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Site Descriptions of Environmental Restoration Units at Oak Ridge National Laboratory, Oak Ridge, Tennessee

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ORNL/ER-391

Energy Systems Environmental Restoration Program

Site Descriptions of Environmental Restoration Units at Oak Ridge National Laboratory, Oak Ridge, Tennessee

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PREFACE

This report, *Site Descriptions of Environmental Restoration Units at the Oak Ridge National Laboratory, Oak Ridge, Tennessee,* was prepared to provide information on each of the 282 sites under the purview of the Environment Restoration (ER) Program at Oak Ridge National Laboratory (ORNL) as specified in the Oak Ridge Reservation (ORR) Federal Facility Agreement, Appendix C, established between the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the Tennessee Department of Environment and Conservation.

This work was performed under Work Breakdown Structure 1.4.12.6.3.01, "Program Management Support." This document provides historical and programmatic information to support ER Program activities at ORNL. Specifically, it contains descriptions of each site's history, operational information, waste characteristics, release data and current site status. These descriptions will be used as a project planning tool and resource for ER Program activities, the regulators and the public.

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ABBREVIATIONS

AOCs	areas of concern
CA	characterization areas
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
D&D	decontamination & decommissioning
DOE	U.S. Department of Energy
ER	environmental restoration
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
HSWA	Hazardous and Solid Waste Amendment
NCP	National Contingency Plan
NMFS	Nuclear Material and Facility Stabilization Program (EM-60)
NPL	National Priority List
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	operable units
RCRA	Resources Conservation and Recovery Act
RFA	RCRA Facilities Assessment
RI	remedial investigation
RmSE	removal site evaluation areas
RSE	remedial site evaluation areas
SDDS	site description data sheet
SWMU	solid waste management unit
TSD	treatment, storage, and disposal
WAG	Waste Area Grouping
WWW	world wide web

EXECUTIVE SUMMARY

This document presents information on each of the 282 sites at Oak Ridge National Laboratory under the purview of the Environmental Restoration Program. The sites included in this document are those contained in Appendix C (revised February 13, 1996) of the Oak Ridge Reservation Federal Facility Agreement (FFA). "Contaminated Site Summary Sheets", revisions to the RFA Summary Sheets in the RCRA Facilities Assessment (ORNL 1987), serve as the basis for this document. Additional sites have been included and up-to-date information is provided on the history and current conditions for the sites. This document is not intended to be an official update of the RFA, rather it will serve as a primary reference source for each of the ER sites at the Oak Ridge National Laboratory.

1. INTRODUCTION

This report provides summary information on Oak Ridge National Laboratory (ORNL) Environmental Restoration (ER) sites as listed in the Oak Ridge Reservation Federal Facility Agreement (FFA), dated January 1, 1992, Appendix C, (revised February 13, 1996). The Oak Ridge National Laboratory was built in 1943 as part of the World War II Manhattan Project. The original mission of ORNL was to produce and chemically separate the first gram-quantities of plutonium as part of the national effort to produce the atomic bomb. The current mission of ORNL is to provide applied research and development in support of the U.S. Department of Energy (DOE) programs in nuclear fusion and fission, energy conservation, fossil fuels, and other energy technologies and to perform basic scientific research in selected areas of the physical, life, and environmental sciences.

ER is also tasked with clean up or mitigation of environmental impacts resulting from past waste management practices on portions of the approximately 37,000 acres within the Oak Ridge Reservation (ORR). Other installations located within the ORR are the Gaseous Diffusion Plant (K-25) and the Y-12 plant. The remedial action strategy currently integrates state and federal regulations for efficient compliance and approaches for both investigations and remediation efforts on a Waste Area Grouping (WAG) basis. As defined in the ORR FFA Quarterly Report July - September 1995, a WAG is a grouping of potentially contaminated sites based on drainage area and similar waste characteristics. These contaminated sites are further divided into four categories based on existing information concerning whether the data are generated for scoping or remedial investigation (RI) purposes. These areas are as follows: 1) Operable Units (OU); 2) Characterization Areas (CA); 3) Remedial Site Evaluation (RSE) Areas; and 4) Removal Site Evaluation (RmSE) Areas.

Information entered into the Site Description Data Sheets (SDDSs) includes the following categories: unit name, unit number, project status, unit location, approximate dimensions and capacity, dates operated, present function, life cycle operation, waste characteristics, release data, site status, media of concern, comments, references, date prepared and photo. Table 1.1 describes in detail the information included under each category. The FFA Appendix C sites are presented in this report by WAG. Each WAG is further divided by Phase; this information is identified for each site in the footer of each SDDS.

Table 1.1. Site Descriptions Data Sheet Information

Category	Description
Unit Name	Name of the facility or site area. Most are consistent with the name in the FFA Appendix C list.
Unit Number	Unit number as it appears on the official SWMU list, dated March 1996, (many sites do not have a number listed in the FFA; if an identification number exists from another source, it is noted in the comments section. Removal of the unit number from previous versions of the FFA Appendix C indicates that the site is no longer considered a SWMU).
Project Status	Specific remedial activity currently being conducted at the site (i.e. remedial investigation, RmSE, etc.). Many sites are not currently scheduled for remedial activities.
Unit Location	Location of FFA site. Coordinates are reported, if available.

Table 1.1 continued

Category	Description
Approximate Dimensions and Capacity	Approximate dimensions and/or capacity of site, where available. Attempts were made to include all aspects of a site (i.e., all internal cell dimensions, building dimensions, etc.)
Dates Operated	Operational period at the site. Some of the sites were used for multiple purposes and when the information was available, it was included in the Life Cycle Operation section by year. Historical records are not available for every facility.
Present function	Most of the FFA sites have no present function. However, some are used partially at the present time and are so noted.
Life Cycle Operation	The historical use of the facility. In many cases, the facility had multiple purposes over its operational life cycle.
Waste Characteristics	Identification of wastes handled at the facility or site over its operational period.
Release Data	Information pertaining to contamination resulting from a release from the facility.
Site Status	Broad category for regulatory authority under which the site falls (e.g. CERCLA, RCRA, etc.).
Media of Concern	Media contaminated due to past practices or operations at the site. Where records indicate that the site has been cleaned up, no release occurred, or no contaminants were detected, this section is left blank.
Comments	General comments regarding the site. Inconsistencies within the various sources are noted here.
References	Specific reference facts presented on the data sheet. Up-to-date references are used to the extent possible.
Date Prepared	Date the data sheet was prepared.
Photo	Photograph of the site.

The document incorporates programmatic and regulatory changes that have redefined what constitutes an ORNL, ER unit. These changes allow for differentiation between Resource Conservation and Recovery Act (RCRA) Hazardous and Solid Waste Amendment (HSWA) permit units and Comprehensive Emergency Response Compensation and Liability Act (CERCLA) FFA units. The changes also reflect inclusion of Decontamination and Decommissioning (D&D) units and Nuclear Materials and Stabilization Program units.

1.1 RCRA COMPLIANCE AND THE HSWA PERMIT

In 1986, the state of Tennessee and the U.S. Environmental Protection Agency (EPA) Region IV issued RCRA permits to DOE. The state RCRA Part B permit, requires RCRA treatment, storage, and disposal (TSD) facilities to adhere to both permit conditions and governing RCRA regulations. Subsequent RCRA permits have been issued by the state at all three installations for other TSDs. The EPA RCRA Hazardous

and Solid Waste Amendment permit governs the corrective action for solid waste management units (SWMUs) located at ORNL that have had historic releases of solid, hazardous, or mixed waste. These sites are individually described in the Contaminated Site Summary Sheets (revised 1990) developed for the RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory (V1), published in 1987. All of the state regulated TSDs, as well as the historic waste management units are considered SWMUs and are potentially subject to the corrective action provisions of the HSWA permit.

1.2 CERCLA COMPLIANCE AND THE FFA

In 1989, ORNL was listed on the federal facilities National Priority List (NPL) and became subject to CERCLA and the requirements found in the National Contingency Plan (NCP) regulations. DOE was required to perform a comprehensive investigation to compile the results of previous investigations and perform additional investigations to locate areas of contamination that were largely a result of past industrial/nuclear process, storage, and disposal practices. Many of these areas of concern (AOCs) are also considered historic waste sites or SWMUs and are listed under the HSWA permit. (Section 1.1)

One of the primary purposes of the FFA is to coordinate any RCRA corrective action under the HSWA permit with the CERCLA response actions. Both RCRA and CERCLA remedial processes are technically similar in that both require initial assessment, review of cleanup alternatives, selection of a preferred action, and the implementation of the preferred remedial action of a SWMU or AOC. Under the auspices of the FFA, the terms "area of concern" can include both SWMUs under RCRA and/or area of contamination under CERCLA.

1.3 WASTE AREA GROUPINGS (WAGs) AND OPERABLE UNITS (OUs)

The cleanup strategy for the ORR has been developed to accelerate the transition of areas of concern from characterization to remediation by making decisions at the watershed scale based on recommended land uses. To better determine the impact of AOCs on the ORR, and to determine appropriate remediation activities to address risks to human health and/or the environment, DOE has chosen to investigate AOCs on a watershed basis. A watershed, as the term is used in this instance, is a surface drainage basin that includes an AOC or group of AOCs to be investigated and/or remediated.

Under RCRA, SWMUs were put into groups that basically coincided with surface water drainage divides (ORNL 1987). Initially these groups are referred to as Waste Area Groups (WAGs). The WAGs provided a means of addressing contaminant migration and groundwater contamination in a way that coincides with environmental conditions. Use of the CERCLA term, "Operable Unit", has recently been revised. In the past, it was interchangeable with the project and/or "Waste Area Grouping" concept at the ORR. The revised FFA Appendix C reflects a redefinition of "Operable Unit " to refer to CERCLA response actions (i.e., removal or remedial actions) for which a signed decision document exists.

1.4 DECONTAMINATION AND DECOMMISSIONING INTEGRATION

Because many of the buildings and structures are sources of environmental contamination due to past operations and because of the mixtures of noncontaminated, hazardous, and low-level wastes that are being generated from decontamination & decommissioning (D&D) activities, surplus buildings and structures have been integrated into the CERCLA process in accordance with DOE Policy agreed upon by EPA and DOE.

Under the DOE Policy, the decommissioning activities are conducted as noontime-critical removal actions unless circumstances at the facility make such actions inappropriate. DOE will conduct a removal site evaluation for facilities being transitioned into the Oak Ridge Operations Nuclear Material and Facility Stabilization Program (*EM-60*) (NMFS) to assess site conditions and determine whether a release or substantial threat of release exists at a facility and then determine what action, if any, is appropriate for a particular project before proceeding. Facilities in the EM-60 program are surplus inactive facilities which have been transitioned from other DOE programs. They are deactivated and then maintained until turnover to another program/organization, (usually for further decontamination and decommissioning). The NMFS facilities will undergo (or have undergone) the Removal Site Evaluation process and removal actions will be conducted as required. After deactivation, the AOCs within the NMFS Program will be removed from Appendix C, if DOE identifies future programmatic uses for the facilities, otherwise, they will be moved to the Remedial Site Evaluation category and moved into the D&D Program. All D&D and NMFS Program facilities were added to the list of AOCs in the FFA to facilitate the integration of these two programs into the CERCLA process. The SDDSs generated for the 32 FFA Appendix C-listed D & D facilities at ORNL are presented in this report by WAG. A number of ancillary buildings associated with the Oak Ridge Research Reactor and one ancillary site associated with the Molten Salt Reactor Experiment are not on the FFA but SDDSs for these D&D sites are included in Chap. 6.

1.5 SITE SPECIFIC INFORMATION

In certain instances, deviations from the FFA Appendix C listing occur in this document. These deviations are made for the purpose of consistency and clarity.

1.5.1 Liquid Radioactive Waste Sites

The numerous liquid radioactive waste tanks, lines, and leak sites are part of an elaborate waste transfer system in use dating back to the 1940s. Throughout the history of their use, these lines have carried low-level, intermediate-level, and high-level liquid radioactive wastes. At times, certain lines have been labeled incorrectly as to the radioactivity level carried. For this reason, although specified as LLLW in the FFA, for purposes of this document, all such sites are referred to as liquid radioactive waste sites regardless of their radioactivity level.

1.5.2 SDDS Numbering System

The ORNL sites listed in the FFA and described in this document are numbered according to a given SWMU. If the site is a SWMU, an identification number is shown in the Unit Number Section of the SDDS. In many cases, sites listed on the FFA do not have identification numbers. This is because these sites are no longer SWMUs but are still being addressed under CERCLA. The identification numbers that appear on the SDDSs are slightly different from those listed for the same site on the FFA Appendix C. This is because, in some instances, zeros were dropped in the FFA listing due to software limitations. The numbers that appear on the SDDSs are consistent with the official SWMU listing dated March 1996.

1.5.3 Update

The *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/01-1546/V1&D1, /V2&D1, and /V3&D1) was issued on November 22, 1996 at the same time the Site Description document was being finalized under the Comprehensive Environmental. The report provides the Environmental Restoration Program with a watershed-wide compilation and interpretation of data from previous studies conducted in the area. It

includes information on risk assessments that have evaluated long-term impacts to human health and the environmental and forms the basis for the development of the Feasibility Study. All of the environmental restoration units in the Melton Valley Area (WAGs 2, 4, 5, 6, 7, 8 and 9) will be addressed consistent with the watershed approach presented in the report. Information from this RI has not been incorporated into the SDDSs; however, a comment has been added in the comment section of each SDDS for the sites in WAG 2, 4, 5, 6, 7, 8 and 9 that refers the reader to this document.

1.6 REFERENCES

Advanced Sciences Inc., 1996. *Program Management Plan for the Nuclear Materials and Facility Stabilization In the U.S. Department of Energy, Oak Ridge Operations*. ES/ER/TM-204. Prepared by Advanced Sciences, Incorporated.

CDM Federal Programs and Science Application International Corporation, November 22, 1996. *"The White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol 1. Main Text"*, DOE/OR/01-1546/V1&D1 ,/V2&D1 and /V3&D1, Oak Ridge, Tennessee.

Federal Facility Agreement, January 1, 1992. EPA, DOE and TDEC. *"Federal Facility Agreement for the Oak Ridge Reservation"*, DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Lockheed Martin Energy Systems, 1995. *Federal Facility Agreement Newsletter*. Oak Ridge Reservation, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, 1995. *Oak Ridge Reservation Federal Facility Agreement Quarterly Report for the Environmental Restoration Program, Volume 4, July-September, 1995*. DOE/OR/01-1347/V4. Prepared by the Environmental Restoration Program, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1987. *"RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory"*, ORNL/RAP-12/V1, Oak Ridge Tennessee.

Science Applications International Corp., 1995. *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program*, DOE/OR-1001/R4. Prepared for the U.S. DOE, Oak Ridge, Tennessee.

2. ORNL SITE DESCRIPTION DATA SHEETS FOR CHARACTERIZATION AREAS

UNIT NAME: 3001 Storage Canal

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992) RCRA closure for sediments - final closure deferred to CERCLA. (Kaiser 1996)

Unit Location: The canal connects the Graphite Reactor (3001) with the Radiochemical Processing Pilot Plant (3019). These two buildings are located on Hillside Avenue near Third Street. Approximate ORNL grid coordinates are N 22,530 ft and E 31,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The canal is 7.0 ft (2.1 m) wide, 11.5 ft (3.5 m) deep, and 101.0 ft (31.0 m) long. The canal is covered with a concrete structure and soil. Water capacity of canal is 62,000 gal (235,000 L). (Bechtel et al 1992)

Dates Operated: 1943 - 1990. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The Oak Ridge Graphite Reactor fuel storage canal connected the fuel discharge pit to the adjoining chemical-processing building (3019). It was used for underwater transfer of spent fuel from the reactor for Building 3001. The canal was in operation from 1943 to 1963 when the reactor was shut down. The canal was then used for storage of radioisotopes until 1990. A leak was discovered in 1990 and removal of the stored material was initiated. Removal of the RCRA - contaminated sludges in the canal began in 1992 in accordance with an approved RCRA closure plan. (Bechtel et al 1992, Kaiser 1996)

Waste Characteristics: Stored isotopes include Co-60 and Sr-90. The canal also contains ~ 1 m(E+3) of contaminated sludge containing Pu-239 (primarily), Pu-238, Am-241, and Cm-244. (ORNL 1990)

Release Data: The canal has bare concrete walls that have absorbed long-lived fission products and Co-60, and probably TRU. Results of radiation surveys were reported in 1984. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: A RCRA Final Closure Plan for the 3001 Storage Canal was issued in 1990 (revised March 1992). A subsequent Engineering Evaluation/Cost Analysis for Building 3001 was issued September 1996, and an Action Memorandum for Building 3001 Canal was issued November 1996. (ORNL 1996)

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & D1, Oak Ridge, Tennessee.

Kaiser, Linda, November 1996. ORNL Program Planning Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

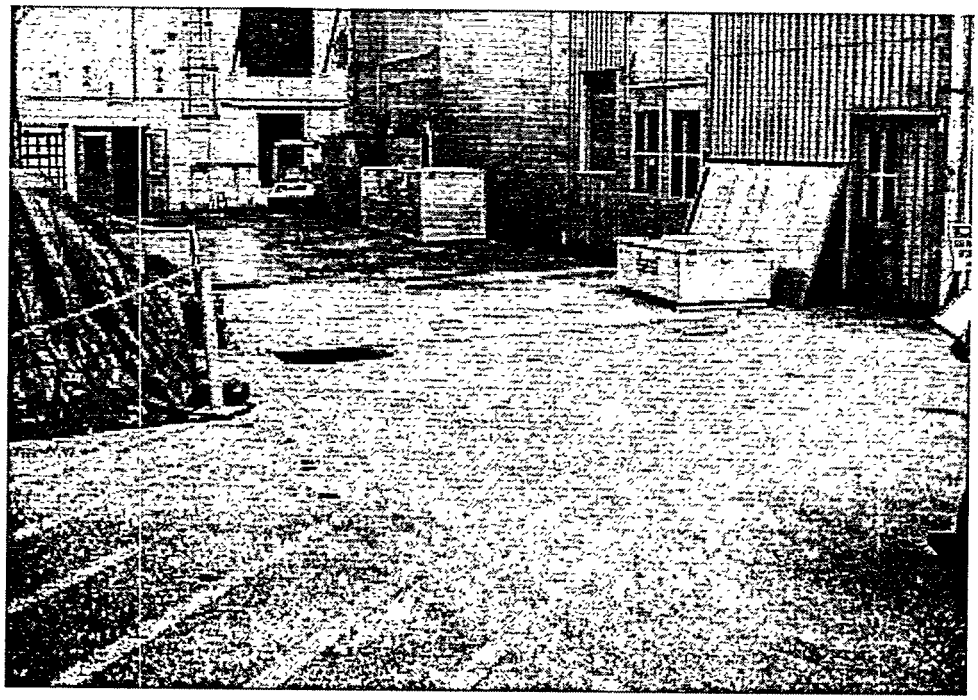
Oak Ridge National Laboratory, September 1996. *Engineering Evaluation/Cost Analysis for Building 3001 Canal, Oak Ridge National Laboratory*, DOE/OR/02-1502 & D2, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1996. *Action Memorandum for Building 3001 Canal, Oak Ridge National Laboratory*, DOE/OR/02-1533 & D2, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1996. *RCRA Final Closure Plan for 3001 Storage Canal*, ORNL/TM-11684, Rev. 2, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_06.JPG



UNIT NAME: Contaminated Surfaces & Soil from 1959 Explosion - Building 3019 Cell

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Building 3019 is located on the northeast corner of Hillside Avenue and Third Street in the ORNL main complex. The approximate ORNL grid coordinates are N 22,530 ft, E 31,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unavailable. (ORNL 1990)

Dates Operated: Pilot plant (3019) was constructed in 1943. Site was contaminated in 1959. (ORNL 1990)

Present Function: Building 3019 houses the Radiochemical Processing Pilot Plant. (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: Plutonium was released from the processing cell as an aerosol of fine particles of plutonium oxide contaminating Building 3019, the Graphite Reactor (Building 3001), and nearby streets and building surfaces. The Pu-239 inventory of the contaminated surfaces and soil was calculated to be less than 0.047 Ci. (ORNL 1990). The area near Building 3019 has also been impacted by a release of condensation fluid from the stack on the north side of the building and past liquid radioactive waste line leaks. (Bechtel et al 1992)

Release Data: In 1959, a non-nuclear explosion in a shielded cell in the Radiochemical Processing Pilot Plant (3019-A) contaminated Building 3019, the Graphite Reactor (3001), and nearby streets and building surfaces. All contaminated areas were decontaminated, or were covered with paint to shield alpha radioactivity. Some soil was removed from contaminated areas; however, all contaminated soil was not removed. (ORNL 1990)

Elevated levels of gross alpha, gross beta, Pu-239, Am-241, Cm-244, Cs-137, and Co-60 have previously been detected. During the 1991 Phase I Study, maximum gross alpha activity was 3,105 ± 696 pCi/g. Pu-238/239/240 and Am-241 were detected above reference levels. Maximum activity of Am-241 was 71.1 ± 4.2 pCi/g; Pu-238 was detected at a maximum activity of 721 ± 73 pCi/g and maximum Pu-239/240 was found to be 41 ± 6.6 pCi/g. Activities greater than reference were reported for gross beta, Ac-228, Ca-45, Co-60, Eu-152/154, Fe-55, I-129, Pm-147, total Sr, and Tc-99. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

No photo available

UNIT NAME: Contamination at Base of 3019 Stack

Unit Number:

Project Status: Remedial Investigation (Bechtel et al 1992)

Unit Location: This area is located south of Building 3020 and west of Building 3019 (the building that houses the 3019 stack). The approximate ORNL grid coordinates are N 22,680 ft and E 30,995 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This is the area around the base of the 3019 stack. (Bechtel et al 1992)

Dates Operated: Site contaminated: 1950s and 1960s. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The area of concern is now referred to as the "3019 Hot Bank." (ORNL 1990). The site is no longer specifically designated as a structure. (Bechtel et al 1992)

Waste Characteristics: Soil analyses taken in August 1985 of the 3019 Hot Bank showed elevated levels of gross alpha and gross beta, Pu, Am, Cm, Cs, and Co. (ORNL 1990)

Release Data: In 1959, a tank within a shielded hot cell in Building 3019 exploded, resulting in the release of plutonium-239 to the environment. (Bechtel et al 1992). Building 3019 stack emissions may have contributed to the overall contamination of the bank; however, other contributors to contamination in this area include low-level waste line leak sites. The 3019 Hot Bank has been a reported source of surface and surface water contamination. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: A radiological survey of the 3019 stack area was conducted by ORNL in 1987. Results from this survey show significant radiological contamination in the storm sewer catch basin at the base of the Building 3019 stack/bank area. The S1 sediment sample contained the highest radionuclide concentrations and gross alpha and beta activity. These results support the findings of the June 1985 scoping survey, in which the highest concentrations of radiological contaminants were found in a soil sample taken south of the chimney-vent station. However, it is significant that the W1 surface water sample collected from the storm sewer catch basin southwest of the chimney-vent station contained 200 pCi/L of Sr-90 and a gross beta activity of 260 pCi/L. Additionally, the S2 sediment sample contained 51 pCi/g of Sr-90 and a gross beta activity of 190 pCi/g. Residual radiological contamination from the 3019 hot bank area is being washed (by means of rainwater runoff) downhill (south) into the storm sewer catch basin. (ORNL 1990) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

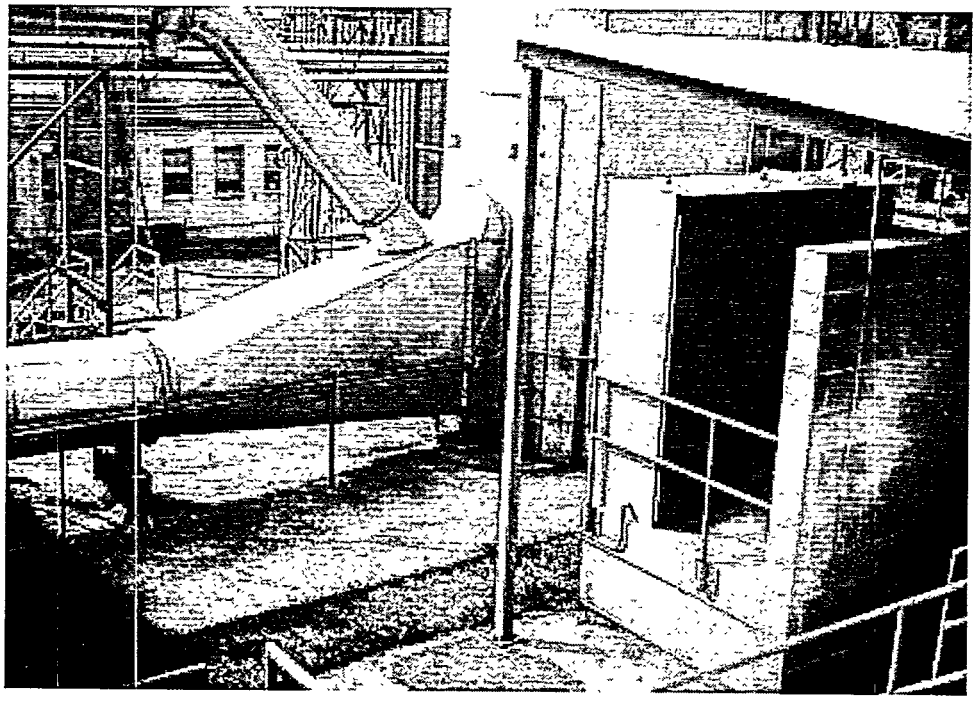
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Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_08.JPG



UNIT NAME: Fission Product Development Laboratory (FPDL) Inactive Cells (Cells 4, 5, 6, 7, 22, and Service Tunnel) - (3517)

Unit Number:

Project Status: The Removal Site Evaluation (RmSE) for the FPDL (Building 3517) was recently completed. (ASI 1996)

Unit Location: Within the FPDL, (Building 3517) is located on the north row of the main cell block. The service tunnel runs along the north side of the cell bank. Cell 22 is located underground adjacent to the building. ORNL grid coordinates are N 21,713 ft and E 31,001 ft.
(ORNL 1995)

Approximate Dimensions and Capacity: Consists of process cells with no viewing windows. Process cells 4 and 5 measure 9 ft by 12.5 ft and process cells 6 and 7 measure 7.5 ft by 12.5 ft by 12 ft. Tank Farm cell 22 measures 25 ft by 12 ft by 14 ft. (ORNL 1995)

Dates Operated: 1958-1975. (ORNL 1995)

Present Function: Not in operation.

Life Cycle Operation: FPDL went on line in 1958 to separate kilocurie amounts of fission products from redox and Purex-type waste streams. A total of 10 MCi of fission product materials was processed during operation of FPDL. In 1975, the chemical processing cells were shut down and maintained in protective storage. Funding restrictions inhibited decontamination of the facility. The initial decontamination program included encapsulation and storage of approximately 500,000 Ci of Sr-90 titanate powder and hot chemical flushes of process equipment and piping within all nine process cells. At one time, Cell 22 housed storage tanks for fission product solutions. Cell 22 still contains an inactive tank and associated piping. (ORNL 1995)

Waste Characteristics: Radioisotopes separated during the late 1950s and early 1960s, include Ce-144, Cs-137, Sr-90, Pm-147, Ru-106, and Tc-99. Cells 4 through 7 contain approximately 430 ft^3 of processing tanks, piping, samples, and instrumentation and are considered to be very high radiation areas. (ORNL 1995)

Release Data: No known releases. (Mandry 1996)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the US Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Mandry, Jerry, September 4, 1996. LMES D&D Project Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Fan House 3003

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: The Fan House is located in the ORNL main complex north of the Graphite Reactor (Building 3001). ORNL grid coordinates are N 22,765 ft and E 31,225 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building is 53 ft wide by 88 ft long by 18 ft high. (ORNL 1990)

Dates Operated: 1943 - 1963. (Burwinkle 1987)

Present Function: The OGR is no longer in operation; however, the fan house may still be used as part of the negative pressure contaminant system for the OGR.

Life Cycle Operation: Coolant air was supplied through underground concrete ducts to the inlet manifold where it was routed through the fuel channels to the exhaust manifold. Exhaust air was then passed through underground concrete ducts to a filter house (Building 3002) for HEPA filtration prior to exhaust through the fan house (Building 3003) to a 200 ft concrete stack (Stack 3018). (Burwinkle 1987)

Waste Characteristics: Gaseous waste. Contaminated primarily with Cs-137 and Sr-90 (80-500 Mr/h). (Ford and Holder 1992)

Release Data: No releases have been reported. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

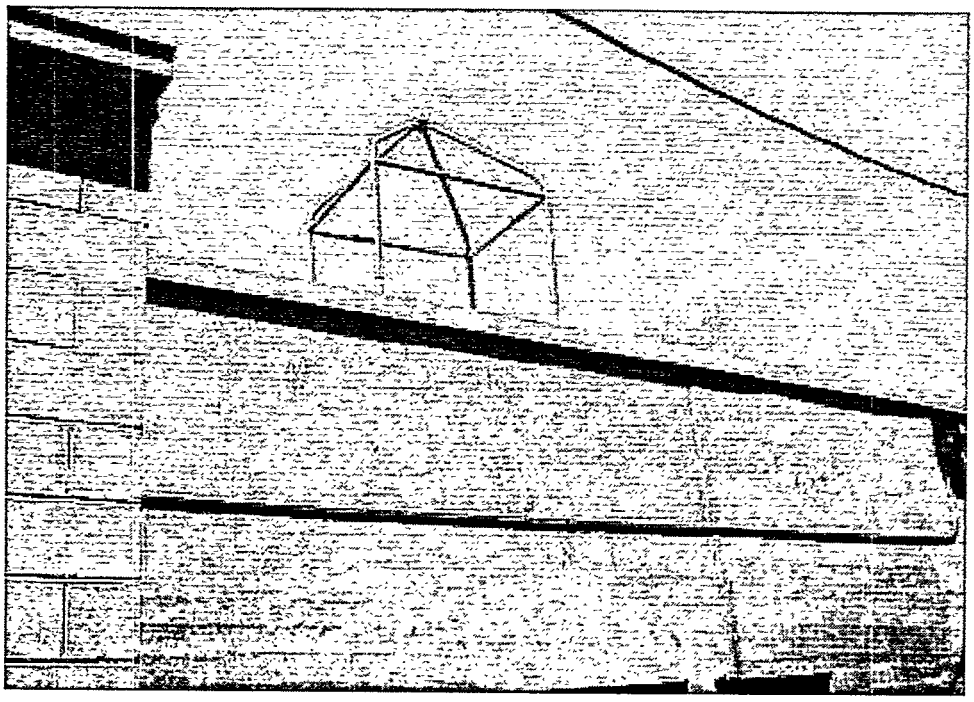
Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr, July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_05.JPG



UNIT NAME: Filter House 3002 (OGR)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Filter House (3002) is located northwest of Building 3001. ORNL grid coordinates are N 22,765 ft and E 31,110 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Filter House has dimensions of 53-ft by 69.5-ft by 27 ft high. (ORNL 1990)

Dates Operated: 1948 - 1963 (ORNL 1990)

Present Function: The OGR is no longer in operation; however, the fan house may still be used as part of the negative pressure contaminant system for the OGR.

Life Cycle Operation: Located between the Graphite Reactor outlet air duct and the Fan House (3003). Function was to halt the release of radioactive particulates (from the stack, 3018)* caused by fuel cladding failure. Coolant air was supplied through underground concrete ducts to the inlet mainfold where it was routed through the fuel channels to the exhaust manifold. Exhaust air was then passed through underground concrete ducts to a filter house (Building 3002) for HEPA filtration prior to exhaust through the fan house (Building 3003) to a 200 ft concrete stack (Stack 3018). (Burwinkle 1987)

Waste Characteristics: Gaseous waste. The building is contaminated primarily with Cs-137 and Sr-90 (80 - 500 Mr/h). (Ford and Holder 1992)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

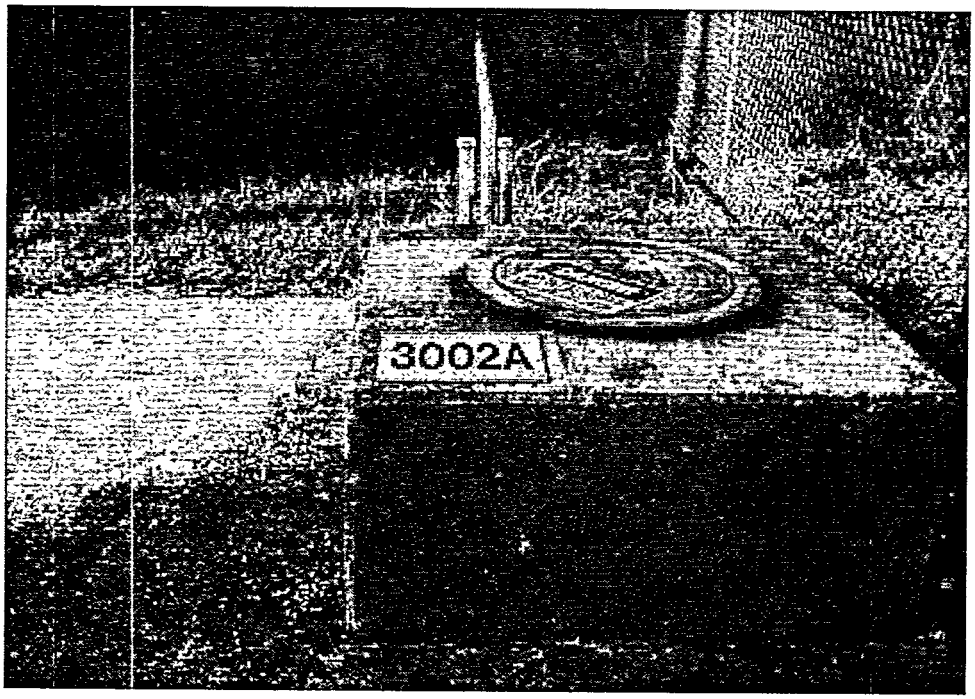
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Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_22.JPG


3002A

UNIT NAME: Fission Product Pilot Plant (3515) [FPPP]

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: The Fission Product Pilot Plant (FPPP) is located at ORNL on the east side of the South Tank Farm in Building 3515. ORNL coordinates are N 21,960 ft and 31,030 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Formally known as the Ru-106 tank arrangement, the facility consists of a concrete pad with tanks surrounded by stacks of concrete blocks. The present facility consists primarily of an unlined concrete-shielded cell, approximately 20 x 10 x 8 ft. (6.0 x 3.0 x 2.4 m high), with an adjacent shielded operating area. (Ford and Holder 1992)

Dates Operated: Site commissioned: 1948. Taken out of service: 1958. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: From 1950-1951, the facility functioned as a hot cell facility. It was then used to separate curie quantities of various radionuclides from low-level liquid wastes. It was abandoned in 1958 when replaced by the Fission Product Development Laboratory (FPDL). (Ford and Holder 1992)

Waste Characteristics: Specific waste information is not available. (ORNL 1990)

Release Data: The current residual radionuclide inventory is believed to be in the range of 10 to 100 Ci, although no recent survey information is available due to lack of direct access. About 3313 cubic ft (92.7 cubic m) of solid radioactive waste and 7063 cubic ft (200 cubic m) of liquid radioactive waste will be generated during decommissioning of this facility. In 1988 a large crack was discovered in the roof that allowed rainwater to enter, penetrate the building, become contaminated and then exit through the exterior walls. The crack was repaired. Contamination is present underneath and adjacent to the building due to drain line leaks during past operations. (Ford and Holder 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

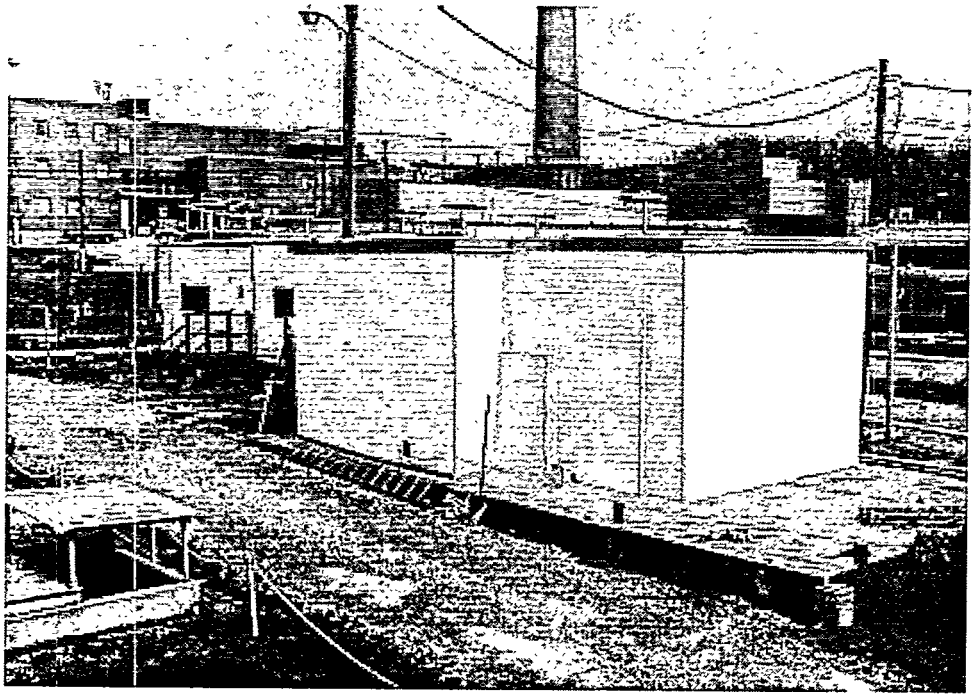
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee, 1992.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 1980_89.JPG



UNIT NAME: Fission Product Pilot Plant (FPPP) Contaminated Soil

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The FPPP is located at ORNL on the east side of the South Tank Farm in Building 3515. ORNL coordinates are N 21,960 ft and E 31,030 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown

Dates Operated: 1948-1958 (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: The FPPP was used in the fission product recovery development program for the separation of curie quantities of various radionuclide from LLLW waste streams. It was abandoned in 1958 when it was replaced by the Fission Product Development Laboratory (FPDL). Shortly after the FPPP was abandoned, the building was entombed in a concrete block shell. (Ford and Holder 1992)

Waste Characteristics: Radiation levels within the process cell prior to entombment ranged from 1 R/h to 100 R/h, with the major contaminants being Co-137 and Sr-90. The remaining radionuclide inventory in the facility is believed to be in the range of 10 to 100 Ci. (Ford and Holder 1992) Radiation levels of the contaminated soil were not identified.

Release Data: Contamination is present underneath and adjacent to the building due to drain line leaks during past operations. (Ford and Holder 1992) A release from the facility was recorded in 1988, but no estimates of radionuclides released is available. The facility was roofed and the ground east was covered with Hypalon and gravel and placecarded as a contamination area (Bechtel et al 1992)

Site Status: CERCLA

Media of Concern: Soil

Comments: The FPPP facility was also called the ruthenium-106 tank arrangement which consisted of a concrete pad and tanks surrounded by stacks of concrete blocks. (Bechtel et al 1992)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Remedial Investigation Report on Waste Area Grouping 5 at Oak Ridge National Laboratory,* Oak Ridge, Tennessee.

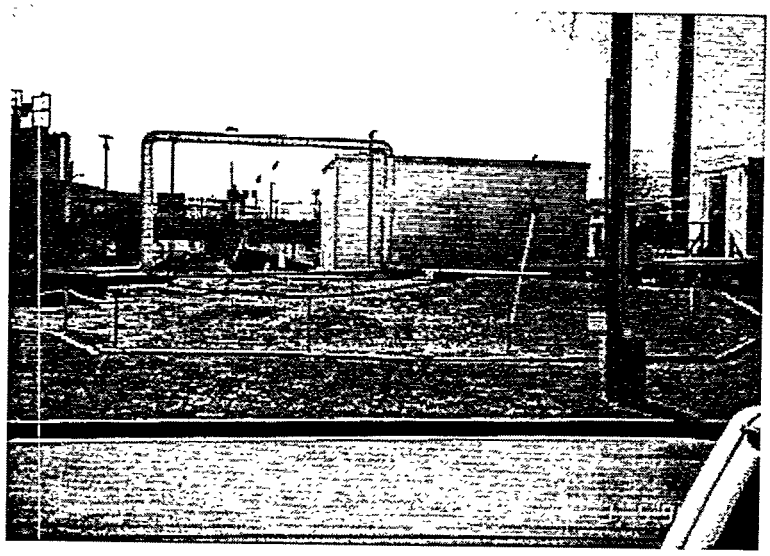
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

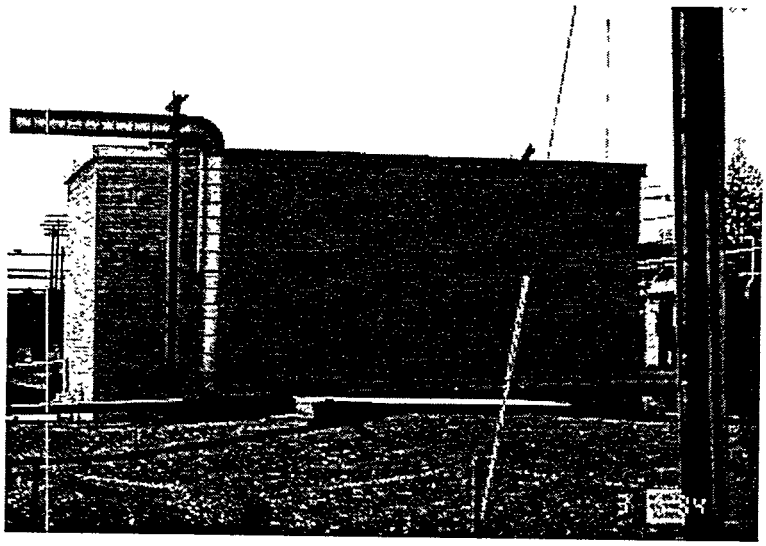
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_15.JPG; 09_16.JPG





UNIT NAME: Graphite Reactor Building 3001

Unit Number:

Project Status: Remedial investigation completed. (Bechtel et al 1992)

Unit Location: The ORNL Graphite Reactor (OGR) is located in Building 3001 at the ORNL complex in Bethel Valley. Building 3001 is just north of Hillside Avenue between Third and Fifth streets. ORNL grid coordinates are N 22,570 ft and E 31,190 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building 3001 is a five-story corrugated metal structure. The dimensions are 140 ft by 116 ft by 70 ft. The reactor was originally designed for a 1-MW power level, but in 1944 improvements in the cooling system and fuel cladding allowed the power level to be increased to an average rate of 3.6 MW. (Burwinkle 1987)

Dates Operated: Date commissioned: 1943. Taken out of service: 1963. (Burwinkle 1987)

Present Function: Not in operation. A portion of the facility is used to allow the public access to view the reactor face and ORNL visual displays. (Ford and Holder 1992)

Life Cycle Operation: The Graphite Reactor was built to produce the first gram-size quantities of plutonium to provide information for the construction of the large plutonium production reactors located at Hanford, Washington. It was later converted to a training reactor. In 1966, the fuel was removed from the reactor and the OGR was designated as a National Historical Landmark. (Burwinkle 1987)

Waste Characteristics: The reactor is reported to contain 16 Ci of C-14, 5,000 uCi (80 mg) of Pu-239, 200 Uci (< 0.5 kg) of uranium oxide, and lesser radiation sources. Gamma spectroscopy indicates the presence of Cs-137 and Co-60. An order-of-magnitude of less than 10 Ci of each is estimated. Thus, the radionuclide inventory in the reactor probably totals less than 50 Ci. The demineralization room, or hot cell, was checked, and Cs-137 and Co-60 were detected in the gamma spectrum. Five percent of the alpha readings (only one reading) were above the ORNL guidelines for establishing a contamination zone. The beta-gamma contamination levels ranged from less than 500 dpm/100 cm^2 to 1,670 dpm/100 cm^2, with an average of approximately 500 dpm/100 cm^2. The only alpha contamination measured 32 dpm/100 cm^2. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16.

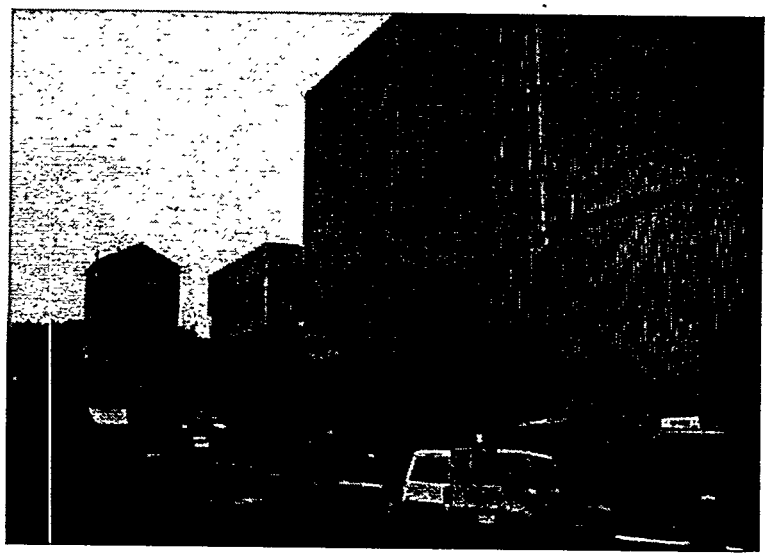
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

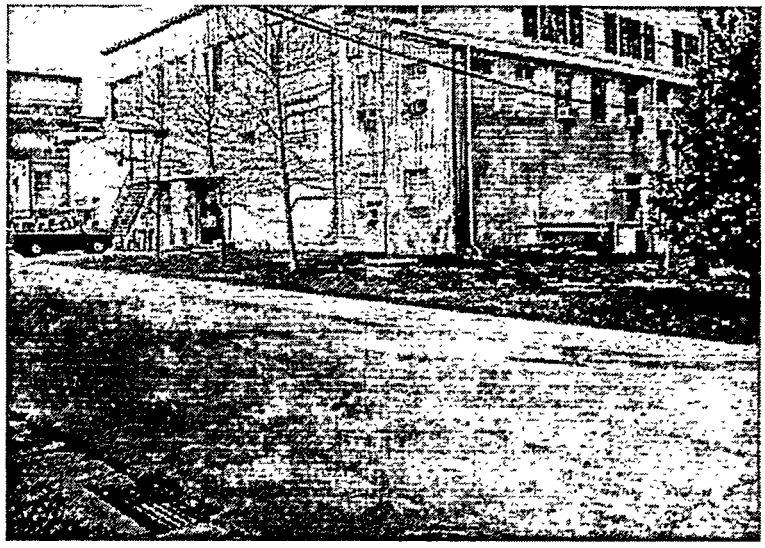
Date Prepared: December 1996

Photo: 07_30.JPG; 07_32.JPG; 07_34.JPG; 13_31.JPG; 13_32.JPG











UNIT NAME: Heat Exchangers (3077)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Heat exchangers are located north of the Low Intensity Test Reactor (LITR) (Bldg. 3005) in the ORNL main complex. ORNL grid coordinates are N 22,855 ft and E 31,390 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Not applicable. (ORNL 1990)

Dates Operated: 1951-1968. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: Two 1-MW water to air heat exchangers provided heat dissipation for the final LITR design and one 1-MW water-to-water heat exchanger. (Ford and Holder 1992)

Waste Characteristics: Water containing traces of neutron activation of reactor cooling water. Only very slight amounts of contamination (Co-60, Ni-63, Fe-55) are indicated on the interiors of the LITR heat exchanger and on pipes in the upper levels of Building 3005. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA

Media of Concern: This site was included in a CERCLA remedial investigation. (Bechtel et al 1992)

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

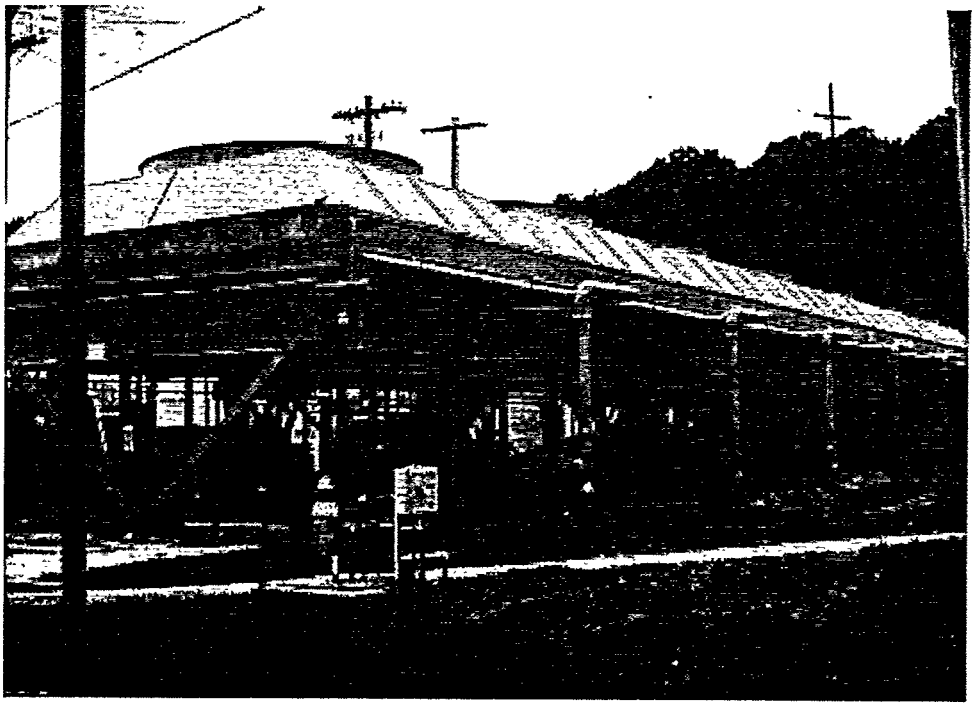
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee

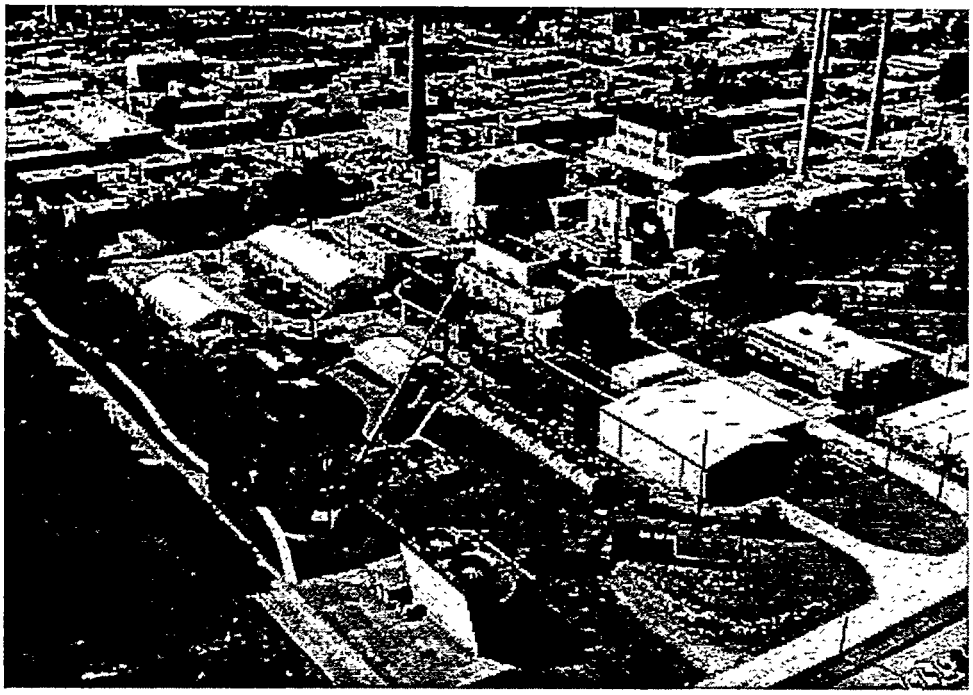
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

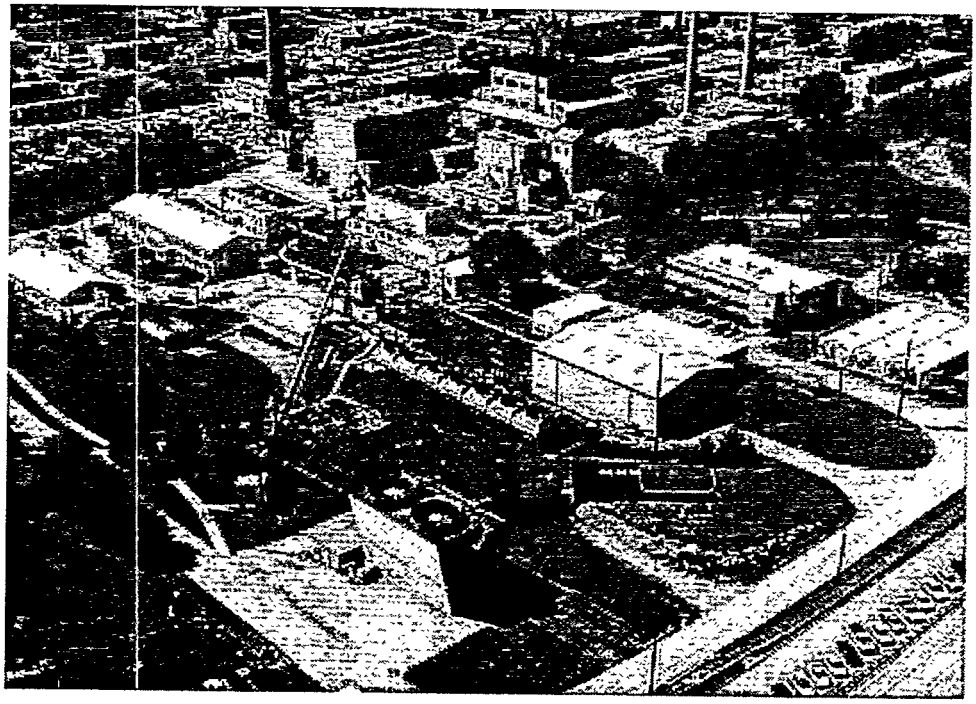
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

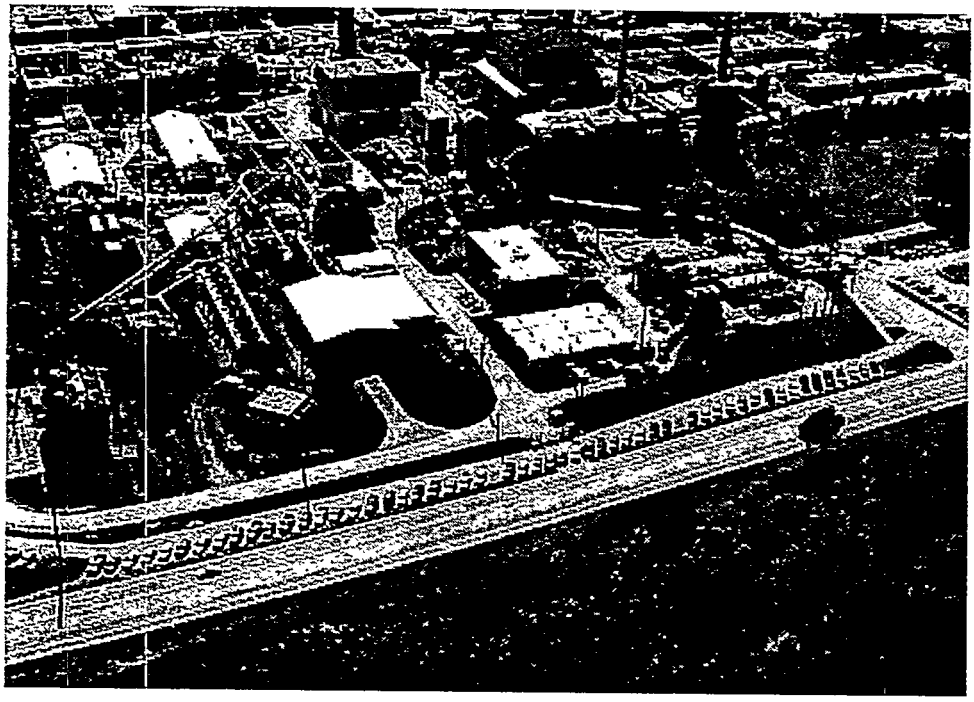
Date Prepared: December 1996

Photo: 28_04.JPG; 3174_94.JPG; 3193_94.JPG; 7714_95.JPG









UNIT NAME: High-level Chemical Development Lab Filter Pit (4556)

Unit Number:

Project Status: Maintained under the Surveillance and Maintenance Program.

