINES & LEAK SITES - UNDERNEATH BUILDING 3026
X01-0005K	LLLW LINES & LEAK SITES - BETWEEN WC-1 & W-5
X01-0005L	LLLW LINES & LEAK SITES - ORR WATER LINE (BUILDING 3085)
X01-0005M	LLLW LINES & LEAK SITES - BUILDING 3028
X01-0005N	LLLW LINES & LEAK SITES - EAST OF BUILDING 2531
X01-0005O	LLLW LINES & LEAK SITES - UNDERNEATH BUILDING 3515
X01-0005P	LLLW LINES & LEAK SITES - BUILDING 3525 TO A SUMP
X01-0005Q	LLLW LINES & LEAK SITES - UNDERNEATH BUILDING 3550
X01-0005R	LLLW LINES & LEAK SITES - SEWER NEAR BUILDING 3500
X01-0005S	LLLW LINES & LEAK SITES - ABANDONED LINE CENTRAL AVENUE AREA
X01-0005T	LLLW LINES & LEAK SITES - BUILDING 4508, NORTH
X01-0005U	LLLW LINES & LEAK SITES - BUILDING 3518, WEST
X01-0005V	LLLW LINES & LEAK SITES - NORTHWEST OF SWSA-1
X01-0005W	LLLW LINES & LEAK SITES - BUILDING 3503, GROUND CONTAMINATION
X01-0006	CONTAMINATED SURFACES AND SOIL FROM 1959 EXPLOSION IN BUILDING 3019 CELL
X01-0007	CONTAMINATION AT BASE OF 3019 STACK
X01-0009	OAK RIDGE RESEARCH REACTOR DECAY TANK RUPTURE SITE (3087)
X01-0010	STORAGE PADS (3503/3504)
X01-0011	DECOMISSIONED WASTE HOLDING BASIN (3512)
X01-0012	WASTE HOLDING BASIN (3513)
X01-0013	EQUALIZATION BASIN (3524)
X01-0014	PROCESS WASTE POND (3539)

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
X01-0015	PROCESS WASTE POND (3540)
X01-0016	SEWAGE AERATION POND (EAST) - (2543)
X01-0017	SEWAGE AERATION POND (WEST) - (2544)
X01-0019	LOW INTENSITY TEST REACTOR (LITR) POND (3085W)
X01-0020	3517 FILTER PIT (FISSION PRODUCT DEVELOPMENT LABORATORY)
X01-0021	FPDL LLLW TRANFER LINE
X01-0022	ISOTOPES DUCTWORK/3110 FILTER HOUSE
X01-0023A	INACTIVE LLLW COLLECTION/STORAGE TANK W-1
X01-0023B	INACTIVE LLLW COLLECTION/STORAGE TANK W-2
X01-0024A	INACTIVE LLLW COLLECTION/STORAGE TANK W-3
X01-0024B	INACTIVE LLLW COLLECTION/STORAGE TANK W-4
X01-0025A	INACTIVE LLLW COLLECTION/STORAGE TANK W-13
X01-0025B	INACTIVE LLLW COLLECTION/STORAGE TANK W-14
X01-0025C	INACTIVE LLLW COLLECTION/STORAGE TANK W-15
X01-0026A	INACTIVE LLLW COLLECTION/STORAGE TANK W-5
X01-0026B	INACTIVE LLLW COLLECTION/STORAGE TANK W-6
X01-0026C	INACTIVE LLLW COLLECTION/STORAGE TANK W-7
X01-0026D	INACTIVE LLLW COLLECTION/STORAGE TANK W-8
X01-0026E	INACTIVE LLLW COLLECTION/STORAGE TANK W-9
X01-0026F	INACTIVE LLLW COLLECTION/STORAGE TANK W-10
X01-0027	INACTIVE LLLW COLLECTION/STORAGE TANK W-11
X01-0028	INACTIVE LLLW COLLECTION/STORAGE TANK W-1A
X01-0029	INACTIVE LLLW COLLECTION/STORAGE TANK WC-1
X01-0030A	INACTIVE LLLW COLLECTION/STORAGE TANK WC-15
X01-0030B	INACTIVE LLLW COLLECTION/STORAGE TANK WC-17
X01-0031A	INACTIVE LLLW COLLECTIO/STORAGE TANK TH-1
X01-0031B	INACTIVE LLLW COLLECTION/STORAGE TANK TH-2
X01-0031C	INACTIVE LLLW COLLECTION/STORAGE TANK TH-3
X01-0032	INACTIVE LLLW COLLECTION/STORAGE TANK TH-4
X01-0033	ACTIVE LLLW COLLECTION TANK 2026A
X01-0034	ACTIVE LLLW COLLECTION TANK WC-2
X01-0035	ACTIVE LLLW COLLECTION TANK WC-3
X01-0036	INACTIVE LLLW COLLECTION TANK WC-4
X01-0037A	INACTIVE LLLW COLLECTION TANK WC-5
X01-0037B	INACTIVE LLLW COLLECTION TANK WC-6
X01-0037C	INACTIVE LLLW COLLECTION TANK WC-8
X01-0037D	ACTIVE LLLW COLLECTION TANK WC-9
X01-0038	ACTIVE LLLW COLLECTION TANK WC-7
X01-0039A	ACTIVE LLLW COLLECTION TANK WC-10
X01-0039B	INACTIVE LLLW COLLECTION TANK WC-11
X01-0039C	INACTIVE LLLW COLLECTION TANK WC-12