Unit Location: Located just east of the intersection of Fifth Street and White Oak Avenue in the ORNL main plant area. (Bechtel et al 1992) Building 4556 is immediately southwest of Building 4507. (ORNL 1996)

Approximate Dimensions and Capacity: Building 4556 is a below-grade filter pit containing high-efficiency-particulate air (HEPA) filters. A vitreous clay pipe from Building 4507 connects with stainless steel pipes that lead into the filter pit. The pit contains two parallel filter banks, each consisting of prefilters and HEPA filters. There are an additional two positions available for subsequent banks of charcoal filters, but these are not currently in service. A pipe in the bottom of each filter bank allows accumulated moisture to flow to a hot drain. A sump in the pit floor allows inleakage of rain water to be removed by the process drains. (ORNL 1996)

Dates Operated: The high-level chemical development laboratory was operated from 1957-1980. (Bechtel et al 1992) The filter pit remains operational. (ORNL 1996)

Present Function: This facility remains operational, in support of continuing ventilation requirements for Building 4507. (ORNL 1996) The building cell ventilation system is routed through this below grade filter pit before connecting to underground ducts going to the 3039 stack. (Ford and Holder 1992)

Life Cycle Operation: The high level chemical development lab was used as a laboratory and small scale pilot plant for development studies of reactor fuel processing, separation, and recovery of transuranic (TRU) materials, and separation of fission products from aqueous wastes. (Ford and Holder 1992)

Waste Characteristics: The total radiation levels for Building 4556 are <= 20 mRAD/hr at 30 cm and at contact. The hazard level classification for this complex is "radiological." (ORNL 1996)

Release Data: No releases have been reported. (Ford and Holder 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

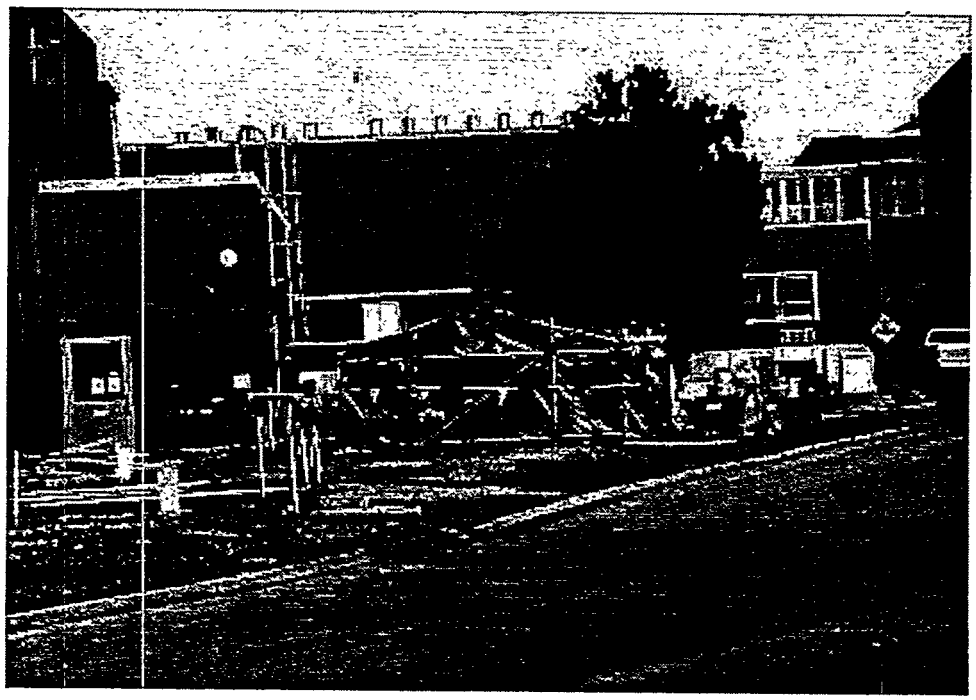
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, April 1996. *Phase I Safety Documentation, The High-Radiation-Level Chemical Development Facility and Filter Pit, Building 4057 and 4556*, prepared by Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 24_01.JPG; 24_02.JPG





UNIT NAME: High-level Chemical Development Lab (4507)

Unit Number:

Project Status: Maintained under the Surveillance and Maintenance program.

Unit Location: This unit is located in the ORNL main plant area near the intersection of Fifth Street and White Oak Avenue. (Bechtel et al 1992) ORNL grid coordinates are N 21,800 ft and E 32,135 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The building consists of four shielded hot cells equipped with master-slave manipulators and associated support equipment in the cell operating area. Chemical makeup and cell charging area above the cells contain a shielded manipulator cave, maintenance glovebox, and a 10-ton gantry crane for handling shielded casks. (Ford and Holder 1992) Building 4507 is a 16.5 m x 16.5 m brick-veneered, concrete-block building with an insulated sheet-metal superstructure. Each of the four cells has internal dimensions of 1.8 m x 3 m with a height of 3.4 m. This block of cells is 13.1 m x 5.5 m and 4.9 m high. Above the cells is a penthouse area which is reached through an airlock from the outside on the western side of the facility. The penthouse contains a large glovebox that straddles cells 3 and 4. (ORNL 1996)

Dates Operated: Constructed in 1957; removed from service 1980 and mothballed. (Bechtel et al 1992)

Present Function: Not in operation. (Bechtel et al 1992)

Life Cycle Operation: The facility is an above ground structure containing 4 hot cells, a second well for the chemical make-up equipment, and a penthouse area above the hot cells with gloveboxes, a gantry crane and a shielded manipulator. (Bechtel et al 1992). It was designed and operated as a laboratory and operated as laboratory and small-scale pilot plant for development studies of reactor fuel processing, separation and recovery of transuranic (TRU) materials, and separation of fission products from aqueous wastes. (Ford and Holder 1992)

Waste Characteristics: The total radiation levels in Building 4507 are <= 0.4 mRad/hr at 30 cm and <= 20 mRad/hr at contact in the penthouse area; <= 0.2 mRad/hr at 30 cm and <= 20 mRad/hr at contact in the area in front of the hot cells; and <= 1.2 mRad/hr at 30 cm and 40 mRad/hr at contact in the area at the rear of the hot cells. The hot cells have total radiation levels as follows (ORNL 1996):

Hot Cell #1 - 7 to 10 Rad/hr at an unknown distance.
#2 - 20 Rad/hr at an unknown distance.
#3 - 200 mRad/hr at an unknown distance.
#4 - 500 mRad/hr at an unknown distance.

Release Data: No releases have been reported. (Bechtel et al 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

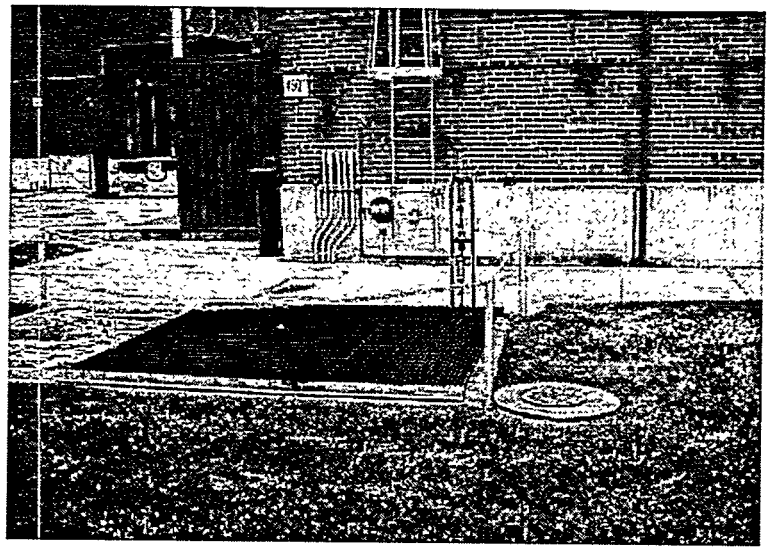
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

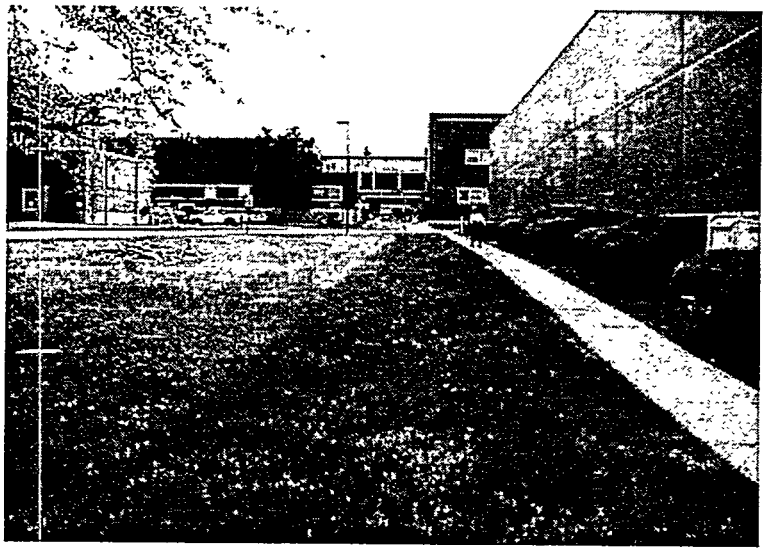
Oak Ridge National Laboratory, April 1996. *Phase I Safety Documentation, The High-Radiation-Level Chemical Development Facility and Filter Pit, Building 4057 and 4556*, prepared by Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_12.JPG; 02_14.JPG





UNIT NAME: Low Intensity Test Reactor (LITR) - (3005)

Unit Number:

Project Status: Remedial investigation completed. (Bechtel et al 1992)

Unit Location: The LITR is located in the northern portion of the main ORNL complex in Building 3005. ORNL grid coordinates are N 22,730 ft and E 31,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The LITR began operation as a 500-Kw reactor but was converted and reached a final power level of 3,000 Kw. The LITR is made up of 5 cylindrical steel and aluminum sections; all but the lowest tank section is aboveground. The facility is primarily steel and is 70 x 62 x 57 ft. (Ford and Holder 1992)

Dates Operated: Date commissioned: March 1951. Taken out of service: October 1968. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: In 1951, the LITR was converted from a hydraulic mockup of materials testing reactor to an operating reactor for the purpose of supplying a variety of irradiation facilities for ORNL and other research groups. Enriched uranium was used as a fuel and beryllium was used as a reflector. (Ford and Holder 1992)

Waste Characteristics: Interior surfaces of the reactor tank and primary water piping system are contaminated with radioactive corrosion products and fission products. It has been estimated that the reactor core contains between 6 and 45 Ci of Co-60, less than 50 Ci of Ni-63, and less than 10 Ci of Fe-55, which are all activation products. It was also estimated that the core might give a reading of about 200-300 rad/h. (ORNL 1990) The core still contains beryllium reflector and other reactor vessel elements. (Ford and Holder 1992)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERLCA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

No photo available

UNIT NAME: Low Intensity Test Reactor (LITR) Ponds (3085W)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: This site is located in the northern part of the main ORNL complex near Building 3005. The two ponds are located ~ 300 ft (92 m) east of the building. ORNL grid coordinates are N 22,790 ft and E 31,760 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The LITR retention ponds were two separate ponds located 350 ft east of the LITR reactor building, with 18,000-gal capacity, dimensions of 2.4 x 14 m, ranging from 1.8 m to 2.4 m deep. The ponds were both lined with limestone, and the stone was covered at the time by earth backfill. (Ford et al 1992)

Dates Operated: Reactor commissioned: 1951. Site inactive: 1964. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The retention ponds were used during the early portion of the LITR operation to serve as holding tanks for process water at the facility to allow settling of particulates and ionized particles with short half-lives to decay before dumping into First Creek. The murky water was completely purged from the LITR, and the ponds were established to completely hold the volume of the primary cooling water. In 1964, the ponds were pumped of remaining groundwater and filled with earth. (Ford et al 1992)

Waste Characteristics: Very little information is available. Principal contamination was probably Na-24 (half-life of 15 h). Hydrogeological conditions are similar to sites in the main ORNL installation in Bethel Valley. (ORNL 1990)

Release Data: A radiological study of the site in 1985 showed average activities of Sr-90, Pu-238, and Pu-239 in the soil higher than background, and that there was some contamination due to Cs-137 and Co-60. The radionuclide inventory was estimated at 20 mCi of Cs-137, 1 mCi of Sr-90, and 100 uCi of Pu-239. (ORNL 1990) Soil samples of the soil directly under and adjacent to the ponds consist of radionuclides Cs-137, Co-60, Sr-90, Pu-238, and Pu-239 detected in concentrations above established background levels. (Ford et al 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

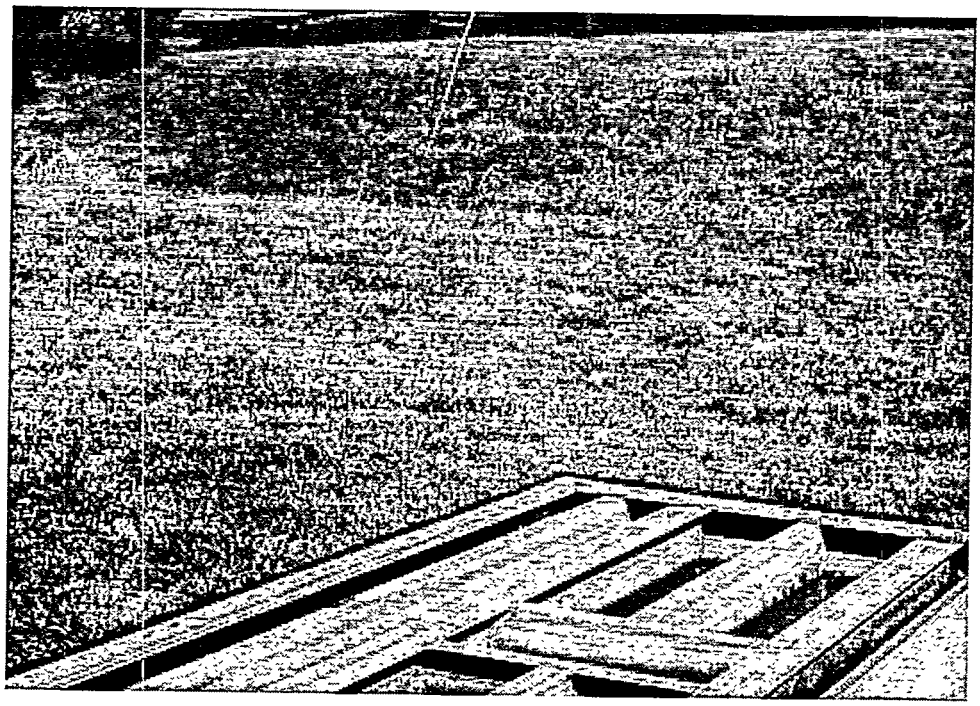
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K., L. Holder, Jr., and R.G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, ORNL/ER-39, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 03_25.JPG



UNIT NAME: Metal Recovery Facility (3505)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Located in the ORNL main complex on the corner of White Oak Avenue and Third Street. ORNL grid coordinates are N 21,840 ft and E 31,910 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The Metal Recovery Facility (MRF) is a one-story metal-sided building, approximately 90 ft long by 70 ft wide by 24 ft high. The items of processing equipment that remain are contained in seven concrete or concrete-block cells, which are secured and maintained under negative pressure, with ventilation through HEPA filters. (Burwinkle 1987)

Dates Operated: Commissioned in 1952. Date of closure: 1960 (Burwinkle 1987)

Present Function: Not in operation.

Life Cycle Operation: The MRF was a pilot and small scale production nuclear fuel reprocessing plant used for the processing of various waste solutions, scrap, and miscellaneous fuel elements for the recovery of uranium, plutonium, neptunium, and americium. The facility was shut down in 1960, after some 25 different processing campaigns, due to the lack of secondary containment. (Burwinkle 1987)

Waste Characteristics:

Release Data: The process cells are internally contaminated, primarily along lower walls and inside process equipment. The majority of this activity is due to long-lived (TRU) surface contamination present. (Burwinkle 1987)

Site Status: CERCLA

Media of Concern: none

Comments: Site is listed as decontamination and decommissioning under the DOE surplus facilities program. Surplus facilities are structures that may require further investigation of the extent of internal contamination, but were not considered to be sources of potential contamination of the environment. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

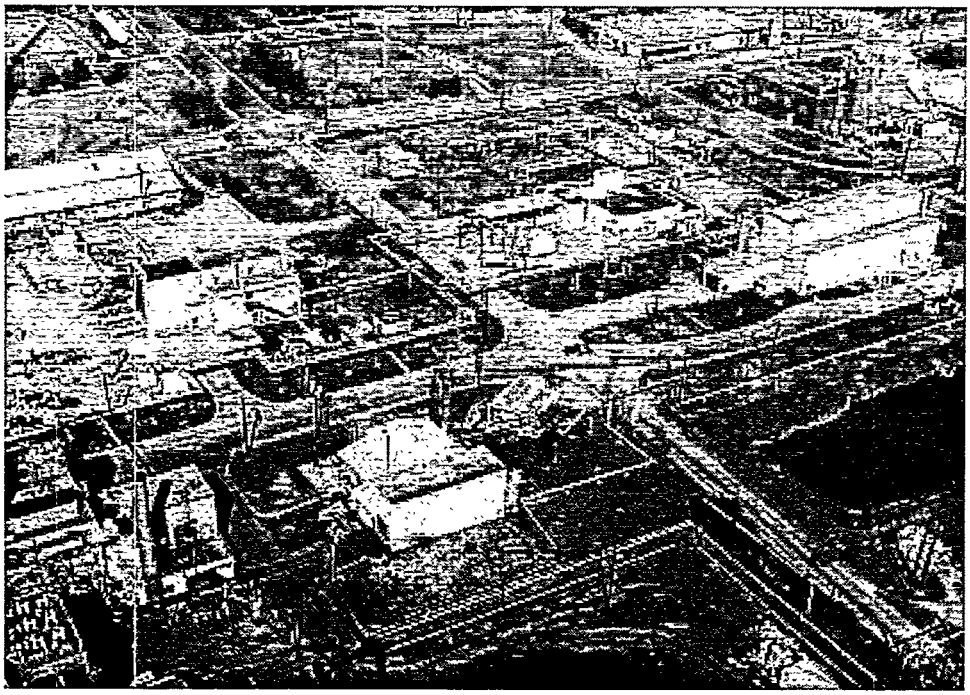
Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Burwinkle, T.W. March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11243_91.JPG



UNIT NAME: Oak Ridge Research Reactor (ORR-Main Building, Facility) - (3042)

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The Oak Ridge Research Reactor (ORR) is located just north of Hillside Ave. between Third and Fifth Streets. ORNL grid coordinates are N 22,570 ft and E 31,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The reactor core was a heterogeneous type which used enriched uranium fuel in the form of aluminum-clad, aluminum-uranium-alloy fuel plates. A fuel element consisted of either 18 or 19 plates. Reactor heat was transferred from the fuel by light water and dissipated to the atmosphere. (Ford and Holder 1992)

Dates Operated: March 1958 - Summer 1960 at 20MW. 1960-1987 at 30MW. Shut down in 1987. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: The ORR was a light-water-moderated and cooled, beryllium and water reflected research reactor designed and built for use as a general purpose research tool. (Ford and Holder 1992) Since 1959, several different experimental facilities have been installed at the Oak Ridge Research Reactor (ORR-Bldg. 3042) for use in testing of various materials, analysis of liquid and gaseous coolant systems, and irradiated sample transfers. Six of these facilities have been designated as surplus and have been accepted into the ORNL SEM. These are (1) GCR A9-B9 experiment (1960-1969) for measurement of fission-product gases from ceramic fuels, (2) Molten Salt Loop (1959-1967) for analysis of homogeneous reactor fuels, (3) Maritime Ship Reactor Loop (1959-1962) for materials testing of structural materials and fuel pins for nuclear merchant ship applications, (4) Pneumatic Tube Irradiation Facility (1968-1973) for transfer of irradiated samples from the ORR to a laboratory in Building 3001, (5) GCR Loop I (1960-1967) to test new fuels for gas-cooled reactors, and (6) GCT Loop II (1962-1963) for the irradiation of unclad graphite fuel specimens for study of fission product releases. (Burwinkle 1987)

Waste Characteristics: All of the experimental facilities involved transfers of irradiated solids, liquids, or gases, during normal operations. (Burwinkle 1987)

Release Data: Hydraulic connection between groundwater in the Building 3019 area and the Building 3042 sump has been documented; contaminants from Building 3019 activities migrated in the groundwater and were found in the Building 3042 sump. Groundwater in this area is contaminated with americium-241, technetium-99, radium-228, and tritium. (Bechtel et al 1992) As a result of handling irradiated materials, the transfer piping became contaminated with long-lived corrosion or fission products to varying degrees depending upon the experiment. In addition, those experiments where significant chemical processing or irradiated product handling and analysis was conducted, much of the process equipment is contaminated. Preliminary characterization efforts have been conducted to determine the radiation/contamination levels and estimate the residual radionuclide inventory present in these facilities. (Burwinkle 1987)

Site Status: CERCLA

Media of Concern: Groundwater

Comments: Other ancillary buildings associated with the ORR Main Facility are ORR Heat Exchanger (3087), Pool-water cooling tower (3086), ORR Pumphouse (3085), ORR Cooling Tower #3 (Building 3103), Heat exchanger pit (3102), two 20,000 gallon above-ground demineralized-water holding tanks; ORR Experimental Facilities in 3042 (GCR A9-B9 Experimental Loop;M), ORR Normal Off-Gas (NOG) Filter Pit charcoal Filter (3126), ORR Neutron Spectrometer Station (Neutron Flight Tube Bldg 3083), ORR Cell Vent Filters (3139), ORR 25-meter Target House (Flight Tube Building) (3107), ORR A/C Cooling Tower (3089), ORR Pressurizable Off-Gas (POG) Filter Pit Off-gas

Filter (3109), and ORR 10,000-gallon decay tank. SDDS's for these sites are located in Appendix A.

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

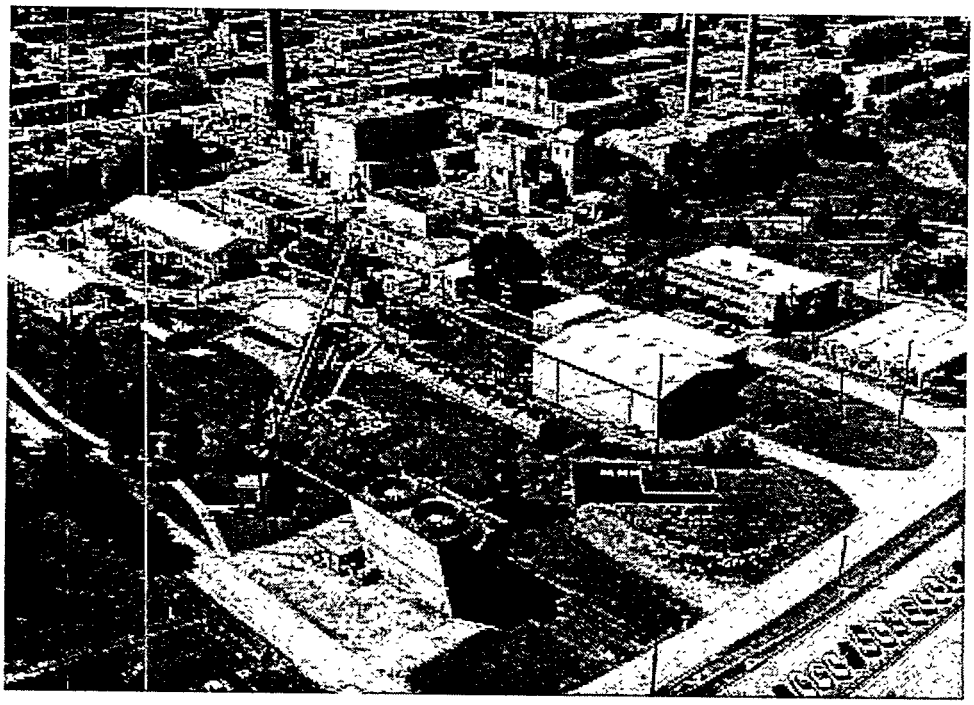
Burwinkle, T.W. March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16.

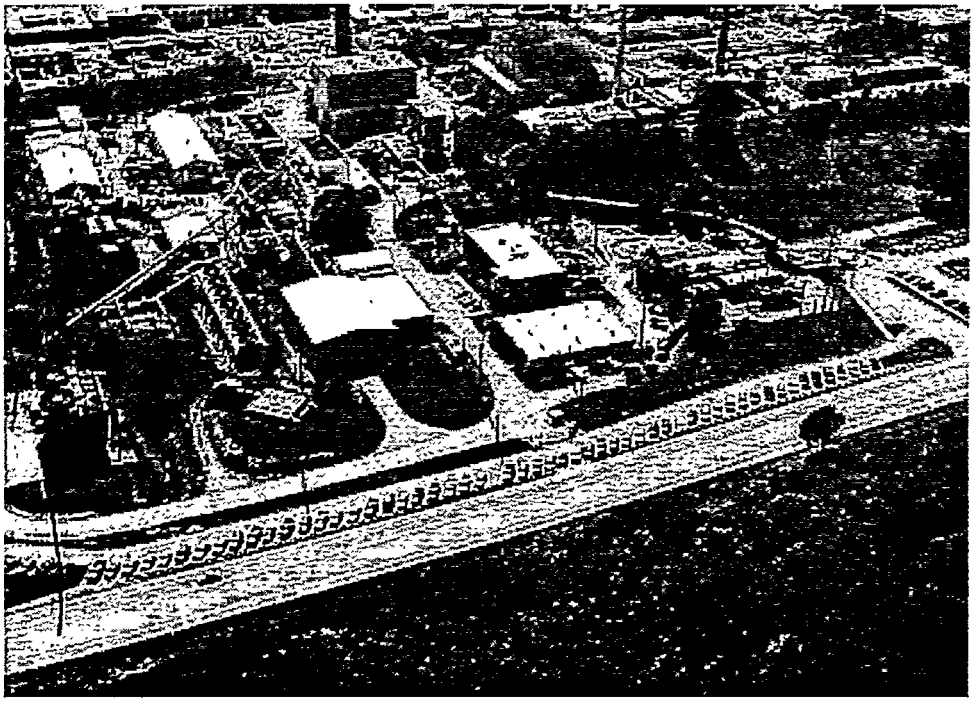
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division. Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 7714_95.JPG; 3174_95.JPG; 3193_94.JPG







UNIT NAME: Oak Ridge Research Reactor Decay Tank Rupture Site (3087)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: The Oak Ridge Research Reactor Decay Tank is located near Building 3042 in the ORNL main complex. The ORNL grid coordinates are N 22,738 ft and E 31,660 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Capacity of the tank is 11,000 gal (41,635 L). (ORNL 1990)

Dates Operated: Site commissioned: unknown. Site leaked: 1974. (ORNL 1990)

Present Function: The tank contains water coolant. (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: Isotopes present in the primary coolant water include Na-24, Sr-90, I-131, Ru-106, and Cs-137. There is no available information concerning the quantity of radionuclides leaked to surrounding soil. (ORNL 1990)

Release Data: The tank developed a leak in 1974 that released primary coolant water at the rate of 1.5 gal/min (5.7 L/min). Surveys detected radiation levels up to 2 R/h. There is no available information concerning the quantity of radionuclides leaked to surrounding soil. Cleanup efforts (in April 1974) included removing, cleaning, and rewelding the tank, but documentation of the removal of contaminated soil is lacking. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

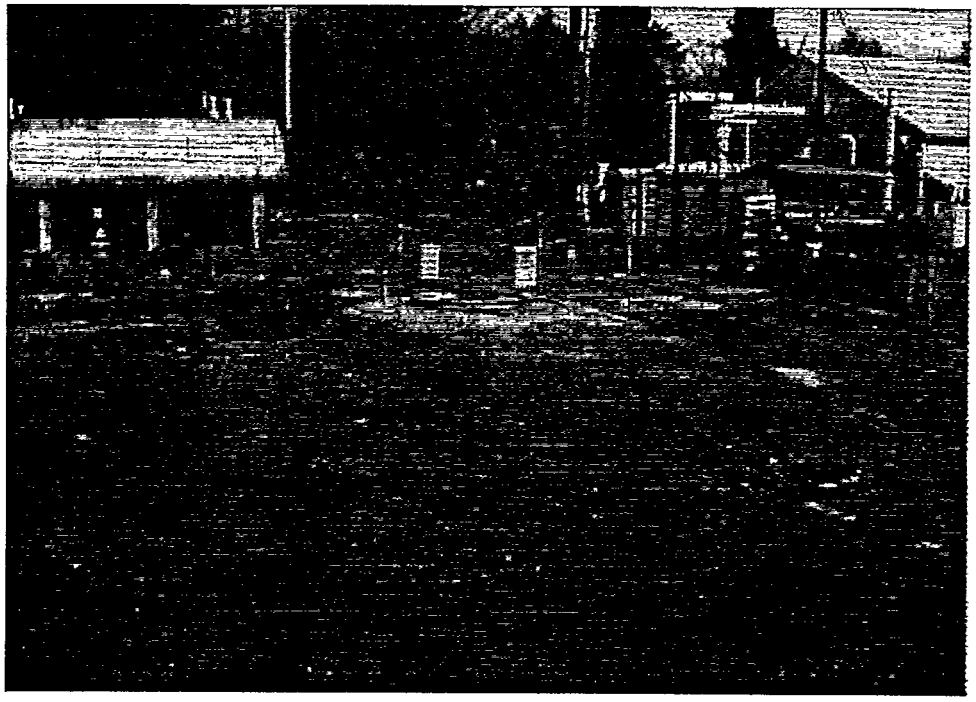
References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_04.JPG; 12_05.JPG





UNIT NAME: Oak Ridge Research Reactor (ORR) Heat Exchanger (3087)

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: Located within the Bethel Valley Secured area. (Burwinkle 1987) The ORR heat exchanger is located southwest of the intersection of Northside Drive and First Street. ORNL grid coordinates are N 23,000 ft and E 31,660 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Consists of 8 aluminum 24 x 24 ft horizontally mounted, finned water-to-air radiators (2.5 MW capacity each). The units were housed in steel support structures, secured to concrete pads and connected to ORR by underground aluminum piping. (Burwinkle 1987)

Dates Operated: 1958-1961. (Burwinkle 1987)

Present Function: Not in operation.

Life Cycle Operation: The ORR heat exchanger was the original heat dissipation system for the ORR. In 1960, the radiators were replaced by a water to water heat exchanger and cooling tower dissipation system. (Burwinkle 1987)

Waste Characteristics: The interior surfaces are slightly contaminated principally with long-lived corrosion products. (Burwinkle 1987)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: The Contaminated Site Summary Sheet (ORNL 1990) identifies the facility as being made up of seven exchangers.

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

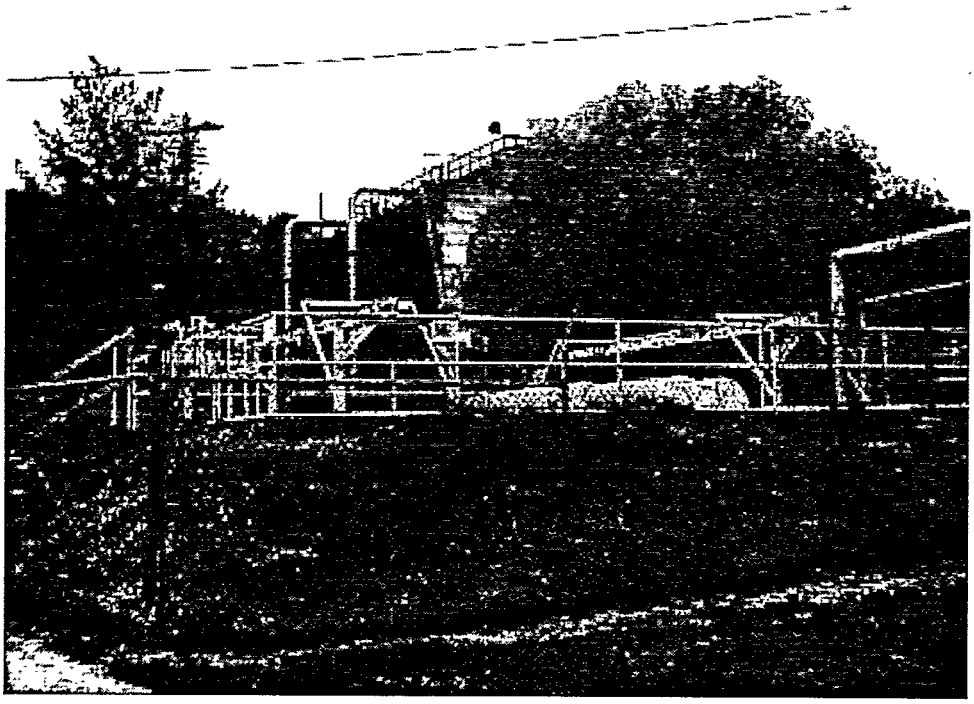
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, ORNL/RAP-16, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_02.JPG; 28_03.JPG



UNIT NAME: Solid Waste Storage Area (SWSA) 1 - (2624)

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: SWSA 1 is located in Bethel Valley at the foot of Haw Ridge, and the closest edge is ~ 25.0 ft (7.6 m) south of White Oak Creek. ORNL grid coordinates are N 20,980 ft and E 30,710 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The site is triangular in shape and encompasses ~ 1 acre (0.4 ha). It is fenced and grassed. (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1944. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: SWSA 1 was the first area used for burial of low-level solid wastes. (ORNL 1990). Contaminated solid wastes were buried in SWSA 1 in trenches using earthen cover. (Bechtel et al 1992)

Waste Characteristics: The burial ground is contaminated with unknown radionuclides and unidentified chemical constituents. Only a small amount (2,000 - 4,000 Ci) of solid radioactive waste was buried in SWSA 1. (ORNL 1990)

In 1987 a surface radiological investigation of SWSA 1 was conducted by ORNL. Results from this survey show that most of the surface gamma radiation of SWSA 1 is due to radiation emanating from nearby White Oak Creek. Measurements of gamma levels determined that exposure rates at the surface were generally elevated above typical ORR background values (13 uR/h), ranging from 20 to 200 uR/h. (ORNL 1990)

Results of the 1992 WAG 1 Site Characterization Summary Report indicate elevated groundwater concentrations of strontium-90, and radium-228, very low levels of plutonium-238/239/240, and cesium-137 in proximity to SWSA 1. Soil samples were contaminated with CS-137 significantly above reference. (Bechtel et al 1992)

Release Data: The burial ground lies within the pathway of surface water drainage from Haw Ridge to White Oak Creek, causing marshes to develop in the topographically low portions of the area following periods of heavy rains and wet seasons. (Bechtel et al 1992). Groundwater movement in the area is to White Oak Creek and is, therefore, monitored via the ORNL Stream Monitoring System. Monitoring activity in 1973 (when water samples were taken from two monitoring wells and a surface seep) indicated a low concentration of Sr-90. In 1975, water samples were taken from two wells and a surface seep and analyzed for Sr-90, Cs-137, and transuranic elements. The results from one well indicated low concentrations of Sr-90 (9.4 dpm/mL) and no indication of Cs-137 or transuranic elements. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

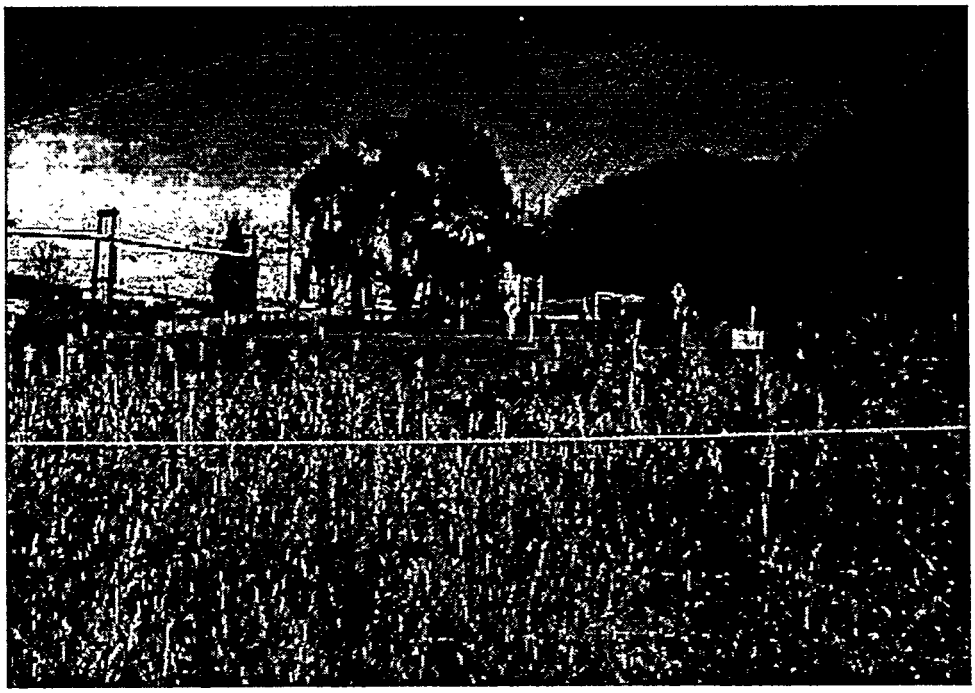
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_30.JPG; 06_31.JPG





UNIT NAME: Stack 3018 (Oak Ridge Graphite Reactor - OGR)

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: Located in the ORNL main plant area of Reactor Drive at the southwest corner of the Fan House Building (3003). ORNL grid coordinates are N 22,740 ft. and E 31,170 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The 200 ft stack is made of concrete, heavily reinforced with steel. The bottom 20 ft of the stack is 12 ft 8 in OD and has a 24 in thick wall. On this base rests a tapered stack which is 10 ft 8 in OD with a 12 in wall at the bottom, tapering to 6 ft 9 in OD with a 6 in thick wall at the top. (ORNL 1990)

Dates Operated: 1943-1963 (operational life of OGR). (Ford and Holder 1992)

Present Function: The OGR is no longer in operation. The reactor is maintained at a negative pressure and the exhaust is vented through the stack. (Ford and Holder 1992) The closure date refers to the date that the OGR was shut down. The stack is still in use as part of the negative pressure containment system for the OGR.

Life Cycle Operation: Used to exhaust air from the OGR to the atmosphere. (Ford and Holder 1992)

Waste Characteristics: The OGR was a natural-uranium fueled reactor. (Burwinkle 1987)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA/SF (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, ORNL/RAP-16, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division. Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

No photo available

UNIT NAME: Underground Exhaust Ducts 3001-3003

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: ORNL grid coordinates are N 22,680 ft and E 31,185 ft. Duct system is mainly north of Building 3001 in the ORNL main complex. (ORNL 1990)

Approximate Dimensions and Capacity: Not Applicable. (ORNL 1990)

Dates Operated: 1943-present. Duct changes were made in 1948 when Filter House was added to the cooling system. (ORNL 1990)

Present Function: The underground concrete duct system transmits the Graphite Reactor cooling air from the reactor (3001) to the Filter House (3002), the Fan House (3003), and then to the stack (3018). (Bechtel et al 1992)

Life Cycle Operation: The exhaust ducts served the Graphite Reactor which was built to produce the first gram-sized quantities of plutonium. Later is was used as a training reactor. Fuel was removed from the reactor in 1966. A large portion of the facility has been altered to allow public access to view the reactor face and ORNL visual displays. (Ford and Holder 1992)

Waste Characteristics: Duct walls are probably contaminated with fission products Cs-137 and Sr-90. Both alpha and beta-gamma contamination has been reported on the duct walls. (Ford and Holder 1992)

Release Data: No reported releases. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Contaminated Site Summary Sheet (CSSS) lists stack no. as 3010. This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

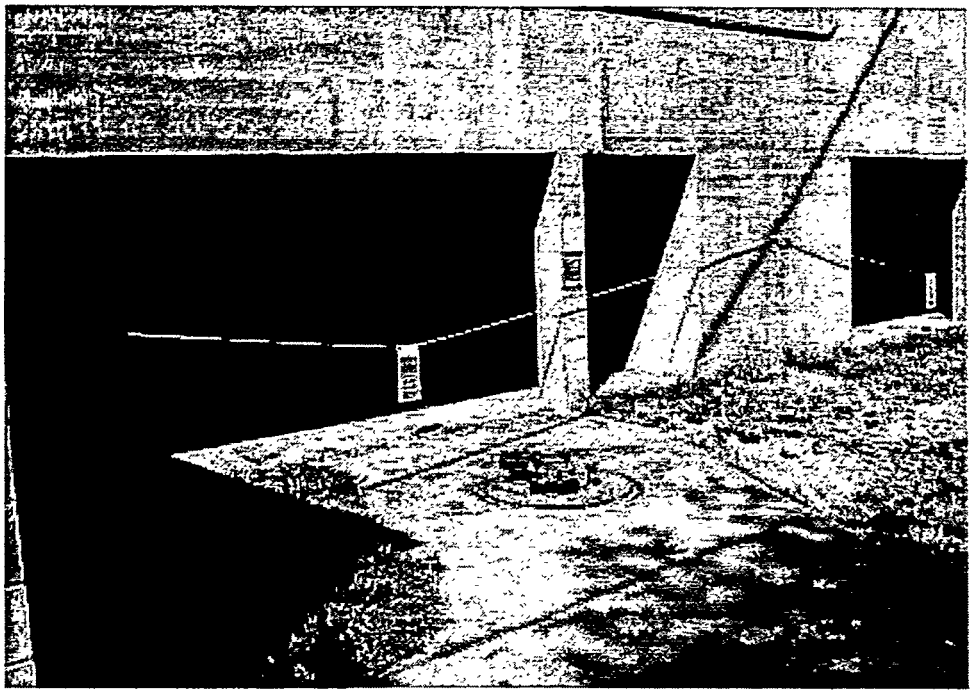
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee. 1992.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_03.JPG; 14_06.JPG





UNIT NAME: WAG 1 Groundwater (Storm Flow)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Main Plant Area. ORNL grid coordinates are N 21,779 ft and E 30,759 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The WAG 1 groundwater activities focus on shallow groundwater that discharges to surface streams within WAG 1.

Dates Operated: Not Applicable.

Present Function: Not Applicable.

Life Cycle Operation: The potential exists for contaminant migration from various sources within WAG 1 through both shallow and deeper groundwater to off-WAG receptors. Having the identification of potential locations for early actions as its objective, this project is entering a period of monitoring and characterization to identify contaminant sources and their migration pathways. (ORNL 1995)

Waste Characteristics: Both radiological and chemical contaminants were identified in groundwater. The primary radionuclides found are strontium and tritium; Ra-226/228, Tc-99, U-234, U-238, Th-228/230/232, Pu-238, Pu-239/240, Am-241, Co-60, Ni-63, Fe-55, and Cs-137 are detected less frequently. There is evidence that Sr-90 is migrating from WAG 1 and seeping into First Creek. The most widespread organic compound detected in groundwater at WAG 1 are TCE and its degradation products 1,2-DCE and vinyl chloride. Metals: Ag, Cd, Cr, Pb, and Hg were detected at concentrations exceeding MCLs. (Bechtel et al 1992)

Release Data: Both point source and non-point sources contribute to groundwater contamination. (Bechtel et al 1992)

Site Status: CERCLA

Media of Concern: Groundwater, Surface Water.

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V2 & D1, Oak Ridge, Tennessee.

Oak Ridge Reservation Federal Facility Agreement Quarterly Report for the Environmental Restoration Program, October 1995, Vol 4 July-Sept 1995, prepared by the Environmental Restoration Division.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: WAG 1 White Oak Creek (WOC) Floodplain Soils and Sediments

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Soils located on the floodplain of WOC and sediments in WOC in the WAG 1 Main Plant Area. The ORNL grid coordinates for the upper WOC are N 18,523 ft and E 28,902 ft. The ORNL grid coordinates for the lower WOC are N 16,619 ft and E 26,360 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This includes the reach of WOC expanding from the eastern boundary of WAG 1 to the 7500 bridge near the intersection of Lagoon Road and Melton Valley Drive.

Dates Operated: 1943 - present

Present Function: Receives surface water discharge and run-off from the ORNL main plant area.

Life Cycle Operation: WOC has historically received surface water discharge and run-off from the ORNL main plant area.

Waste Characteristics: Surface water, sediment and floodplain soil samples indicate that significant amounts of contamination loading to WOC occurs in the vicinity of the WAG 1 impoundments and SWSA 1. Elevated gross alpha activities in floodplain soil of WOC ranged from 57.3 ± 16.9 pCi/g to 166 ± 45 pCi/g. Both naturally occurring and man-made radioisotopes were detected. Elevated levels of gross beta activities in floodplain soils of WOC ranged from 32.9 to 39,400 pCi/g, mostly attributed to the Cs-137 content in the samples. Contaminated sediments were widely detected in WOC. The maximum concentration of Cs-137 detected was 2489 pCi/g, and the maximum concentration of Sr-90 was 67 pCi/g. PAHs and six metals were also detected above reference levels. Mercury was detected in floodplain soils near the Fifth Creek Confluence at concentrations as high as 16,000 µg/Kg. (Bechtel et al 1992)

Release Data: In 1986, areas of gamma radiation were identified in an EG&G aerial radiological survey conducted over the WOC Floodplain area. (Williams et al 1987) Surface drainage and point-source discharges from WAG 1 enters WOC at Fifth Creek or First Creek. In addition, groundwater within WAG 1 discharge to these creeks (Bechtel et al 1992)

Site Status: CERCLA

Media of Concern: Soil, Sediments, Surface Water.

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V2 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Williams, J.K., C. Clark, Jr., J.A. Roberts, and M.S. Uziel, December 1987. *Radiological Investigations at Potential Deer Contamination Sites,* ORNL/RAP-26, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

No photo available

UNIT NAME: Mercury Contaminated Soil (Building 3503)

Unit Number: 01.01

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The contaminated soil is that surrounding Building 3503 on the corner of White Oak Avenue and Southside (main ORNL complex). ORNL grid coordinates are N 21,620 ft and E 31,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known.

Dates Operated: Site was in operation in the period 1950-1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Building 3503 was used in the PUREX spent fuel reprocessing program. (ORNL 1990)

Waste Characteristics: The major contaminant is liquid mercury. (ORNL 1990)

Release Data: During the 1950s and early 1960s, substantial quantities of mercury were used in the spent fuel reprocessing program known as PUREX. No information exists on the amount of possible losses. Analyses of soil samples collected from various locations around Building 3503 ranged from 0.8 to 25 ppm. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

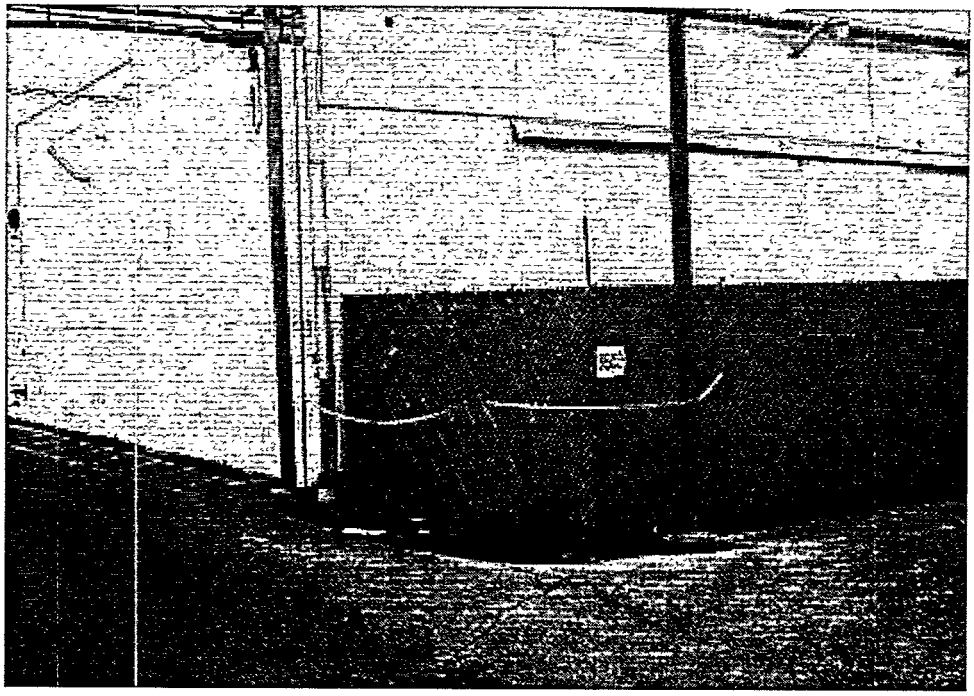
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_13.JPG



UNIT NAME: Mercury Contaminated Soil (Building 3592)

Unit Number: 01.02

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The contaminated soil is that surrounding Building 3592 on the west corner of White Oak Avenue and Fourth Street (main ORNL complex). ORNL grid coordinates are N 21,750 ft and E 31,425 ft. (ORNL 1990)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known.

Dates Operated: Site was in operation in the 1950s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The building around which the soil is located was used in component development activities for a lithium separation process. (ORNL 1990)

Waste Characteristics: Main contaminant is liquid mercury. (ORNL 1990)

Release Data: During 1956, equipment development work in Building 3592 was performed in support of the research activity in Building 4501 on lithium separation. Over a period of ~ two months, more than 60,000 lb of mercury were used. No estimate of the amounts lost through spills is available; however, operating personnel have estimated a total of 2,000 to 3,000 lb were lost due to spills and leaks. The facility is currently being used as a coal conversion pilot plant. Analyses of soil samples taken in 1983 from various locations around Building 3592 showed mercury concentrations ranging from 4.1 to 320 ppm. (ORNL 1990)

Concentrations of mercury detected during the 1991 Site Characterization Summary Report were as high as 548,000 µg/Kg. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

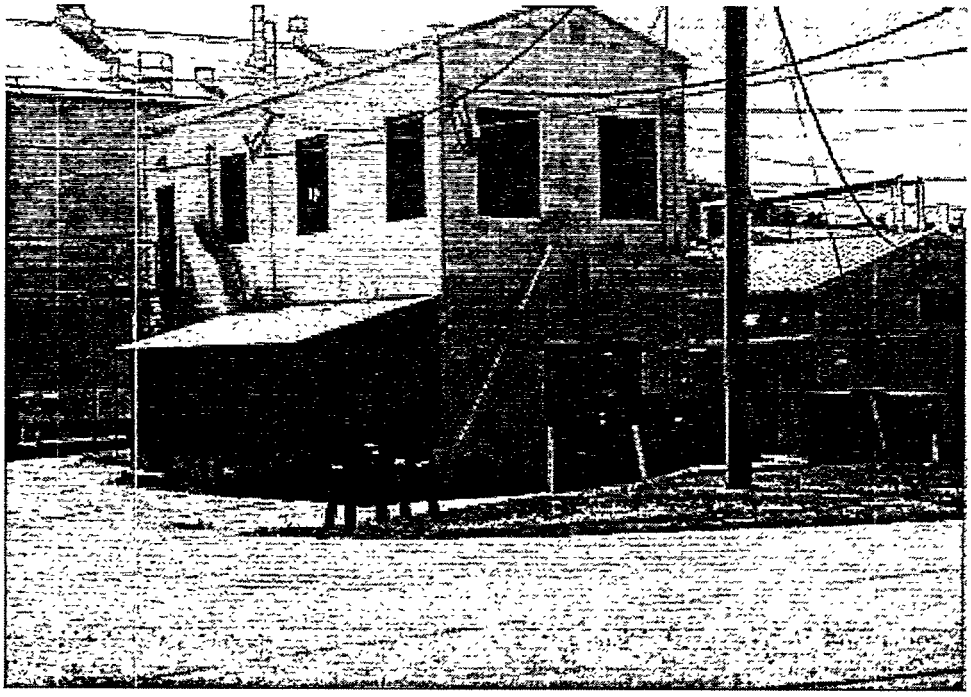
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_34.JPG



UNIT NAME: Mercury Contaminated Soil (Building 4501)

Unit Number: 01.03

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The contaminated soil is that surrounding Building 4501 on the southeast corner of Fifth Street and Central Avenue. ORNL grid coordinates are N 21,980 ft and E 32,090 ft. (ORNL 1990)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known.

Dates Operated: Site was in operation April to November 1954. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The building around which the soil is located was used in a small pilot plant supporting the lithium separation process. Building 4501 is currently used as a high-level radiochemistry laboratory. (ORNL 1990)

Waste Characteristics: Main contaminant is liquid mercury. (ORNL 1990)

Release Data: At Building 4501, ton quantities of mercury were used for ~ six months during 1954 for the operation of a small pilot plant for lithium separation (OREX process). Spills did occur. During a spill the visible mercury was cleaned up, but the concrete floor had cracks, and the mercury was able to escape in this manner. The Analyses of soil samples collected from various locations in 1983 indicated that soils around Building 4501 had concentrations of mercury ranging from 0.05 to 465 ppm. (ORNL 1990)

The mercury concentration detected in soils from this site during the 1991 Site Characterization Summary Report was 12,600 µg/Kg. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: It is suspected that the mercury from this site may have entered Fifth Creek and subsequently been transported to downstream floodplain locations. (Bechtel et al 1992)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

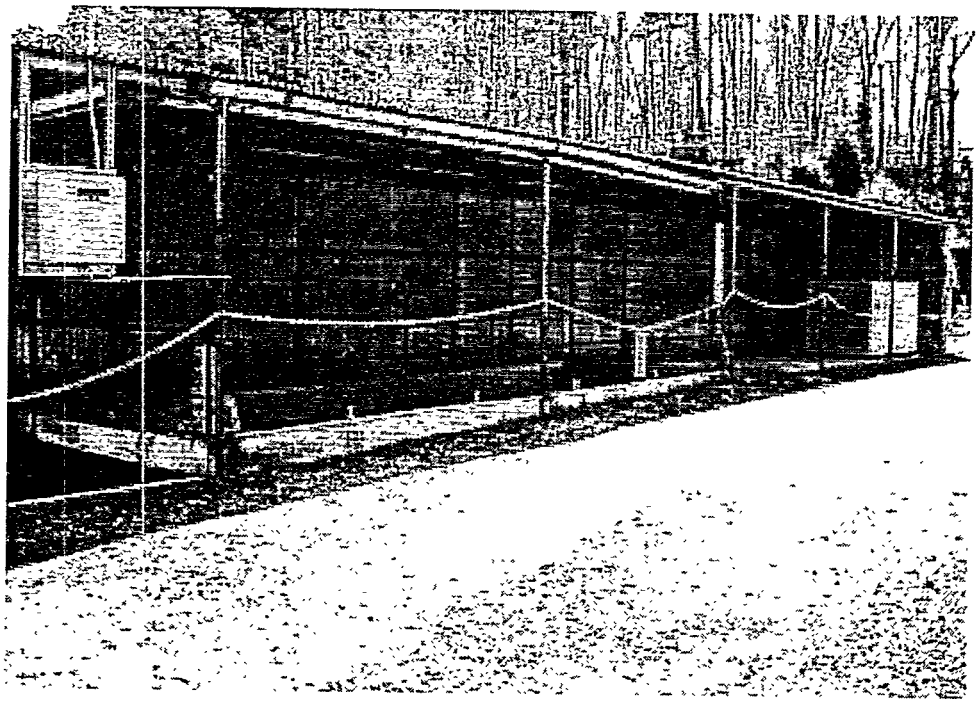
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 18_27.JPG



UNIT NAME: Mercury Contaminated Soil (Building 4508)

Unit Number: 01.04

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: ORNL grid coordinates are N 21,580 ft and E 32,030 ft. (ORNL 1990)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known.

Dates Operated: Data not available.

Present Function: Not in operation.

Life Cycle Operation: General research and development activities. (ORNL 1990)

Waste Characteristics: The contaminant of concern is liquid mercury. (ORNL 1990)

Release Data: Although research activities in Building 4508 are reported to have used inventories of less than 100 lb of mercury, there is no information available to indicate that a mercury spill has occurred. No soil sampling has been conducted around Building 4508. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

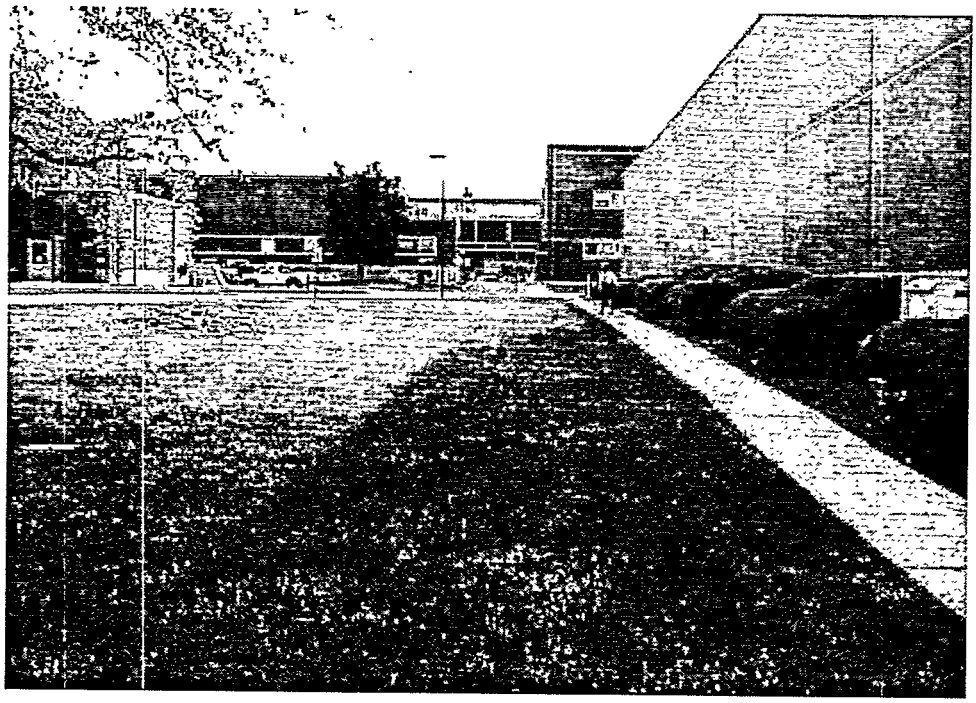
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_14.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - South of Building 3020

Unit Number: 01.05A

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: Site is located due south of Building 3020. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. ORNL grid coordinates are N 22,656 ft and E 31,006 ft. (ORNL 1990)

Dates Operated: Site leak date: mid 1970s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the Laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Leak site contains Pu, Sr, Cs, and other radionuclides; concentrations are unknown. The line served Building 3108, and leaks occurred at the vent stack and the valve pit areas. The initial leak occurred in the mid 1970s when a sight glass in the header froze and broke. Later a restriction downline caused a backup to occur with overflow at both locations. Leakage from this site, and from overflows that have occurred, have also contaminated the storm drainage system north of Building 3074 from east to west. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - East of the Building 3020 Stack

Unit Number: 01.05B

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located east of the Building 3020 Stack. ORNL grid coordinates are N 22,675 ft and E 31,034 ft. (ORNL 1990)

Approximate Dimensions and Capacity: SWMU 1.5B is a leak/spill site. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: ~ 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The leak is believed to have occurred some 30 years ago, possibly from exhaust-gas duct leakage. A 1970 contamination survey of the area showed 20 Mr/h on the soil surface. Data on the composition of the contaminants are not given. Most of the contamination is in the soil and concrete pad. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - West of Building 3082

Unit Number: 01.05C

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located west of Building 3082. ORNL grid coordinates are N 22,698 ft and E 31,003 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: ~ 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: Wastes handled in the collection system were routinely-generated laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams from certain sources.

The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Release Data: This leak was thought to have occurred over 25 years ago. Readings in the area were 1 - 2 mR/h in surveys during the 1970s. The contamination was most probably caused by off-gas duct leakage or an liquid radioactive waste line leak; however, no documentation is known to exist regarding the source. This site is also close to the location of an old plutonium facility that was housed in a wooden frame building. The building was destroyed early in the history of ORNL and is not listed on current maps. The area of contamination may or may not be affected by the past presence of this building. Data on contaminant composition are not available. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - North of Building 3019

Unit Number: 01.05D

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located north of Building 3019 (West of the Building 3074/3019 gate). ORNL grid coordinates are N 22,588 ft and E 30,901 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak discovered: February 1985. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: A low-level waste line leak occurred in a concrete encased vitrified clay (Chemware) line that served the manipulator shop upstream and the Building 3020 stack; the line/header had deteriorated over time. There is no real estimate of the period of leakage; however, the leak was discovered in February 1985 after Sr-90 was found in the sewer system at higher than normal levels. The leak occurred at the "T" in the line. Upon excavation, a cavern was found in the area. Excavation was provided for access to the leak; no attempt was made to remove all the contaminated soil in the area. The contaminated earth removed was disposed of, and the excavation was backfilled with clean earth after the north and south lines into the T were capped. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

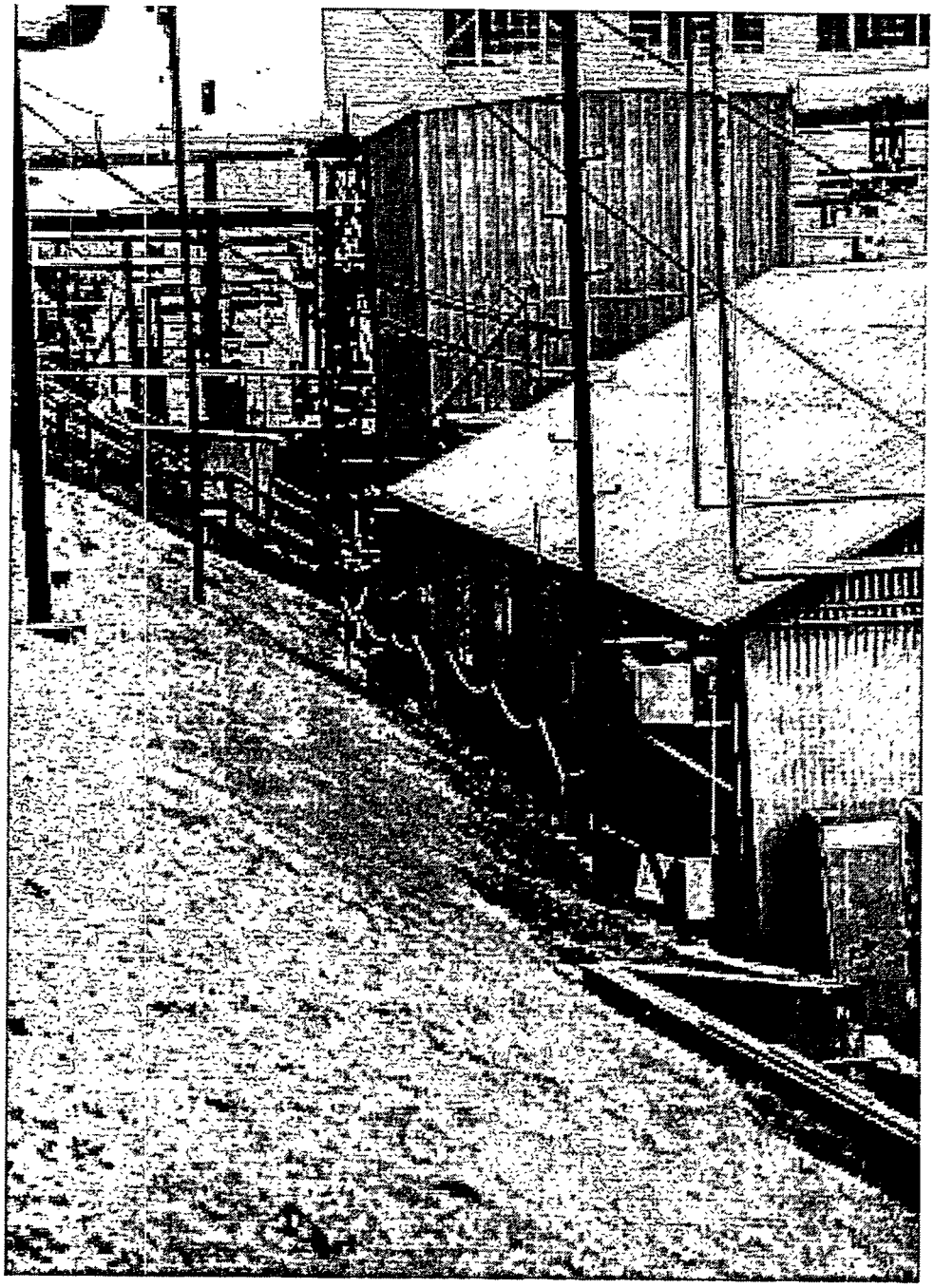
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory,* DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_09.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - SW Corner of Building 3019

Unit Number: 01.05E

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located at the southwest corner of Building 3019. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. ORNL grid coordinates are N 22,468 ft and E 30,713 ft. (ORNL 1990)

Dates Operated: Site leak date: 1970s (last occurring in 1978). (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: This leak is located in the liquid radioactive waste line draining the analytical cells in Building 3019B. After the last occurrence in 1978, the leak was corrected; soil was removed during the corrective action only to make repairs. Samples of the soil removed had radiation levels of 100 mR/h. The line was known to contain Sr-90, Co-60, mixed fission products, and alpha emitters. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

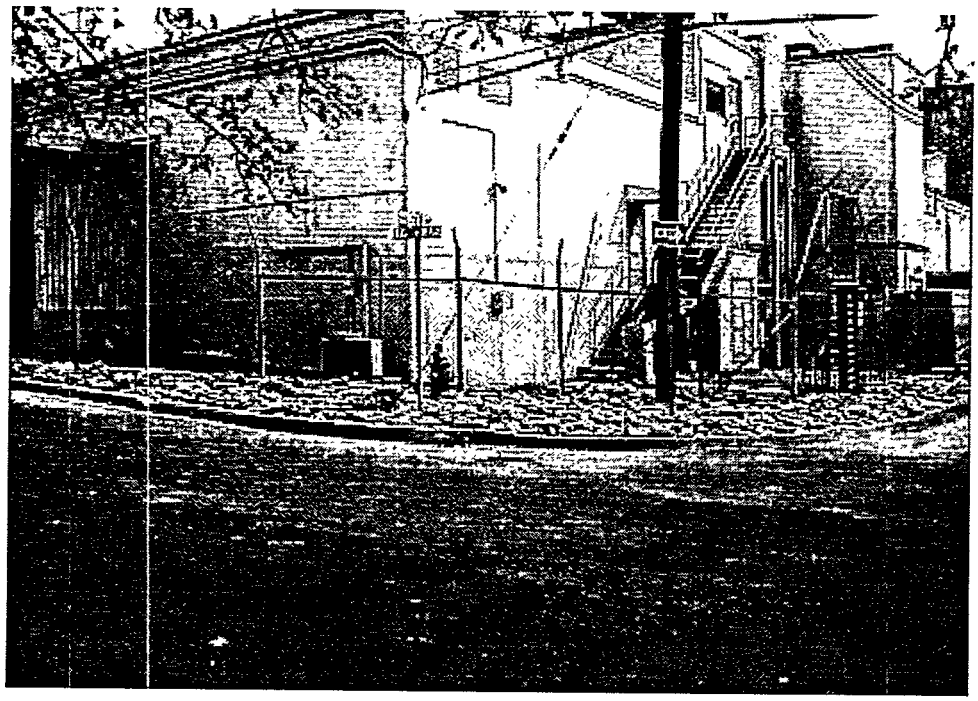
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_10.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Between W-5 and WC-19

Unit Number: 01.05F

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The site is between W-5 and WC-19, 30 ft (9 m) east of the northeast corner of Building 3025 and 45 ft (14 m) from the south edge of the Hillside area. ORNL grid coordinates are N 22,391 ft and E 31,3198 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: October 16, 1972. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Radiation readings of 700 mR/h were noted at the steam leak area (in earth around leak), and readings of 20 to 600 mR/h were found in mud in a half-round drain tile extending eastward to a storm sewer catch basin, in the general area of the leak. (ORNL 1990) The area was contaminated with Cd-115, Ce-141, Ba-140, and Nb-95. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) The FFA, Appendix C, lists this site as occurring between W-5 and WC-19, however, the Grimsby document says between WC-5 and WC-19. (Grimsby 1986)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Grimsby, H.J., January 1986. *Identification of Low-Level Waste Line Leak Site at Oak Ridge National Laboratory,* Letter Report RAP86-8, Internal Distribution Only, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Underneath Building 3047

Unit Number: 01.05G

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The site is the area underneath Building 3047. ORNL grid coordinates are N 22,342 ft and E 31,672 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: undetermined. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Underground soil contamination is suspected due to the history of Building 3047 operations. Few documented cases of releases (leaks) were found in Laboratory records; however, intralaboratory correspondence documents the presence of contamination in this area. The main contaminant is Sr-90. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 15_14.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - General Isotopes Area (3037, 3038, 3034)

Unit Number: 01.05H

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The General Isotopes Area is located around Buildings 3034, 3037, and 3038. ORNL grid coordinates are N 22,162 ft and E 31,573 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: 1950s and 1960s (multiple events). (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: Wastes handled in the collection system were routinely-generated Laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams from certain sources.

The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Release Data: This general area is contaminated with Cs-137, Co-60, Ru-106, Sr-90, and possibly mercury. The amount of radioactivity discharged into the process waste system from this source has been listed as 4.3 Ci. Some mention of Pm-147 and Ce leakage has also been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

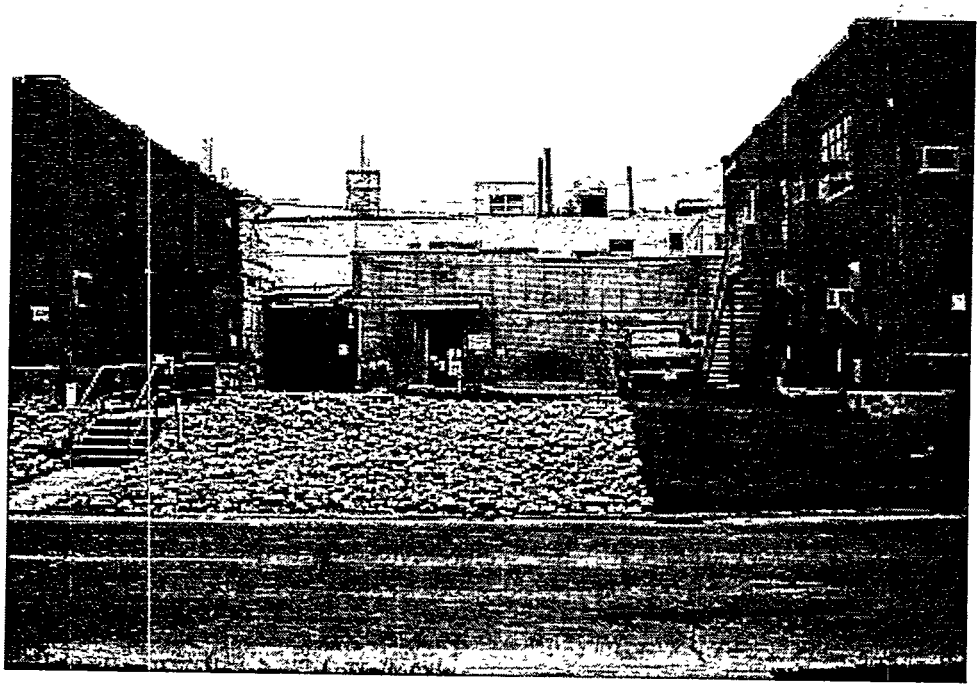
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_16.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 3092 Area

Unit Number: 01.05I

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: Site is located around Building 3092. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. ORNL grid coordinates are N 22,183 ft and E 31,426 ft. (ORNL 1990)

Dates Operated: Site leak date: unknown. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: This site was included in a tabulation of contaminated areas dated January 31, 1972. The writeup stated that a spill occurred onto grass alongside of Building 3092. The grass and soil were dug up and replaced with clean dirt. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

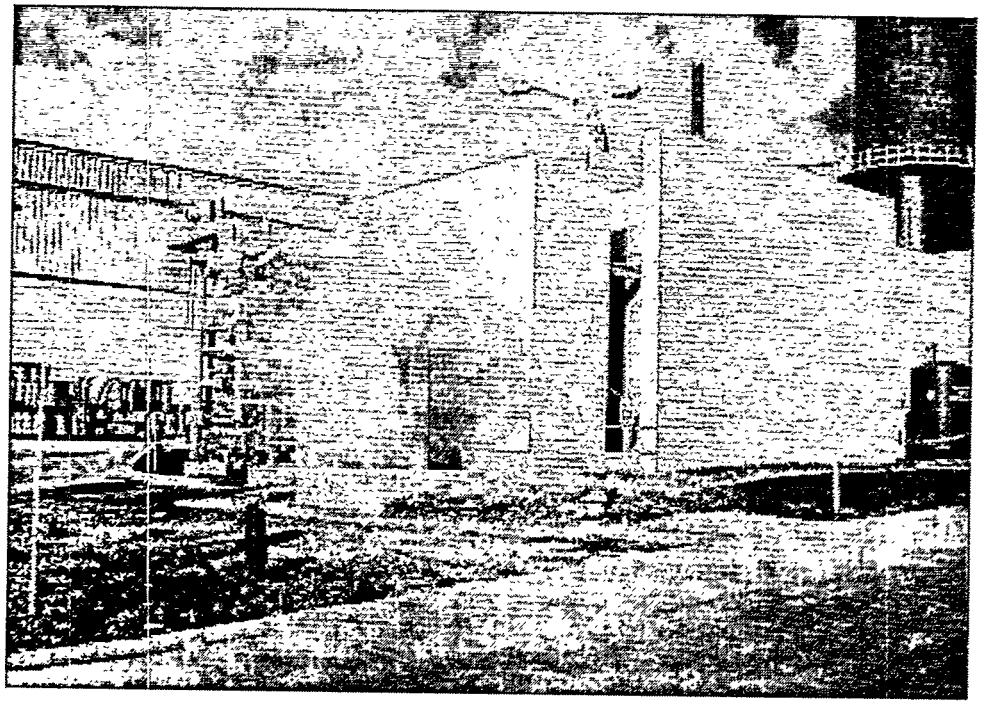
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

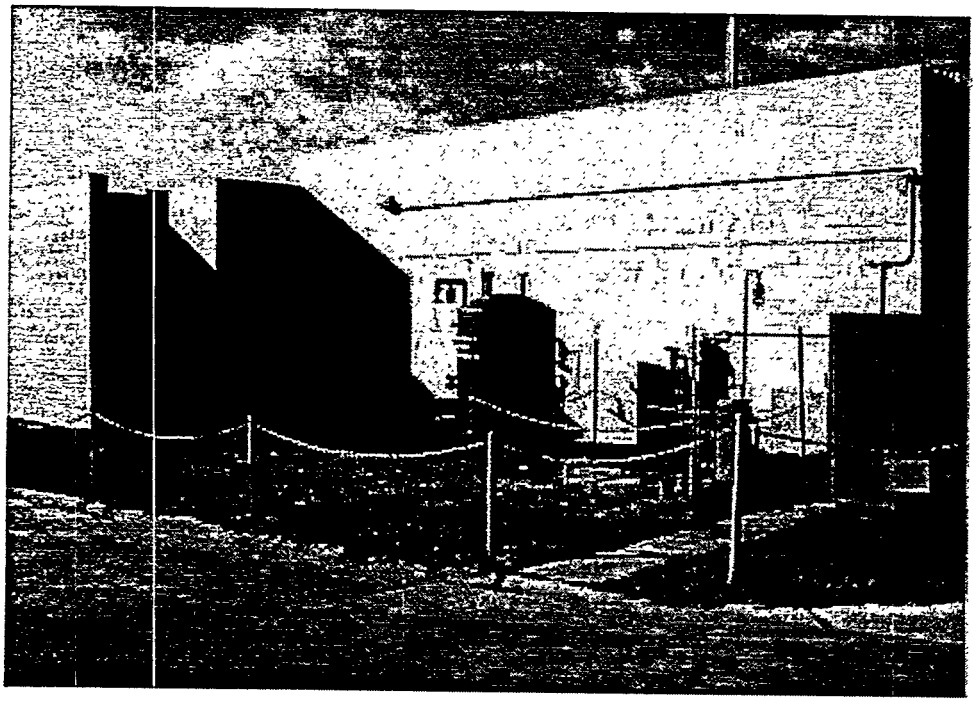
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_19.JPG; 12_20.JPG





UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Underneath Building 3026

Unit Number: 01.05J

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The site is located beneath and around Building 3026. ORNL grid coordinates are N 22,184 ft and E 31,236 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: 1950s and 1960s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Because of its long use, Building 3026 area contamination may include isotopes of uranium, fission products, and transuranics. Numerous leaks have been reported during that time interval. Few quantitative data were found; however, the site is suspected to have contamination based on references from Operations Division reports.

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

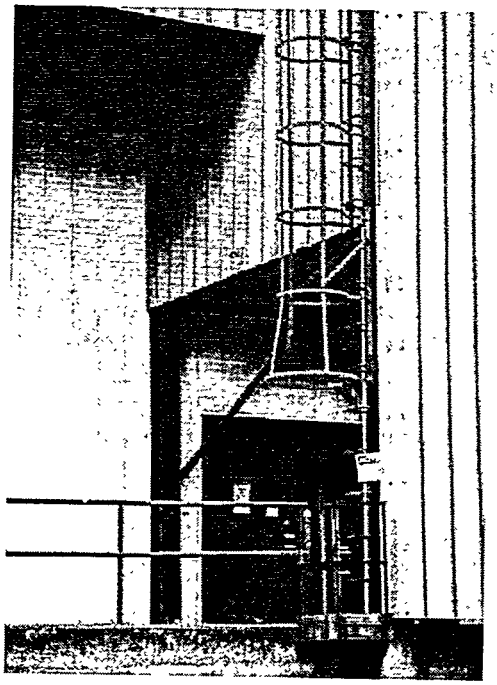
References:

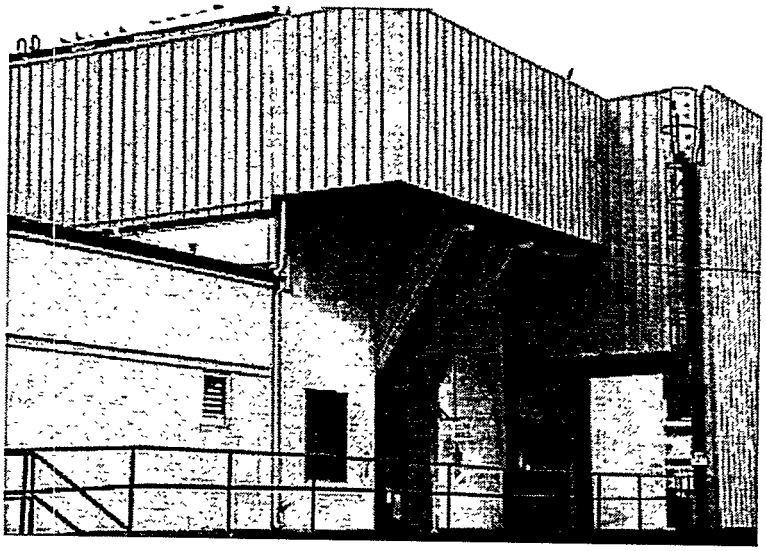
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_16.JPG; 28_19.JPG





UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Between WC-1 and W-5

Unit Number: 01.05K

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located in the Building 3024 area, between WC-1 and W-5. ORNL grid coordinates are N 22,127 ft and E 31,625 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: 1953 - 1979. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. (ORNL 1990)

The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents. (ORNL 1990)

Release Data: A break in the transfer line between waste tanks WC-1 and W-5 was reported January 31, 1977 and keyed to engineering drawing A-90015-0-0063-F. Excerpts from Operations Division Reports indicated leaks from various tanks have occurred in this area. The FFA, Appendix C, lists this as between WC-1 and WC-5, but the original source indicates the leak is between WC-1 and W-5. (Grimsby 1986)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation and will be remediated in accordance with the FFA. (Bechtel et al 1992)

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Grimsby, H.J., January 1986. *Identification of Low-Level Waste Line Leak Site at Oak Ridge National Laboratory.* Letter Report RAP86-8, Internal distribution only, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_13.JPG; 18_01.JPG; 18_02.JPG




WC-1

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - ORR Water Line (Building 3085)

Unit Number: 01.05L

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site included several leaks located in the 24-in (61-cm) primary water line of ORR (Building 3085), located away from the building itself. ORNL grid coordinates are N 22,857 ft and E. 31,6723 ft (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; additions and modifications are of stainless steel. The amount of waste leaked or spilled is not known.The leak was in the Oak Ridge Research Reactor (ORR) 24-in. (61-cm) waterline. (ORNL 1990)

Dates Operated: Site leak date: 1975. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The waterline transports cooling water from the ORR to its heat exchangers. (ORNL 1990)

Waste Characteristics: Water is the primary coolant for the ORR and contains activation products. The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Radiation levels were encountered to 2 R/h, and transferable contamination, which resulted from the leaks, was found up to 100 mR/h. The contamination was primarily Cd-115 with traces of Na-24, Sc-45, Cr-51, Zr-95, Cs-137, and Cs-141. All contaminated soil was transferred to SWSA 6. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Excavation and repair of the site extended from #1 pump cell to ~80 ft (24 m) north of Building 3085 to the "Y" pit. (ORNL 1990) Following repair of the leaks, a 6-in. (15-cm) concrete wall was poured on each side of the pipe and covered with 3/8-in. (0.5-cm) aluminum treadplate. (ORNL 1990)

Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

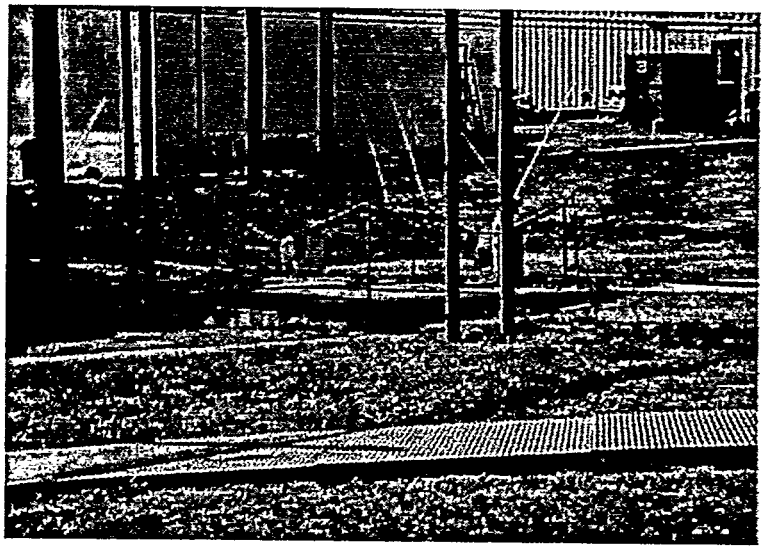
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_01.JPG; 12_06.JPG





UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 3028

Unit Number: 01.05M

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: Leak site is probably in an liquid radioactive waste line serving Building 3028 and Building 3047. ORNL grid coordinates are N 22,350 ft and E 31,511 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Leak reported: March 1985. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: This leak was discovered in the liquid radioactive waste line leading from Building 3028 during excavation for the construction of condensate traps in the liquid radioactive waste lines serving Buildings 3028 and 3047. After uncovering the 6-in.-diam stainless steel pipe, radiation levels of over 200 R/h were measured in contaminated soil at the contact with the pipe. Analysis of the contaminated soil revealed the presence of certain short-lived isotopes that could only have originated from the gadolinium process in Building 3047. The leaking section of pipe was abandoned and new lines installed to bypass the contaminated area. Contaminated soil from the excavation was removed, and the hole was backfilled with clean soil. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

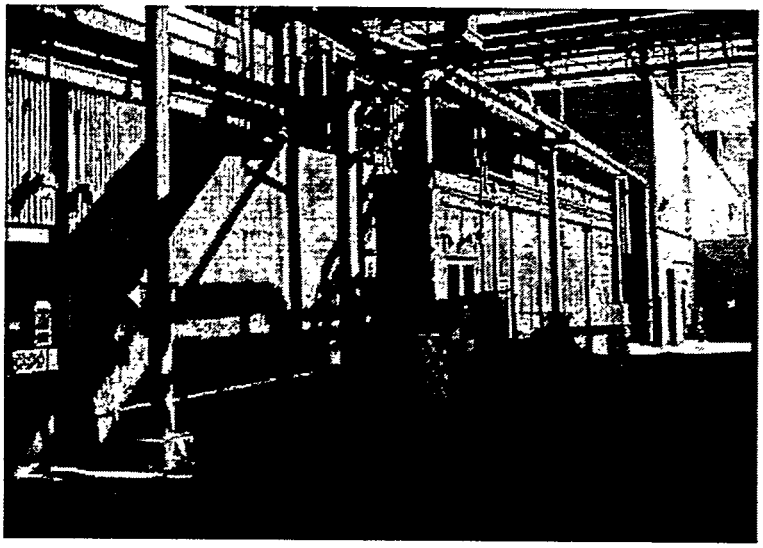
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_21.JPG; 12_22.JPG





UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - East of Building 2531

Unit Number: 01.05N

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The site is found east of Building 2531 in the area south of Central Avenue in the ORNL main complex. ORNL grid coordinates are N 21,876 ft and E 30,712 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: December 1971 and April 1978. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The abandoned 2-in. (5-cm) cast-iron waste transfer line was broken by a communications construction group during trenching operations. The line was repaired with an Adam's clamp. Another leak was the result of an underground crossover that developed between the process waste line and a storm sewer. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

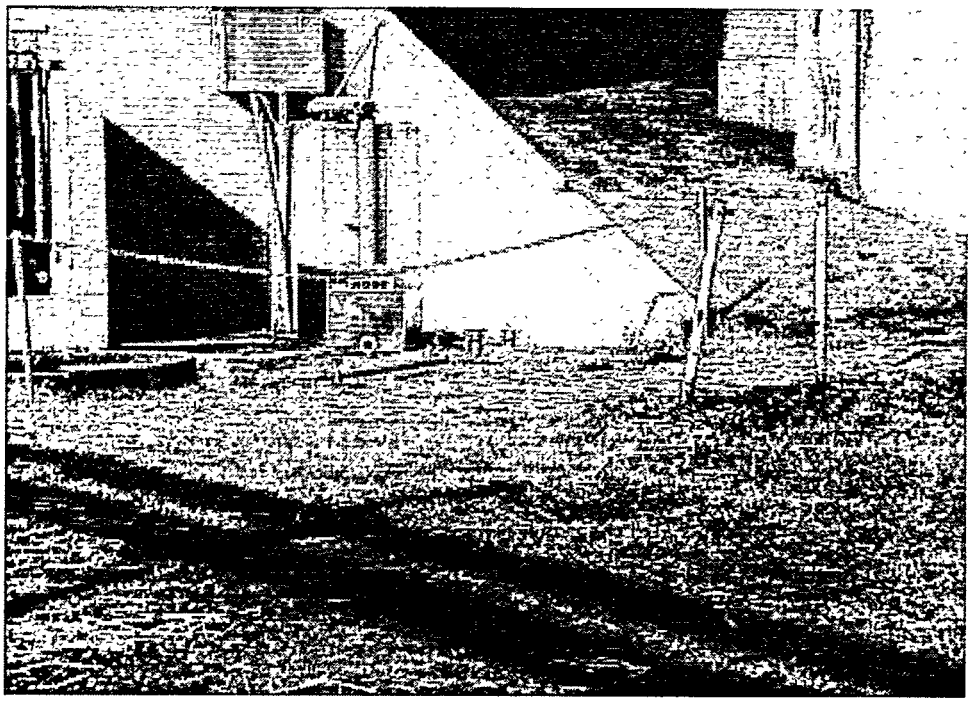
References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_32.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Underneath Building 3515

Unit Number: 01.05O

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located underneath Building 3515 south of Central Avenue in the ORNL main complex. ORNL grid coordinates are N 21,902 ft and E 31,068 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date site contaminated: August 1951. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: No information available; however, the current radionuclide inventory for Building 3515 is believed to be in the range of 10 to 100 Ci. (Bechtel et al 1992)

Release Data: A pipe trench, which was dug at the southeast corner of the South Tank Farm, became highly contaminated when a weld in a process tank jacket failed in Building 3515; the water from the jacket was piped to the storm sewer located in this area. This area has been cleaned up by removing the contaminated soil. (ORNL 1990). The area under Building 3515 is contaminated as a result of past use as a radioactive chemical processing plant. Radioactive material leaking into the condensate line was carried to the concrete drain pipe leading to White Oak Creek. A leaking joint in the concrete pipe ~ 100 ft (30 m) south of Building 3515 resulted in spreading contamination to a ditch and surrounding area. The contaminated earth in and near the ditch was removed. Cell floor and pan drains were diverted to W-12 hot waste storage. The concrete gallery floor was decontaminated by chipping. The entire floor was painted before operation was resumed. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

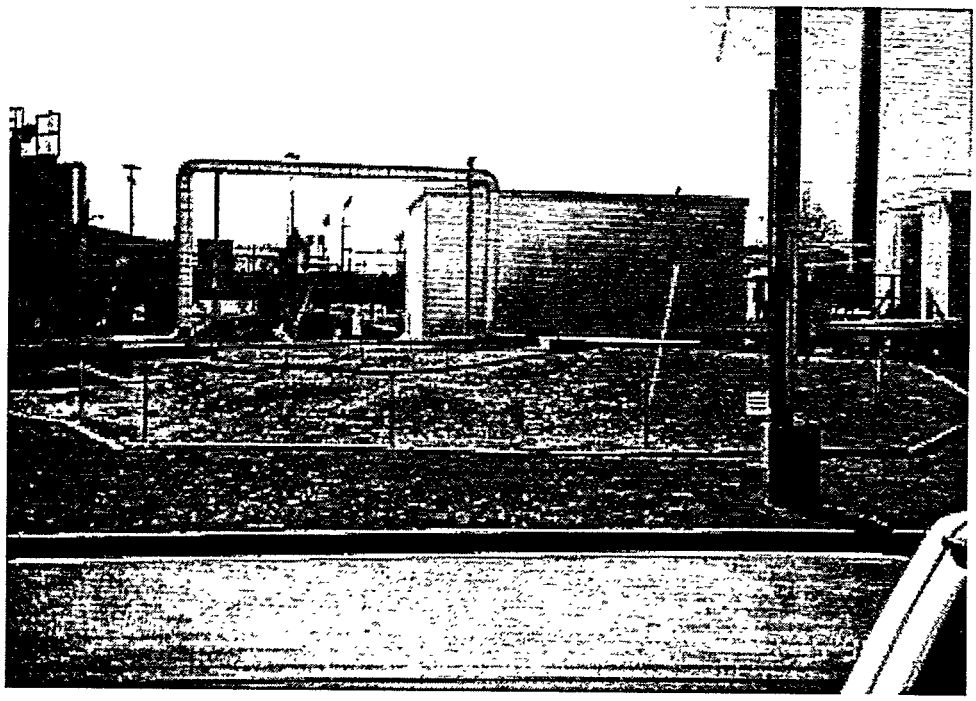
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_15.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 3525 to a Sump

Unit Number: 01.05P

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: Contamination at the site is a sump in the area of Building 3525 south of Central Avenue in the ORNL main complex. ORNL grid coordinates are N 22,058 ft and E 31,142 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: prior to January 1972. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: In this approximate area, severe contamination may be found resulting from leaking liquid radioactive waste lines discharging water into a ventilation duct, which in turn feeds a sump located at this point. (ORNL 1990) The 1992 remedial investigation indicated: This area exhibited exposure rates ranging from ~ 50 to 1000 μR/h; however, this area did not exhibit elevated radiation field measurements. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

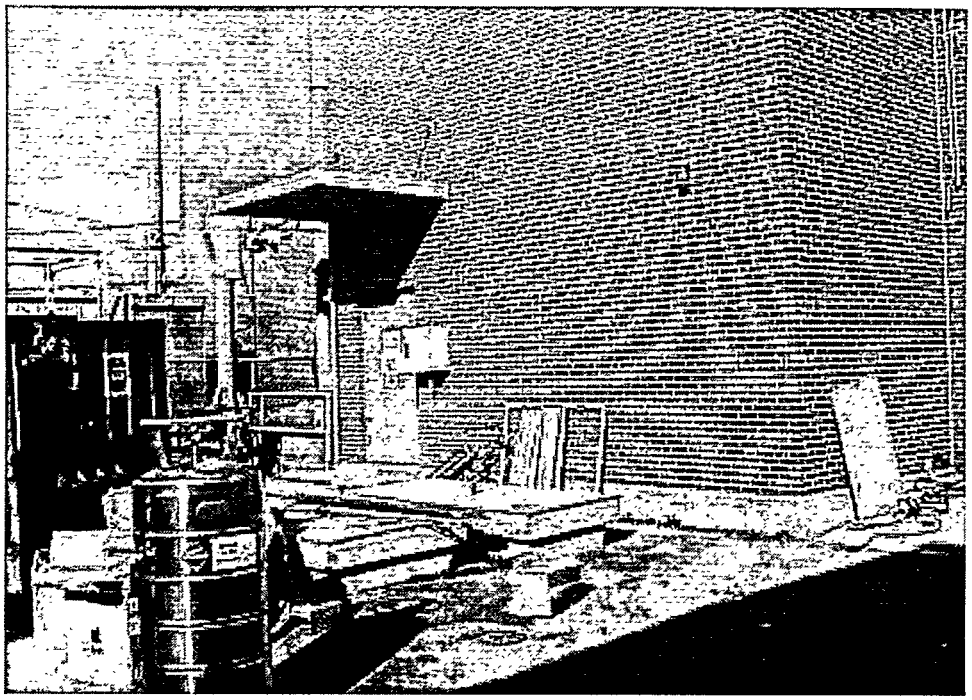
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13,1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_23.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Underneath Building 3550

Unit Number: 01.05Q

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is designated as the area around and underneath Building 3550 south of Central Avenue in the ORNL main complex. ORNL grid coordinates are N 21,898 ft and E 31,288 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date leak: Prior to January 1972. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Ground beneath the former semi-works ports of Building 3550 may be contaminated. Part of this building was demolished, and all material from the building was removed for disposal. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_36.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Sewer Near Building 3500

Unit Number: 01.05R

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is south of Central Avenue in the ORNL main complex. It is the 3500 Block area of the sanitary sewer system. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. ORNL grid coordinates are N 22,042 ft and E 31,506 ft. (ORNL 1990)

Dates Operated: Site contamination date: 1958-1980. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Contamination of the 3500 Block area of the sanitary sewer system has resulted from inleakage of various liquid radioactive waste sources, such as Building 3026 and other radioisotope areas. The leaks were active solutions of radioisotopes; composition data are not available. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Abandoned Line Central Avenue Area

Unit Number: 01.05S

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located near Building 3026 and north of Central Avenue in the ORNL main complex. ORNL grid coordinates are N 22,121 ft and E 31,281 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date site indicated as contaminated: January 31, 1972. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. Wastes handled in the collection system were routinely-generated laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams from certain sources. (ORNL 1990)

Release Data: The activity in the storm sewer discharge seeped into an abandoned section of clay pipe from contaminated soil. The activity in the sanitary sewer came mainly from inleakage under Central Avenue in front of Building 3026, although some traces of activity have also been found in the sewer running east to west on the north side of Building 4508. The leak into the sewer in front of Building 3026 was undoubtedly from earth contaminated by an old line that leaked and was taken out of service years ago. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