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
X01-0039D	INACTIVE LLLW COLLECTION TANK WC-13
X01-0039E	INACTIVE LLLW COLLECTION TANK WC-14
X01-0040	ACTIVE LLLW COLLECTION TANK WC-19
X01-0041	INACTIVE LLLW COLLECTION TANK W-12
X01-0042A	ACTIVE LLLW COLLECTION TANK W-16
X01-0042B	INACTIVE LLLW COLLECTION TANK W-17
X01-0042C	INACTIVE LLLW COLLECTION TANK W-18
X01-0045A	ACTIVE LLLW WASTE CONCENTRATE STORAGE TANK C-1
X01-0045B	ACTIVE LLLW WASTE CONCENTRATE STORAGE TANK C-2
X01-0046	SWSA-1 (2624)
X01-0047	SWSA-2 (4003)
X01-0056A	INACTIVE LLLW COLLECTION TANK W-19
X01-0056B	INACTIVE LLLW COLLECTION TANK W-20
X01-0058	FORMER WASTE PILE AREA
X01-0062	WASTE EVAPORATOR FACILITY (3506)
X01-0063	TRANSFER CANAL AND DISOLVER PIT (3505)
X01-0064A	ACTIVE LLLW COLLECTION TANK S-223
X01-0064B	ACTIVE LLLW COLLECTION TANK S-324
X01-0064C	INACTIVE LLLW COLLECTION TANK S-424
X01-0064D	ACTIVE LLLW COLLECTION TANK S-523
X01-0065A	ACTIVE LLLW COLLECTION TANK F-201
X01-0065B	ACTIVE LLLW COLLECTION TANK F-501
X01-0066	INACTIVE LLLW COLLECTION TANK W-11
X01-0067A	INACTIVE LLLW COLLECTION TANK 4501-C
X01-0067B	INACTIVE LLLW COLLECTION TANK 4501-D
X01-0067C	INACTIVE LLLW COLLECTION TANK 4501-P
X01-0068	INACTIVE FILTER HOUSE SEAL TANK 3002-A
X01-0069A	ACTIVE LLLW COLLECTION TANK N-71
X01-0069B	ACTIVE LLLW COLLECTION TANK P-3
X01-0069C	ACTIVE LLLW COLLECTION TANK P-4
X01-0070	ACTIVE LLLW COLLECTION TANK LA-104
X01-0071	INACTIVE LLLW COLLECTION TANK H-209
X01-0073	INACTIVE LLLW COLLECTION TANK 3001-B
X01-0074	INACTIVE LLLW COLLECTION TANK 3003-A
X01-0075	INACTIVE LLLW COLLECTION TANK 3004-B
X01-0076	INACTIVE LLLW COLLECTION TANK 3013
X01-0077	ACTIVE LLLW COLLECTION TANK L-11
X01-0078	INACTIVE LLLW COLLECTION TANK T-30
X01-0079	3001 STORAGE CANAL
X02-0001	WHITE OAK LAKE AND EMBAYMENT (7846)
X02-0002	WHITE OAK CREEK AND TRIBUTARIES (0853)
X03-0001	SWSA 3 (1001)

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
X03-0002	SCRAP METAL AREA (1562)
X03-0003	CONTRACTORS' LANDFILL (1554)
X04-0001	LLW LINE NORTH OF LAGOON ROAD (7800)
X04-0003	SWSA-4 (7800)
X05-0001A	LLLW LINES AND LEAK SITES-OHF, RELEASE OF GROUT
X05-0001B	LLLW LINES & LEAK SITES-BUILDING 7852 HYDROFRACTURE INJECTION AREA
X05-0002	OLD HYDROFRACTURE FACILTY (OHF) POND (7852A)
X05-0003	OHF SITE SURFACE FACILITIES (7852)
X05-0004	NEW HYDROFRACTURE SITE SURFACE FACILITY (7860)
X05-0005A	INACTIVE OHF WASTE STORAGE TANK T1
X05-0005B	INACTIVE OHF WASTE STORAGE TANK T2
X05-0005C	INACTIVE OHF WASTE STORAGE TANK T3
X05-0005D	INACTIVE OHF WASTE STORAGE TANK T4
X05-0005E	INACTIVE OHF WASTE STORAGE TANK T9
X05-0006	PROCESS WASTE SLUDGE BASIN (7835)
X05-0007	SWSA-5 (7802)
X05-0009	RADIOACTIVELY CONTAMINATED WASTE-OIL STORAGE TANK (7860A)
X05-0014	OLD LANDFILL (NE EDGE OF SWSA-5)
X05-0015	ACTIVE LLLW SLOTTING TANK T-13
X05-0016	INACTIVE LLLW TANK T-14
X06-0001	SWSA 6 (7822)
X06-0002	EMERGENCY WASTE BASIN (7821)
X06-0003	SWSA-6 - EXPLOSIVE DETONATION TRENCH (7822A)
X07-0001	DECONAMINATION FACILITY (7819)
X07-0002	HOMOGENEOUS REACTOR EXPERIMENT (HRE) FUEL WELLS (7809)
X07-0003	HYDROFRACTURE EXPERIMENTAL SITE 1, SOIL CONTAMINATION (HF-S1A)
X07-0004A	LLLW LINES & LEAK SITES-GAUGING STATION NW OF BUILDING 7852
X07-0004B	LLLW LINES & LEAK SITES-PIT 6 SE (LEAK SITE 1)
X07-0004C	LLLW LINE LEAK SITES-END OF TRENCH 7 ACCESS ROAD (LEAK SITE 2)
X07-0004D	LEAK IN TRANSFER LINE FROM DECONTAMINATION FACILITY (7819) TO PIT1 (7805)
X07-0004E	LLLW LINE LEAK SITE - LEAK IN LINE BETWEEN PIT 3 (7807) AND TRENCH 6 (7810)
X07-0004F	LLLW LINE LEAK SITE - LEAK AT VALVE PIT NORTH OF TRENCH-7 (7818)
X07-0005	PIT 1 (7805)

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