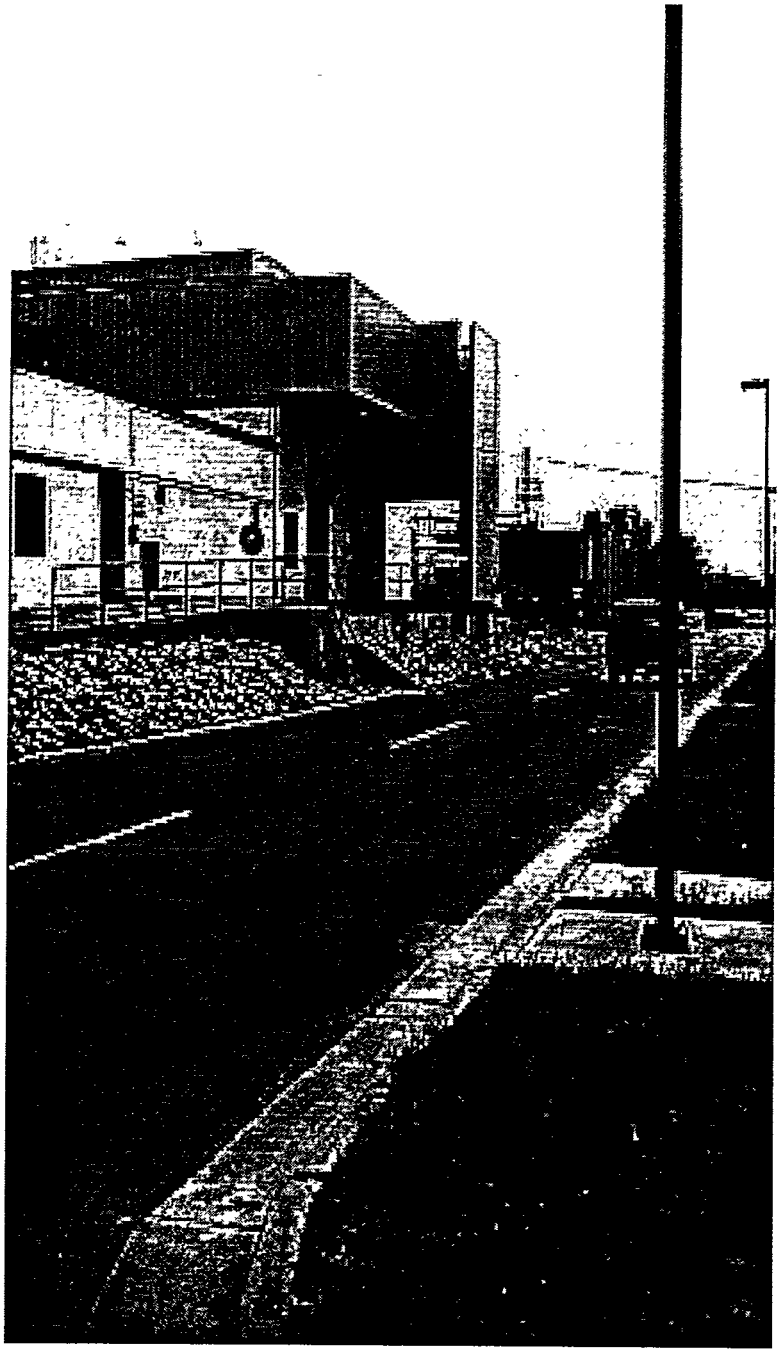
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_01.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 4508, North

Unit Number: 01.05T

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located just north of Building 4508 in the area south of Central Avenue in the ORNL main complex. ORNL grid coordinates are N 21,734 ft and E 31,930 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date site indicated as contaminated: January 31, 1972. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The ground north of Building 4508 was contaminated by Sr-90. An unsuccessful attempt was made in 1970 to determine the source of this contamination. This area has since been paved. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) In May of 1990 an area around an oak tree just north of Building 4508 was discovered to have contaminated leaves. The area around the tree is now roped off as a contaminated zone. This contamination may have come from this leak site. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

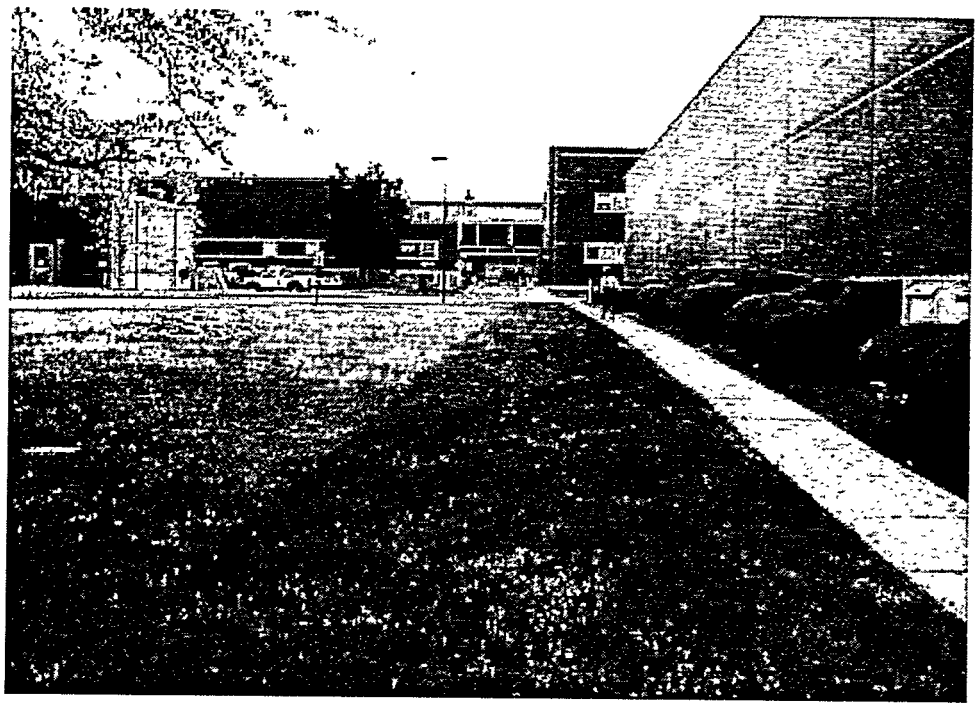
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_14.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 3518, West

Unit Number: 01.05U

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The site is north of Building 3544 and Building 3518, west of the Equalization Basin (3524), and south of White Oak Avenue. ORNL grid coordinates are N 21,504 ft and E 30,727 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date leak discovered: 1978. (ORNL 1990)

Present Function: The Process Waste Treatment Plant treats the very low-level liquid wastes that are termed process waste (normally does not contain radioactivity but could be contaminated as the result of equipment failure or human error). (ORNL 1990)

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The material was a concentrated strip solution from the Process Waste Treatment Plant (PWTP) that was contaminated with low-level amounts of Sr-90 and Cs-137. The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The spill of less than 100 gal (378 L) required the removal of ~ 6 cubic yards of contaminated dirt. The line was punctured by an air hammer bit during the installation of a waste transfer line from Building 1504. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

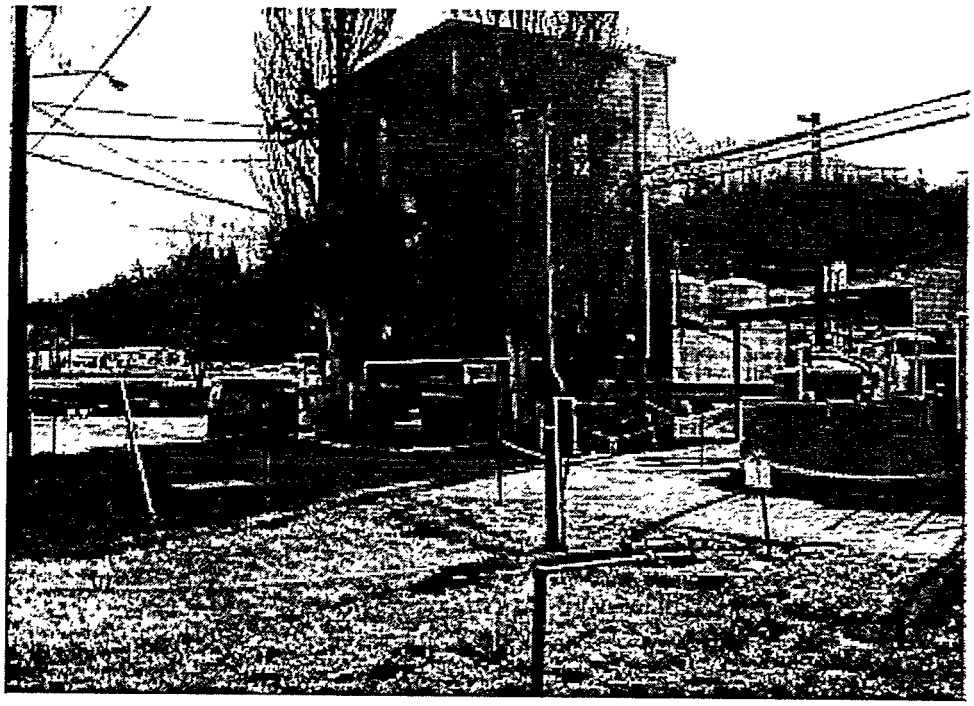
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_30.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - NW of Solid Waste Storage Area (SWSA) 1

Unit Number: 01.05V

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located just northwest of SWSA 1. ORNL grid coordinates are N 21,118 ft and E 30,346 ft. (ORNL 1990)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date site indicated as contaminated: January 31, 1972. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The low-level liquid waste (liquid radioactive waste) system at ORNL was designed to collect radioactive waste solutions from the various sources at the Laboratory. Virtually all of the buildings within the Laboratory that were involved in radionuclide operations were served by this system. (ORNL 1990)

Waste Characteristics: Wastes handled in the collection system were routinely-generated Laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams from certain sources. (ORNL 1990)

The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Release Data: A break that occurred in the liquid radioactive waste transfer line northwest of SWSA 1 allowed leakage into White Oak Creek. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

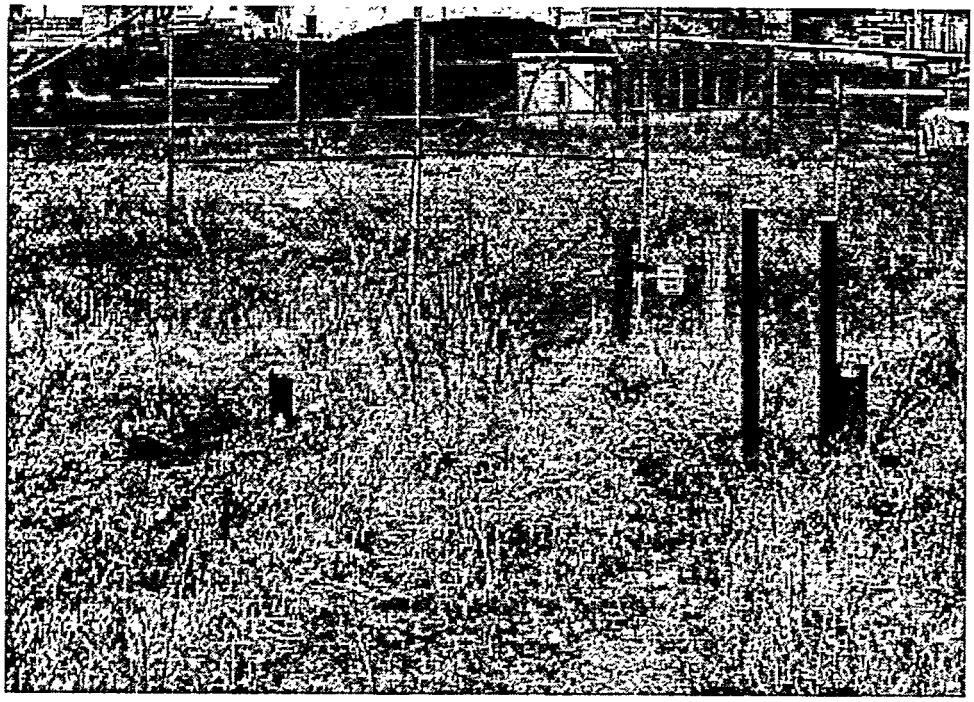
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_06.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 3503, Ground Contamination

Unit Number: 01.05W

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The site is located at the Solvent Column Pilot Plant, Building 3503, south of White Oak Avenue in the ORNL main complex. ORNL grid coordinates are N 21,622 ft and E 31,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Date site contaminated: 1954. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Main Plant Area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Much of the activity was the result of a series of operating accidents at the Solvent Column Pilot Plant (Building 3503). One of the accidents was the leaking of a discharge line from a waste tank. The other was a spill at the thorium waste tank that overflowed and contaminated the surrounding ground and groundwater. The groundwater surrounding these tanks is pumped to the equalization basin. (ORNL 1990) Soil samples collected in the vicinity of Buildings 3503 and 3592 for the 1990-91 radiological survey indicated gross alpha activities up to 2839 ± 639 pCi/g. Isotopes contributing to the high alpha were identified as U-238 and U-234. Gross beta activities were as high as 2260 ± 342 pCi/g, mostly from Ce-137 and Sr-90. (Grimsby 1986)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines, others are along the lines themselves, and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

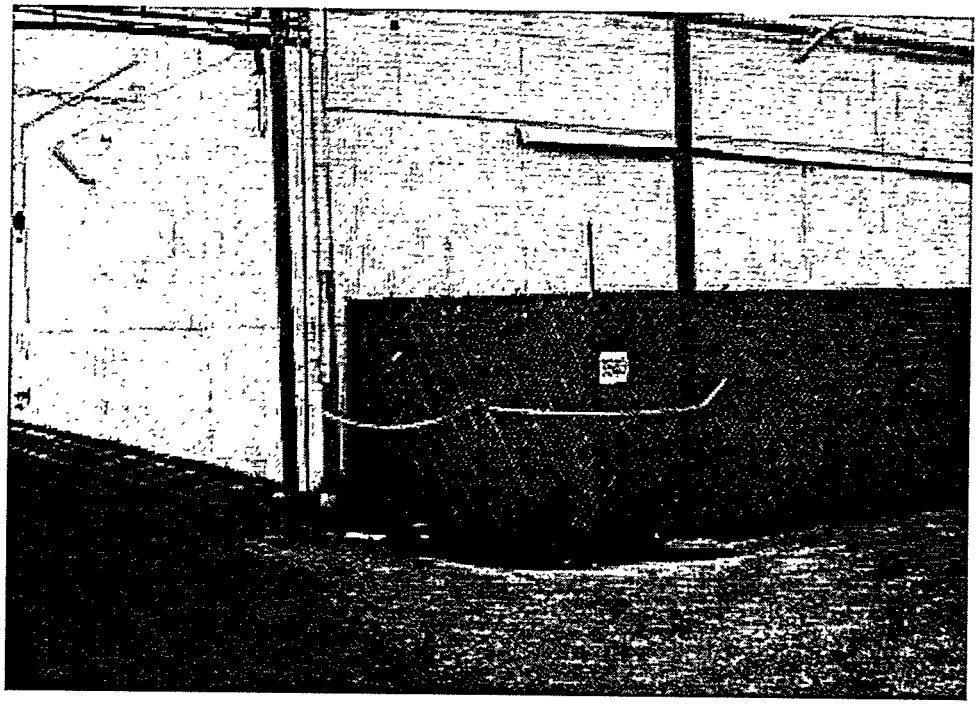
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Grimsby, H.J., January 1986. *Identification of Low-Level Waste Line Leak Site at Oak Ridge National Laboratory,* Letter Report RAP86-8, Internal Distribution Only, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_13.JPG



UNIT NAME: Graphite Reactor Storage Canal Overflow (3001/3019)

Unit Number: 01.08

Project Status: Remedial Investigation completed. (Bechtel et al 1992) RCRA closure for sediments - final closure deferred to CERCLA. (Kaiser 1996)

Unit Location: The canal runs under Buildings 3001 and 3019 on Hillside Avenue. The approximate ORNL coordinates are N 22,530 ft and E 31,100 ft. (ORNL 1990) The exact location of the overflow is not known. (Kuhaida 1996)

Approximate Dimensions and Capacity: The canal is 7.0 ft (2.1 m) wide, 11.5 ft (3.5 m) deep, and 101.0 ft (31.0 m) long. (ORNL 1990) The canal is covered with a concrete lid and soil. The capacity of the canal is 62,000 gallons. (Bechtel et al 1992). The dimensions for the overflow are unknown. (Kuhaida 1996)

Dates Operated: Site commissioned: 1943. Taken out of service: 1990). (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The Oak Ridge Graphite Reactor fuel storage canal connected the fuel discharge pit to the adjoining chemical-processing building (3019). (ORNL 1990) It was used for underwater transfer of spent fuel from the reactor to Building 3001. The canal was in operation from 1943 to 1963 when the reactor was shut down. The canal was then used for storage of radioisotopes until 1990, when a leak was discovered and removal of the stored material was initiated. (Bechtel et al 1992). Removal of the RCRA - contamination sludges in the canal began in 1992 in accordance with an approved RCRA closure plan. (Bechtel et al 1992, Kaiser 1996)

Waste Characteristics: Stored isotopes include Co-60 and Sr-90. The canal also contains ~ 1 m(E+3) of contaminated sludge containing Pu-239 (primarily), Pu-238, Am-241, and Cm-244. (ORNL 1990)

Release Data: The canal has bare concrete walls that have absorbed long-lived fission products and Co-60, and probably TRU. Results of radiation surveys were reported in 1984. One ORNL engineering drawing contains the notation "overflow"; however, no documentation of this event can be found; as a result, the exact nature of the overflow or extent of contamination, if any, is not known. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: It is suspected that the canal overflow is the leak that occurred in the canal itself and not a separate SWMU. (Kuhaida 1996)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

A RCRA Final Closure Plan for the 3001 Storage Canal was issued in 1990 (revised March 1992). A subsequent Engineering Evaluation/Cost Analysis for Building 3001 was issued September 1996, and an Action Memorandum for Building 3001 Canal was issued November 1996. (ORNL 1996)

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Kaiser, Linda, November 1996. ORNL Program Planning Manager, personal communication with Anita Parker, Advanced Sciences, Inc. Kuhaida, Jerry, December 2, 1996. LMES Project Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

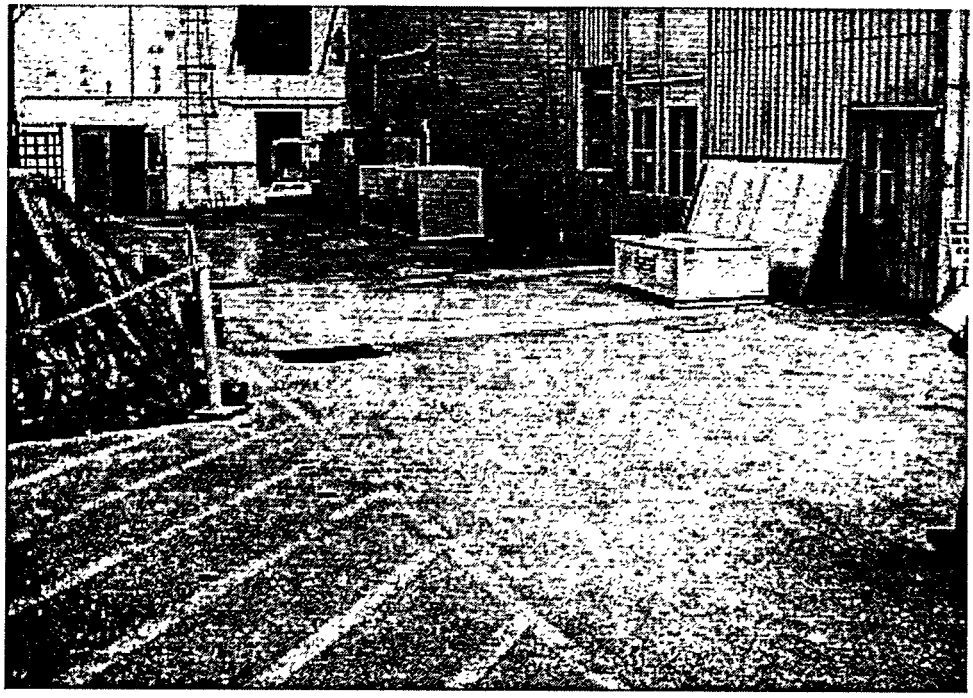
Oak Ridge National Laboratory, September 1996. *Engineering Evaluation/Cost Analysis for Building 3001 Canal, Oak Ridge National Laboratory*, DOE/OR/02-1502 & D2, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1996. *Action Memorandum for Building 3001 Canal, Oak Ridge National Laboratory*, DOE/OR/02-1533 & D2, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1996. *RCRA Final Closure Plan for 3001 Storage Canal*, ORNL/TM-11684, Rev. 2, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_06.JPG



UNIT NAME: Decommissioned Waste Holding Basin (3512)

Unit Number: 01.11

Project Status: Remedial Investigation Completed. (Bechtel et al 1992)

Unit Location: This site is the location of the present parking lot for Building 3544. ORNL grid coordinates are N 21,370 ft and E 30,780 ft. (ORNL 1990)

Approximate Dimensions and Capacity: 3512 was an earthen-diked pond ~ 40 x 40 ft (12 x 12 m), with a holding capacity of 30,000 gal (113,000 L). (Bechtel et al 1992)

Dates Operated: Site commissioned: early 1940s. Site taken out of service: 1957. (Bechtel et al 1992)

Present Function: The site is presently the parking lot for Building 3544. (Bechtel et al 1992)

Life Cycle Operation: The waste holding basin was used as a retention pond receiving process waste from the liquid radioactive waste storage tanks from 1944 to 1950. (Bechtel et al 1992)

Waste Characteristics: Information concerning waste characteristics could not be found. Substantial quantities of process waste water that probably contained various radionuclides were discharged to the pond. During the late 1940s as much as 250 gal of isobutyl methyl ketone were discharged to the pond. (Bechtel et al 1992) Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents. (ORNL 1990)

Release Data: Total radioactive contamination has been estimated at less than 10 Ci. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The contaminated site summary sheets (CSSS) indicates that 1,300 gal of isobutyl methyl ketone was discharged to the pond. After the pond was removed from service in 1957, the soil was excavated in conjunction with construction of the PWTP and the hole was backfilled with gravel. (Bechtel et al 1992).

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

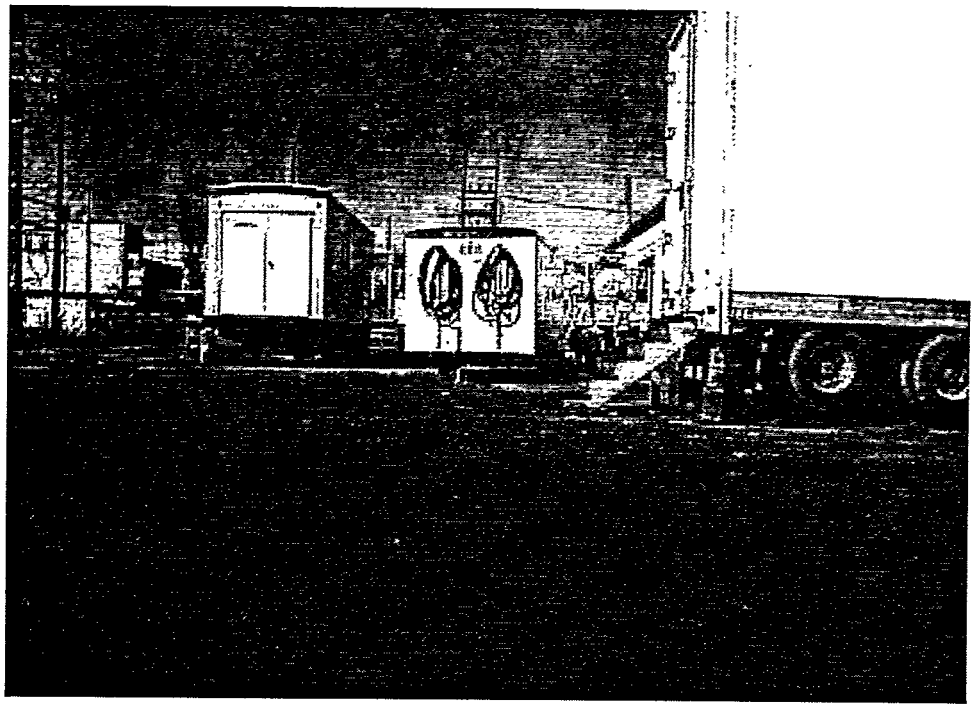
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_24.JPG



UNIT NAME: Waste Holding Basin (3513)

Unit Number: 01.12

Project Status: FS Completed, PP in progress (FFA 1996)

Unit Location: Settling Basin 3513 is located in the settling basin area in the southwest corner of the ORNL complex in Bethel Valley, overlying the limestone bedrock of the Chickamauga Group. It is ~ 110 ft (33 m) north of White Oak Creek between Building 3544 and the two 190 Process Waste ponds (3539 and 3540). ORNL grid coordinates are N 21,320 ft and E 31,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This unlined surface basin has been taken out of service but remains uncovered. Dimensions are ~ 220 x 220 ft (67 x 67 m), sloping 200 x 200 ft (61 x 61 m) at the bottom with a normal storage capacity of ~ 1,880,000 gal (7,116,574 L) of water and sediment. (ORNL 1990)

Dates Operated: Site commissioned: 1944. Site inactive: 1976. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: This unlined impoundment was constructed to act as a settling basin for untreated waste waters prior to their discharge into White Oak Creek. It was in operation until 1976 when a new process waste treatment plant began operation. (ORNL 1990)

Before 1954, impoundment 3513 received supernatant outflow through five pipes along the north side of the basin from the liquid radioactive waste storage tanks of the South Tank Farm. Water in the basin was treated with fly ash and soda lime to precipitate radionuclides before being discharged into White Oak Creek. (Jacobs Engineering 1995)

Waste Characteristics: Wastes to the basin included supernatant from the gunite tanks until 1949. Additional wastes were from laboratory floor and sink drains, chemical process cells, and cooling water from the graphite reactor. Following construction of the Process Waste Treatment Plant, the basin served as a settling basin for treated effluent prior to release to WOC. (ORNL 1990)

At the time of a September 1983 survey the sediment layer ranged from 1.6 ft to 3.3 ft (0.5 m to 1 m) thick and contained ~ 71, 428 cubic ft (2,000 cubic m) of residue. In addition to Cs-137 and Sr-90, the sediment contained measurable quantities of Co-60, Eu-154, Pu-238, Pu-239, Am-241, and Cm-244. In an earlier study, total inventory of radionuclides was estimated to be Ci-235, with Cs and Sr accounting for 84% and 13%, respectively. The remaining radionuclides comprised 3% of the total inventory. EP Toxicity analysis of the sediment showed that it was toxic by characteristic because of elevated levels of mercury. (ORNL 1990)

Water samples, obtained during an 1985 investigation, exceeded National Interim Primary Drinking Water Standards (NIPDWS) levels for some metals; chromium, lead, and selenium exceeded the NIPDWS (0.05 mg/L), while arsenic, barium, cadmium, fluoride, mercury, nitrate, herbicides, and pesticides were below the maximum allowable NIPDWS. PCBs were detected 0.006 mg/L. The radioactivity in the water is from cesium-137 at 7.8 pCi/mL and strontium-90 at 11 pCi/mL with an estimated inventory in 1985 of 0.05 Ci of cesium-137 and 0.03 Ci of strontium-90. Gross beta activity (25 pCi/mL) is predominantly from strontium-90 decay, and gross alpha activity is less than 0.65 pCi/mL. (Bechtel et al 1992)

Radionuclides detected in sediments at impoundment 3513 during the 1994 investigations and their concentrations (reasonable maximum exposure concentration, pCi/g dry) include Am-241 (4,600), Ce-137 (1,100,000), Co-60 (3,000), Pu-238 (2,500), Pu-239/240 (24,000), and Sr-90 (140,000). Reasonable maximum exposure chemical concentrations (mg/kg) in sediments detected during the 1994 investigation include n-nitroso-di-n-propylamine (26), mercury (410), zinc (620), Aroclor-1254 (75), and Aroclor-1260 (29). Mercury measured in a surface water sample collected during a historical investigation as reported by Stansfield and Francis (1985) was detected at 0.0003 mg/L and polychlorinated byphenols (PCBs) were measured at 0.0006 mg/L. (Jacobs Engineering 1995)

Release Data: From four quarters of groundwater monitoring, it was observed that concentrations of Fe, chlorides, Mn, Zn, total organic carbon, and gross alpha and beta activity in downgradient wells were significantly greater than measurements in groundwater taken from monitoring wells upgradient from the impoundment. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

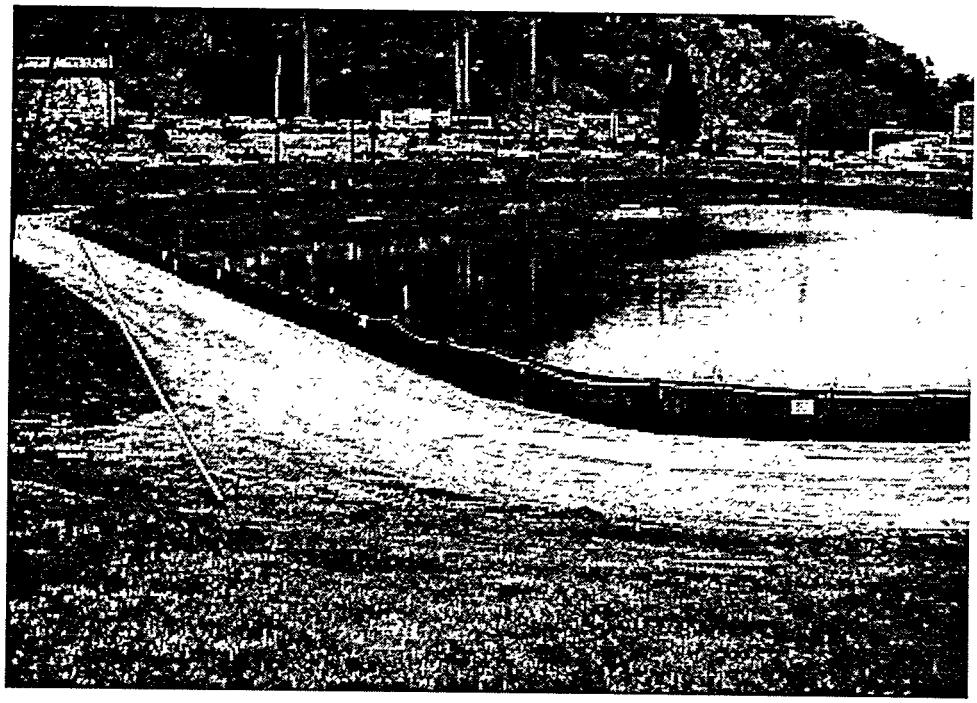
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Jacobs Engineering, November 1995. *Remedial Investigation/Feasibility Study for Surface Impoundments Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1246 & D2. Prepared by Jacobs ER Team, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_33.JPG



UNIT NAME: Equalization Basin (3524)

Unit Number: 01.13

Project Status: Feasibility Study completed, Proposed Plan in progress (FFA 1996)

Unit Location: The Equalization Basin (3524) is in the south central portion of the Bethel Valley ORNL complex. This pond is on the southeast corner of the intersection of Third Street and White Oak Avenue. ORNL grid coordinates are N 21,550 ft and E 30,935 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This unlined basin measures 95 x 250 ft (29 x 76 m) with a maximum depth of 6.5 ft (2 m). It is capable of storing 1,000,000 gal (3,785,000 L) of liquids. Elevation at the top of the berm is ~787 ft (240 m). The present Basin 3524 was constructed in two stages. The original pond was one half the size of the present pond and occupied only the eastern half of the present area. (ORNL 1990)

Dates Operated: The site operated from 1945 to April 1989. (ORNL 1990)

Present Function: Not in operation. Presently, the equalization basin is only used for surge capacity, during storm events.

Life Cycle Operation: Process wastes from the ORNL building complexes were delivered to the Equalization Basin prior to discharge to the process waste treatment facility (Building 3544). Basin 3524 normally received process wastes from the Bethel Valley ORNL facility, but on occasion some waste from the Melton Valley facilities was received. (ORNL 1990)

Waste Characteristics: Sludge samples were collected from the Equalization Basin (3524) during January and February 1986. Analysis of sludge by the EP leach test revealed no toxicity characteristics. Benzene, chloroform, and methylene chloride were three non-EP-TOX limited volatile organics present, with average concentrations of 6.8, 3.6, and 6.4 µg/L, respectively. In 1984, analysis of the sludge indicated an inventory of 150 Ci. Of this total, 100 Ci was Cs-137, 30 Ci was Sr-90, and 11 Ci was Th, U, and TRU. (ORNL 1990)

Samples were collected in January and February 1986 from the influent water entering the ponds and from the water directly above the sludge in the bottom of the ponds to measure for EP toxicity constituents and other VOCs. The EP toxicity constituents were below RCRA-hazardous waste characteristic thresholds in all samples. The highest VOCs present in the influent water sample were trichloroethylene at 2.2 µg/L, chloroform at 7.9 µg/L, methylene chloride at 23 µg/L, and 1,2-dichloroethane at 2.8 µg/L. In the samples of water directly overlying the sludge, the VOCs and their highest concentrations detected were methylene chloride at 288 µg/L, chloroform at 199 µg/L, and benzene at 6 µg/L. Presently the pond contains water and contaminated bottom sediments. (Bechtel et al 1992)

Reasonable maximum exposure (RME) concentrations of radionuclides detected in sediments (pCi/g dry) at impoundment 3524 during the 1994 investigation include Am-241 (33,000), Ce-137 (360,000), Co-60 (7,800), Pu-238 (3,500), Pu-239/240 (72,000), and Sr-90 (140,000). RME chemical concentrations detected in sediments (mg/kg) include n-nitroso-di-n-propylamine (23), mercury (560), zinc (5,900), Aroclor-1254 (130), and Aroclor-1260 (--). (Jacobs Engineering 1995)

Release Data: Four quarters of groundwater monitoring showed the major groundwater contaminants in downgradient wells to be gross alpha and beta radionuclides. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: A CERCLA Proposed Plan is being finalized for approval by EPA and TDEC. (Kuhaida 1996)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

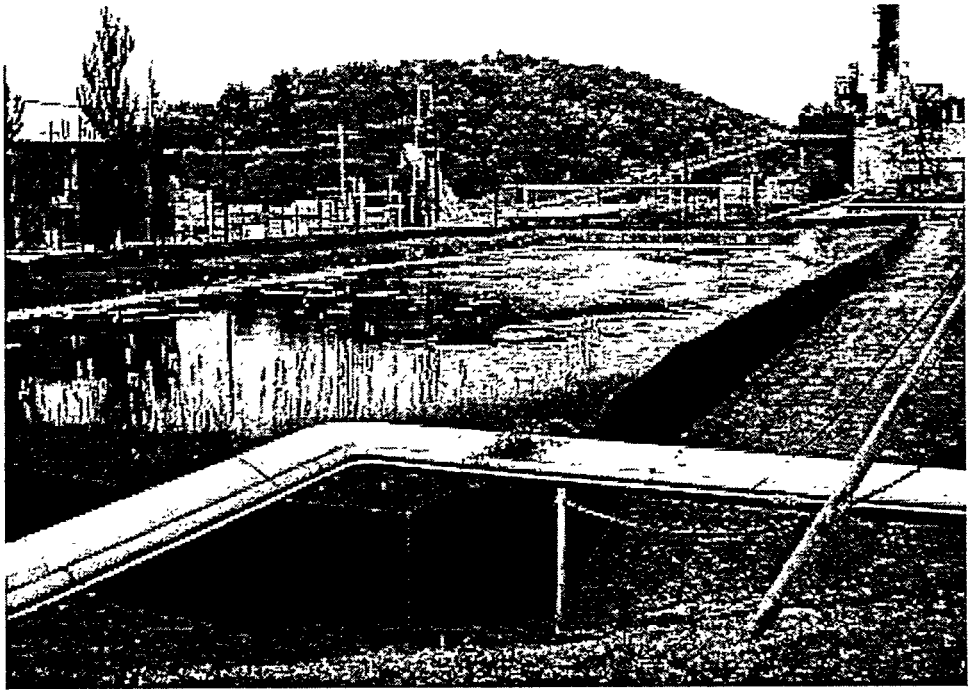
Jacobs Engineering, November 1995. *Remedial Investigation/Feasibility Study for Surface Impoundments Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1246 & D2. Prepared by Jacobs ER Team, Oak Ridge, Tennessee.

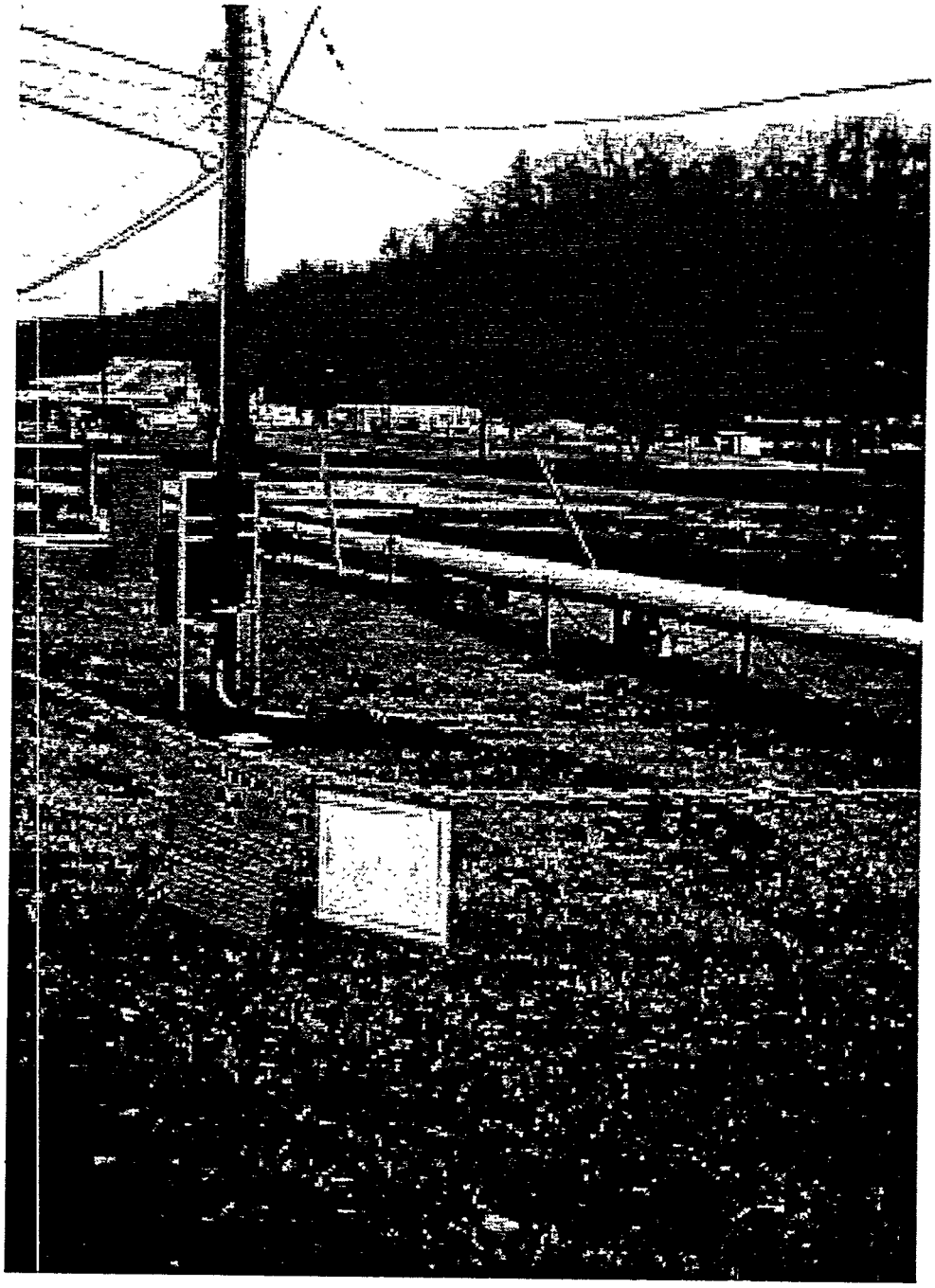
Kuhaida, Jerry, October 1996. LMES Program Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_30.JPG; 26_09.JPG





UNIT NAME: Process Waste Pond (3539)

Unit Number: 01.14

Project Status: Feasibility Study Completed, Proposed Plan in progress (FFA 1996)

Unit Location: The 190 Process Pond (Basin 3539) is an open pond, located in the central ORNL complex (Bethel Valley), south of Building 3584 and east of the Holding Basin 3513. ORNL grid coordinates are N 21,355 ft and E 31,340 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The pond has a capacity of 150,000 gal (567,812 L) and measures 65 x 90 ft (20 x 28 m) at the top of the berm. Elevation at the top of the berm is 787 ft (240 m) MSL. Maximum depth is 8 ft (2.4 m). A 6-in.-thick compacted clay liner serves as the bottom of the basin. (ORNL 1990)

Dates Operated: Site commissioned: 1964. Operation suspended in March 1990. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The two 190 Process Waste ponds (see also 3540) are paired surge basins, designed to receive process waste streams from the Building 4500 complex. Waste streams from Building 4500 are split into the basins and monitored for radionuclide content before discharge to White Oak Creek or to the Equalization Basin (3524) and the process waste treatment system (Building 3544). The basins are operated in such a manner that when one pond is filling the other is empty or in the process of being emptied. (ORNL 1990)

Waste Characteristics: Wastes are derived from floor drains, laboratory drains, steam condensates, and process vessel cooling waters. During January and February 1986, sludge samples were collected from the 190 Process Waste ponds (3539 and 3540) and analyzed for metal, pesticide, herbicide, and volatile organic constituents. A comparison of metal concentrations in EP-TOX extracts from sludge with EP toxicity limits indicated that none exceeded the EP toxicity limits. Pesticide/herbicide extracts were also below limits. Methylene chloride and 1,2-transdichloroethylene were two non-EP-TOX limited volatile organics present with average concentrations of 3.6 and 2.1 µg/L, respectively. Total radioactivity present in the ponds is estimated to be less than 10 Ci. (ORNL 1990)

Samples were collected in January and February 1986 from the influent water entering the ponds and from the water directly above the sludge in the bottom of the ponds to measure for EP toxicity constituents and other VOCs. The EP toxicity constituents were below RCRA-hazardous waste characteristic thresholds in all samples. The highest VOCs in the influent water were dichlorobromomethane, trichloroethylene, chloroform, methylene chloride, and 1,2-dichloroethane, at 5.2, 4.2, 130.8, 8.4, and 2.80 µg/L, respectively. In the samples of water directly overlying the sludge, the VOCs detected were methylene chloride and chloroform at 8 and 2.4 µg/L, respectively. (Bechtel et al 1992)

Reasonable maximum exposure (RME) concentrations of radionuclides detected in sediments (pCi/g dry) at impoundment 3539 during the 1994 investigation include Am-241 (<270), Ce-137 (92), Co-60 (6), Pu-238 (20), Pu-239/240 (160), and Sr-90 (140). RME chemical concentrations detected in sediments (mg/kg) include n-nitroso-di-n-propylamine (3.4), mercury (800), zinc (1,200), Aroclor-1254 (180), and Aroclor-1260 (160). (Jacobs Engineering 1995)

Release Data: Four quarters of groundwater monitoring revealed significantly higher concentrations of chlorides, Fe, Mn, Pb, and gross beta in groundwater from wells downgradient from the waste pond, as compared to groundwater sampled from upgradient monitoring wells. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

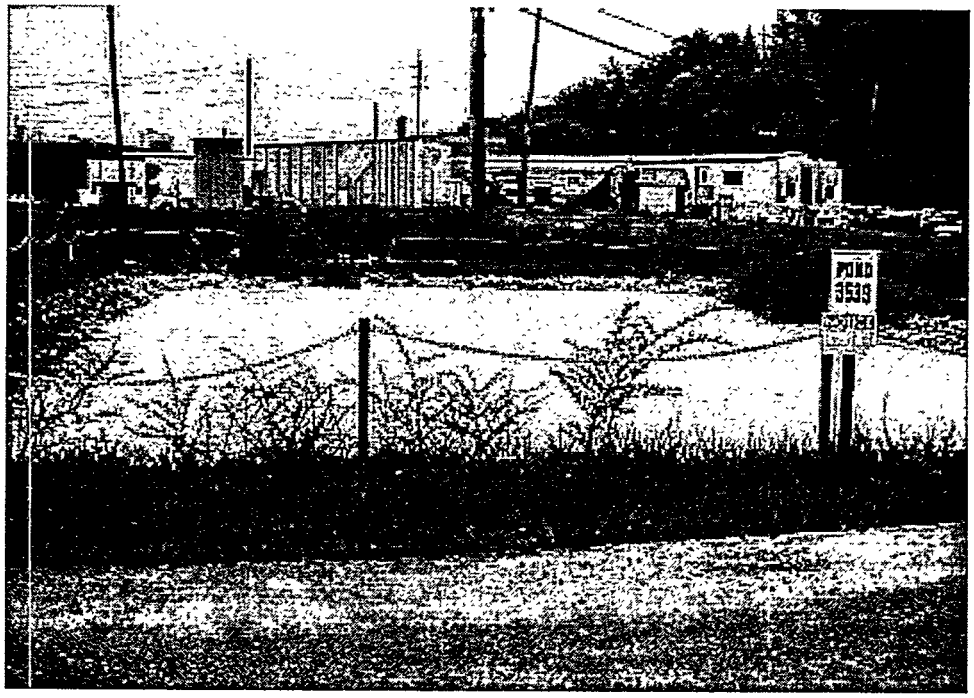
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Jacobs Engineering, November 1995. *Remedial Investigation/Feasibility Study for Surface Impoundments Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee,* DOE/OR/02-1246 & D2. Prepared by Jacobs ER Team, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_31.JPG



UNIT NAME: Process Waste Pond (3540)

Unit Number: 01.15

Project Status: FS Completed, PP in progress (FFA 1996)

Unit Location: This basin is located South of Basin 3539 and East of the Holding Basin 3513. ORNL grid coordinates are N 21,290 and E 31,340. (ORNL 1990)

Approximate Dimensions and Capacity: The pond has a capacity of 150,000 gal (567,812 L) and measures 65 x 90 ft (20 x 28 m) at the top of the berm. Elevation at the top of the berm is 787 ft (240 m) MSL. Maximum depth is 8 ft (2.4 m). A 6-in.-thick compacted clay liner serves as the bottom of the basin. (ORNL 1990)

Dates Operated: Site commissioned: 1964. Operation suspended in March 1990. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The two 190 Process Waste ponds (see also 3539) are paired surge basins, designed to receive process waste streams from the Building 4500 complex. Waste streams from Building 4500 are split into the basins and monitored for radionuclide content before discharge to White Oak Creek or to the Equalization Basin (3524) and the process waste treatment system (Building 3544). The basins are operated in such a manner that when one pond is filling the other is empty or in the process of being emptied. (ORNL 1990)

Waste Characteristics: Wastes are derived from floor drains, laboratory drains, steam condensates, and process vessel cooling waters. During January and February 1986, sludge samples were collected from the 190 Process Waste ponds (3539 and 3540) and analyzed for metal, pesticide, herbicide, and volatile organic constituents. A comparison of metal concentrations in EP-TOX extracts from sludge with EP toxicity limits indicated that none exceeded the EP toxicity limits. Pesticide/herbicide extracts were also below limits. Methylene chloride and 1,2-transdichloroethylene were two non-EP-TOX limited volatile organics present with average concentrations of 3.6 and 2.1 µg/L, respectively. Total radioactivity present in the ponds is estimated to be less than 10 Ci. (ORNL 1990)

Samples were collected in January and February 1986 from the influent water entering the ponds and from the water directly above the sludge in the bottom of the ponds to measure for EP toxicity constituents and other VOCs. The EP toxicity constituents were below RCRA-hazardous waste characteristic thresholds in all samples. The highest VOCs in the influent water were dichlorobromomethane, trichloroethylene, chloroform, methylene chloride, and 1,2-dichloroethane, at 5.2, 4.2, 130.8, 8.4, and 2.80 µg/L, respectively. In the samples of water directly overlying the sludge, the VOCs detected were methylene chloride and chloroform at 8 and 2.4 µg/L, respectively. (Bechtel et al 1992)

Reasonable maximum exposure (RME) concentrations of radionuclides detected in sediments (pCi/g dry) at impoundment 3540 during the 1994 investigation include Am-241 (<270), Ce-137 (92), Co-60 (6), Pu-238 (20), Pu-239/240 (160), and Sr-90 (140). RME chemical concentrations detected in sediments (mg/kg) include n-nitroso-di-n-propylamine (3.4), mercury (800), zinc (1,200), Aroclor-1254 (180), and Aroclor-1260 (160). (Jacobs Engineering 1995)

Release Data: Four quarters of groundwater monitoring revealed significantly higher concentrations of chlorides, Fe, Mn, Pb, and gross beta in groundwater sampled from upgradient monitoring wells. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

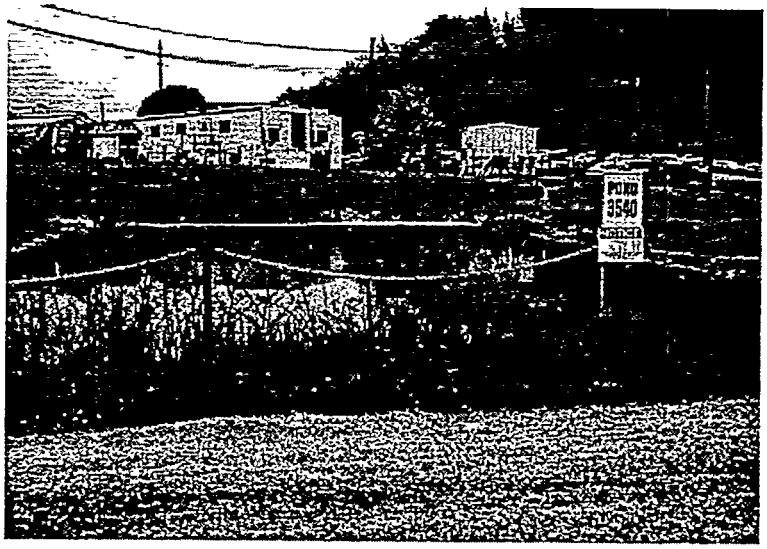
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

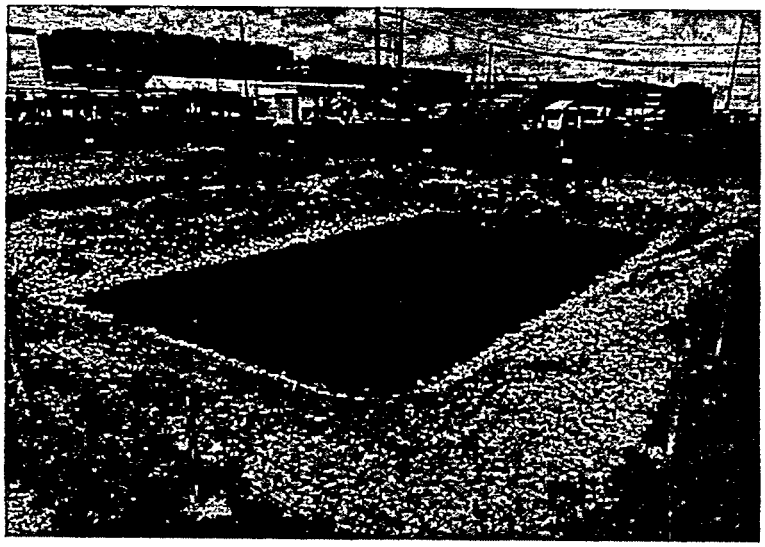
Jacobs Engineering, November 1995. *Remedial Investigation/Feasibility Study for Surface Impoundments Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee,* DOE/OR/02-1246 & D2. Prepared by Jacobs ER Team, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_32.JPG; 3669_91.JPG





UNIT NAME: 3517 Filter Pit (Fission Product Development Laboratory)

Unit Number: 01.20

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: Located east of Building 3517. ORNL coordinates are N 21,750 ft and E 31,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unit consists of two banks of fiber roughing filters arranged in series. (Bechtel et al 1992)

Dates Operated: Began operation in 1958. Operation continues at present. Facility upgrade was completed in 1986. (Bechtel et al 1992)

Present Function: The unit was designed to filter building air exhaust from the Fission Product Development Laboratory, Building 3517. (Bechtel et al 1992)

Life Cycle Operation:

Waste Characteristics: Present levels of radiation at the filters measure ~ 200 R/h. The main radionuclides are Cs-137 and Sr-90. (Bechtel et al 1992) Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The stainless steel roughing filters were acid backwashed, and the leakage from this operation has contaminated the filter pit. Recent excavation at the site resulted in the removal of large quantities of contaminated soil, with maximum levels of 30 R/h at one meter. An undetermined amount of contaminated soil remains. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: In the 1960s, the roughing filters were replaced with stainless steel back-washable filters, which were replaced with high efficiency particulate absolute (HEPA) finishing filters in the 1970s. (Bechtel et al 1992)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

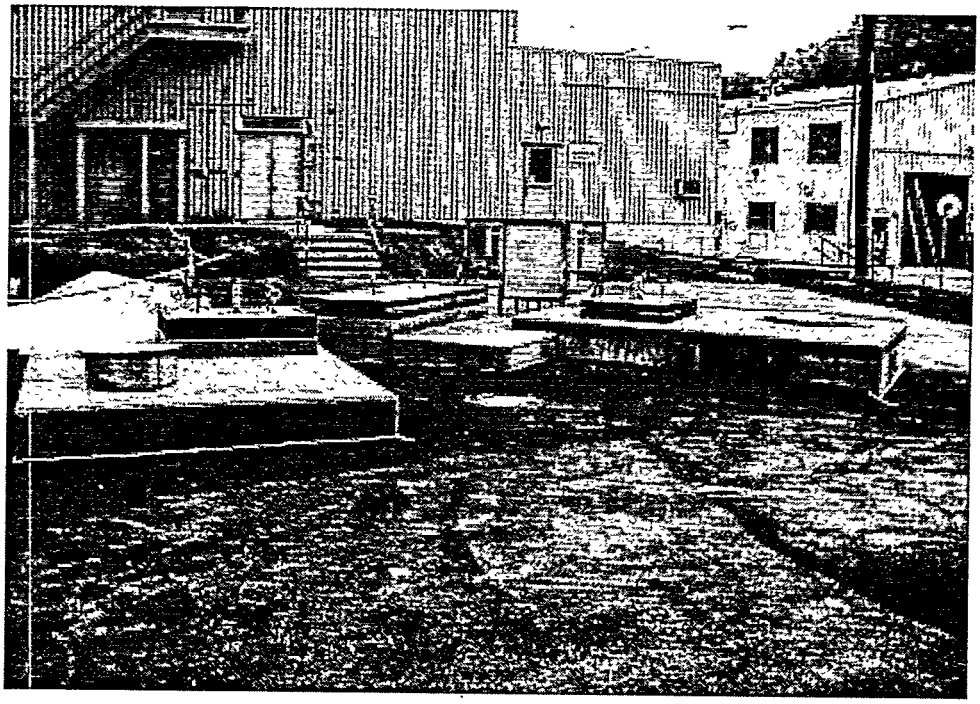
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FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_03.JPG



UNIT NAME: Fission Product Development Laboratory (FPDL) - Liquid Radioactive Waste Transfer Line

Unit Number: 01.21

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: The line runs underground from the Fission Product Development Laboratory (FPDL, Building 3517) to the South Tank Farm (area 3507). ORNL grid coordinates are N 21,740 ft and E 30,910 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The line consists of ~ 317 ft of 1.5-in single-contained stainless steel pipe. It runs underground from the east end of the FPDL, north and west around Building 3503, to a collection header along Central Avenue. (Ford et al 1992)

Dates Operated: 1958—1986 (Ford et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The FPDL LLW Transfer Line was installed in 1958 for transporting low-level radioactive waste from the FPDL to the South Tank Farm for storage subsequent to volume reduction by evaporation and final disposal by hydrofracture. In more recent years, the evaporated waste was retained in tankage after volume reduction.(Ford et al 1992)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

On the basis of the usage of the line, it can be assumed that the interior of the pipe is highly contaminated, primarily with Sr-90 and Cs-137. Nitric acid has also been transferred but would not likely be present in significant quantities after a flushing operation. (Ford et al 1992)

Release Data: Transferable levels have been estimated to exceed 2.5×10^8 dpm/100 cm^2 beta-gamma and the interior radiation level on the order of 5 R/h. The line is believed to be in sound physical condition with no known leaks having occurred. (Ford et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The line was removed from service in 1986 and replaced by a double-contained system. (Ford et al 1992) The contaminated site summary sheet (CSSS) indicates dates operated as 1958—1978.

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory. Oak Ridge, Tennessee, for FY 1993-2002,* ORNL/ER-39, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-1

Unit Number: 01.23A

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located in the North Tank Farm (3023 Area) near the intersection of Third Street and Central Avenue. ORNL grid coordinates are N 22,210 ft, E 30,809 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The tank is constructed of gunite (sprayed concrete) and is 12 ft (3.6 m) in diameter and 8 ft (2.4 m) tall. Capacity of the tank is 4,800 gal (18,200 L). The tank is dome-shaped and covered with 6 ft (1.8 m) of compacted soil. (Bechtel et al 1992)

Dates Operated: Site commissioned: 1943. Taken out of service: 1960. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to hold waste from the 3019 Radiochemical Processing Pilot Plant. (Bechtel et al 1992)

Waste Characteristics: Wastes resulted from the Radiochemical Processing Pilot Plant (3019). The tank volume measured in 1994-95 was 2,926 gal. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-1 is 200 Bq/mL consisting of Cs-137/Ba-132m, Sr-90 and H-3. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 204 Bq/mL consisting of Cs-143/Ba 137m, Sr-90 and H-3. (MACTEC 1996)
Release Data: An undetermined amount of leakage occurred in 1960, causing the tank to be taken out of service. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning.(Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

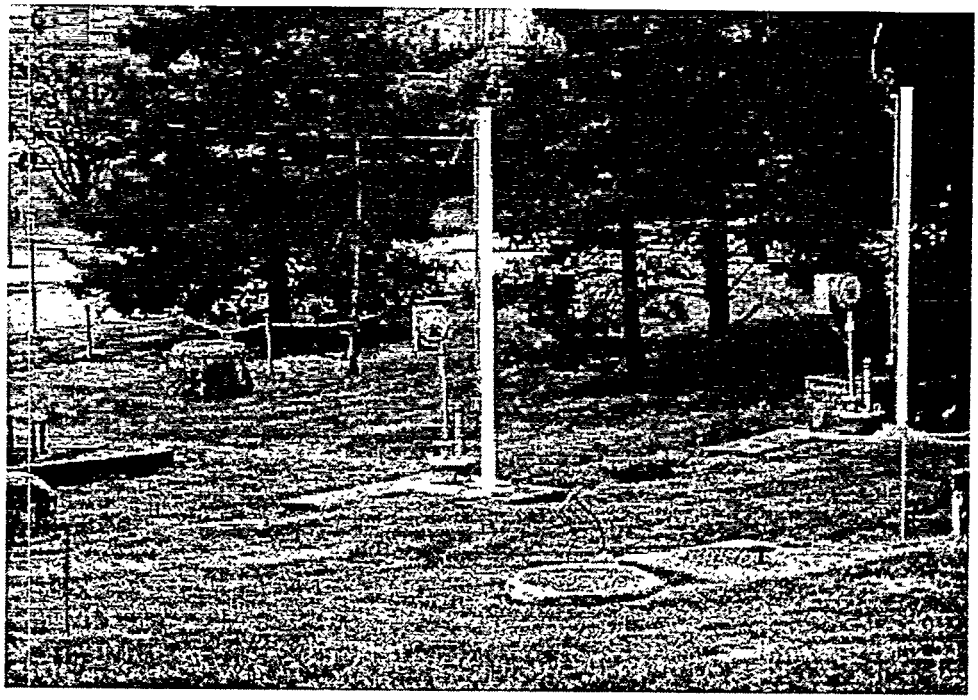
MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

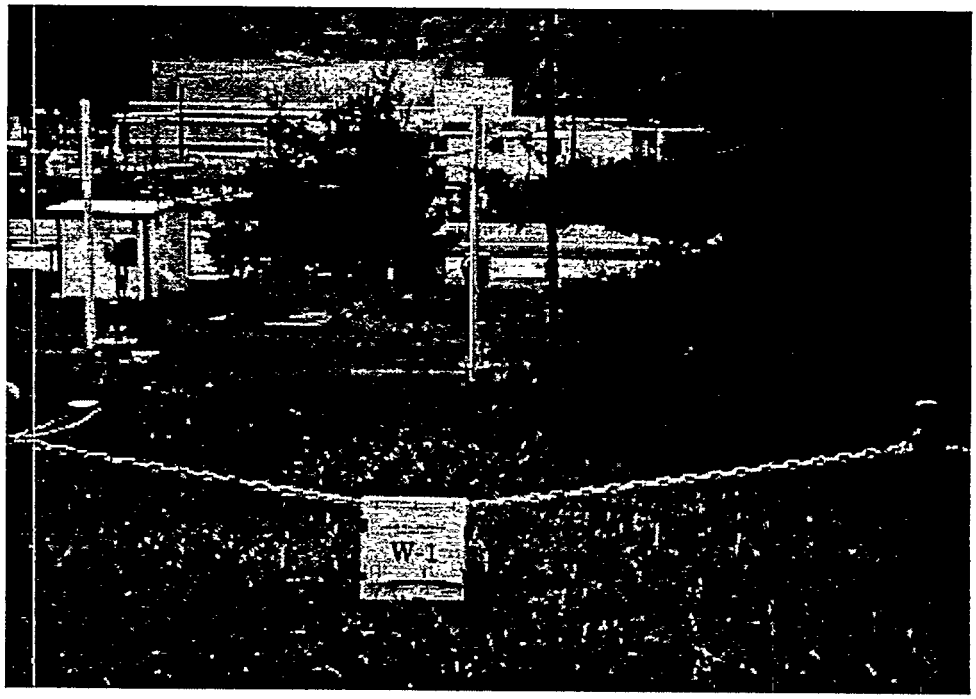
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

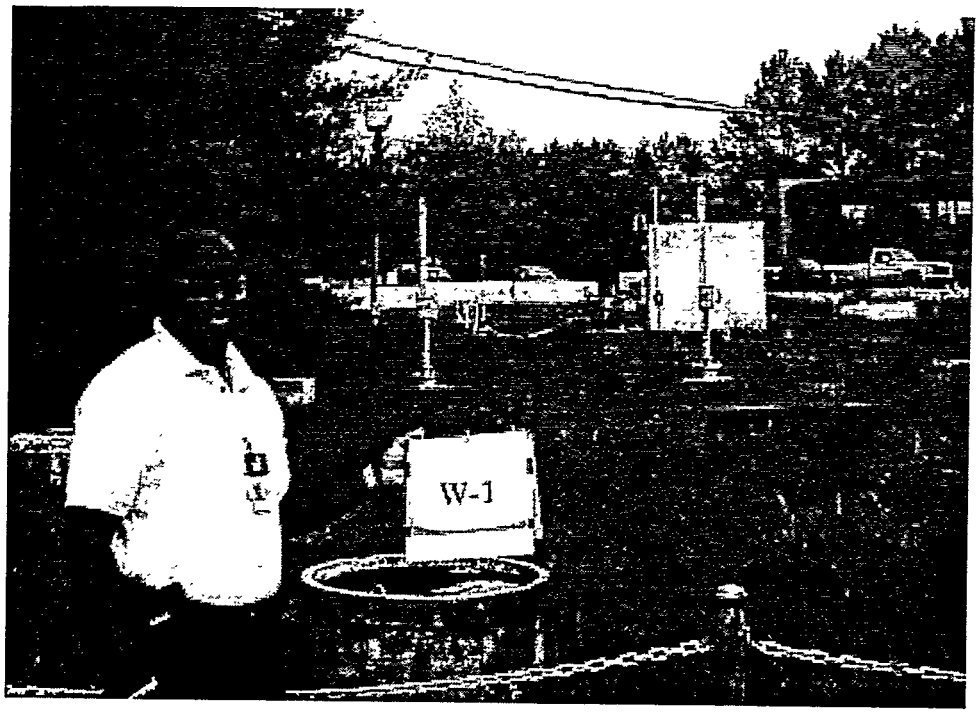
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_21.JPG; 18_06.JPG; 18_14.JPG






W-1

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-2

Unit Number: 01.23B

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located in the North Tank Farm (3023 Area) near the intersection of Third Street and Central Avenue. ORNL grid coordinates are N 22,210 ft and E 30,830 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The tank is constructed of gunite (sprayed concrete) and is 12 ft (3.6 m) in diameter and 8 ft (2.4 m) tall. Capacity of tank is 4,800 gal (18,200 L). The tank is dome-shaped and covered with 6 ft (1.8 m) of compacted soil. (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: This tank was designed to hold the overflow from tank W-1. (ORNL 1990)

Waste Characteristics: Wastes resulted from Radiochemical Processing Plant (3019) (ORNL 1992). The tank volume measured in 1994-1995 was 1,995 gal. The curie loading for the GAAT tanks is derived from the Phase I sampling (August -November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-2 is 212 Bq/mL consisting of Cs-137/Ba-132m, Sr-90, Np-237 and H-3. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 216 Bq/mL consisting of Cs-137/Ba-137m, Sr-90, Np-237, and H-3. (MACTEC 1996)

Release Data: An undetermined amount of leakage occurred in 1960, causing tank operation to stop. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

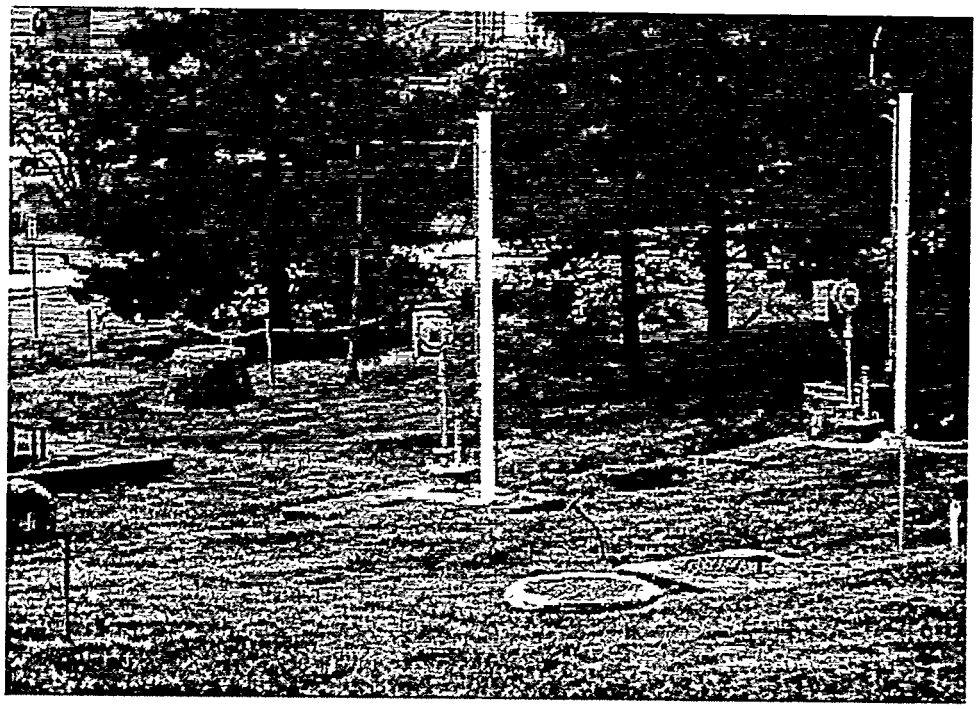
MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

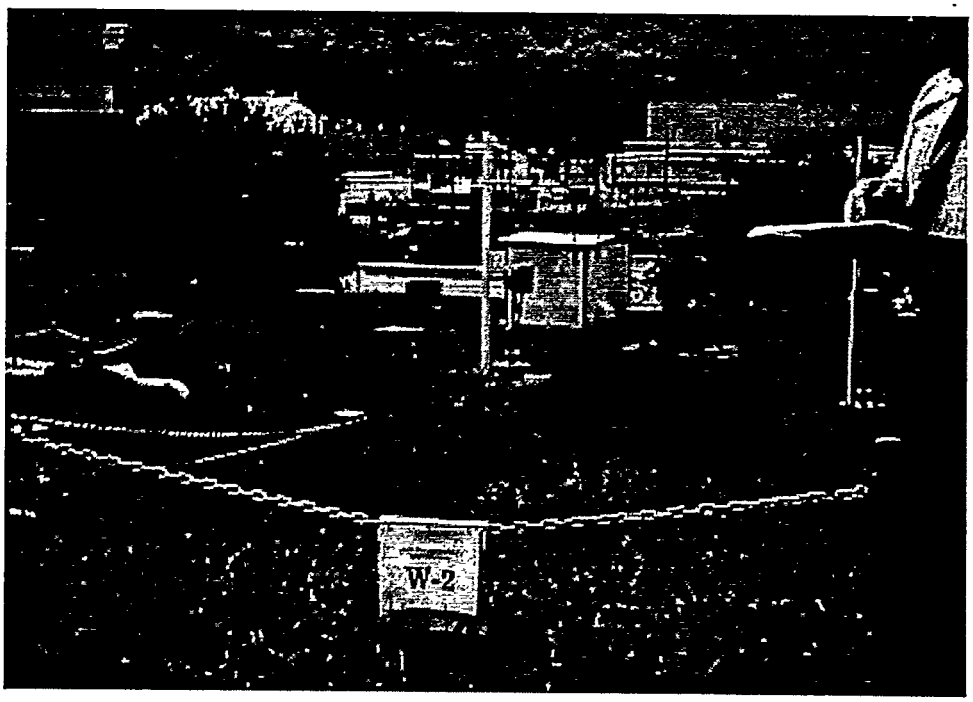
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_21.JPG; 18_07.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-3

Unit Number: 01.24A

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located in the Tank Farm (3023 Area). ORNL coordinates are N 22,180 ft and E 30,885 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Capacity is 42,500 gal (161,000 L). The tank is constructed of gunite (sprayed concrete). The diameter is 25.0 ft (7.6 m); height is 12.0 ft (3.6 m). It is covered with 6.0 ft (1.8 m) of compacted soil. (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1960s. (ORNL 1990)

Present Function: The tank was designed to collect and store liquid radioactive waste from Building 3019. Tank W-3 received plutonium waste. It is considered a TRU tank under DOE Order 5820.2A. (MACTEC 1996)

Life Cycle Operation: The tank was designed to hold metal waste from Building 3019. Tank W-3 received plutonium waste. (ORNL 1990)

Waste Characteristics: The tank volume was measured in 1994-1995 and contained 628 gal of sludge and 15,688 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-3 is 908 Bq/mL consisting of Cs-137/Ba-132m, H-3, and Sr-90 and some uranium isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 1250 Bq/mL consisting of Cs-137/Ba-132m, H-3, and Sr-90 and some uranium isotopes. The curies loading median confidence limit for the sludge portion of the tank is 23,600 Bq/g consisting of Co-60, Cs-137/Ba-137m, Eu-154, Sr-90/Y-90, H-3, AM-241, CM-244 uranium and plutonium isotopes. The curie loading 95 percentile confidence limit for the sludge in the tank is 54,200 Bq/g consisting of Co-60, Cs-137/Ba-137m, Eu-154, Sr-90/Y-90, H-3, AM-241, CM-244 uranium and plutonium isotopes. The maximum TRU isotopes detected was 155 nCi/g and the maximum Pu-alpha detected was 132 nCi/g. Metals exceeding RCRA criteria in the sludge portion of the tank were Cr (D007) and (D009) Hg. Cr detected in the liquid portion exceeded RCRA criteria. (MACTEC 1996)

Release Data: Tank collected surface water. Soil around the tank is contaminated with Cs-137 and Sr-90. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group II Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. A proposed plan is expected to be completed December 1996. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

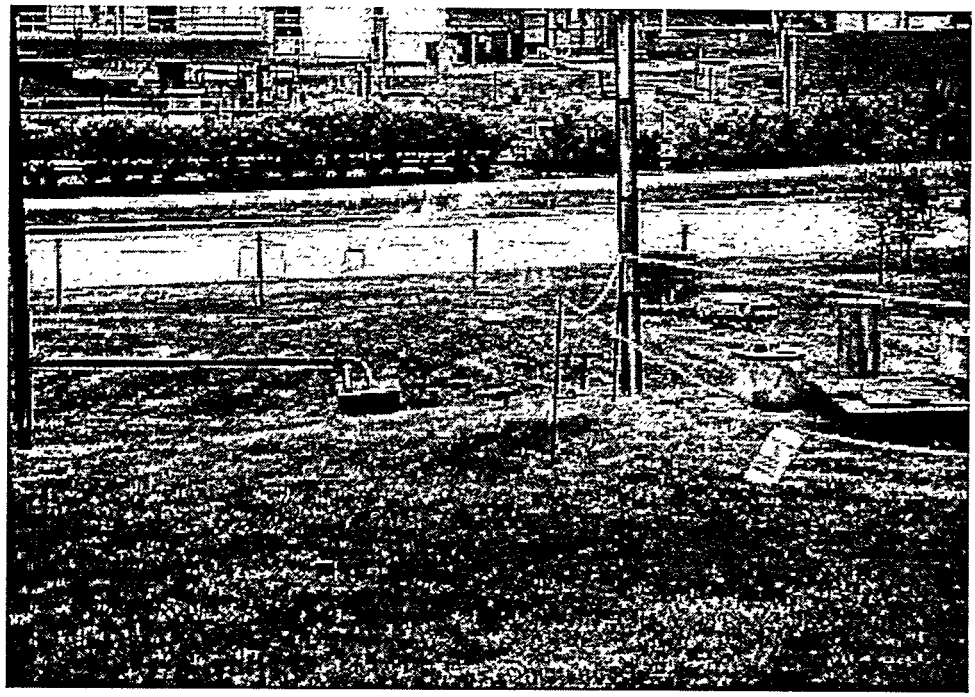
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

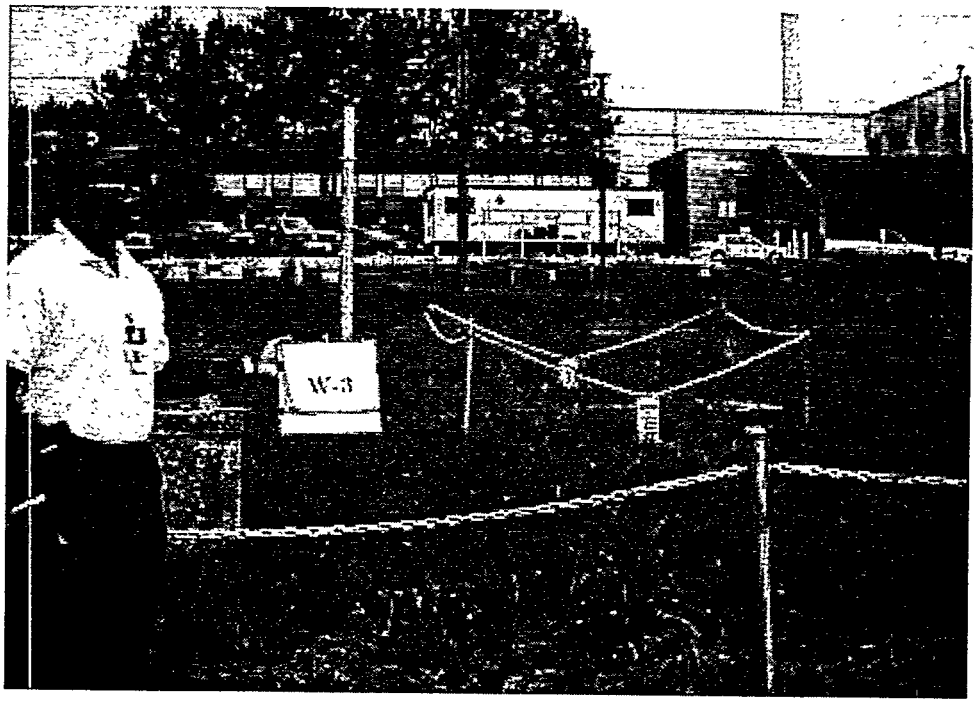
Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_20.JPG; 18_12.JPG




W-8

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-4

Unit Number: 01.24B

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located on North Tank Farm (3023 Area). ORNL coordinates are N 22,180 ft and E 30,920 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Capacity is 42,500 gal (161,000 L). The tank is constructed of gunite (sprayed concrete). The diameter is 25.0 ft (7.6 m); height is 12.0 ft (3.6 m). It is covered with 6.0 ft (1.8 m) of compacted soil. (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1960s. (ORNL 1990)

Present Function: The tank was designed to hold liquid radioactive waste from Building 3019. Tank W-4 received uranium waste. It is considered a TRU tank under DOE Order 5820.2A (MACTEC 1996)

Life Cycle Operation: The tank was designed to hold metal waste from Building 3019. Tank W-4 received uranium waste. (ORNL 1990)

Waste Characteristics: Some aqueous samples from this tank contained elevated levels of 4-methyl-2-pentanone (7 mg/L) and 200 µg/L of naphthalene. Sludge samples contained PAHs and Phthalates (5.7 mg/kg and 11 mg/kg, respectively). (Bechtel et al 1993) The tank volume was measured in 1994-1995 and contained 1,313 gal of sludge and 29,754 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-4 is 4070 Bq/mL consisting of H-3. Co-60, Cs-137, Sr-90, plutonium and uranium isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 19,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Pu and some uranium isotopes. The curies loading median confidence limit for the sludge portion of the tank is 18,700 Bq/g consisting of H-3, Co-60, Cs-137, Sr-90 and uranium isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 520,000 Bq/g consisting of H-3, Co-60, Cs-137, Sr-90 and uranium isotopes. (MACTEC 1996)

Release Data: Tank collected surface water. It is known that the soil around the tank is contaminated by Cs-137 and Sr-90. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group II Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. A proposed plan is expected to be completed December 1996.(Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

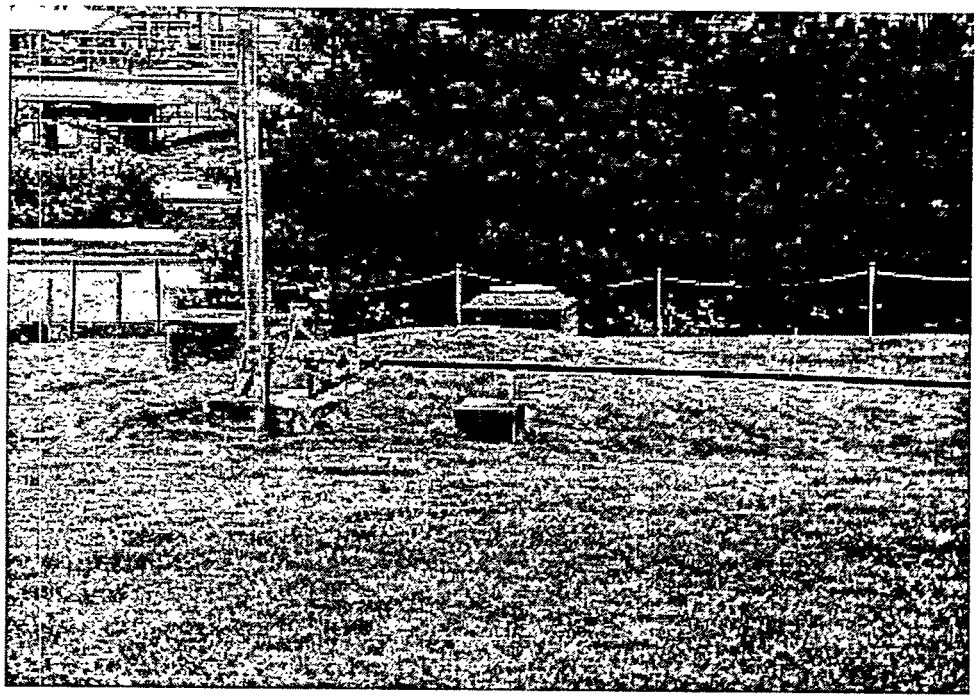
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_19.JPG; 18_13.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-13

Unit Number: 01.25A

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at the North Tank Farm (3023 Area). ORNL coordinates N 22,230 ft and E 30,865 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank W-13 is a horizontal tank 11.0 ft (3.35 m) long and 6.0 ft (1.83 m) diameter; tank capacity is 2,000 gal (7,000 L). Walls of the tank are stainless steel. It is buried in concrete to a depth of 7.5 ft (2.3 m). (ORNL 1990)

Dates Operated: Site commissioned: 1940s. Taken out of service: 1958. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Tank W-13 collected and stored waste from the Chemistry Division Hot Laboratory Group. (ORNL 1990)

Waste Characteristics: The tank contained 460 gal (1,700 L) of liquid, and no sludge before it was emptied. (ORNL 1990) Results of the 1988 sampling indicate a gross alpha activity of 760 Bq/mL and a gross beta activity of 1,400,000 Bq/mL. TRU waste activity was as high as 550 Bq/mL which was reported for Pu-238. Other constituents detected (Bq/mL) were Cs-137 (580,000), Co-60 (190), Sr-90 (590,000), and H-3 (2,800). (Jacobs Engineering, Inc. 1994)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (Bechtel et al 1992)

Release Data: Reason for decommissioning not documented. No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The tank was emptied in September 1992. (Jacobs Engineering, Inc. 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

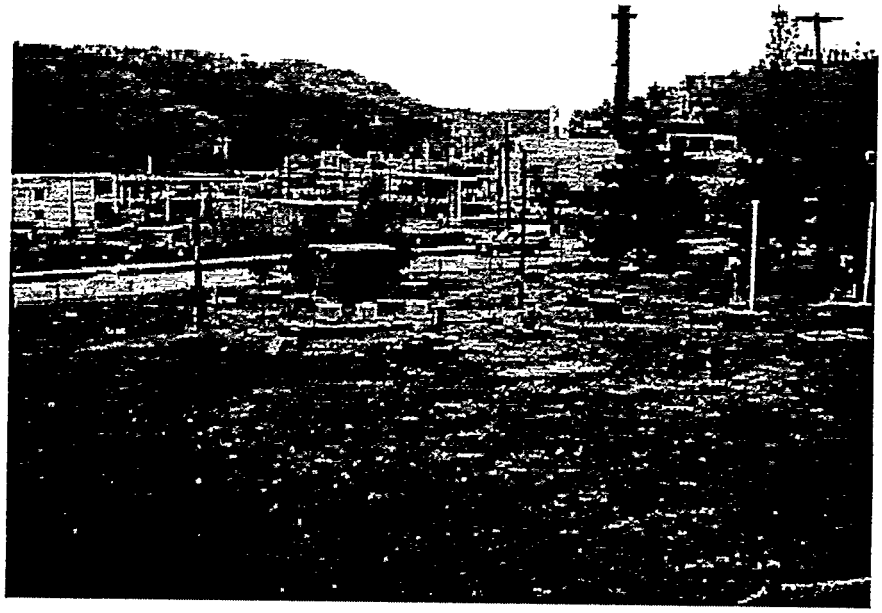
Jacobs Engineering, Inc. May 1994. *Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee.* DOE/OR/02-1275 & D1, Oak Ridge,Tennessee.

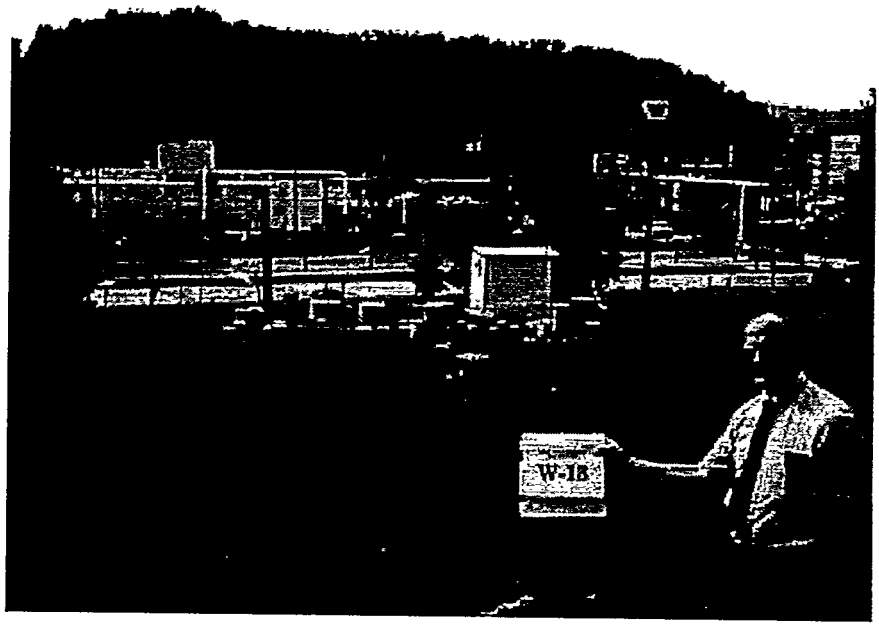
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_13.JPG; 18_08.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-14

Unit Number: 01.25B

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at the North Tank Farm (3023 Area). ORNL coordinates are N 22,230 ft and E 30,872 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank W-14 is a horizontal tank 11.0 ft (3.35 m) long and 6.0 ft (1.83 m) diameter; tank capacity is 2,000 gal (7,600 L). Walls of the tank are stainless steel. It is buried in concrete to a depth of 7.5 ft (2.3 m). (ORNL 1990)

Dates Operated: Site commissioned: 1940s. Taken out of service: 1958. (ORNL 1990).

Present Function: Not in operation.

Life Cycle Operation: Tank W-14 collected and stored wastes from the Operations Division. (ORNL 1990)

Waste Characteristics: The tank contained 260 gal (1,000 L) of liquid and no sludge before it was emptied. (ORNL 1990) Results of the 1988 sampling indicates a gross alpha activity of 8,400 Bq/mL and a gross beta activity of 1,000,000 Bq/mL. TRU waste activity was as high as 150 Bq/mL which was reported for Cm-244 and Pu-238. Other constituents detected (Bq/mL) were Cs-137 (410,000), Co-60 (1,100), Sr-90 (430,000), and H-3 (3.0). (Jacobs Engineering, Inc. 1994)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (Bechtel et al 1992)

Release Data: Reason for taking out of service not documented. No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Tank was emptied in September 1992. (Jacobs Engineering, Inc. 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

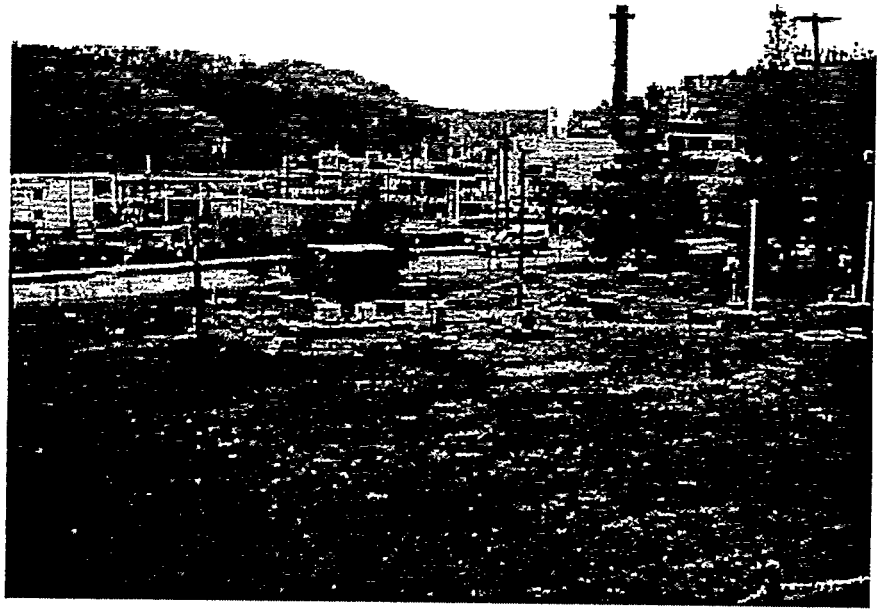
Jacobs Engineering, Inc. May 1994. *Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee.* DOE/OR/02-1275 & D1, Oak Ridge,Tennessee.

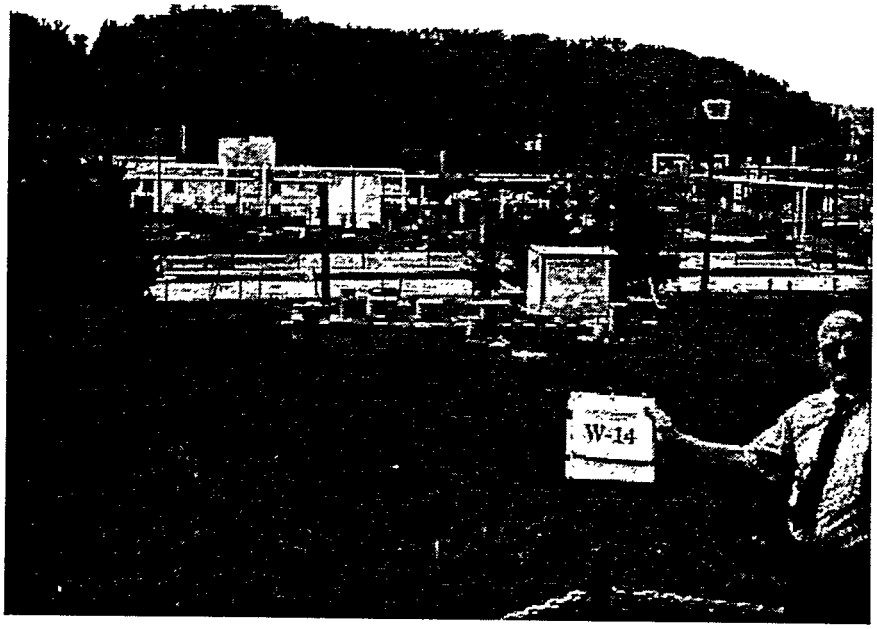
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_18.JPG; 18_10.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-15

Unit Number: 01.25C

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at the North Tank Farm (3023 Area). ORNL coordinates are N 22,222 ft and E 30,880 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank W-15 is a vertical cylinder tank 6.0 ft (1.8 m) tall, 8.0 ft (2.4m) in diameter; tank capacity is 2,000 gal (7,600 L). Walls of the tank are stainless steel. It is buried in concrete to a depth of 7.5 ft (2.3 m). (ORNL 1990)

Dates Operated: Site commissioned: 1940s. Taken out of service: 1958. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Tank W-15 collected and stored wastes from the Operations Division. (ORNL 1990)

Waste Characteristics: The tank contained 600 gal (2,500 L) of liquid and no sludge before it was emptied. (ORNL 1990) Results of the 1988 sampling indicates a gross alpha activity of 2,600 Bq/mL and a gross beta activity of 3,600,000 Bq/mL. TRU waste activity was as high as 630 Bq/mL which was reported for Pu-239. Other constituents detected (Bq/mL) were Cs-137 (1,600,000), Co-60 (1,400), Sr-90 (1,700,000), and H-3 (32). (Jacobs Engineering, Inc. 1994)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (Bechtel et al 1992) Liquid is also classified as corrosive (pH=0.2) (ORNL 1990)

Release Data: Major radionuclides are the same as for W-14. Reason for taking out of service not documented. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The tank was emptied in 1992. It was rechecked in November, 1993, and was still empty.(ORNL 1994) Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Jacobs Engineering, Inc. May 1994. *Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee.* DOE/OR/02-1275 & D1, Oak Ridge, Tennessee.

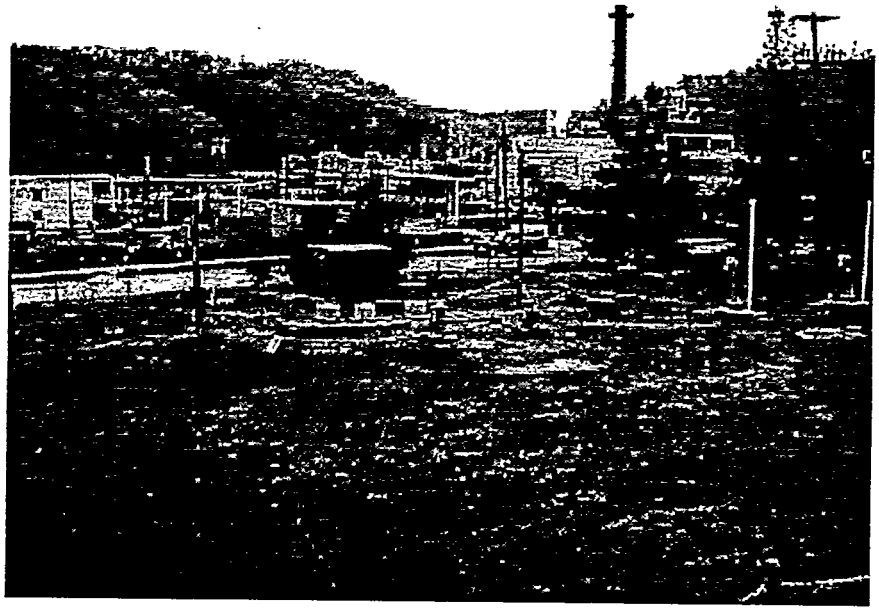
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

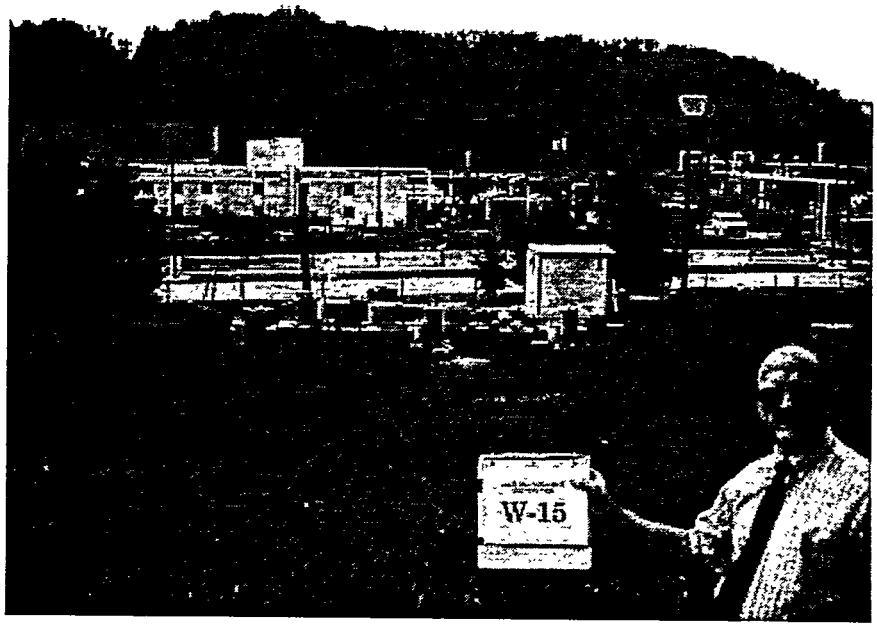
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_18.JPG; 18_11.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-5

Unit Number: 01.26A

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at South Tank Farm (3507 Area), near the intersection of Central Avenue and Third Street. ORNL grid coordinates are N 22,000 ft and E 30,850 ft. (ORNL 1990)

Approximate Dimensions and Capacity: One of six tanks constructed of reinforced gunite. The tanks are underground (two rows of three each) on a 60.0-ft (18.3-m) grid. Inside diameter is 50.0 ft (15.2 m), and the height is 12.0 ft (3.7 m). The dome-shaped tank is covered with a 6-ft (1.8-m) layer of compacted soil. Capacity is 170,000 gal (643,000 L). (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1978. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to collect and store wastes from various ORNL projects and programs. The tank was emptied in the early 1980s. (ORNL 1990)

Waste Characteristics: Trichloroethanes and tetrachloroethanes were detected at 138 µg/L and 267 µg/L, respectively. (Bechtel et al 1993) The tank contents were measured in 1994-1995 and contained 3,422 gal of sludge and 27,964 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of Tank W-5 is 3,400 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Plutonium and uranium isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 4950 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Plutonium and uranium isotopes. The curie loading median confidence limit for the sludge portion of the tank is 59,500 Bq/g consisting of H-3, Co-60, Cs-137, Sr-90, Plutonium and uranium isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 97,400 Bq/g consisting of H-3, Co-60, Cs-137, Sr-90, plutonium and uranium isotopes. Tank W-5 is considered a non -TRU tank under DOE Order 5820.2A. Metals exceeding RCRA criteria in the sludge portion of the tank were Cr (D007), Hg (D009), and Pb (D008). (MACTEC 1996)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Rainwater has infiltrated the tank. No out-of-tank leakage was reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group III Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. (Emison 1996) A proposed plan is expected to be completed in May 1997. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159& D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

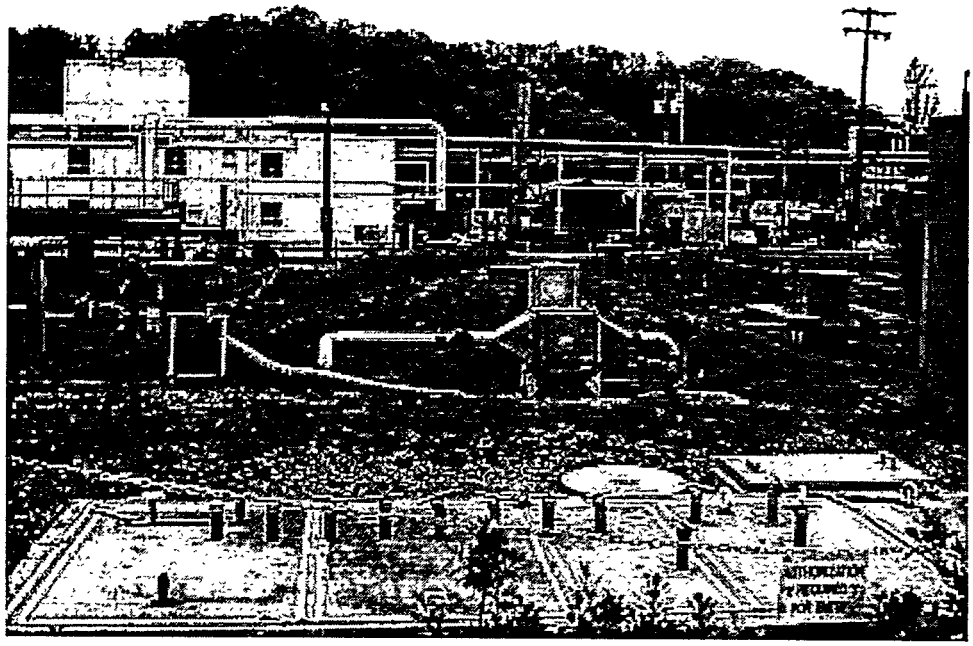
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee

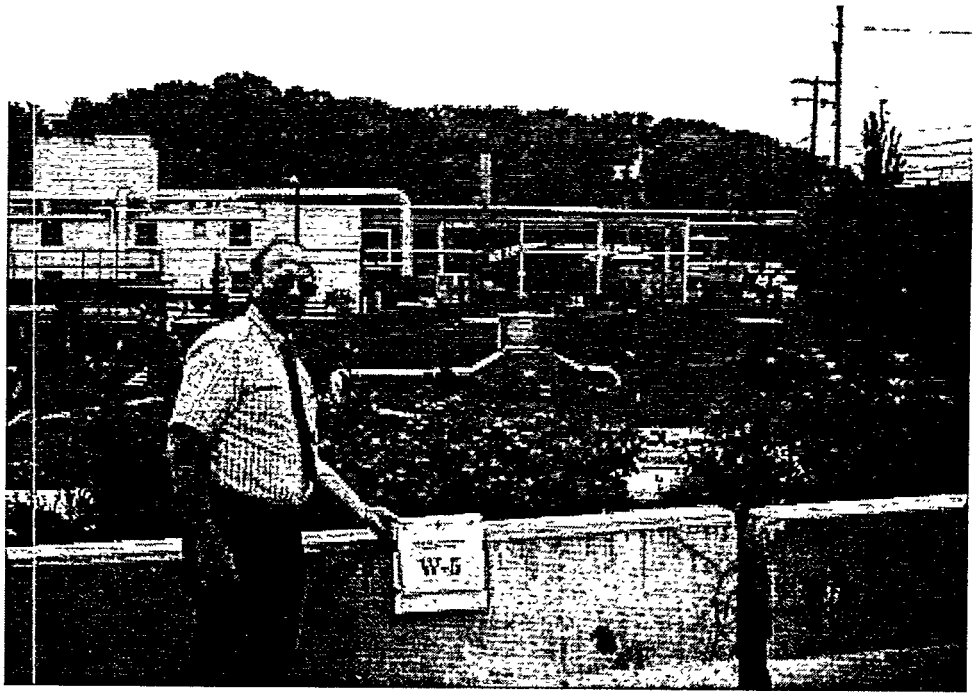
Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_24.JPG; 19_17.JPG




W-5

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-6

Unit Number: 01.26B

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at the South Tank Farm. ORNL grid coordinates are N 21,940 ft and E 30,850 ft.

Approximate Dimensions and Capacity: One of six tanks constructed of reinforced gunite. The tanks are underground (two rows of three each) on a 60.0-ft (18.3-m) grid. Inside diameter is 50.0 ft (15.2 m), and the height is 12.0 ft (3.7 m). The dome-shaped tank is covered with a 6-ft (1.8-m) layer of compacted soil. Capacity is 170,000 gal (643,000 L). (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1978.

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to collect and store wastes from various ORNL projects. The tank was emptied in the early 1980s. (ORNL 1990)

Waste Characteristics: Trichlorethene was detected at concentrations as high as 82 µg/L and benzoic acid as high as 300 µg/L. (Bechtel et al 1993) The tank contents were measured in 1994-1995 and contained 7,037 gal of sludge and 41,479 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-6 is 80,100 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Cm-244+d and PU and U isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 503,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Cm-244+d and PU and U isotopes. The curies loading median confidence limit for the sludge portion of the tank is 611,000 Bq/g consisting of Co-60, H-3 Cs-137, Eu-154, Sr-90, CM-244, CF-252 and Pu and U isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 1,010,000 Bq/g consisting of Co-60, H-3 Cs-137, Eu-154, Sr-90, CM-244, CF-252 and Pu and U isotopes. Tank W-6 is considered a TRU tank under DOE Order 5820.2A. The maximum Pu-alpha value was 219 nCi/g. Metals exceeding RCRA criteria detected in the sludge portion of the tank were Cr (D007), Hg (D009), and Pb (D008). TCLP Hg detected in sludge also exceeded the RCRA criteria. (MACTEC 1996)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Rainwater has infiltrated the tank. No out-of-tank leakage reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group III Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. (Emison 1996) A proposed plan is expected to be completed in May 1997. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee,* DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory,* DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory,* ORNL/ER-365, Oak Ridge, Tennessee.