X07-0006A	PIT 2 (7806)
X07-0006B	PIT 3 (7807)
X07-0006C	PIT 4 (7808)
X07-0007	TRENCH 5 (7809)
X07-0008	TRENCH 6 (7810)
X07-0009	TRENCH 7 (7818)
X08-0001A	HFIR/TRU WASTE COLLECTION BASIN (7905)
X08-0001B	HIFR/TRU WASTE COLLECTION BASIN (7906)
X08-0001C	HFIR/TRU WASTE COLLECTION BASIN (7907)
X08-0001D	HIFR/TRU WASTE COLLECTION BASIN (7908)
X08-0002	HYDROFRACTURE EXPERIMENT SITE 2 (HF-S2A)
X08-0003A	LLLW LINES & LEAK SITE-LAGOON ROAD & MELTON VALLEY DRIVE
X08-0003B	LLLW LINES & LEAK SITES-MELTON VALLEY DRIVE & SWSA 5 ACCESS ROAD
X08-0003C	LLLW LINES & LEAK SITES - 7500 AREA
X08-0003D	LLLW LINES & LEAK SITES- WEST OF MELTON VALLEY PUMPING STATION
X08-0003E	LLLW LINES & LEAK SITES- BUILDING 7920 & MELTON VALLEY PUMPING STATION AREA
X08-0003F	LLLW LINES & LEAK SITES - 7920 DITCH LINE
X08-0003G	LLLW LINES & LEAK SITES - MELTON VALLEY TRANSFER LINE
X08-0005	ACTIVE LLLW COLLECTION AND STORAGE TANK WC-20
X08-0006	ACTIVE LLLW COLLECTION/STORAGE TANK HFIR
X08-0007A	ACTIVE LLLW COLLECTION/STORAGE TANK T-1
X08-0007B	ACTIVE LLLW COLLECTION/STORAGE TANK T-2
X08-0018A	ACTIVE LLLW COLLECTION TANK F-111
X08-0018B	ACTIVE LLLW HOLDING TANK F-126
X08-0019A	ACTIVE LLLW COLLECTION TANK B-2-T
X08-0019B	ACTIVE LLLW COLLECTION TANK B-3-T
X08-0019C	ACTIVE LLLW COLLECTION TANK C-6-T
X08-0020	INACTIVE LLLW COLLECTION TANK 7503A
X09-0001	HOMOGENEOUS REACTOR EXPERIMENT (HRE) POND (7556)
X09-0002A	INACTIVE LLLW COLLECTION AND STORAGE TANKS 7560
X09-0002B	INACTIVE LLLW COLLECTION & STORAGE TANK 7562
X09-0005	WASTE EVAPORATOR 7502
X09-0006	WASTE EVAPORATOR LOADING PIT
X10-0001	HYDROFRACTURE EXPERIMENT SITE 1 (HF-S1)
X10-0002	HYDROFRACTURE EXPERIMENT SITE 2 (HF-S2)
X10-0003	OLD HYDROFRACTURE FACILITY (7852)
X10-0004	NEW HYDROFRACTURE INJECTION WELL (7860)
X11-0001	WHITE WING SCRAP YARD (XDO751)

REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
X13-0001	CESIUM-137 CONTAMINATED FIELD (0800)
X13-0002	CESIUM-137 EROSION/RUNOFF STUDY AREA (0807)
Y01-D023	CHESTNUT RIDGE SECURITY PITS
Y01-D026	UNITED NUCLEAR LANDFILL
Y01-D102	SANITARY LANDFILL II
Y01-D112	FILLED COAL ASH POND
Y02-D024HC	HAZARDOUS CHEMICAL DISPOSAL AREA - BONE YARD - BURN YARD
Y02-D106	RUST SPOIL AREA
Y02-D107	SPOIL AREA I
Y02-S125	SY-200 YARD
Y02-S600	BEAR CREEK
Y02-T004	S-3 PONDS
Y02-T008	OIL RETENTION POND NO. 1
Y02-T009	OIL RETENTION POND NO. 2
Y02-T014	OIL LANDFARM
Y03-D103	S-2 SITE
Y03-D104	COAL PILE TRENCH
Y03-P500	Z-OIL CONTAMINATED AREAS
Y03-S018	SALVAGE YARD OIL STORAGE
Y03-S020	SALVAGE YARD OIL/SOLVENT DRUM STORAGE AREA
Y03-S022	MACHINE COOLANT STORAGE TANKS
Y03-S111	SALVAGE YARD SCRAP METAL STORAGE AREA
Y03-S117	BUILDING 81-10 AREA
Y03-S120	LINE YARD
Y03-S121	WASTE Z-OIL TANK
Y03-S127	MERCURY-CONTAMINATED AREAS
Y03-S200	TANK 0074-U
Y03-S201	TANK 0084-U
Y03-S204	TANK 2063-U
Y03-S209	TANK 2100-U
Y03-S210	TANK 2101-U
Y03-S212	TANK 2104-U
Y03-S214	TANK 2116-U
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Y03-S217	TANK
Y03-S218	TANK
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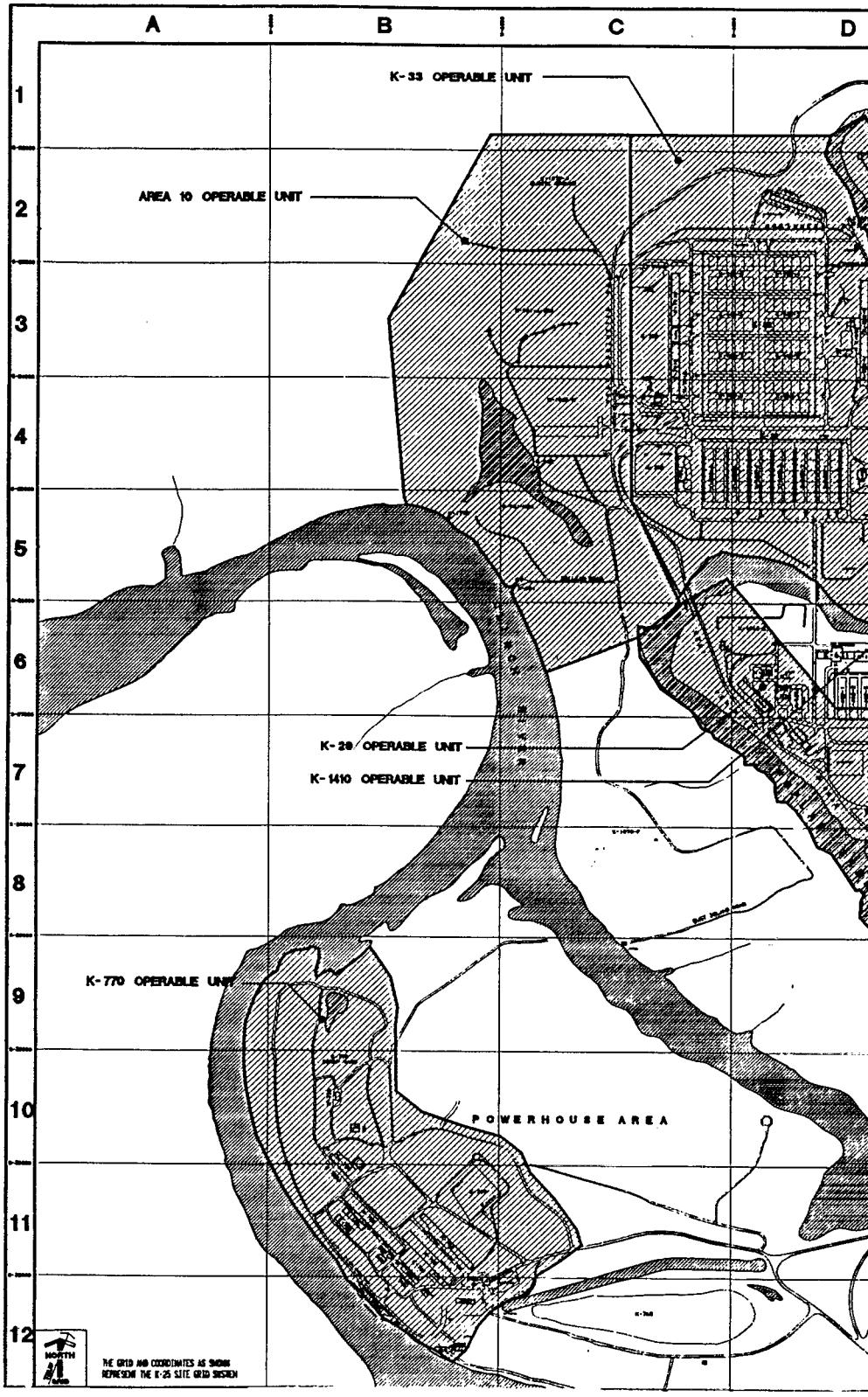
Y03-S227	BUILDING 9206 TANK
Y03-S228	BUILDING 9206 TANK
Y03-S244	TANK 2102-U
Y03-S321	BUILDING 9201-1 WEST YARD