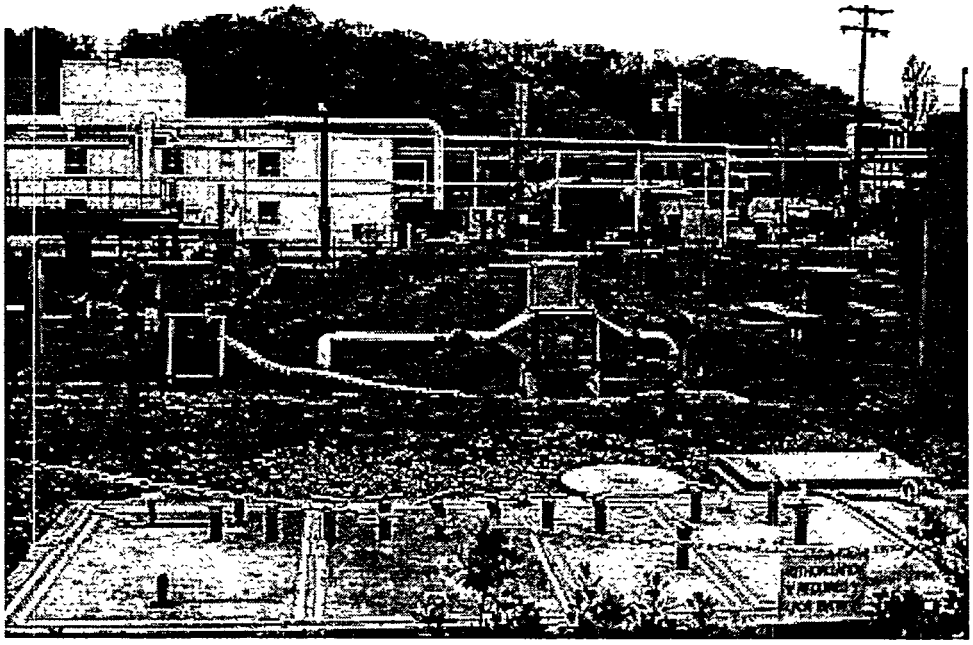
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

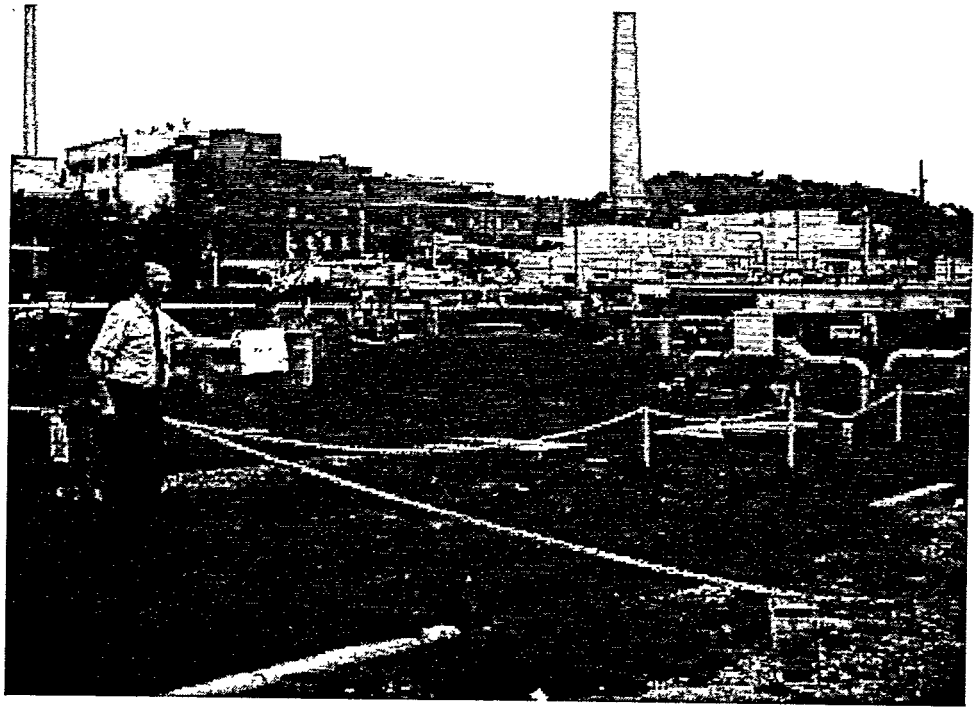
Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_24.JPG; 19_15.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-7

Unit Number: 01.26C

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at South Tank Farm. 3507 area. ORNL grid coordinates are N 22,000 ft and E 30,910 ft. (ORNL 1990)

Approximate Dimensions and Capacity: One of six tanks constructed of reinforced gunite. The tanks are underground (two rows of three each) on a 60.0-ft (18.3-m) grid. Inside diameter is 50.0 ft (15.2 m), and the height is 12.0 ft (3.7 m). The dome-shaped tank is covered with a 6-ft (1.8-m) layer of compacted soil. Capacity is 170,000 gal (643,000 L). (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1978.

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to collect and store wastes from various ORNL projects. The tank was emptied in the early 1980s. (ORNL 1990)

Waste Characteristics: Major organic constituents detected were methanol (14 mg/L) and ~1,000 µg/L of carbon tetrachloride. Benzoic acid was detected at 2,000 µg/L. Fluoranthane and several phthalates were detected in sludges. (Bechtel et al 1993) The tank contents were measured in 1994-1995 and contained 8,812 gal of sludge and 3,565 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-7 is 641,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Cm-244 and Th-232+d. The curie loading 95 percentile confidence limit for the liquid 641,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Cm-244 and Th-232+d. The curie loading median confidence limit for the sludge portion of the tank is 1,950,000 Bq/g consisting of Co-60, Cs-134, Cs-137, Eu-152/154, Sr-90 Am-241, Cm-244 U and Pu isotopes. The curie loading 95 percentile confidence limit for the sludge in the tank is 2,840,000 Bq/g consisting of Co-60, Cs-134, Cs-137, Eu-152/154, Sr-90 Am-241, Cm-244 U and Pu isotopes. Tank W-7 is considered a non-TRU tank under DOE Order 5820.2A. Metals detected in the sludge portion exceeding RCRA criteria were Cr (D007) and Hg (D009). TCLP Hg detected in the sludge also exceeded RCRA criteria. (MACTEC 1996)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Rainwater has infiltrated the tank. No out-of-tank leakage reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group III Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. (Emison 1996) A proposed plan is expected to be completed in May 1997. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

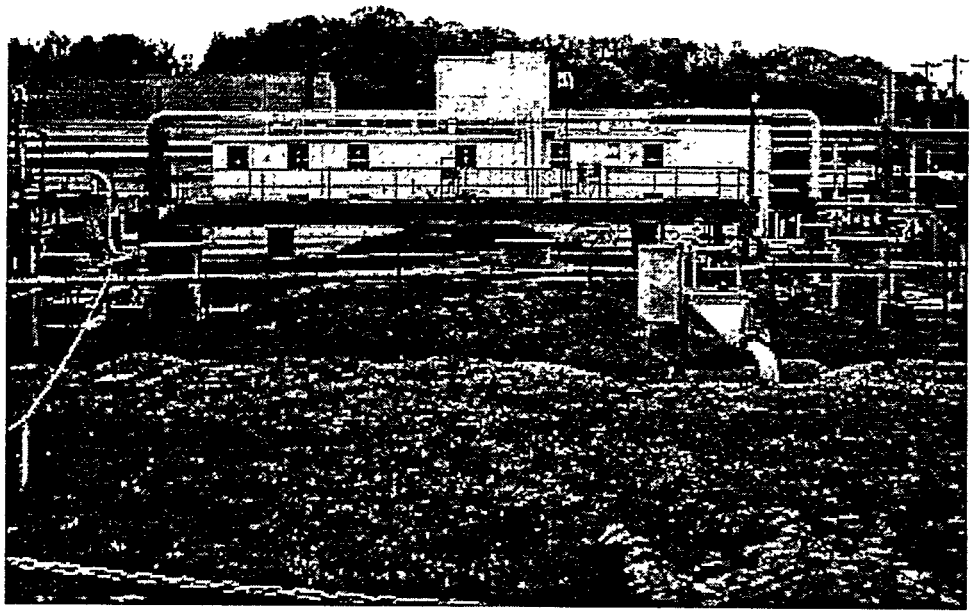
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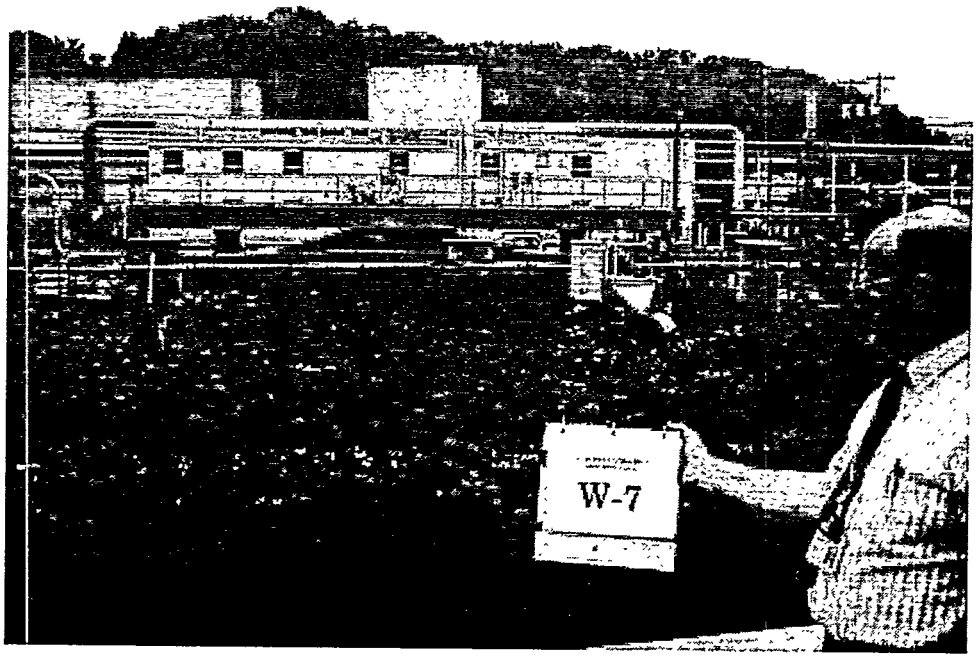
Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_25.JPG; 19_18.JPG




W-7

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-8

Unit Number: 01.26D

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at South Tank Farm, 3507 area. ORNL grid coordinates are N 21,940 ft and E 30,910 ft. (ORNL 1990)

Approximate Dimensions and Capacity: One of six tanks constructed of reinforced gunite. The tanks are underground (two rows of three each) on a 60.0-ft (18.3-m) grid. Inside diameter is 50.0 ft (15.2 m), and the height is 12.0 ft (3.7 m). The dome-shaped tank is covered with a 6-ft (1.8-m) layer of compacted soil. Capacity is 170,000 gal (643,000 L). (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1978.

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to collect and store wastes from various ORNL projects and programs. The tank was emptied in the early 1980s. (ORNL 1990)

Waste Characteristics: PAHs were detected in sludge. (Bechtel et al 1993) The tank contents were measured in 1994-1995 and contained 10,309 gal of sludge and 64,581 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-8 is 308,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Cm-244 and Th-232+d. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 374,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Cm-244 and Th-232+d. The curie loading median confidence limit for the sludge portion of the tank is 2,960,000 Bq/g consisting of Co-60, Cs-134, Ca-137, Eu-152/154, Sr-90, Am-241, Cm-244, Cf-252, Pu and U isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 3,490,000 Bq/g consisting of Co-60, Cs-134, Ca-137, Eu-152/154, Sr-90, Am-241, Cm-244, Cf-252, Pu and U isotopes. Tank W-8 is considered a TRU tank under DOE Order 5820.2A. The maximum Pu-alpha value was 246 nCi/g. Metals detected in the sludge portion exceeding RCRA criteria were Cr (D007), Hg (D009), and Pb (D008). Cr, Hg, Tl detected in the liquid portion exceeded RCRA criteria. (MACTEC 1996)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Rainwater has infiltrated the tank. No out-of-tank leakage reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group III Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. (Emison 1996) A proposed plan is expected to be completed in May 1997. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

2-150

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee,* DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

2-152

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-9

Unit Number: 01.26E

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at South Tank Farm, 3507 area. ORNL grid coordinates are N 22,000 ft and E 30,970 ft. (ORNL 1990)

Approximate Dimensions and Capacity: One of six tanks constructed of reinforced gunite. The tanks are underground (two rows of three each) on a 60.0-ft (18.3-m) grid. Inside diameter is 50.0 ft (15.2 m), and the height is 12.0 ft (3.7 m). The dome-shaped tank is covered with a 6-ft (1.8-m) layer of compacted soil. Capacity is 170,000 gal (643,000 L). (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1978. The tank was emptied in the early 1980s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to collect and store wastes from various ORNL projects and programs. (ORNL 1990)

Waste Characteristics: The 1988 sampling event indicated low levels of PAHs and phthalates detected in the sludge. The tank contents were measured in 1994-1995 and contained 2,861 gal of sludge and 46,616 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-9 is 45,000 Bq/mL consisting of H-3, Co-60, Cs-134/137, Sr-90, Cm-244 and U isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 57,700 Bq/mL consisting of H-3, Co-60, Cs-134/137, Sr-90, Cm-244 and U isotopes. The curie loading median confidence limit for the sludge portion of the tank is 2,200,000 Bq/g consisting of Co-60, Cs-134, Cs-137, Eu-152/154/155, Sr-90, Am-241, Cm-244, Pu and U isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 2,600,000 Bq/g consisting of Co-60, Cs-134, Cs-137, Eu-152/154/155, Sr-90, Am-241, Cm-244, Pu and U isotopes . Tank W-9 is considered a TRU tank under DOE Order 5820.2A. The maximum Pu-alpha value was 676 nCi/g. Metal detected in the sludge portion exceeding RCRA criteria were Cr, Hg, and Pb. Tl detected in the liquid portion exceeded RCRA criteria. (MACTEC 1996)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Rainwater has infiltrated the tank. No out-of-tank leakage was reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

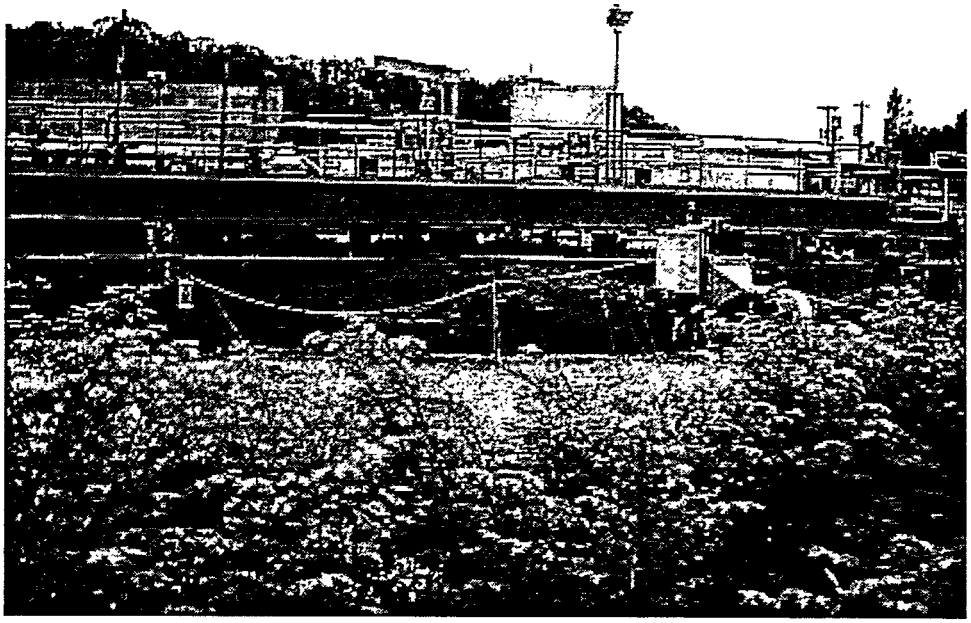
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_26.JPG; 19_19.JPG




W-9

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-10

Unit Number: 01.26F

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at South Tank Farm, 3507 area. ORNL grid coordinates are N 21,940 ft and E 30,970 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Constructed of reinforced gunite. The tanks are underground (two rows of three each) on a 60.0-ft (18.3-m) grid. Inside diameter is 50.0 ft (15.2 m), and the height is 12.0 ft (3.7 m). The side walls are 7.5 ft thick. Each tank is covered with a 6-ft (1.8-m) layer of compacted soil. Capacity is 170,000 gal (643,000 L). (Bechtel et al 1992)

Dates Operated: Site commissioned: 1943. Taken out of service: 1978. The tank was emptied in the early 1980s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to store wastes from various ORNL projects and programs. (ORNL 1990)

Waste Characteristics: Methanol was detected in liquid samples at concentration of 30-40mg/L. Benzoic acid (2900 µg/L) and naphthalene (20 µg/L) were also detected. PAHs (14,600 mg/kg) were detected in sludge samples. (Bechtel et al 1993) The tank contents were measured in 1994-1995 and contained 9,298 gal of sludge and 10,860 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-10 is 102,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Pu and U isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 200,000 Bq/mL consisting of H-3, Co-60, Cs-137, Sr-90, Pu and U isotopes. The curies loading median confidence limit for the sludge portion of the tank is 5,590,000 Bq/g consisting of H-3, Co-60, Cs-134/137, Eu-152/154, Sr-90, Am-241, Cm-244, Pu and U isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 16,000,000 Bq/g consisting of H-3, Co-60, Cs-134/137, Eu-152/154, Sr-90, Am-241, Cm-244, Pu and U isotopes. Tank W-10 is considered a TRU tank under DOE Order 5820.2A. The maximum Pu-alpha value was 432 nCi/g. Metal detected in the sludge portion exceeding RCRA criteria were Cr (D007), Hg (D009), and Pb (D008).
(MACTEC 1996)

Analysis of 1988 samples in the tank of liquid and sludge indicates that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Rainwater has infiltrated the tank. No out-of-tank leakage was reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group III Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. (Emison 1996). A proposed plan is expected to be completed in May 1997. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

2-156

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

2-158

UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-11

Unit Number: 01.27

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located on the southeast corner of the South Tank Farm (3057 Area), ~ 100 ft (30 m) north of the eastern end of Building 3517 and ~ 50 ft (15 m) from Building 3515. ORNL coordinates N 21,865 ft and E 31,050 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank W-11 measures 8.0 ft (2.4 m) in diameter and 5.5 ft (1.7 m) in height. Its capacity is 1,500 gal (5,677 L); it is covered with 6.0 ft (1.8 m) of soil overburden. The dome-shaped tank is constructed of gunite. (Bechtel et al 1992)

Dates Operated: Site commissioned: 1943. Taken out of service: ~ 1948. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The tank was designed to serve in waste collection and monitoring for research laboratories in Building 3550. (Bechtel et al 1992)

Waste Characteristics: Sludge samples contained several PAHs at concentrations as high as 240 mg/kg. (Bechtel et al 1993) The tank contents were measured in 1994-1995 and contained 722 gal of liquid; no sludge was found. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank W-11 is 22.8 Bq/mL consisting primarily of Sr-90. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 83.1 Bq/mL consisting primarily of Sr-90. (MACTEC 1996)

Analysis of 1988 liquid and sludge samples indicated that the liquid is not RCRA waste; however, the sludge has the characteristics of RCRA waste. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Tank was removed from service because of leaks. Surface soil samples show that the tank site is contaminated with Sr-90 and Cs-137. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

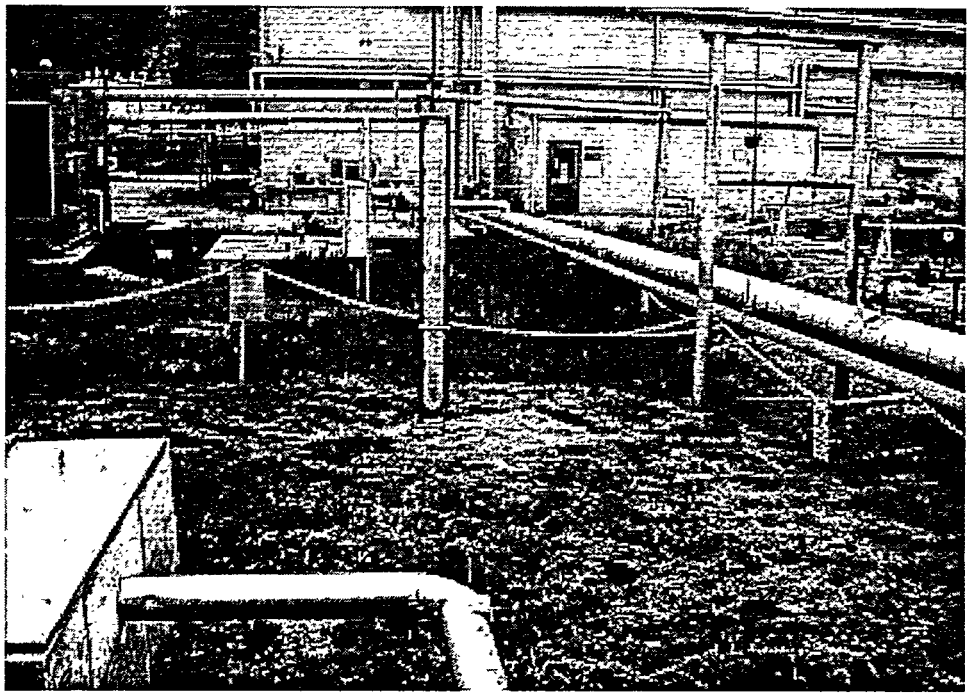
MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_29.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank W-1A

Unit Number: 01.28

Project Status: Remedial Investigation completed (FFA 1996)

Unit Location: Located at the North Tank Farm (3023 Area), northeast of the intersection of Third Street and Central Avenue. ORNL coordinates are N 22,255 ft and E 30,810 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is made of stainless steel and has a capacity of 4,000 gal (15,100 L). It is covered with more than 6.0 ft (1.8 m) of soil. Tank is horizontal. Diameter is 7.5 ft (2.3 m) and length is 13.5 ft (4.1 m). (ORNL 1990)

Dates Operated: Site commissioned: mid 1950s. Taken out of service: 1986. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Tank W1-A collected wastes from the high radiation level analytical facilities of buildings 2026, 3019-B, and the Radiochemical Processing Pilot Plant (3019). (ORNL 1990)

Waste Characteristics: Results of the 1988 tank sampling indicate gross alpha activity at 1,100 Bq/mL and the gross beta activity of 1,300 Bq/mL. TRU waste activity was as high as 67 Bq/mL for Pu-239. Other radiological constituents detected (Bq\mL) were Cs-137 (140), Co-60 (4.4), Sr-90 (320), H-3 (2.6), and U-238 (5.0). (Jacobs Engineering, Inc. 1994) Methanol was detected at 7 mg/L in the liquid samples. (Bechtel et al 1993)

Analysis of the 1988 samples of liquid in this tank indicate that the liquid should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (Bechtel et al 1992)

Release Data: Estimated radiation exposure rates in excess of 100 R/h may be present in the tank and inlet process lines. However, the transfer line to Tank W-1A from Buildings 2026 and 3019 is strongly suspected of leaking and contaminating soil near the tank. For this reason, Tank W-1A was removed from service. (ORNL 1990).

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: The tank is routinely emptied due to inleakage of rainwater during storm events. (Jacobs Engineering 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1992)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

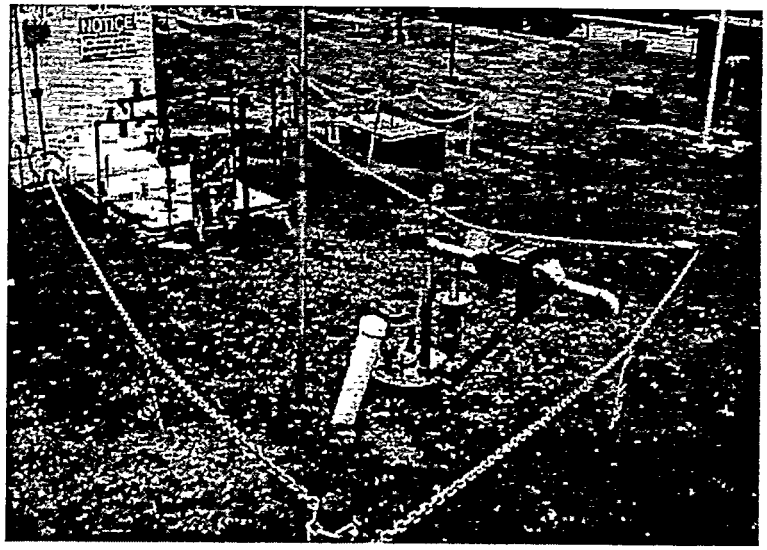
Jacobs Engineering, Inc. May 1994. *Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee.* DOE/OR/02-1275 & D1, Oak Ridge, Tennessee.

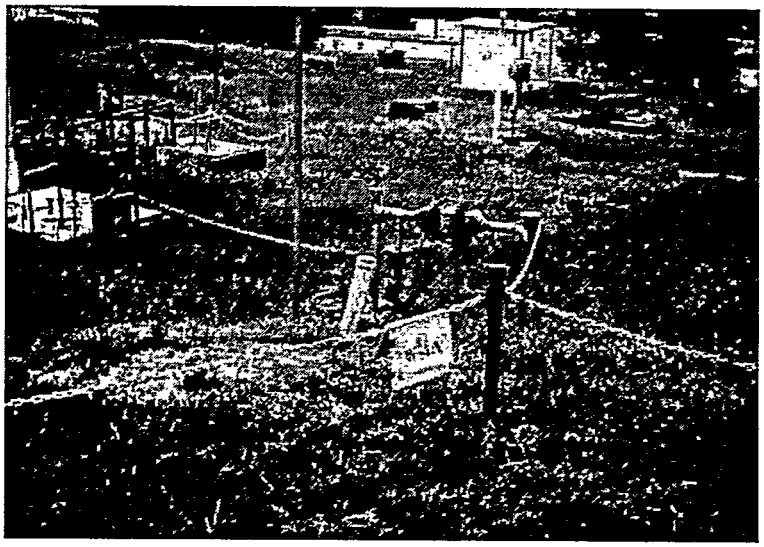
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_23.JPG; 18_05.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank WC-1

Unit Number: 01.29

Project Status: No Activity. (Whitehead 1996)

Unit Location: Tank is located east of Building 3038 and west of Building 3037 near the center of the main ORNL complex. Fifth Avenue Creek is ~ 150 ft (46 m) east of the tank. ORNL coordinates are N 22,144 ft and E 31,676 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is 8.66 ft (2.6 m) in diameter, 6.0 ft (1.8 m) high, and constructed of stainless steel. Capacity is 2,000 gal (7,600 L). (ORNL 1990)

Dates Operated: Site commissioned: 1950s. Taken out of service: 1968. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The tank was used for the collection and monitoring of process liquid waste from isotope production and development laboratories (Buildings 3038, 3029, 3028, 3030, 3031, 3032, 3033, and 3047). The tank also collected waste from the Building 3110 filter, 3039 stack, and 3092 scrubber. (ORNL 1990) The tank was emptied in 1992. (ORNL 1994)

Waste Characteristics: The tank was sampled in 1990 at which time 375 gal of liquid remained in the tank. The liquid portion associated with the suspended solid has elevated levels of RCRA metals (Ba, Cr, and Pb). The Pb was greater than the RCRA limit by a factor of 10. Only Cs-137 (3.17×10^4 Bq/mL) and Sr-90 (1.4×10^3 Bq/mL) were observed at an appreciable level in the liquid phase. A much higher level of long-lived fission products was observed in the suspended solids. The level of transuranium elements (4×10^4 Bq/mL for Pu-238 and 3.48×10^4 for Am-241) was high enough to classify the solid as TRU waste. (Autry et al 1992)

Release Data: Maximum direct beta-gamma absorbed dose is 0.23 mrad/h at 0.4 to 1.2 in. (1 to 3 cm) above surface and 10 ft (3 m) from tank. Highest Cs-137 and Co-60 activities were 1,188 pCi/g and 567 pCi/g, respectively. Highest Sr-90 concentrations were 207 pCi/mL and 97 pCi/mL. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Autrey, J.W., J.M. Keller, W.H. Griest, J.L. Botts, R.L. Schenley, and M.A. Snipe, February 1992. *Sampling and Analysis of the Inactive Waste Tanks TH-2, WC-1 and WC-15* ORNL/ER-19, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

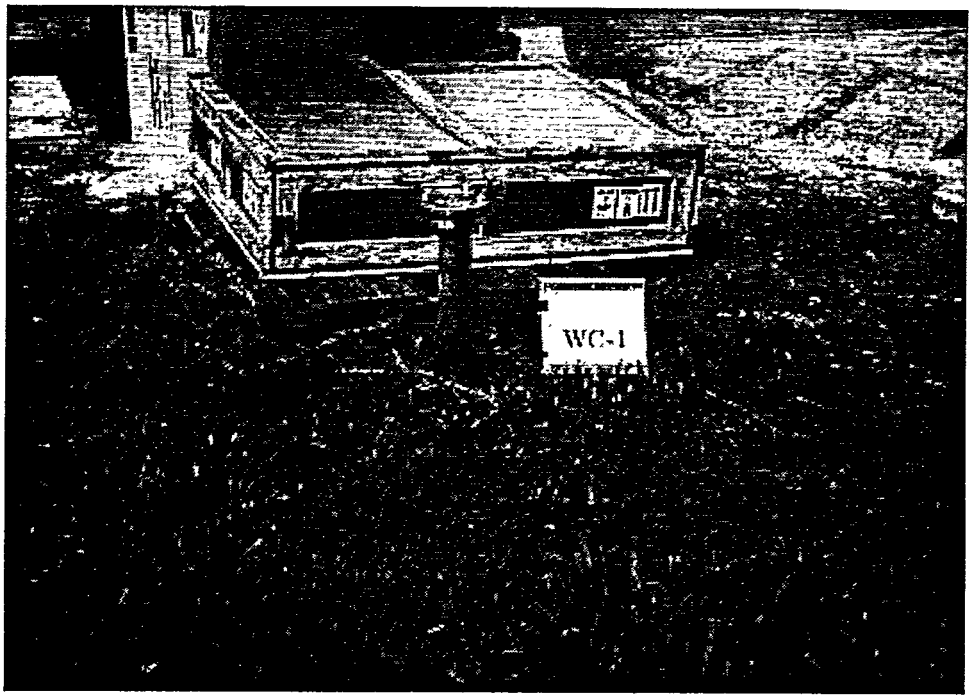
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 18_02.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank WC-15

Unit Number: 01.30A

Project Status: No Activity. (Whitehead 1996)

Unit Location: Located south of Building 3587 and west of Building 4508 near the intersection of Fifth Street and White Oak Avenue. Fifth Creek is ~ 65 ft (20 m) east of the tank site. ORNL grid coordinates are N 21,730 ft and E 31,771 ft. (ORNL 1994)

Approximate Dimensions and Capacity: Tank is made of stainless steel and is placed underground, with ~ 10.0 ft (3.0 m) of soil and gravel cover. Diameter: 5.5 ft (1.7 m). Height: 7.33 ft (2.23 m). It is not accessible from ground level. Capacity is 1,000 gal (3,800 L). (ORNL 1990)

Dates Operated: Site commissioned: 1951. Taken out of service: 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Tank was designed to receive waste from research laboratories in Building 4500. It was emptied in mid-1993 after some of the contents leaked out through the bottom of the tank. (ORNL 1994) (ORNL 1994)

Waste Characteristics: The tank contents were sampled during the 1989 sampling campaign. The results were as follows: 0.48 Bq/mL gross alpha; 12.2 Bq/mL gross beta; 3.5 Bq/mL Cs-137; 1.68 Bq/mL Sr-90; and < 0.2 Bq/mL Co-60. The tank contained an organic layer with di-n-butylphthalate present at a concentration of 1,900 µg/L. (ORNL 1994)

Release Data: Tank was taken out of service because of leaks. Groundwater entered the tank after it was emptied and stabilized at ~ 40% of the tank capacity (~ the level of the groundwater table). (ORNL 1994) Soil cores taken in the vicinity of tanks WC-15 and WC-17 are contaminated over their full length with no predominant distribution pattern. Radionuclides observed in the soil include Cs-137, Sr-90, Co-60, Am-241, and Cm-244. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

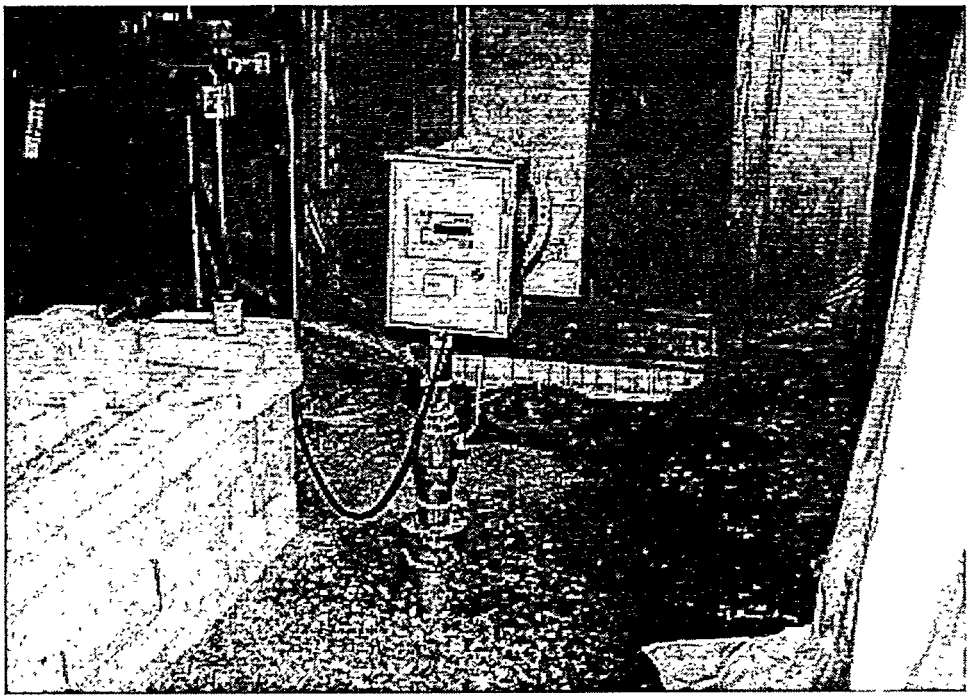
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_06.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank WC-17

Unit Number: 01.30B

Project Status: No Activity. (Whitehead 1996)

Unit Location: Located south of Building 3587 and west of Building 4508 near the intersection of Fifth Street and White Oak Avenue. Fifth Creek is ~ 65 ft (20 m) east of the tank site. ORNL grid coordinates are N 21,736 ft and E 31,771 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is made of stainless steel and is placed underground, with ~ 10.0 ft (3.0 m) of soil and gravel cover. Diameter: 5.5 ft (1.7 m). Height: 7.33 ft (2.23 m). It is not accessible from ground level. Capacity is 1,000 gal (3,780 L). (ORNL 1990)

Dates Operated: Site commissioned: 1951. Taken out of service: 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Tank was designed to receive waste from research laboratories in Building 4500. (ORNL 1990) The tank was pumped in 1992 and as much sludge as possible was removed. (ORNL 1994)

Waste Characteristics: Tank WC-17 was sampled in the 1988 sampling campaign. The results were as follows: < 10 Bq/mL Cs-137 and < 1 Bq/mL Sr-90. The tank has been emptied since these samples were taken. (ORNL 1994)

Analysis of the 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (ORNL 1990)

Release Data: Tank was taken out of service because of leaks. The tank has 2 holes in the bottom where groundwater enters. (ORNL 1994) Soil cores taken in the vicinity of tanks WC-15 and WC-17 are contaminated over their full length with no predominant distribution pattern. Radionuclides observed in the soil include Cs-137, Sr-90, Co-60, Am-241, and Cm-244. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_07.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank TH-1

Unit Number: 01.31A

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: Located near Building 3503 (south of the building) and north of Southside Avenue. ORNL coordinates are N 21,520 ft and E 31,400 ft. (Whitehead 1996)

Approximate Dimensions and Capacity: This tank has a capacity of 2,500 gal (9,500 L) and is vertically oriented. The height is 10 ft (3 m) with a diameter of 7 ft (2.1 m). The tank is buried ~ 5 ft (1.5 m) below the surface and is constructed of stainless steel. The tank is anchored on a concrete pad. (Whitehead 1996). TH-1 was a used tank prior to being installed. The tank is mounted on a flat surface concrete pad with U-bolts. It is not embedded in concrete. (Bechtel et al 1992)

Dates Operated: Site commissioned: 1948. Taken out of service and emptied: 1970. (Bechtel et al 1992)

Present Function: FFA Category D, Out-of-Service, Inactive, liquid radioactive waste Task. (Whitehead 1996)

Life Cycle Operation: Tank received waste from the thorium pilot plant project in Building 3503. (ORNL 1990)

Waste Characteristics: Tank contained an estimated 280 gal (1,100 L) of liquid prior to emptying in September 1992. (ORNL 1994) The samples from this tank were not significantly different from the blank. The liquid activities were 390 Bq/mL gross alpha; 32,000 Bq/mL gross beta; 900 Bq/mL Cs-137; 5 Bq/mL H-3; < 20 Bq/mL Co-60 and 10,000 Bq/mL Sr-90. The alpha emitters were 88 Bq/mL U-238 and 51 Bq/mL Th. Ag, Ba, Cr, Hg, Ni, Pb, and Si were also detected. (Bechtel National Inc/CH2MHill 1993)

Release Data: A walk-over survey found absorbed dose rates to be 3.2 mrad/h. The highest levels of Cs-137 and Sr-90 in surface soils were 7.6 nCi/g and 4.6 nCi/g, respectively. Groundwater was encountered at a core site (16.1 ft [4.9 m] below grade) and determined to be contaminated with Sr-90 at a concentration of 97 pCi/mL. The tank is not known to be inleaking or outleaking. (ORNL 1994)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2MHill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory,* Oak Ridge, Tennessee, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_36.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank TH-2

Unit Number: 01.31B

Project Status: No Activity. (Whitehead 1996)

Unit Location: The site is located near Building 3503 (south of the building) and north of Southside Avenue. (Whitehead 1996). ORNL coordinates are N 21,524 ft and E 31,420 ft. (ORNL 1994)

Approximate Dimensions and Capacity: This tank has a capacity of 2,400 gal (9,100 L) and is vertically oriented. The height is 10 ft (3 m) with a diameter of 7 ft (2.1 m). The tank is buried ~5 ft (1.5 m) below the surface and is constructed of stainless steel. The tank is anchored on a concrete pad. (Whitehead 1996)

Dates Operated: Site commissioned: 1952. Taken out of service and emptied: 1970. (Bechtel et al 1992)

Present Function: Not in Operation.

Life Cycle Operation: The tank received waste from the thorium pilot plant project in Building 3503. (Bechtel et al 1992)

Waste Characteristics: Because of high radiation levels, Tank TH-2 was not sampled for radioactivity in 1988. The direct reading at the top of the tank measured 150 mrad/h, and the transferable counts were 50 dpm alpha and 3,000 dpm beta-gamma per 100 sq cm. Dose rate increased after shielding was removed. Direct dose rate was 6 rad/h, and transferable contamination was 100 dpm alpha and 22,000 dpm beta-gamma per 100 sq cm, respectively. (ORNL 1990) The tank was emptied in FY 1992 (ORNL 1994) The tank was sampled in 1990. (Kaiser 1996) Results for liquid contents were as follows: Gross alpha activity was 87.6 Bq/mL and gross beta activity was 9280 Bq/mL. Ca-137 was measured up to 2,740 Bq/mL; C-14 2,350 Bq/mL; H-3 2.34 Bq/mL; Co-60 4 Bq/mL; 2,820 Bq/mL Sr-90. No sludge or organic layers were found. (Bechtel National, Inc/CH2MHill 1993) Only Hg exceeded the RCRA limits for metals. (Autry et al 1992)

Release Data: A walk-over survey found absorbed dose rates to be 3.2 mrad/h. The highest levels of Cs-137 and Sr-90 in surface soils were 7.6 nCi/g and 4.6 nCi/g, respectively. Groundwater was encountered at a core site (16.1 ft [4.9 m] below grade) and determined to be contaminated with Sr-90 at a concentration of 97 pCi/mL. (ORNL 1994)

Site Status: CERCLA (ORNL 1994)

Media of Concern: Groundwater

Comments: Location is listed as south of White Oak Avenue on the 1990 contaminated site summary sheets (CSSS).

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Autrey, J.W., J.M. Keller, W.H. Griest, J.L. Botts, R.L. Schenley, and M.A. Snipe, February 1992. *Sampling and Analysis of the Inactive Waste Tanks TH-2, WC-1 and WC-15* ORNL/ER-19, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Bechtel National Inc./CH2MHill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory,* Oak Ridge, Tennessee, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee. FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Kaiser, Linda, May 1996. ORNL Program Planning Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 19_21.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank TH-3

Unit Number: 01.31C

Project Status: No Activity. (Whitehead 1996)

Unit Location: The site is located near Building 3503 (south of the building) and south of White Oak Avenue. ORNL coordinates are N 21,524 ft and E 31,436 ft. (ORNL 1994)

Approximate Dimensions and Capacity: Capacity is 3,300 gal (12,500 L), diameter is 9.2 ft (2.8 m), and height is 10 ft (3 m). The vertical tank is mounted on a concrete slab and buried ~5 ft deep (Bechtel et al 1992)

Dates Operated: Site commissioned: 1952. Taken out of service and emptied: 1970. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The tank received waste from the thorium pilot plant project in Building 3503. (Bechtel et al 1992)

Waste Characteristics: The tank was sampled in 1988 and found to contain 140 gal of liquid contaminated with strontium, cesium, tritium, caborn-14, uranium, and thorium. The pH of the liquid was 1.8. Chlorobenzene was detected at 2 µg/L and mercury was detected at 11 µg/L. Gross beta activity was ~ 3.2×10^4 Bq/mL, mostly from strontium and cesium; gross alpha activity was ~ 1.5×10^2 Bq/mL, mostly from uranium. (Bechtel National, Inc/CH2MHill 1993)

Analysis of 1988 samples of liquid in this tank indicate that the liquid should be classified as having RCRA characteristics. No sludge was found in the tank. Liquid should also be classified as corrosive (pH=1.8). (ORNL 1990)

Release Data: A walk-over survey found absorbed dose rates to be 3.2 mrad/h. The highest levels of Cs-137 and Sr-90 in surface soils were 7.6 nCi/g and 4.6 nCi/g, respectively. Groundwater was encountered at a core site (16.1 ft [4.9 m] below grade) and determined to be contaminated with Sr-90 at a concentration of 97 pCi/mL. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: The tank was emptied in 1992 (ORNL 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National Inc./CH2MHill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory,* Oak Ridge, Tennessee, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 19_20.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection/Storage Tank TH-4

Unit Number: 01.32

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: Located in the central ORNL complex between Central Avenue and White Oak Avenue. The nearest building is Building 3500. See ORNL coordinates N 21,760 ft and E 31,515 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is made of gunite. Capacity is 14,000 gal (53,000 L); diameter is 20 ft (6 m); height is 9.0 ft (2.7 m). Tank is covered with ~ 6.0 ft (1.8 m) of soil. (ORNL 1990)

Dates Operated: Site commissioned: 1943. Taken out of service: 1970. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Tank was built to receive waste from the irradiated thorium and uranium pilot plant (Building 3550) development projects. (Bechtel et al 1992)

Waste Characteristics: In March 1993, the tank was reportedly filled with alkaline thorium and uranium sludge. Both the liquid and sludge in Tank Th-4 appear, based on gross alpha measurements, to have relatively low activities of TRU elements which are less than 3,700 Mq/mL or less than 3,700 Bq/g, respectively. Liquid and sludge samples have exhibited elevated levels of Cs-137 (up to 240 Bq/mL ad 660 Bq/g, respectively) and Sr-90 (up to 25 Bq/mL and 2,200 Bq/g, respectively). (Jacobs Engineering 1994) Total radioactivity is estimated to be < 1 Ci. Maximum absorbed dose rate above the tank contents was 8.1 mrad/h. The direct reading at the tank opening was 0.5 mrad/h. No direct dose rate greater than 0.1 mrad/h was detected at the tank site, except for readings of 0.26 mrad/h and 0.32 mrad/h at pipe locations. Major radionuclide inventory is Sr-90 (0.06 Ci), Cs-137 (0.5 Ci), TRU (0.085 Ci). (ORNL 1990). Other hazardous constituents include Cr, Hg, Pb, VOCs, and SVOCs. (Bechtel et al 1992)

The Site Characterization Summary Report (Bechtel et al 1992) showed the tank to be filled with liquid to a level above its design capacity, with ~ 6,315 gal of sludge in the bottom. The gross beta activity was ~ 10.8 Ci, mostly from strontium-90 and cesium-137, and gross alpha activity was ~ 2.8 Ci from uranium and thorium.

The tank contents were measured in 1994-1995 and contained 5,452 gal of sludge and 5,410 gal of liquid. The curie loading for the GAAT tanks is derived from the Phase I sampling (August - November 1994), the Phase II sampling (May - August 1995) and the 1988 sampling events. The curie loading median confidence limit for the liquid contents of tank TH-4 is 313 Bq/mL consisting of Cs-137, Sr-90 and some U isotopes. The curie loading 95 percentile confidence limit for the liquid contents of the tank is 491 Bq/mL consisting of Cs-137, Sr-90 and some U isotopes. The curies loading median confidence limit for the sludge portion of the tank is 6,100 Bq/g consisting of Co-60, Cs-137, Sr-90, Pu isotopes, Th-232+d and U isotopes. The curie loading 95 percentile confidence limit for the sludge of the tank is 9,500 Bq/g consisting of Co-60, Cs-137, Sr-90, Pu isotopes, Th-232+d and U isotopes. Metals detected in the sludge contents of the tank exceeded RCRA criteria for Cr (D007) and Hg (D009).
(MACTEC 1996)

Analysis of 1988 samples liquid and sludge samples indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP.
(ORNL 1990)

Release Data: Soil samples revealed that there was no significant contamination at this site, with no activity exceeding 27 pCi/g. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is part of Group II Gunite and Associated Tanks (GAAT), and is being addressed under CERCLA. (Emison 1996) A proposed plan is expected to be completed December 1996. (Riner 1996) A Record of Decision (ROD) is expected in 1997. (Emison 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Emison, John, November 25, 1996. Apex Environmental, Inc., personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Jacobs Engineering, Inc. May 1994. *Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee,* DOE/OR/02-1275 & D1, Oak Ridge, Tennessee.

MACTEC, March 1996. *Evaluation of Phase I and Phase II Sampling and Analysis Data for the Gunite and Associated Tanks at Oak Ridge National Laboratory*, ORNL/ER-365, Oak Ridge, Tennessee

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Riner, Ray, December 2, 1996. Parsons Corporation, GAAT Program Business Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 19_01.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-4

Unit Number: 01.36

Project Status: Pending approval from TDEC tank will be grouted in place FY96. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 22,210 ft and E 31,145 ft. This tank is located west of Building 3026. (ORNL 1990)

Approximate Dimensions and Capacity: The tank is a vertical stainless steel tank that rests on a concrete slab. The tank is 7.0 ft (2.1 m) in diameter and 7.0 ft in length. The top of the tank is located 8 ft (2.4 m) below the surface. It has a capacity of 1,700 gal (6,400 L) and a normal operating volume of 1,200 gal (4,500 L). The tank receives waste through a 1-in.-diam (2.5-cm-diam) stainless steel line. It discharges through a 2-in. (5-cm) stainless steel pipe. (ORNL 1990)

Dates Operated: Date installed: 1944. Taken out of service late 1950's. (ORNL 1994)

Present Function: Not in operation.

Life Cycle Operation: The tank received radioactive waste until the 1950's from Building 3026. It was used as a waste storage tank for Building 3026. Waste from the Roll Up Process, which involved dissolving uranium targets and extracting isotopes, was disposed of in this tank. At the time the tank was removed from active service, it contained ~ 1400 gallons of waste. The tank was drained and flushed in May 1990; a heel of ~ 190 gallons remained in the tank. (ORNL 1994)

Waste Characteristics: The major nuclides of concern are Sr-90, Cs-137, Co-60, and H-3. The gross alpha activity detected in 1990 was 105 Bq/mL and the gross beta activity was 142,000 Bq/mL. This tank was not sampled in 1992-1993 because it was empty. No hits of soluble organics were observed. (Bechtel National/CH2MHill 1993) The tank receives ~ 0.25 gal/day due to inleakage from a leaking flange on the discharge line and the tank ventilation system. (ORNL 1994)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2MHill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory* Oak Ridge, Tennessee. DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

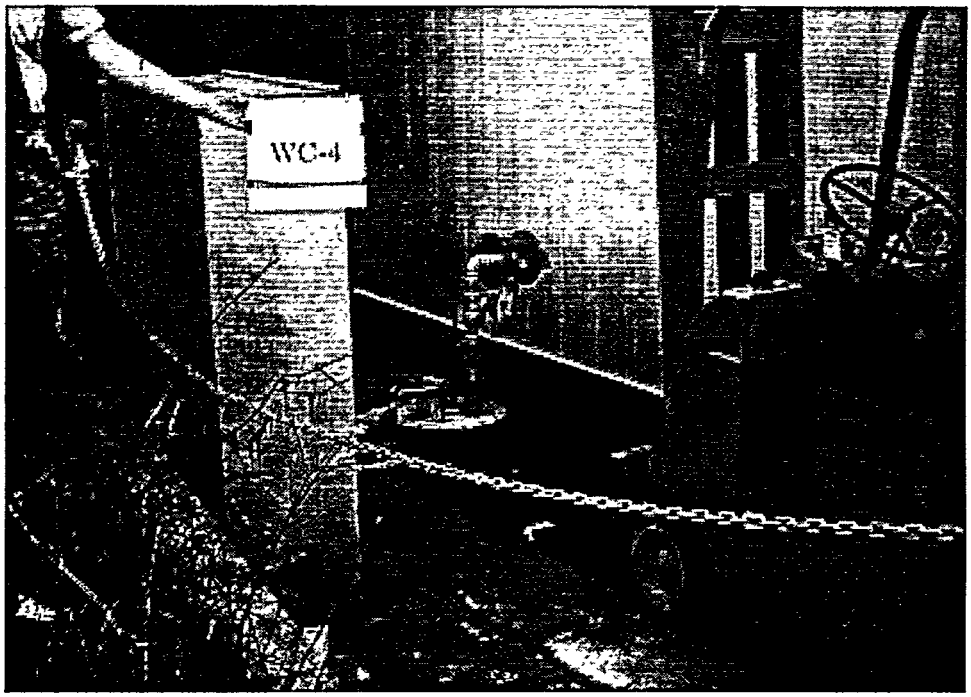
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 18_03.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-5

Unit Number: 01.37A

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,515 ft and E 31,425 ft. This tank is located south of Building 3503. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 5.5 ft (1.7 m) in diameter and 7.3 ft (2.2 m) in length. The tank top is located 8 ft (2.4 m) below the surface. It has a capacity of 1,000 gal (3,800 L) and a normal operating volume of 750 gal (2,800 L). All lines entering or leaving the tank are 2-in.-diam (5-cm-diam) stainless steel. (ORNL 1990)

Dates Operated: Date installed: 1952. Removed from service: 1991 (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Tank WC-5 was used as a waste storage tank for Building 3508, which was known as the Chemical Technology Alpha Laboratory. This facility has not served as a radioactive laboratory since ~ 1985, when it was turned over to Instrumentation and Controls Division. (ORNL 1994)

Waste Characteristics: This tank was sampled in 1992. The results of the liquid samples analyzed indicated the presence of dilute NaOH, all other inorganic concentrations were low. Mercury was detected at 0.22 mg/L, however, which is slightly over the threshold that classifies a waste as RCRA (ie ≥ 0.2 mg/L). Gross alpha and beta activities were ~ 1 Bq/mL each. Several samples collected from the tank bottom contained a trace of sediment. One bottom sample contained 141 Bq/mL of alpha activity and 0.44 mg/L of mercury. The principle metal analytes in the sediment solids appeared to be Ca, Fe, and Mg. Very little volatile organic compounds were detected; the only SVOA detected was phthalate detected at trace levels. No pesticides or PCB's were detected. (Sears et al 1995) Tank WC-5 contained ~ 450 gal of liquid as of April 1993. All drains within Building 3508 that drain to this tank have been blocked. The tank appears to collect inleakage during rainfall. (ORNL 1994).

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

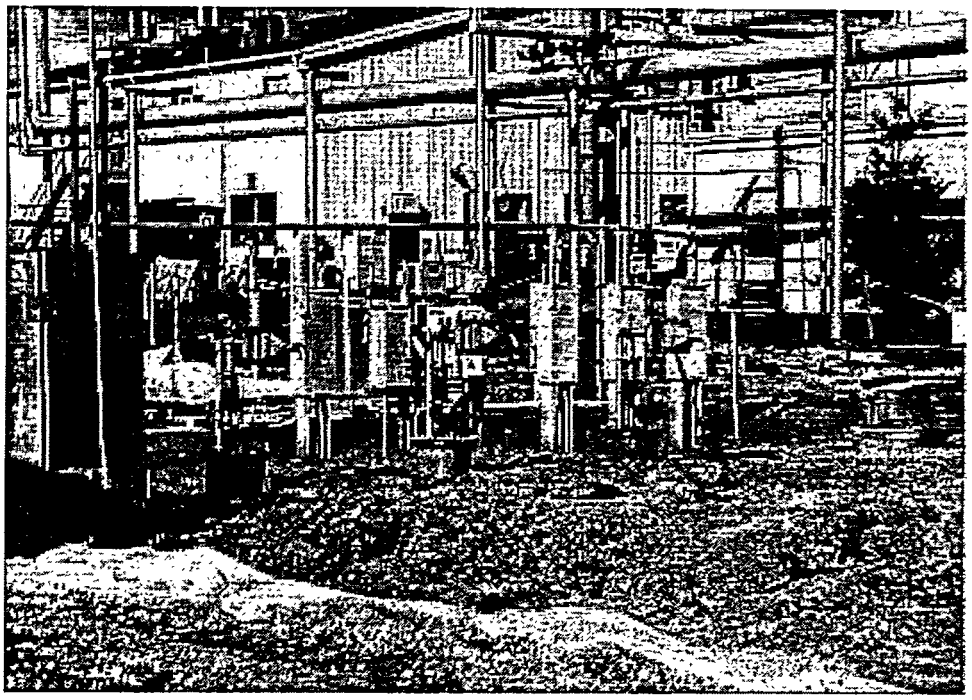
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Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 12_27.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-6

Unit Number: 01.37B

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,510 ft and E 31,425 ft. This tank is located south of Building 3503. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 4.5 ft (1.4 m) in diameter and 5.67 ft (1.7 m) in length. The tank top is located 9.7 ft (2.9 m) below the surface. It has a capacity of 500 gal (1,900 L) and a normal operating volume of 350 gal (1,300 L). All lines entering or leaving the tank are 2-in.-diam (5-cm-diam) stainless steel. (ORNL 1990)

Dates Operated: Date installed: 1952. Removed from service: 1991 (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The tank received waste from Buildings 3508, 3541, and 3592. (ORNL 1990)

Waste Characteristics: Except for sodium, few inorganic analytes were detected in the aqueous phase and their concentrations were low. The gross alpha and gross beta activities were < 1 and 1 Bq/mL, respectively. Several samples collected from the tank bottom contained sediment. Sediments contained gross alpha activity detected at 1,670 Bq/mL and low levels of uranium and thorium (45 and 30 mg/L respectively). No VOC, SVOC, pesticide, or PCB TCL compounds were detected above reporting limits (Sears et al 1995) Tank WC-6 contained ~ 85 gal of liquid as of April 1993. The tank appears to collect inleakage during rainfall. (ORNL 1994).

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

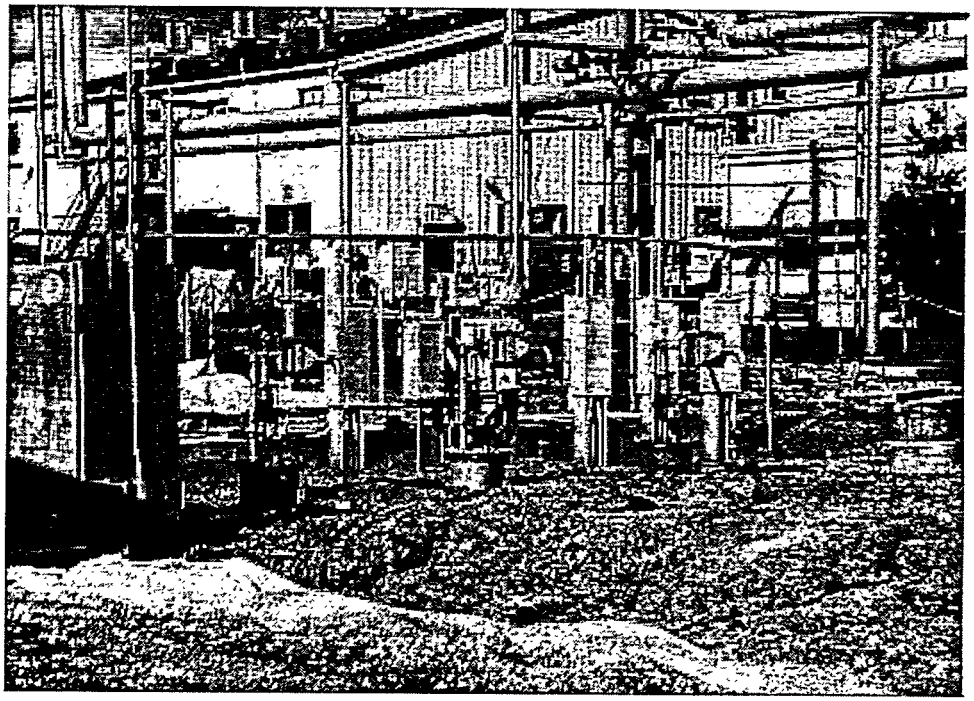
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 12_28.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-8

Unit Number: 01.37C

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,505 ft and E 31,425 ft. This tank is located south of Building 3503. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 5.5 ft (1.7 m) in diameter and 7.3 ft (2.2 m) in length. The tank top is located 4.0 ft (1.2 m) below the surface. It has a volume of 1,000 gal (3,800 L) and a normal operating volume of 750 gal (2,800 L). All lines entering or leaving the tank are 2-in.-diam (5-cm-diam) stainless steel. (ORNL 1990)

Dates Operated: Date installed: 1952. Removed from service: 1991 (ORNL 1994)

Present Function: Tank WC-8 contained ~ 345 gal of liquid as of April 1993. An average of 112 gal/month was collected in this tank during 1992. The tank is used to collect pump prime water for a nearby pump. (Pump is to be replaced in the future). (ORNL 1994)

Life Cycle Operation: Tank WC-8 was used as a waste storage tank for Building 3503. Currently, the tank only receives waste when an adjacent pump is primed (the pump prime water is sent to this tank). (ORNL (1994)

Waste Characteristics: The samples collected from Tank WC-8 were basic due to diluted NaOH. Concentrations of other inorganic analytes were low. The gross alpha and beta activities were < 1 and 6 Bq/mL, respectively. No VOC, SVOC, pesticides, or PCB TCL compounds were detected above reporting limits. (Sears et al 1995)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Kaiser, Linda, May 1996. ORNL Program Planning Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

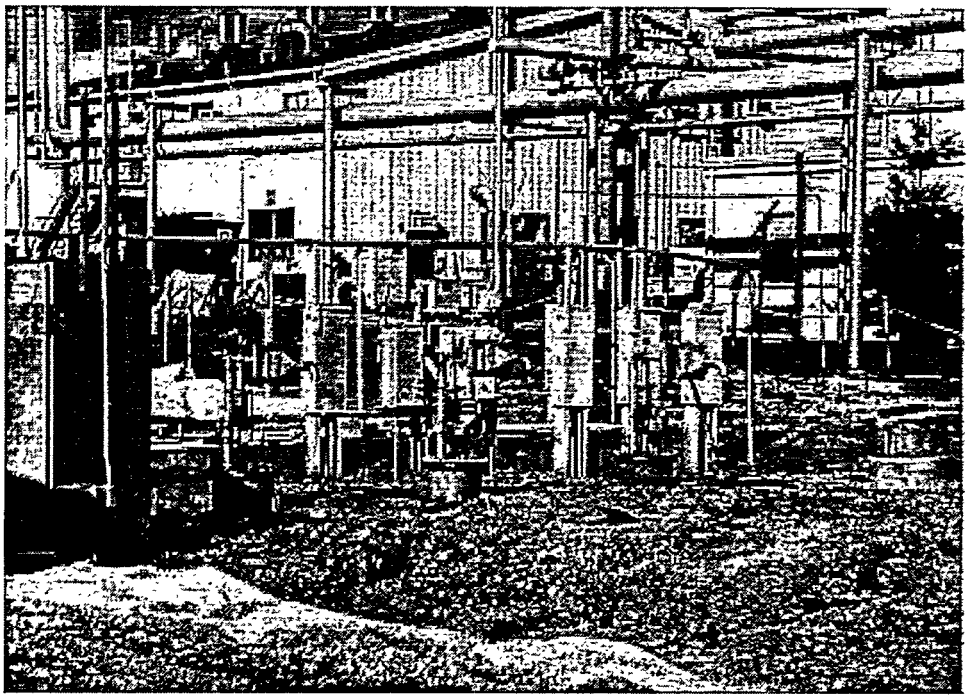
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 12_29.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-11

Unit Number: 01.39B

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,730 ft and E 31,765 ft. This tank is located south of Building 3587. (ORNL 1990)

Approximate Dimensions and Capacity: Capacity is 4,600 gal (17,400 L) with a normal operating volume of 2,900 gal (11,000 L). The unit is a horizontal stainless steel tank. The diameter is 7.7 ft (2.3 m); length is 13.7 ft (4.2 m). The depth from the ground surface to the top of the tank is 9.0 ft (2.7 m).(ORNL 1990)

Dates Operated: Date installed: 1951. Removed from service: 1991 (Bechtel et al 1992)

Present Function: Building 4556 (filter pit for Building 4507) discharges to this tank. Cell ventilation ductwork in the area also discharges to tank WC-11. (ORNL 1994)

Life Cycle Operation: Tank WC-11 was used as a waste storage tank for Building 4500N, 4501, 4505, 4507, and 4456. Building 4556 is a filter pit for Building 4507 and still generates liquid radioactive waste. (ORNL 1994)

Waste Characteristics: Tank WC-11 contained ~ 450 gal of liquid as of April 1993, a small amount of which is sludge. An average of 468 gal/month was collected in this tank during 1992. (ORNL 1994) Tank WC-11 contained 1) an aqueous layer, 2) a small amount of brown sediment, and 3) a dark-brown, oily layer floating over the aqueous layer. The aqueous phase samples were radioactive with Cs-137 (58,000 Bq/mL the principle contributor. Co-60 was detected up to 110 Bq/mL. Field survey results for 200 mL of samples were ~ 20-25 Mrem/h for one sample. Concentrations of inorganics were low with the exception of sodium. The tank bottom (including sediment) sample contained alpha emitters (364 Bq/mL), europium isotopes (250-1,660 Bq/mL) and Co-60 (518 Bq/mL) in addition to Cs-137 (63,300 Bq/mL). Field survey results for 200 ml of tank bottom sample were 40-50 mrem/h. Principle metal analytes in sediment solids are Ca, Mg, Fe, and Mn. Sediments also contained U (3.8 mg/L), Th (3.4 mg/L), Ni (6.5 mg/L), and Pb (4.6 mg/L). No VOC, SVOC, pesticide, or PCB TCL compounds were detected above reporting limits for aqueous samples. (Sears et al 1995) Aroclor-1254 was detected at 1,700 µg/L in the organic layer. A GC profile of the organic layer indicated it is vacuum pump oil, or another similar oil. (Bechtel et al 1993)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (1994a)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1 Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1995), Oak Ridge, Tennessee.

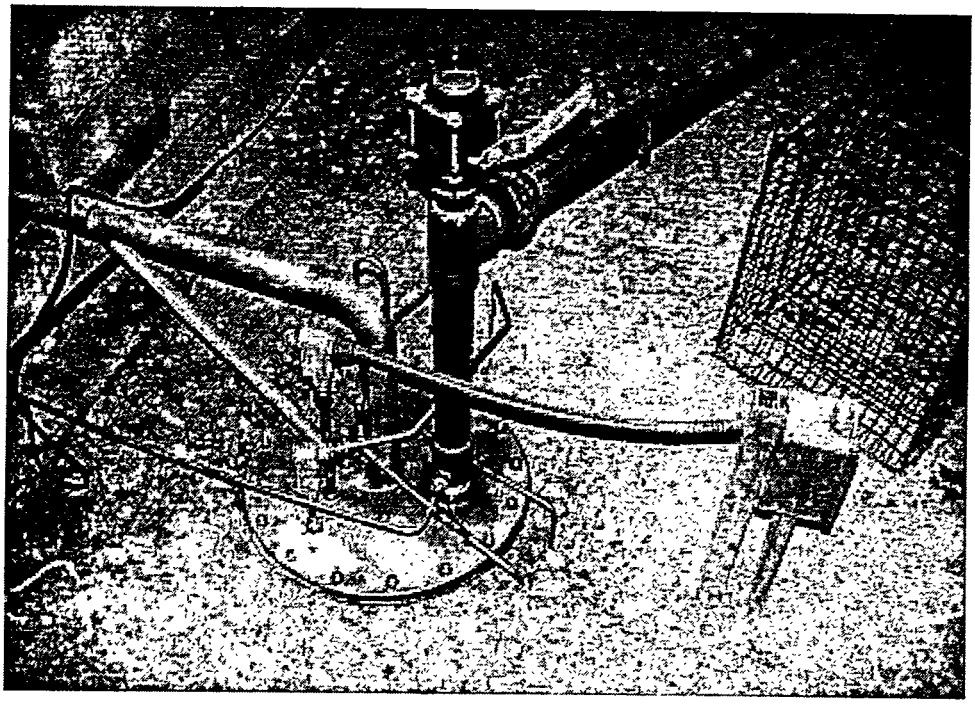
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee. Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL/TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_08.JPG



UNIT NAME: Inactive liquid radioactive waste Collection Tank WC-12

Unit Number: 01.39C

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,710 ft and E 31,770 ft. This tank is located south of Building 3587. (ORNL 1990)

Approximate Dimensions and Capacity: Capacity is 1,000 gal (3,800 L) with a normal operating volume of 700 gal (2,600 L). The unit is a vertical stainless steel tank that rests on a concrete slab. The diameter is 5.5 ft (1.7 m); length is 7.9 ft (2.3 m). The depth from the ground surface to the top of the tank is 9.1 ft (2.8 m). (ORNL 1990)

Dates Operated: Date installed: 1951. Removed from service: 1991 (Bechtel et al 1992)

Present Function: The sump for tank T-30 discharges to WC-12 and is manually operated. (ORNL 1994).

Life Cycle Operation: Tank WC-12 was used as a waste storage tank for Building 4505 and 4507. The sump in the vault in which tank T-30 is located, still pumps to this tank. (ORNL 1994)

Waste Characteristics: Tank WC-12 contained ~ 160 gal of liquid as of April 1993, a small amount of which is sludge. An average of 56 gal/month was collected in this tank during 1992. Tank WC-12 contained 1) an aqueous layer, 2) a shallow layer of thin sludge with highly radioactive solids, and 3) a trace of a yellow oily layer floating on the aqueous layer. The liquid samples were radioactive with Cs-137 as the principle contributor. Field survey results for 200 ml of sample were ~ 20-25 mrem/h. Concentrations of inorganic analytes, with the exception of Na, were low. No VOC, SVOC, pesticides, or PCB TCL constituents were detected above the reporting limits. Initial surveys of sludge samples indicated radiation fields up to ~900 mrem/h under the sludge layer and up to ~400 mrem/h with the sampling probe parallel to the sample bottle on the bench top. The highly penetrating nature of the radiation indicated the presence of Co-60. High levels of europium isotopes (70,400 - 380,000 Bq/mL), Co-60 (45,600 Bq/mL), Cs-137 (35,900 Bq/mL), Cm-244 (1,600 Bq/mL) and Pu-239/240 (24 Bq/mL) were present. Principle inorganic detected (mg/L) were Na (2,200), Ca (430), Fe (220), Mn (210), and Mg (110). The oily layer was not characterized. (Sears et al 1995)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

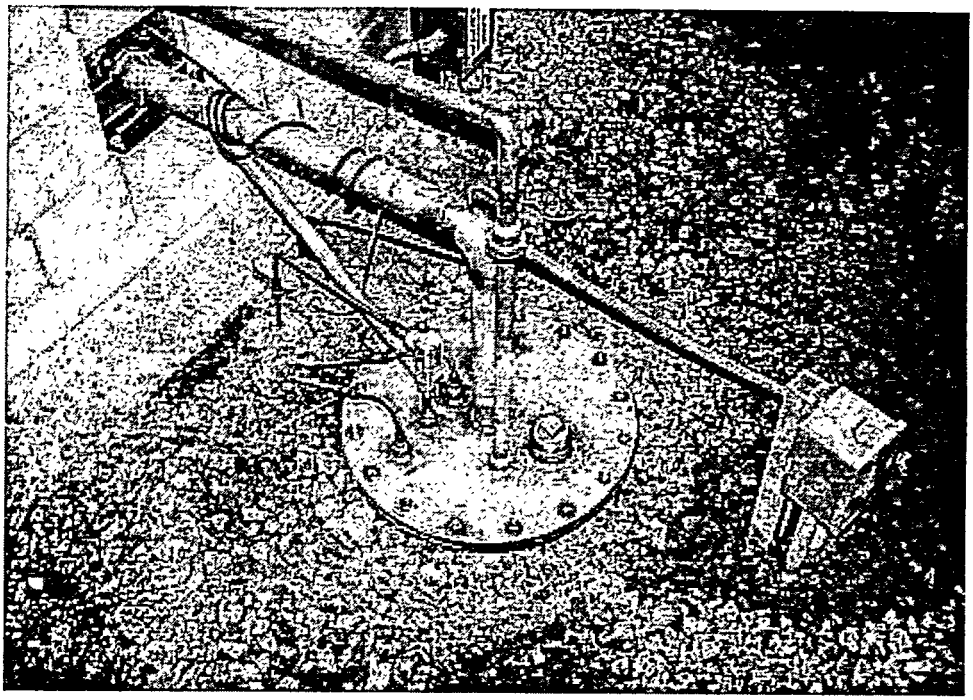
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_03.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-13

Unit Number: 01.39D

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,725 ft and E 31,770 ft. This tank is located south of Building 3587. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 5.5 ft (1.7 m) in diameter and 7.3 ft (2.2 m) long. The depth from the ground surface to the top of the tank is 9.3 ft (2.8 m). The unit has a capacity of 1,000 gal (3,800 L) and a normal operating volume of 700 gal (2,600 L). (ORNL 1990)

Dates Operated: Date installed: 1951. Removed from service: 1991 (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Tank WC-13 was used as a waste storage tank for Buildings 4500N, 4500S, and 4508. Various research activities that generated liquid radioactive waste were performed in these facilities. (ORNL 1994)

Waste Characteristics: Tank WC-13 contained ~175 gal of liquid as of April 1993, a small amount of which is sludge. An average of 70 gal/month was collected in this tank during 1992. (ORNL 1994) The tank contained 1) an aqueous layer, 2) a layer of sludge, and 3) an oily layer floating on the aqueous layer. The aqueous layer was radioactive mainly with Cs-137 (5,540 Bq/mL). Field survey results of ~200 ml of sample were 2-3 mrem/h. Low concentrations of inorganics were detected including U (14.4 mg/L) and Hg (2.7 mg/L). VOC's detected in the liquid layer were methyl alcohol (9,600 mg/L), N-butyl (8,900 mg/L) and an unknown compound eluding near the acetone retention time. No SVOCs, pesticides, or PCBs were detected above reporting limits. Sludge samples contained fairly high levels (Bq/mL) of europium isotopes (4,580-39,700), Co-60 (1520), Cs-137 (4580), Sr-90 (286), and some alpha emitters and RCRA metals. The principle metals detected (mg/L) were Na (11,700), U (6,700), Th (1,600), Ca (3,800), and Fe (3,400). The laboratory survey for ~ 200 ml of a composite sludge sample was ~50 mrem/h. The SVOC, di-n-butylphthalate (31,000 B µg/kg) and the PCB, aroclor-1254 was detected at 1630 µg/kg. The tank contains a layer of oil (~0.5 in thick) over the aqueous phase which appears to be vacuum pump oil. The SVOA, di-n-butylphthalate (17,000 J mg/L) and the PCB, aroclor-1254 (5060 µg/L) was detected in the oily layer. (Sears et al 1995)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill, June 1993. *Waste Characterization Data Manual for the Inactive Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge Tennessee*, DOE/OR/01-1159 & D1, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

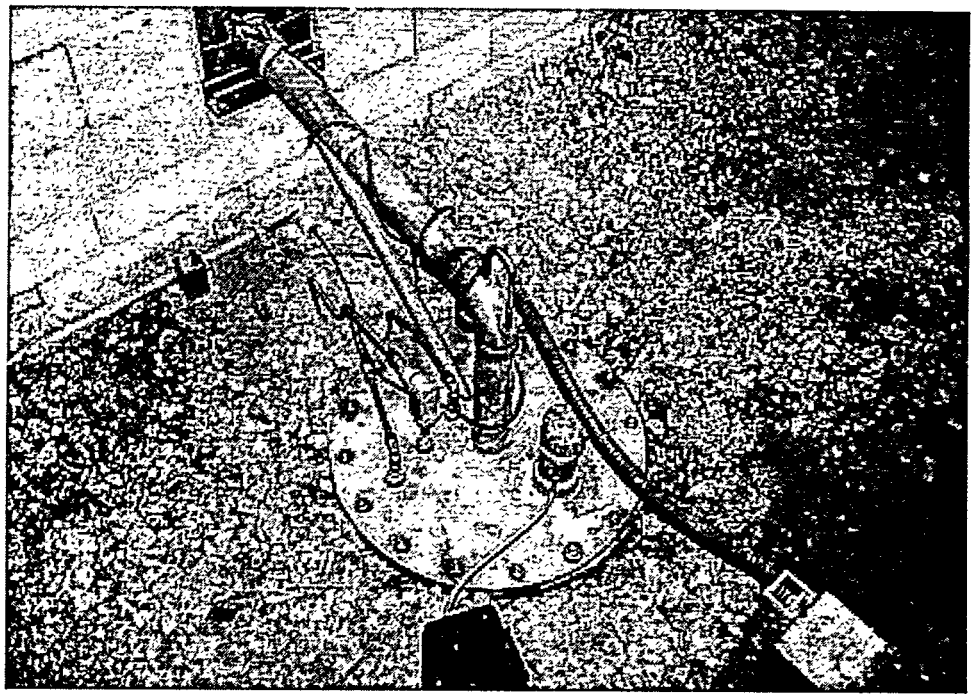
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_05.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank WC-14

Unit Number: 01.39E

Project Status: Tank removal action for liquid contents completed. Action memorandum signed February 2, 1995. (FFA 1996).

Unit Location: The ORNL coordinates for the tank are N 21,720 ft and E 31,770 ft. This tank is located south of Building 3587. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 5.5 ft (1.7 m) in diameter and 7.3 ft (2.2 m) long. The depth from the ground surface to the top of the tank is 9.3 ft (2.8 m). The unit has a capacity of 1,000 gal (3,800 L) and a normal operating volume of 700 gal (2,600 L).(ORNL 1996)

Dates Operated: Date installed: 1951. Removed from service: 1991 (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Tank WC-14 was used as a waste storage tank for Building 4501. (ORNl 1994)

Waste Characteristics: Tank WC-14 contained ~ 260 gal of liquid as of April 1993. An average of 14 gal/month was collected in this tank during 1992. (ORNL 1994) Inorganic concentrations in the aqueous phase were low for the 1993 samples. Aroclor-1248 was detected at 6.9 µg/L in August 1993, but at 13.2 µg/L in 1994. The 1993 sludge samples contained up to 2.4×10^5 µg/Kg of aroclor-1248. The liquid portion exhibited a gross alpha activity up to 90 Bq/mL and the sludge contained a gross alpha activity of 3.6×10^4 Bq/Kg. The gross beta activity exhibited in the liquid portion was 5.5×10^4 Bq/mL and 5.2×10^5 Bq/Kg in sludge. The major contributors for both the liquid and the sludge portions were Co-60, Cs-134, Cs-137 and Sr-90. (Sears et al 1995)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

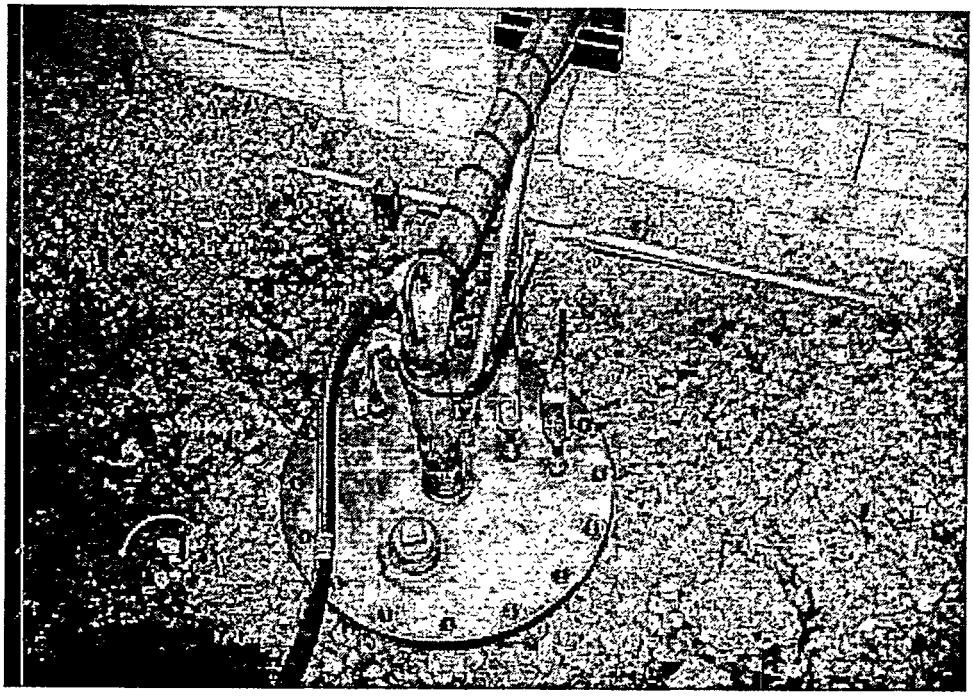
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_04.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-12

Unit Number: 01.41

Project Status: No Activity, (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 21,875 ft and E 31,060 ft. This is located southwest of Building 3525. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 4.0 ft (1.2 m) in diameter and 5.33 ft (1.6 m) long. The tank has a capacity of 700 gal (2,600 L) and a normal operating volume of 400 gal (1,500 L). (ORNL 1990)

Dates Operated: Date installed: 1951. Removed from service: 1991 (Bechtel et al 1992) Tank W-12 was temporarily used again for 15 months ending in October 1995; at that time it was drained and flushed.

Present Function: Not in operation.

Life Cycle Operation: Tank W-12 was used as a waste collection and storage tank for Building 3525. The tank vault sump and valve pits for tanks W-19 and W-20 also transfer to tank W-12. (ORNL 1994)

Waste Characteristics: The most recent sample was taken during the sampling campaign in October 1991. Results were as follows: liquid activities were 17.6 Bq/mL gross alpha; 5.5 x 10^4 Bq/mL gross beta; 5.48 x 10^4 Bq/mL Cs-137; 6.64 x 10^2 Bq/mL Sr-90; and 31 Bq/mL Co-60. Low level of PCBs were also detected. (ORNL 1994) Tank W-12 collected an average of 353 gal/month during 1992. This is the average collected while no "active" generators were using the tank. The tank has been viewed with a remote camera, and a line into the tank is the source of liquid entering W-12. (ORNL 1994)

Release Data: No releases reported. (ORNL 1990)

Site Status: RCRA/CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 19_04.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-17

Unit Number: 01.42B

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 22,030 ft and E 31,065 ft. This tank is located east of the South Tank Farm. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 5.5 ft (1.7 m) in diameter and 7.3 ft (2.2 m) long. The depth from the ground surface to the top of the tank is 9.3 ft (2.8 m). The unit has a volume of 1,000 gal (3,800 L) and a normal operating volume of 700 gal (2,600 L). (ORNL 1990)

Dates Operated: Date installed: 1950. Removed from service: 1991 (Bechtel et al 1992)

Present Function: Tank W-17 collects inleakage this is routinely emptied and processed at the liquid radioactive waste evaporator. Tanks W-17 and W-18 collected an average of 805 gal/month during 1992. (ORNL 1994)

Life Cycle Operation: This tank collected liquid radioactive waste from hot cells in Building 3026 and liquids from the 3500 area cell ventilation duct. (Bechtel et al 1992)

Waste Characteristics: W-17 contained a clear aqueous liquid; no sediment was observed. The field survey results were < 0.1 mrem/h. Samples collected October, 1992, were basic and contained dilute NaOH. Gross alpha activity was < 1 Bq/mL and gross beta activity was 24 Bq/mL. Low concentration (mg/L) of As (0.006) and Pb (0.4) were detected. Other inorganic constituents detected (mg/L) Ca (4.0), Mg (0.2), Na (1460), Th (<0.17), U (3.3), and Zn (10.7). Acetone was detected only slightly above blank values. No SVOA or pesticides were detected. (Sears et al 1995)

Analysis of 1988 liquid and sludge samples in the tank indicated that both should be classified as having RCRA waste characteristics. Volatile organic RCRA constituents were above the regulatory thresholds listed in the TCLP. (Bechtel et al 1992)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Tank W-17 collects inleakage that is routinely emptied and processed at the liquid radioactive waste evaporator. The inlet line is thought to be the location of the inleakage. (ORNL 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) The inlet line to W-17 (and W-18) is thought to be the location of the inleakage. (ORNL 1994)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

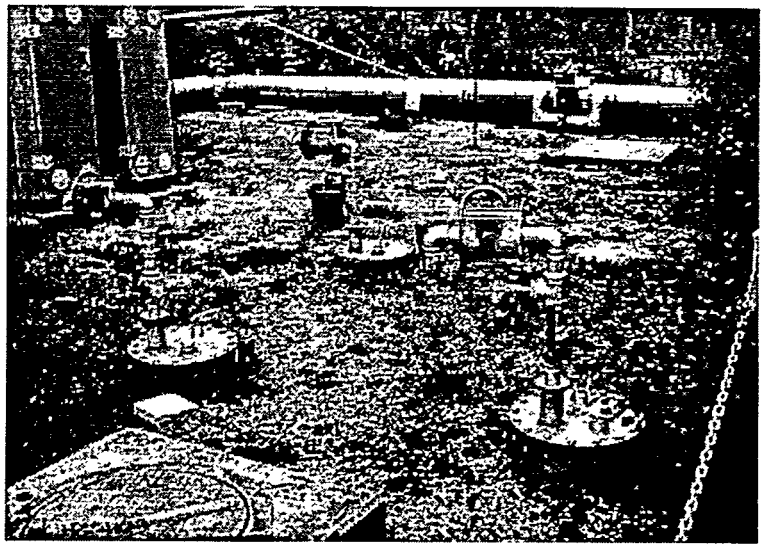
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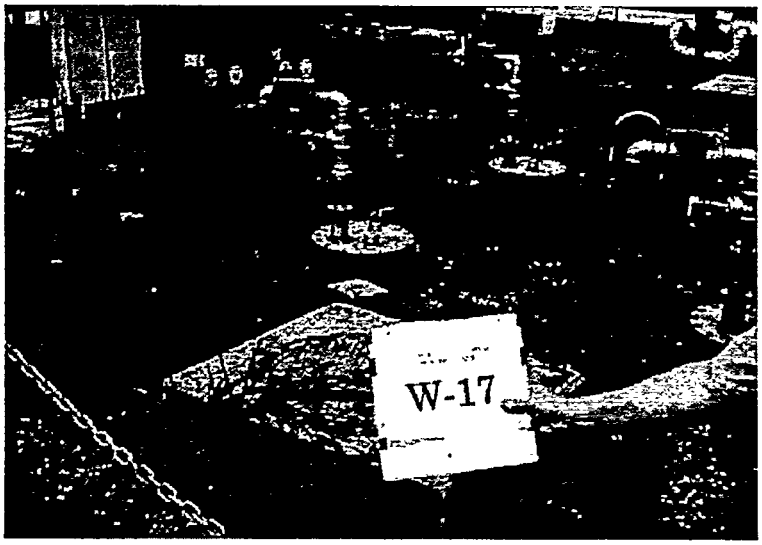
Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_27.JPG; 19_03.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-18

Unit Number: 01.42C

Project Status: No Activity. (Whitehead 1996)

Unit Location: The ORNL coordinates for the tank are N 22,030 ft and E 31,700 ft. This tank is located east of the South Tank Farm. (ORNL 1990)

Approximate Dimensions and Capacity: The unit is a vertical stainless steel tank that rests on a concrete slab. The tank is 5.5 ft (1.7 m) in diameter and 7.3 ft (2.2 m) long. The depth from the ground surface to the top of the tank is 9.3 ft (2.8 m). The unit has a capacity of 1,000 gal (3,800 L) and a normal operating volume of 700 gal (2,600 L). (ORNL 1990)

Dates Operated: Date installed: 1950. Removed from service: 1991 (Bechtel et al 1992)

Present Function: No in operation.

Life Cycle Operation: Tank W-18 served as a waste collection tank for Building 3026C, an isotope production facility, until 1991. (ORNL 1994)

Waste Characteristics: The tank was sampled in October 1992 and was found to contain a clear aqueous liquid with a thin layer of a fine, chalk-white sediment on the bottom. The field survey results for 200-mL samples were < 0.1 mrem/h. Gross alpha and gross beta activities were < 1 and 14 Bq/mL, respectively, for the filtered sample. Radionuclides detected Bq/mL) were Co-60 (0.64), Cs-137 (15.5), Eu-152 (<0.5), Eu-154 (<0.38), Eu-155 (<0.29), Cs-137 (92.9), Sr-90 (1.7), and Zn-65 (0.29). The liquid waste was basic and contained some bromide (1,200 mg/L) but all other inorganic analyte concentrations were low. The principle metal detected in sediment was zinc. With bromide in the liquid phase, this suggests that zinc bromide from a hot-cell shielding window may have been discharged into the tank. No SVOC's were detected and pesticides/PCB's were detected below reporting limits. (Sears et al 1995)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Bechtel et al (1992) shows the installation date at 1950, where as ORNL (1994) indicates service date beginning in 1951. Tank W-18 collects inleakage that is routinely emptied and processed at the liquid radioactive waste evaporator. Tanks W-17 and W-18 collected and average of 805 gal/month during 1992. The inlet to W-17 and W-18 is thought to be the source of the inleakage to the tanks. (ORNL 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1994), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

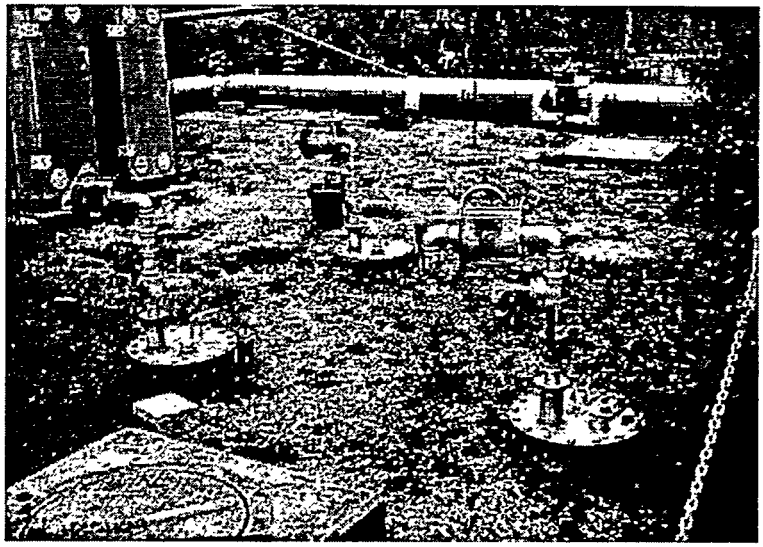
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

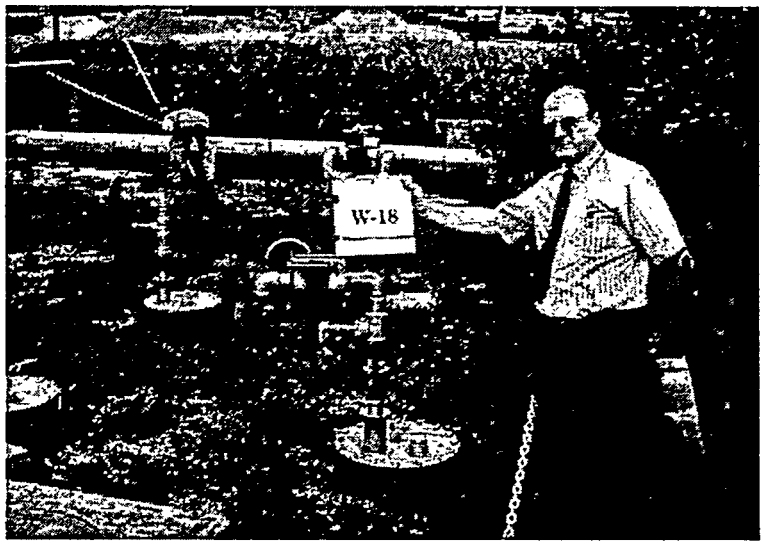
Sears, M.B, J.M. Giaquinto, W.H. Griest, R.T. Pack, T. Ross, and R.L. Schenley, December 1995. *Sampling and Analysis of Inactive Radioactive Waste Tanks W-17, W-18, WC-5, WC-6, WC-8, and WC-11 through WC-14 at ORNL,* ORNL\TM-13017, prepared by the Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tanks Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_27.JPG; 19_02.JPG





UNIT NAME: Solid Waste Storage Area (SWSA) 2 - (4003)

Unit Number: 01.47

Project Status: Remedial Investigation Completed (Bechtel et al 1992)

Unit Location: SWSA 2 is located on the south side of a hill near the east entrance and main parking area of ORNL, northwest of Building 4500. ORNL grid coordinates are N 22,420 ft and E 32,310 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The disposal area is a rectangular area of ~3.6 acres (1.4 ha). It is currently unfenced and has a grass cover. (ORNL 1990)

Dates Operated: Site commissioned: 1944. Taken out of service: 1946. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The area was used for disposal of solid waste contaminated with beta or gamma activity, liquid waste contaminated with plutonium in stainless steel drums, and alpha-contaminated material from off-site locations. (Bechtel et al 1992)

Waste Characteristics: The burial site is reported to contain no waste. The burial waste and contaminated soil were moved to another site (SWSA 3) some time after the site was closed in 1946. There have been unsubstantiated reports that some wastes remain buried at the site. (Bechtel et al 1992)

Release Data: No significant migration of radionuclides has taken place from SWSA 2. Coring was conducted in 1976 on the site as a part of subsurface investigations for a new building. Analysis of these samples indicated that the soil and water from 25 locations around the site did not contain concentrations of tritium, gross beta, or gross alpha levels that were significantly higher than background samples collected throughout eastern and central Tennessee. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

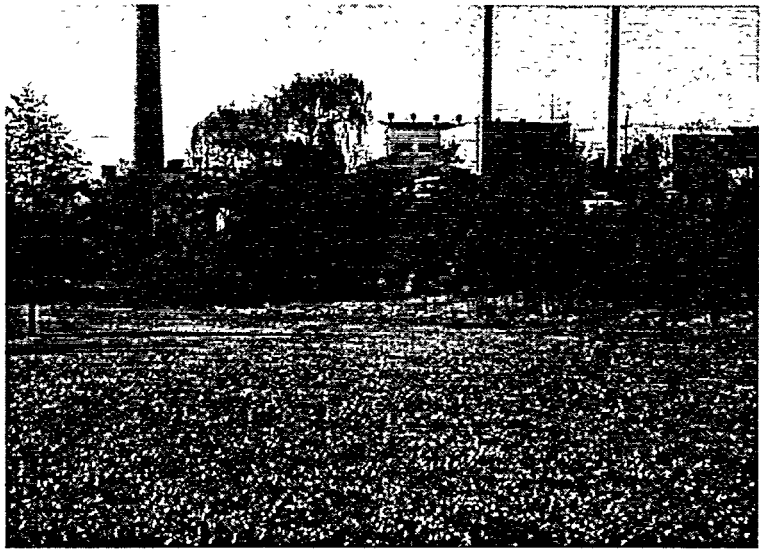
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

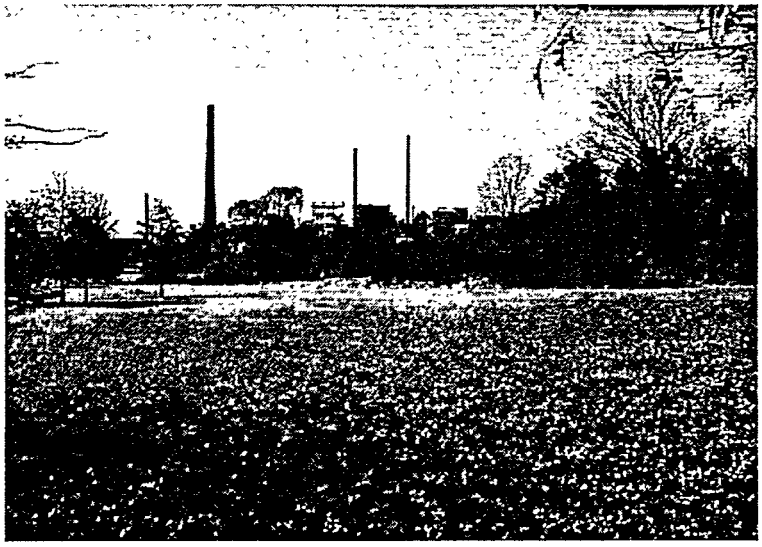
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_22.JPG; 06_23.JPG; 26_08.JPG







UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-19

Unit Number: 01.56A

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank is located north of Building 3517 (Fission Product Development Laboratory) and west of Building 3505 (Metal Recovery Facility). ORNL grid coordinates are N 21,815 ft and E 31,008 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is 7.5 ft wide by 8.5 ft long and is constructed of stainless steel. Capacity of the tank is 2250 gal (8500 L). (ORNL 1990)

Dates Operated: The tank collected wastes from 1955 until the early 1960s, when it was removed from service. (ORNL 1990)

Present Function: Not in operation. Tank W-19 was found to be empty when it was opened in 1988. The tank was rechecked in May 1994 and was found to be empty. (ORNL 1994)

Life Cycle Operation: This tank was installed for the purpose of collecting liquid radioactive waste solutions from Building 3505. After closure of the Metal Recovery Facility (Building 3505) in 1960, the tank was used for a period of 1-2 years by the Fission Product Development Laboratory for liquid radioactive waste collection. (ORNL 1990)

Waste Characteristics: The tank is reportedly empty but remains internally contaminated. Primary wastes handled by the Metal Recovery Facility contained Sr-90, Cs-137, Pu-238, Pu-239, and Pu-240. In addition, wastes from the Fission Product Development Laboratory contained significant quantities of Ce-144 and Pm-147. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: There have been no reported leaks or releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) The site characterization summary report (Bechtel et al 1992) indicates that the waste source was Buildings 3503 and 3517. The Surveillance and Maintenance report (ORNL 1994) indicates that the waste source was Buildings 3019 and 3517. The 1990 Contaminated Site Summary Sheet indicates the waste source as Building 3517 and 3505.

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

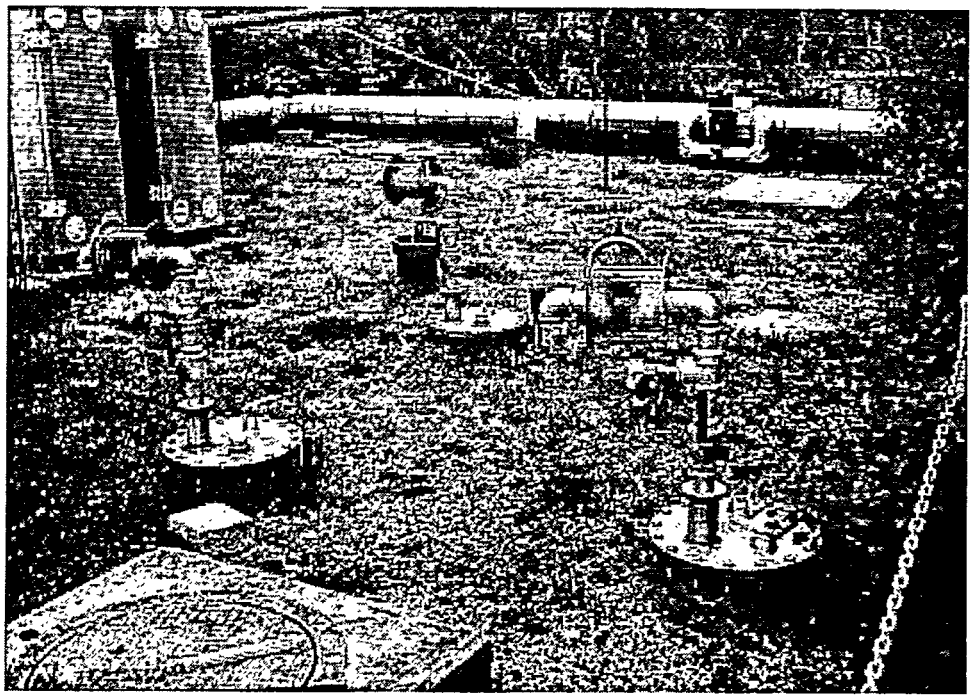
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

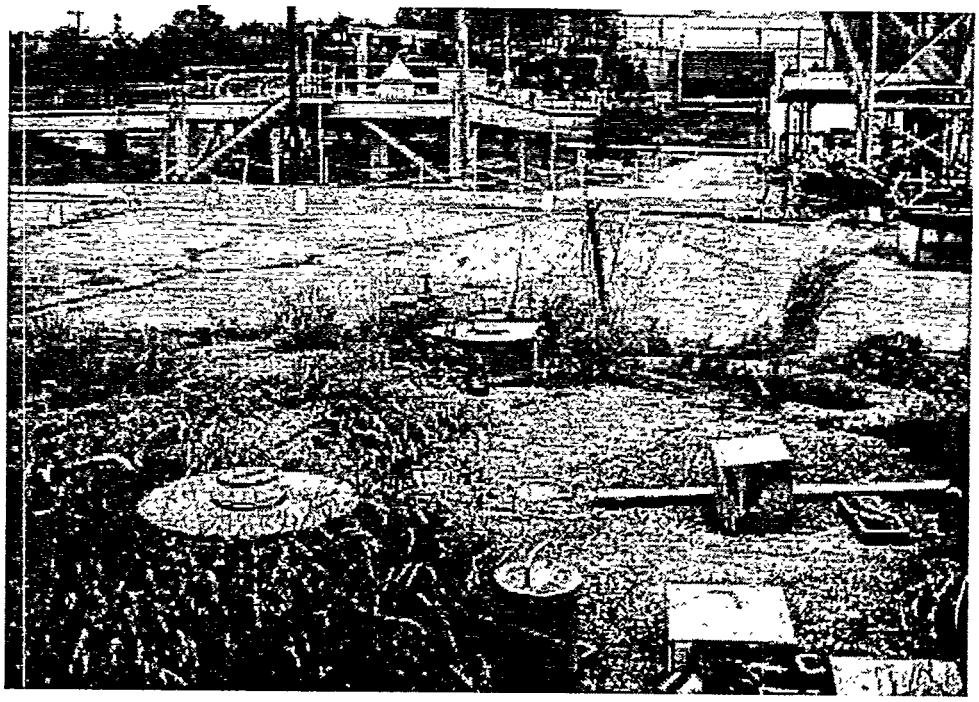
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

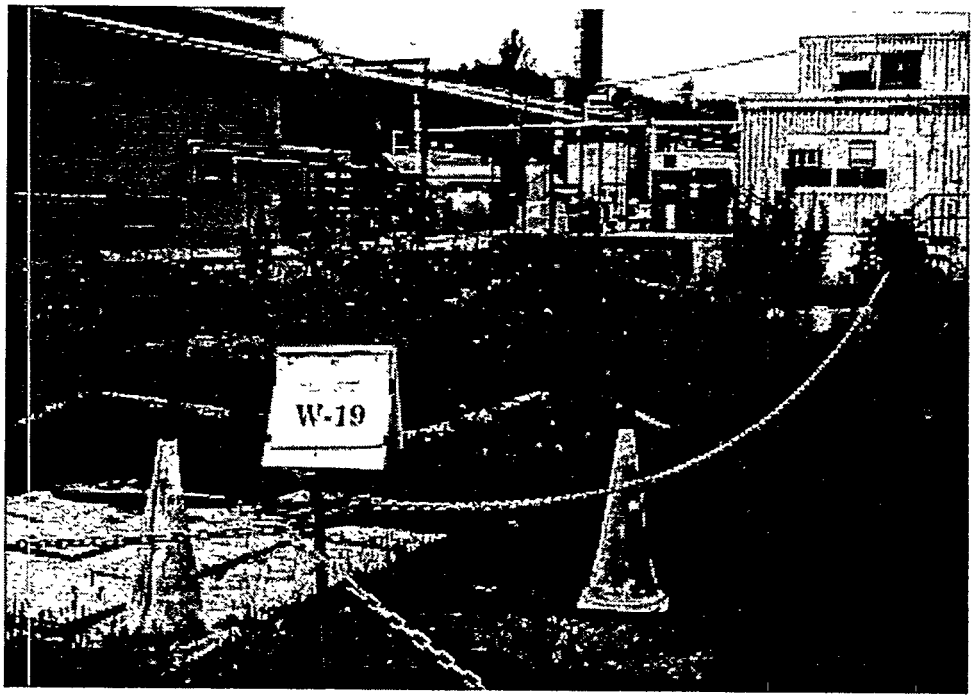
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_27.JPG; 02_02.JPG; 19_08.JPG






W-19

UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-20

Unit Number: 01.56B

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank is located north of Building 3517 (Fission Product Development Laboratory) and west of Building 3505 (Metal Recovery Facility). ORNL Grid coordinates are N 21,805 ft and E 31,008 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is 7.5 ft wide by 8.5 ft long and is constructed of stainless steel. Capacity of the tank is 2250 gal (8500 L). (ORNL 1990)

Dates Operated: The Metal Recovery Facility was constructed in 1951 and commissioned in 1952. The tank collected wastes from 1955 until the early 1960s, when it was removed from service. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: This tank was installed for the purpose of collecting liquid radioactive waste solutions from Building 3505. After closure of the Metal Recovery Facility in 1960, the tank was used for a period of 1-2 years by the Fission Product Development Laboratory for liquid radioactive waste collection. (ORNL 1990)

Waste Characteristics: The tank is reportedly empty but remains internally contaminated. Primary wastes handled by the Metal Recovery Facility contained Sr-90, Cs-137, Pu-238, Pu-239, and Pu-240. In addition, wastes from the Fission Product Development Laboratory contained significant quantities of Ce-144 and Pm-147. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: There have been no reported leaks or releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) The site characterization summary report (Bechtel et al 1992) indicates that the waste source was Buildings 3503 and 3517. The Surveillance and Maintenance report (ORNL 1994) indicates that the waste source was Buildings 3019 and 3517. The 1990 Contaminated Site Summary Sheet indicates the waste source as Building 3517 and 3505.