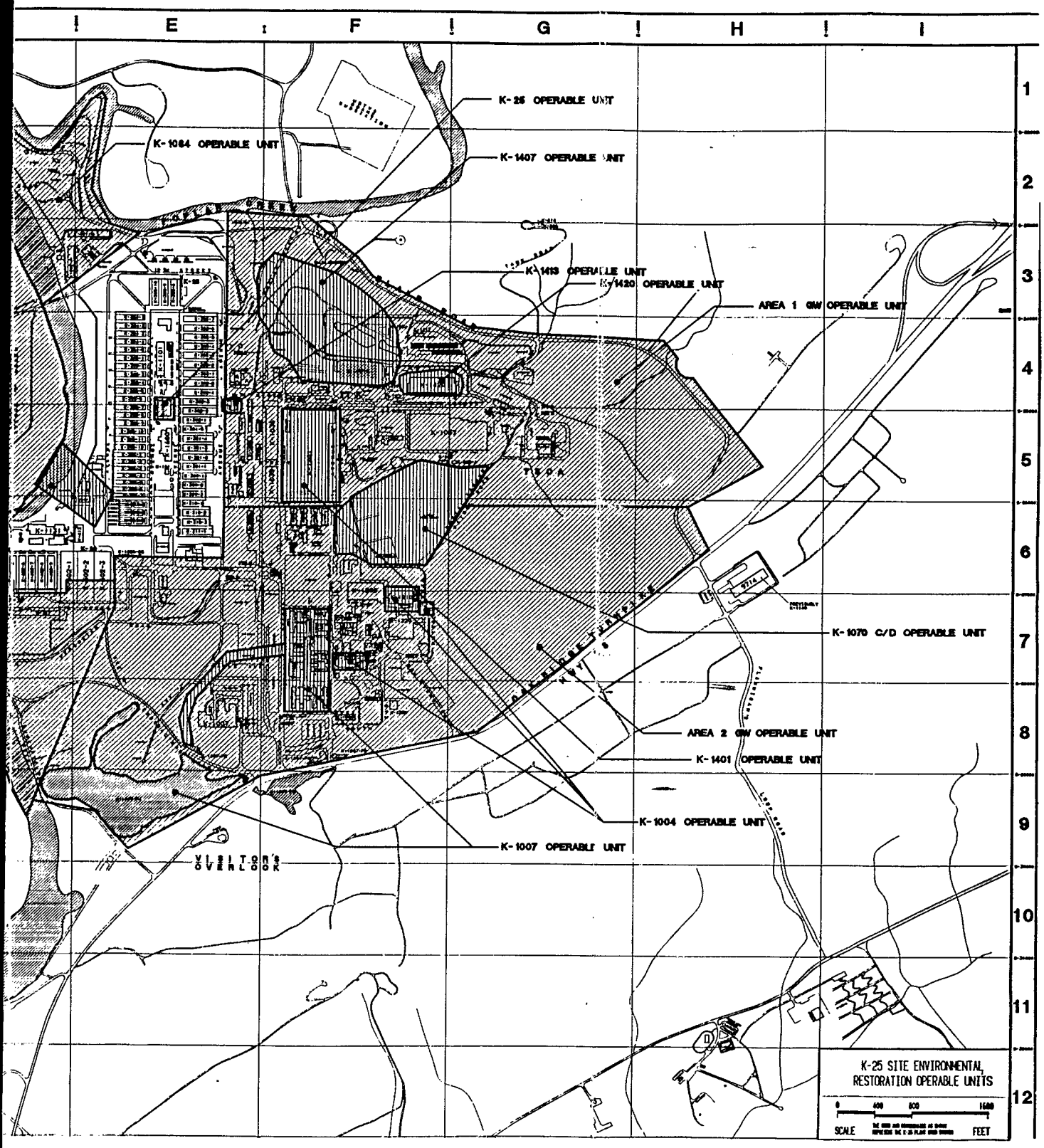
REMEDIAL INVESTIGATION/FEASIBILITY STUDY PHASE

DOE NUMBER	DESCRIPTION
Y03-S326	BUILDING 9202 EAST PAD
Y03-S334	BUILDING 9401-2 POLYTANK STATION
Y03-S335	BUILDING 9401-3 EAST YARD
Y03-S337	BUILDING 9620-2 WEST YARD
Y03-S338	BUILDING 9712 NORTHEAST YARD
Y03-S351	BUILDING 9401-2 EAST YARD
Y03-S601	NITRIC ACID PIPELINE
Y03-S602	UPPER EAST FORK POPLAR CREEK
Y03-T010	NEW HOPE POND
Y03-T038	WASTE COOLANT PROCESSING FACILITY
Y03-T109	SALVAGE YARD DRUM DEHEADER
Y04-S603	EAST FORK POPLAR CREEK
Y05-D024	BEAR CREEK BURIAL GROUNDS

Appendix C

OPERABLE UNIT MAP


A
B
C
D
1
2
3
4
5
6
7
8
9
10
11
12
K-33 OPERABLE UNIT
AREA 10 OPERABLE UNIT
K-29 OPERABLE UNIT
K-1410 OPERABLE UNIT
K-770 OPERABLE UNIT
POWERHOUSE AREA
NORTH
THE GRID AND COORDINATES AS SHOWN
REPRESENT THE K-25 SITE GRID SYSTEM



OPERABLE UNIT MAP

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Distribution

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6. K. M. Downer
7. N. W. Durfee
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20. L. W. Long
21. C. W. McGinn
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29. D. W. Swindle
30. K. S. Turner
31. B. D. Walker
32. S. C. Wells
33. R. K. White

34-38. ER Document Management Center

39. K-25 Applied Technology Library
40. K-25 Site Records

41-42. Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831

43-44. S. S. Perkins, DOE Field Office, Oak Ridge, Information Resource Center, 105 Broadway, Oak Ridge, TN 37830

45. R. C. Sleeman, DOE Field Office, Oak Ridge, P.O. Box 2001, Oak Ridge, TN 37831-8541
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