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

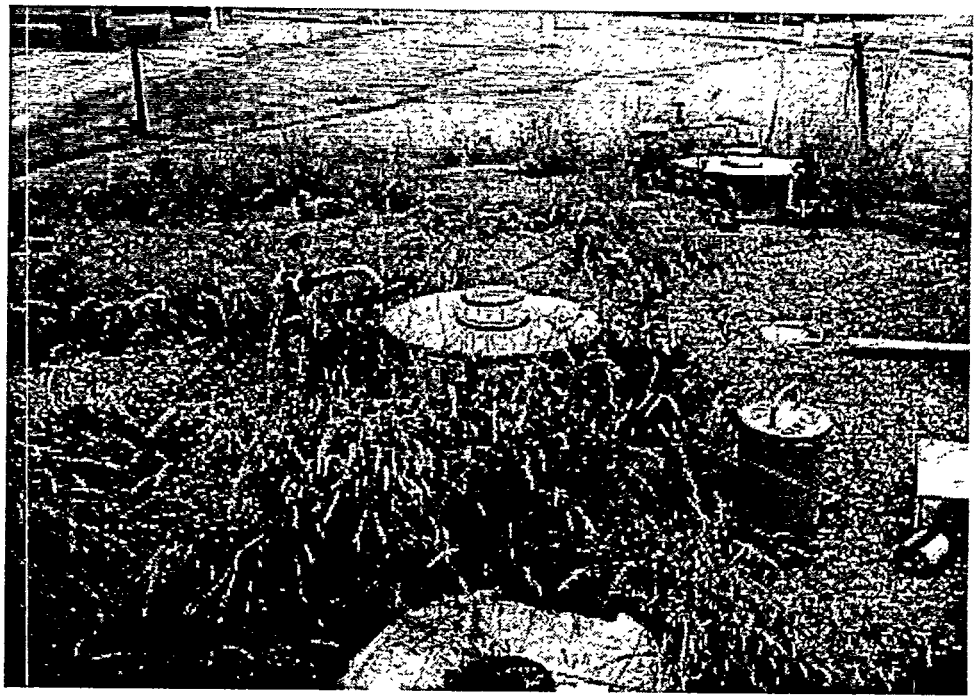
Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

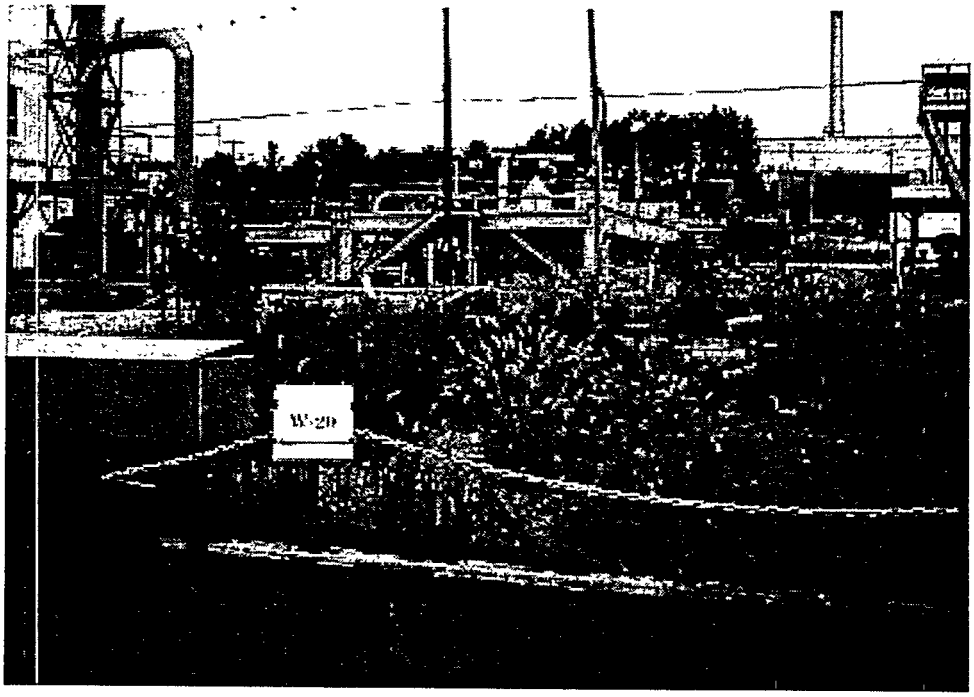
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 02_01.JPG; 19_07.JPG





UNIT NAME: Former Waste Pile Area (South of NRWTP)

Unit Number: 01.58

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Directly south of the site of the Nonradiological Wastewater Treatment Plant. Approximate ORNL grid coordinates are N 20,780 ft and E 31,250 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Irregularly shaped area of ~1.58 acres. (Bechtel et al 1992)

Dates Operated: Unknown. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Apparently used for disposal of waste from construction operations and as a soil borrow area. (Bechtel et al 1992). May be an extension of SWMU 01.57 Nonradiological Wastewater Treatment Plant Site. (ORNL 1990)

Waste Characteristics: Construction trash and debris. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

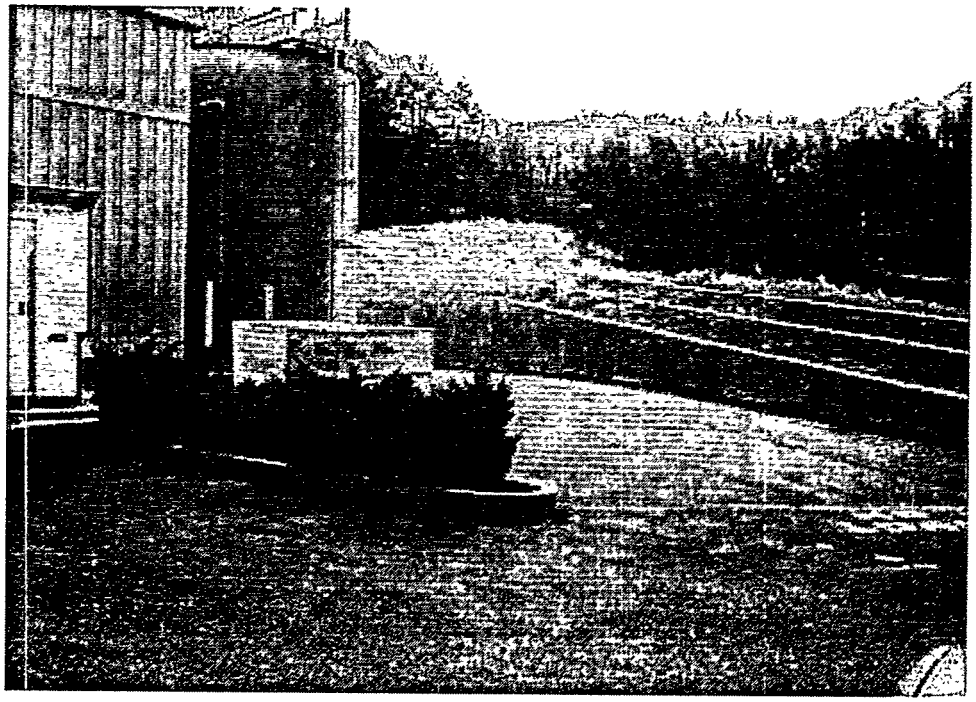
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & D1, Oak Ridge, Tennessee.

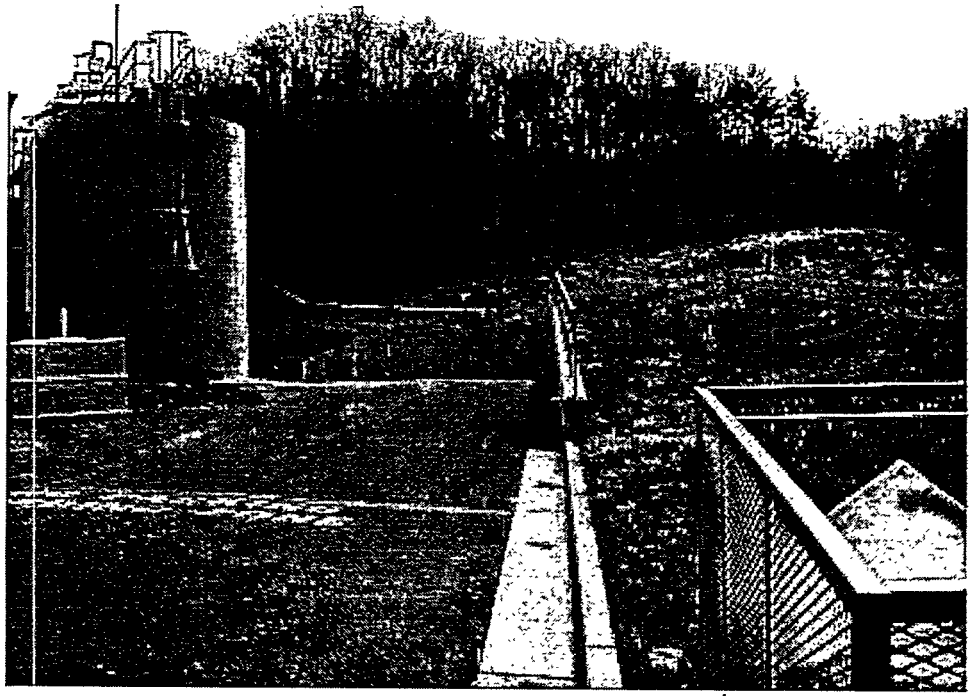
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_01.JPG; 13_02.JPG





UNIT NAME: Transfer Canal and Dissolver Pit (3505)

Unit Number: 01.63

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Located on the west side of the Metal Recovery Facility Building (3505) which is located north of White Oak Avenue. ORNL grid coordinates are N 21,860 ft and E 30,830 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Transfer canal is 6 x 35 x 14 ft deep concrete basin. Dissolver pit is about 8 x 10 ft wide and 10-ft deep with aboveground shield blocks and piping connections. (Ford et al 1992)

Dates Operated: 1952 - 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Used to handle fuel elements (slugs) prior to dissolving the fuel element cladding for uranium recovery. Water was used as shielding. It is connected to the dissolver pit by a 3 in slug chute. (Ford et al 1992)

Waste Characteristics: Canal wall and water probably slightly contaminated with Sr-90, Cs-137, Co-60 and uranium and plutonium isotopes. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

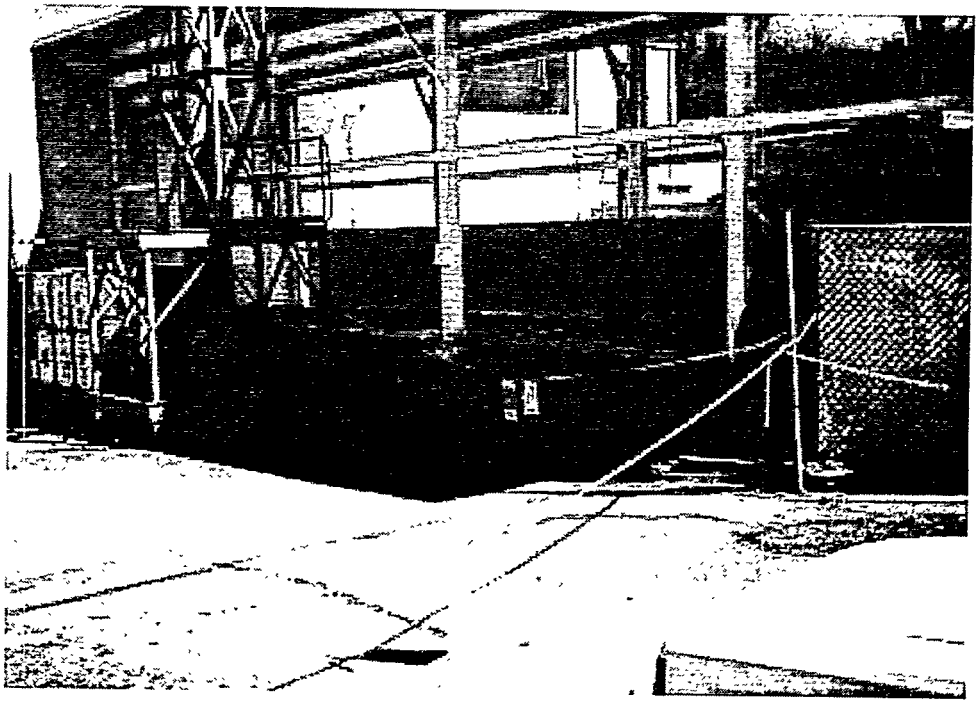
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee. 1992.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_19.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank S-424

Unit Number: 01.64C

Project Status: No activity. (Whitehead 1996)

Unit Location: This tank is located in an underground vault adjacent to the northwest corner of Building 3517 (Fission Products Pilot Plant). Approximate ORNL coordinates are N 21,780 ft and E 30,950 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank S-424 is a 500 gallon, glass-lined carbon steel tank housed in an epoxy-lined concrete vault. A continuously monitored sump is present in the vault. (ORNL 1990). S-424 is 5 1/2 ft in diameter by about 7 ft in height. Three nozzles and an 18-in. manway are situated in the top of the tank, and a sump drain is located in the bottom of the tank. (ORNL 1994)

Dates Operated: 1955 - 1960s (ORNL 1994)

Present Function: Not in operation.

Life Cycle Operation: Tank S-424 is part of the tank complex serving Building 3517. The tank was originally used to collect highly corrosive chloride-bearing supernate from a precipitation operation in Building 3517. The tank was removed from service because of deterioration of the PVC drain line connected to it. During 1992, attempts were made to empty the tank. No liquid was removed, further confirming that it was empty. (ORNL 1994)

Waste Characteristics: Liquid radioactive waste resulting from fission product separations in Building 3517. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No leakage from tank reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

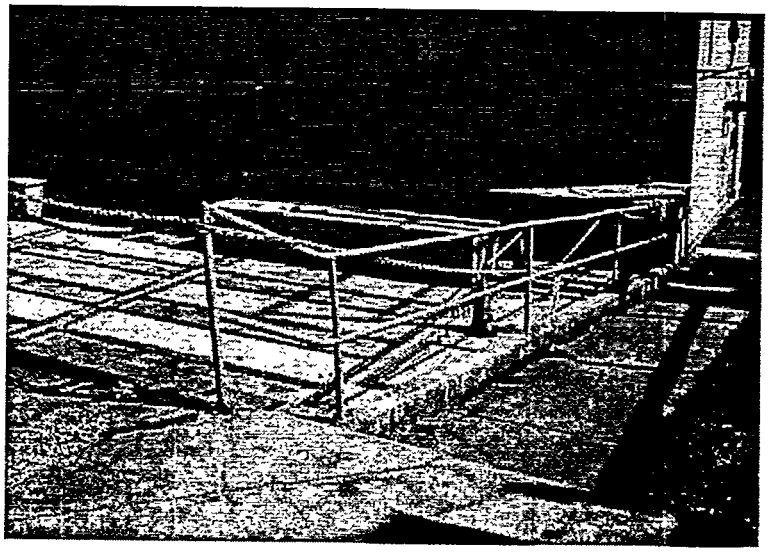
Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 14_20.JPG; 19_09.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank W-1 I

Unit Number: 01.66

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank is located under Building 3028 which is west of Fifth Street behind Building 3046. ORNL coordinates are N 22,354 ft and E 31,555 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Horizontal tank, 4-ft diameter by 5-ft long, stainless steel. Capacity is 500 gallons. (ORNL 1990)

Dates Operated: 1959-1988 (ORNL 1994)

Present Function: Tank W-1-I is believed to be empty of liquid but may contain some residual solids. The tank has an associated dry well that has been sampled and found to be clean. An effort has been made to pump the tank (to display that it is empty); however, the pump is frozen. Several drains in hot cells in Building 3028 drain to the tank. The drains are blocked with removable rubber stoppers. (ORNL 1994)

Life Cycle Operation: Tank W-1-I was used to collect waste liquids from isotope recovery operations in Building 3028. The tank was emptied and flushed in 1988. (ORNL 1994)

Waste Characteristics: No reported chemical or radionuclide analyses. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No leaks or releases have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

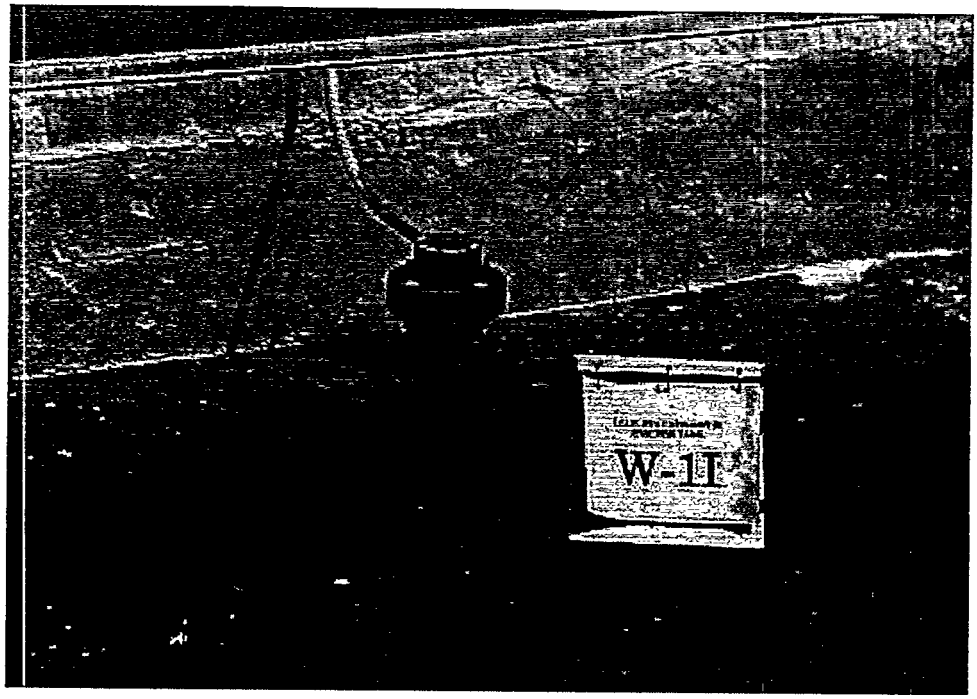
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

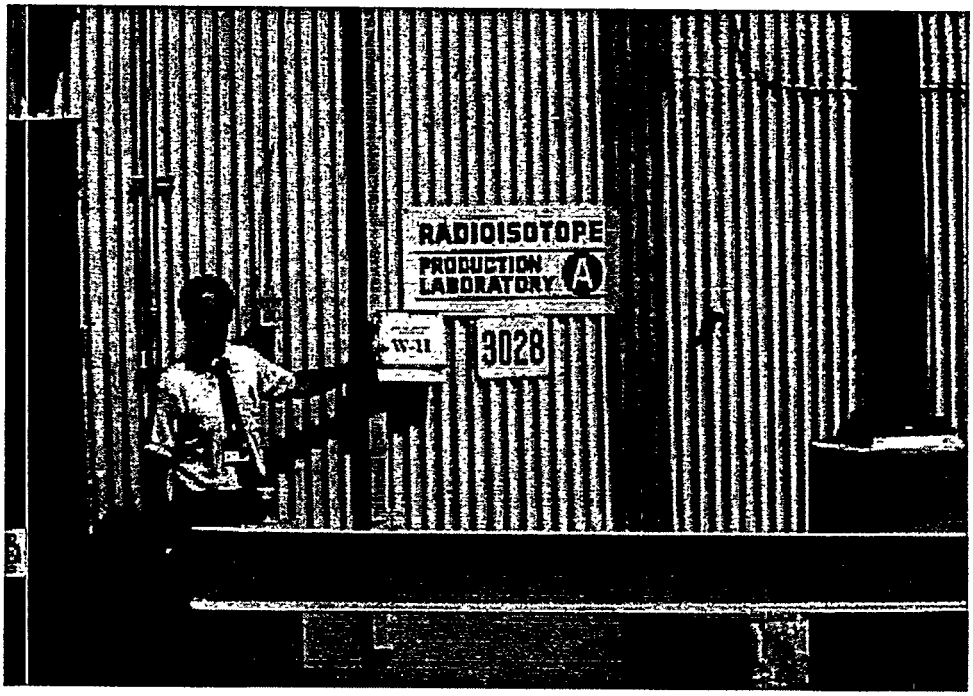
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 18_25.JPG; 18_24.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank 4501-P

Unit Number: 01.67C

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank 4501-P is located under the basement of Building 4501, in Room BG74. The approximate ORNL grid coordinates are N 21,980 ft and E 32,090 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank 4501-P is a cylindrical, single-walled, 140 gallon tank housed approximately 12 inches in a vault underneath the floor of the basement. The tank is constructed of 347 stainless steel with 1/4 inch wall thickness and 3/8 inch head section thickness. The tank's O.D. is 32 inches and it has a height of 42 inches. (ORNL 1990 and ORNL 1994)

Dates Operated: 1954-1967 (ORNL 1994)

Present Function: Not in operation. Tank 4501-P was emptied and rinsed in 1990. It currently contains about 2 gal of liquid. A process water line (which is double valved) goes to this tank. (ORNL 1994)

Life Cycle Operation: Tank 4501-P was installed in 1955 to serve the Aqueous Homogeneous Reactor Project as a holding tank for plutonium solutions prior to treatment in the liquid radioactive waste system. In 1963, the tank was used with the Thorium Utilization Project as a holding tank for thorium solutions. The tank is inactive, it has been out of service for many years. All of the entries to the tank are sealed or valved. (ORNL 1990)

Waste Characteristics: The tank contains an estimated 2 gallons of liquid but is considered empty (has a 1- to 3-gal heel). (ORNL 1990) The waste heel has been analyzed as 98 Bq/mL gross alpha and 24 Bq/mL gross beta. The soil underneath Building 4501 is thought to be contaminated with mercury. (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No leaks or releases have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 15_01.JPG



UNIT NAME: Inactive Filter House Seal Tank 3002-A

Unit Number: 01.68

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank 3002-A is located about 20 ft south of Building 3002. ORNL grid coordinates are N 22,715 ft and E 31,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank 3002-A is a 2200 gallon, stainless steel tank. (ORNL 1990). The tank is contained in an underground, unlined concrete vault. The vault can be viewed through a manhole; the tank is some 15-20 ft down in the vault. Tank 3002-A and the vault have an overflow line that goes to a process waste manhole. The tank can also be diverted to tank WC-19. Tank diameter is 8 ft; height is 6 ft. (ORNL 1994)

Dates Operated: Unknown (~1943). Tank is no longer in service. (ORNL 1994)

Present Function: Not in operation.

Life Cycle Operation: Tank 3002-A was used to collect liquid condensate from the 3002 filter house; effluent was transferred to tank WC-19. This tank is no longer in use. (ORNL 1994)

Waste Characteristics: Sample results of the liquid taken in 1992 are as follows: 0.01 Bq/mL gross alpha; 1.78 Bq/mL gross beta; 0.788 Bq/mL ^{137}Cs; and 0.01 Bq/mL ^{60}Co. (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No leaks or releases have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

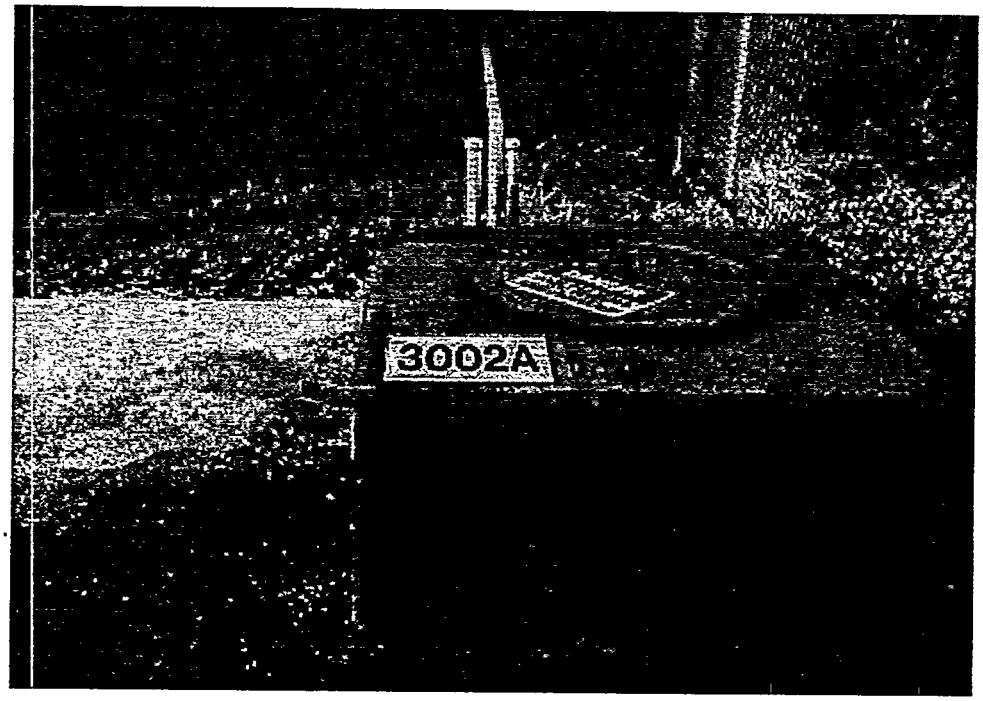
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

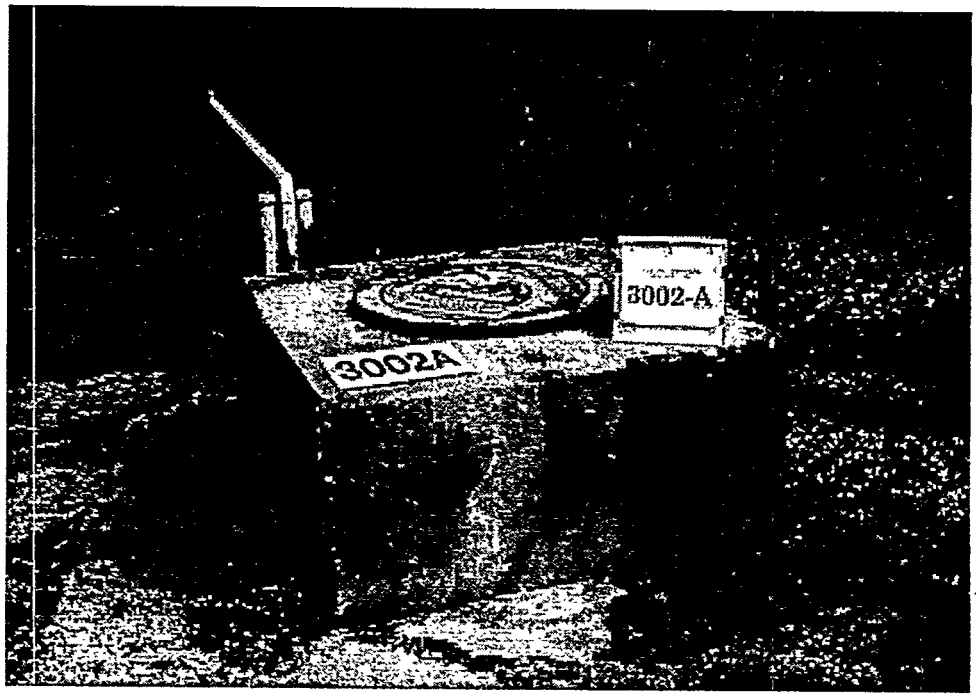
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275. Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 07_22.JPG; 18_18.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank LA-104 (F-104)

Unit Number: 01.70

Project Status: Remediated as Maintenance Action. (Whitehead 1996)

Unit Location: Tank LA-104 (F-104) was located under the floor at the west end of Building 3047. Approximated ORNL grid coordinates are N 22,733 ft and E 31,232 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The tank has a capacity of 296 gal (1120 L). Tank is stainless steel and was previously located in a concrete vault. (ORNL 1990). The diameter of the tank is 3 ft and the length is 5 ft. (ORNL 1996)

Dates Operated: Installed in 1960. Removed from service: November 1994. (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: Tank LA-104 served as a vacuum surge tank to prevent liquid carryover to the vacuum pump serving the building's hot cells. (ORNL 1996)

Waste Characteristics: liquid radioactive waste resulting from hot cell operations. Chemical and radionuclide analyses have not been reported. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: RCRA/CERCLA (ORNL 1990)

Media of Concern:

Comments: The tank was remediated as a maintenance action in February 1996. (Whitehead 1996) All lines were cut and capped. (Clark 1996)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992). It is listed in the FFA, Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Clark, Randy, August 1996. LMES Principle Engineer, personal communication with Anita Parker, Advanced Sciences, Inc.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), and Appedix F (updated November 15, 1994), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory 1996 Fact Sheet; WAG 1: LA-104 Inactive Tank.
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank H-209

Unit Number: 01.71

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank is located at the southwest corner of the Fission Product Development Laboratory (3517). Approximate ORNL grid coordinates are N 21,693 ft and E 30,916 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is located approximately 6 ft underground (ORNL 1994) and is reported to be a horizontal 2500 gallon unit. (ORNL 1990)

Dates Operated: 1961-unknown. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Used to collect condensate and contaminated process waste from the floor drains in Building 3517. (ORNL 1990) Tank H-209 was emptied in September 1993. Prior to this time, the tank contained liquid. (ORNL 1994)

Waste Characteristics: This tank is empty (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

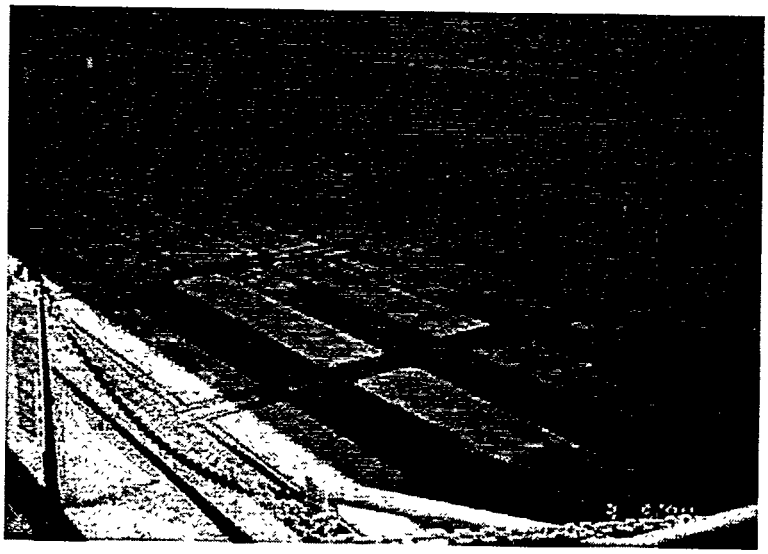
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

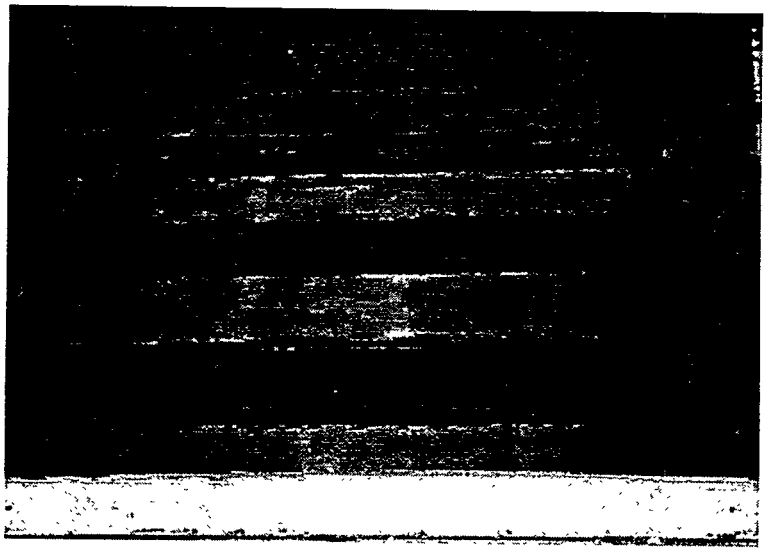
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

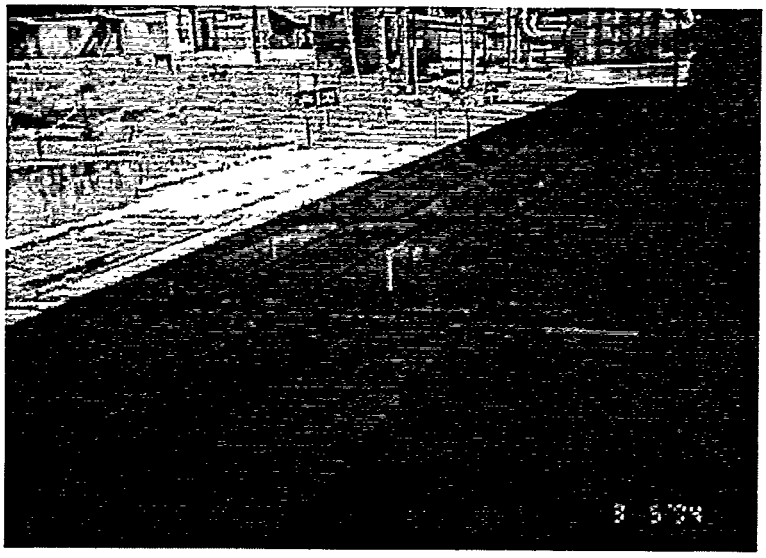
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 08_03.JPG; 08_04.JPG; 08_05.JPG; 13_35.JPG; 24_13.JPG











UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank 3001-B

Unit Number: 01.73

Project Status: Remediated as Maintenance Action. (Whitehead 1996)

Unit Location: Tank 3001-B is located south of the Graphite Reactor Building (3001)on Hillside Avenue. ORNL grid coordinates are N 22,494 ft and E 31,161 ft. (ORNL 1990). The tank is located under concrete at the base of steps to Building 3001. It is accessed through a 6-in.-square metal plate in the concrete. (ORNL 1994)

Approximate Dimensions and Capacity: This is a 75-gal stainless steel tank. (ORNL 1990)

Dates Operated: 1943 - 1965. (ORNL 1990)

Present Function: Not in operation. The tank has only 1/2 in. of liquid in it and is thus considered to be empty. (ORNL 1994)

Life Cycle Operation: This tank is thought to have been a hold-up tank for the hot lab drains in Building 3001. This hot lab handled mostly irradiated samples, and any radioactive waste from it has probably decayed to very low levels. (ORNL 1990)

Waste Characteristics: The tank is virtually empty; however, the liquid sampled in 1992 gave the following results: 0.014 Bq/mL gross alpha; 0.98 Bq/mL gross beta; 0.75 Bq/ml Cs-137; and <0.06 Bq/mL Co-60. (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) Tank was removed as a maintenance action in Sept 1995. A section of pipe was installed in place of the tank to allow the 3001 Canal Demineralizer to be backflushed. (Whitehead 1996)

This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service. This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Reportfor Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 18_20.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank 3003-A

Unit Number: 01.74

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank 3003-A is located about 15 ft south of Building 3003 which is located on Beacon Drive. Approximate ORNL grid coordinates are N 22,723 ft and E 31,232 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank 3003-A is a 16,000-gal concrete tank located partly aboveground. It is approximately 7 ft in diameter and 14 ft in height. (ORNL 1994)

Dates Operated: 1943 - 1965. (ORNL 1990)

Present Function: Not in operation. Tank 3003-A was emptied in September 1993. Prior to September, the tank contained liquid. (ORNL 1994)

Life Cycle Operation: Tank 3001-A received liquid radioactive waste from three cells and a stack in Building 3003. This building was the air handling facility for the Graphite Reactor (3001). (ORNL 1994)

Waste Characteristics: This tank is empty. (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

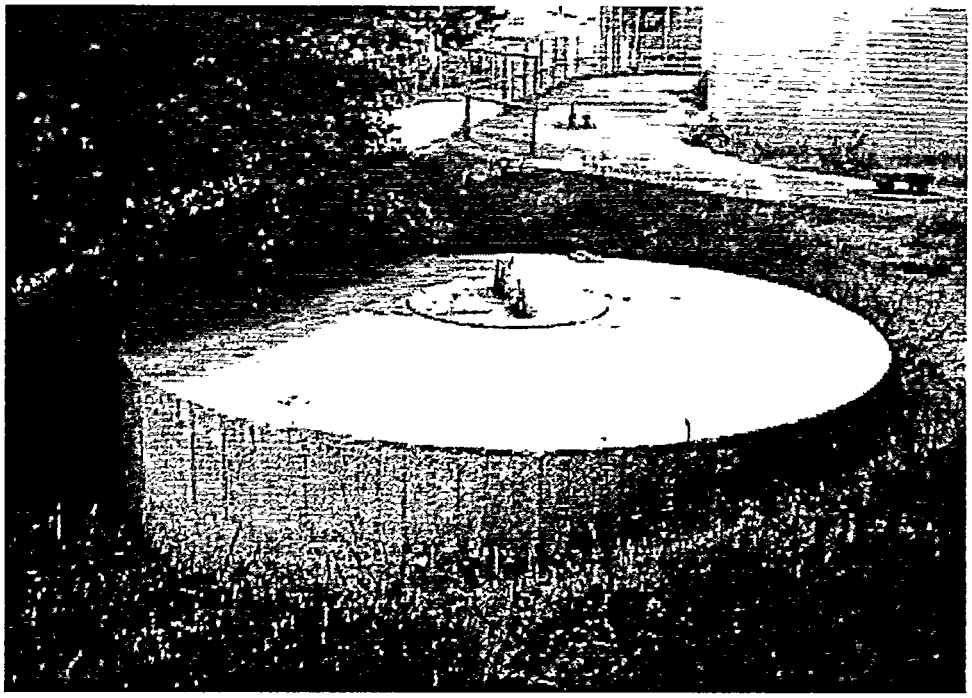
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

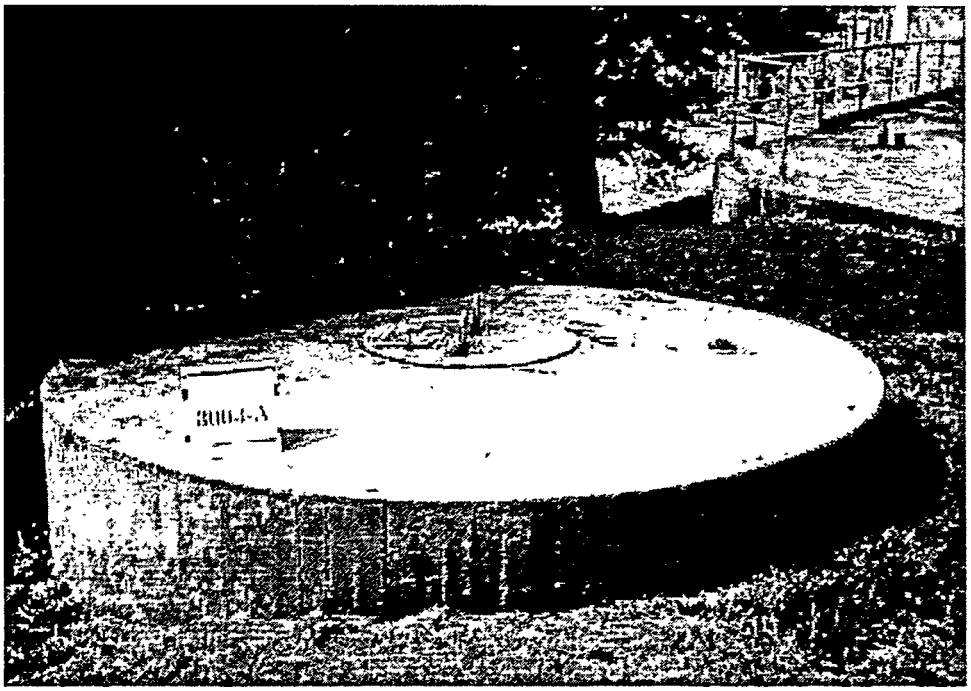
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 02_07.JPG; 18_19.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank 3004-B

Unit Number: 01.75

Project Status: Remediated as Maintenance Action. (Whitehead 1996)

Unit Location: Tank is located east of Building 3008 (Source and Special Materials Vault). Approximate ORNL grid coordinates are N 22,662 ft and E 31,320 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is a vertical, cylindrical, 347 stainless steel tank. Diameter is 30 in, and height is 3-ft, with dished heads. Located in underground concrete pit. (ORNL 1990)

Dates Operated: 1956 - unknown. (ORNL 1990)

Present Function: Not in operation. Tank 3004-B was emptied in September of 1993. Prior to this time the tank contained liquid. (ORNL 1994)

Life Cycle Operation: Tank 3004-B is called the Low Intensity Test Reactor (LITR) Hot Waste Hold-up Tank. It appears that this tank, similar to the other hold-up tanks, could be emptied to the process water system or the liquid radioactive waste system, depending on the contamination level of the water. (ORNL 1990) The date it was taken out of service is unknown. (ORNL 1994)

Waste Characteristics: Tank 3004-B is empty. (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. Tank was remediated as a maintenance action in August 1995. All lines were cut and capped. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

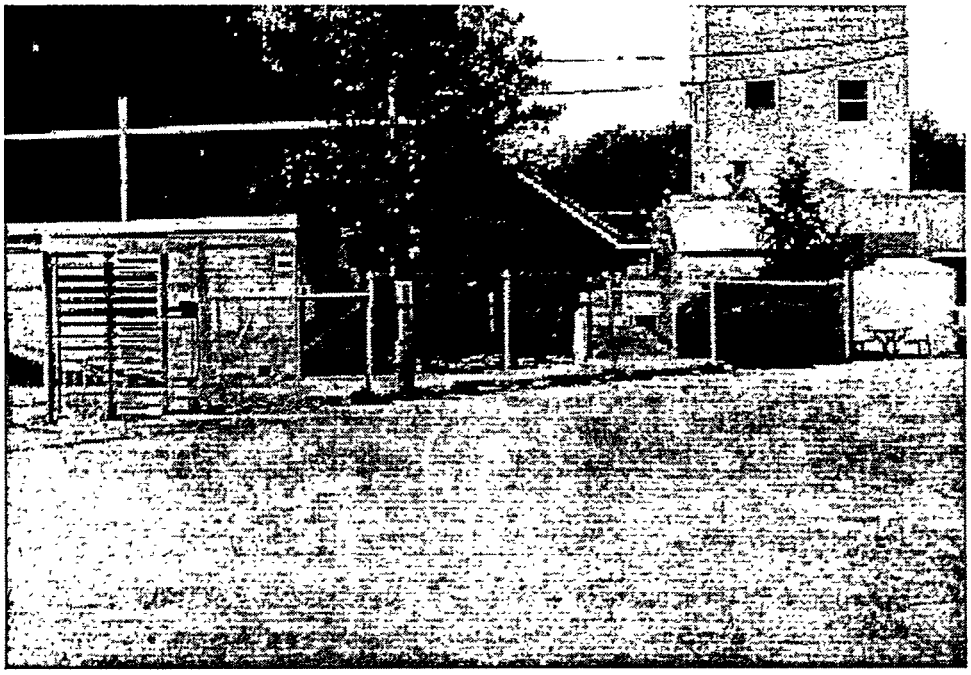
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manger, personal communication with Anita Parker,Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 14_07.JPG; 25_01.JPG; 25_02.JPG; 18_23.JPG









UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank 3013

Unit Number: 01.76

Project Status: Remediated as Maintenance Action. (Whitehead 1996)

Unit Location: Tank 3013 is located south of Building 3013 (now Biological Disposal Laboratory, but formerly called the Source Building). Approximate ORNL grid coordinates are N 22,750 ft and E 31,010 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is 3.5 ft in diameter by 5.5 ft high. Tank is 304 stainless steel. Capacity is 350 gal. (ORNL 1990)

Dates Operated: 1946 - unknown (ORNL 1990)

Present Function: Not in operation. Tank 3013 was emptied in September 1993. Prior to this date, the tank contained liquid. (ORNL 1994)

Life Cycle Operation: This tank is connected to the drains in Building 3013. Building 3013 was originally an environmental processing lab that dealt with very low level contaminated environmental samples. It was later a source storage building that held sealed sources, which should not have led to contaminated discharges. (ORNL 1990)

Waste Characteristics: Tank 3013 is empty (ORNL 1994)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. Tank was remediated in August 1995 as a maintenance action. Lines were cut, capped and grouted in place. (Whitehead 1996)

This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA. This tank is listed in the FFA Appendix F as an existing tank system without secondary containment that is removed from service.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

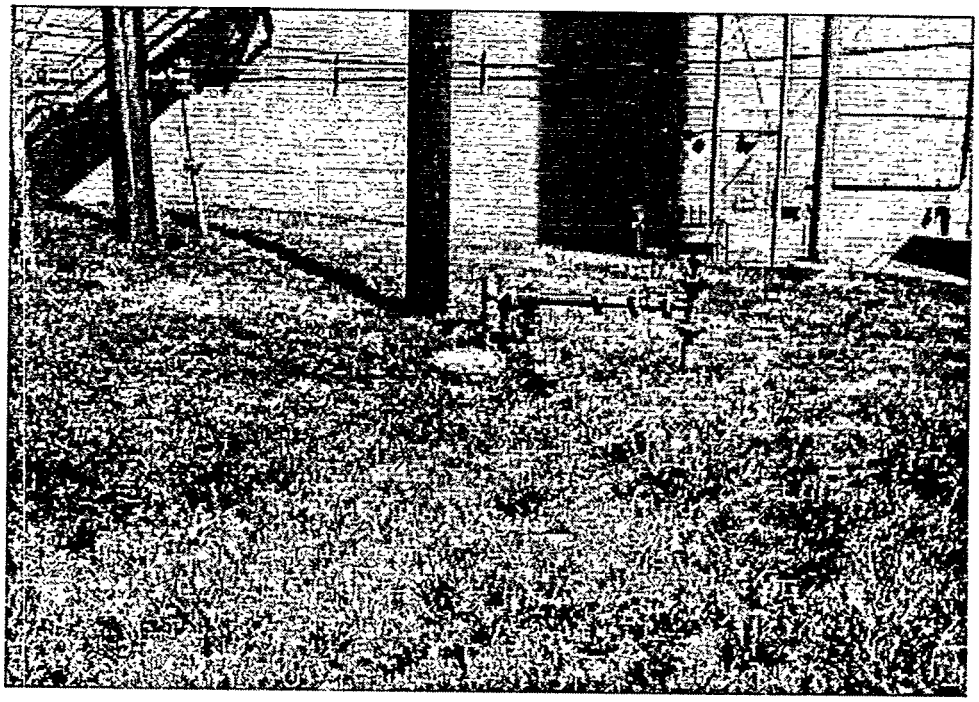
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

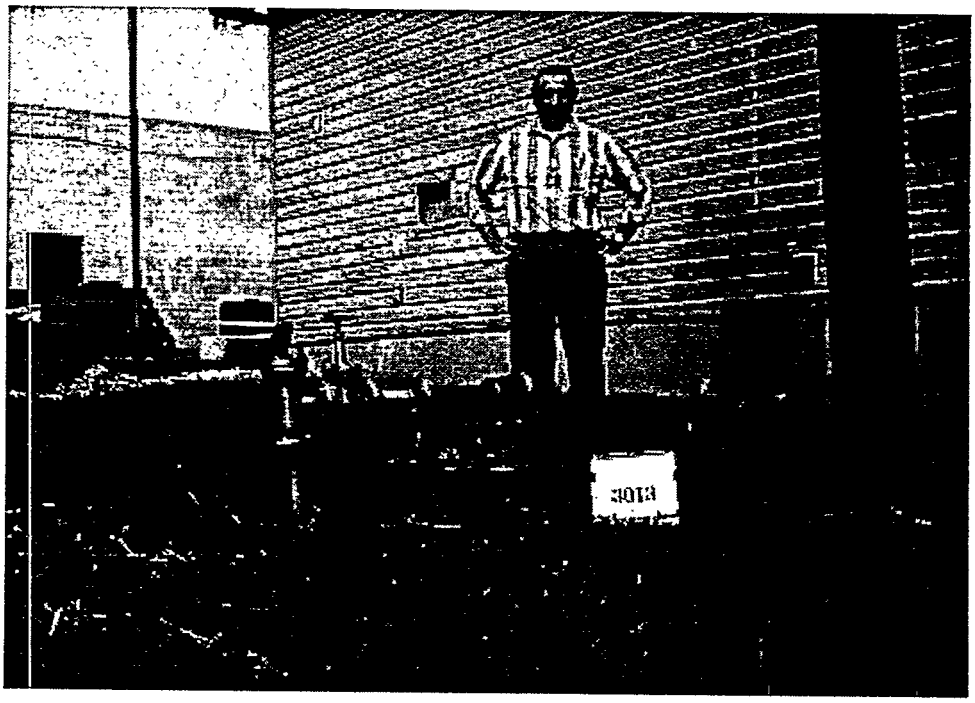
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 14_01.JPG; 18_17.JPG; 24_25.JPG







UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank T-30

Unit Number: 01.78

Project Status: Currently Remediating as a Maintenance Action. (Whitehead 1996)

Unit Location: Tank T-30 is located near the southwest corner of Building 4507. Approximate ORNL grid coordinates are N 21,760 ft and E 32,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The tank has a reported capacity of 824 gal. (ORNL 1990). The tank is about 4.5 ft in diameter by 8 ft tall. It is located in an underground concrete pit. (ORNL 1994)

Dates Operated: 1961-1980 (ORNL 1994)

Present Function: Tank T-30 was emptied in September 1993. The tank is believed to be sound based on historical volume trends. There are no known methods of adding liquid to the tank. A hole was cut in the tank to access the contents for sampling in 1989. A rubber stopper was put in the hole. The tank is on vessel off-gas. The pit is kept at negative pressure by the cell ventilation system; the pressure is read in the building. (ORNL 1994) All lines have been isolated, cut, and capped. (Whitehead 1996)

Life Cycle Operation: Tank T-30 was used as a waste storage tank for Building 4507. Tank T-30 was designed to receive highly radioactive solutions from reactor fuel dissolution studies in the Building 4507 hot cells. The building and associated facilities (including tank T-30) were placed on standby in 1980. (ORNL 1994)

Waste Characteristics: Liquid radioactive waste from hot cell operations. Samples of liquid contents indicated that liquid phase is not a RCRA waste. No sludge is reported in the tank. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Cm-244

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This tank is listed in the FFA, Appendix F, as an existing tank system without secondary containment that is removed from service. This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and was remediated in accordance with the FFA. The FFA, Appendix C, indicated that the Remedial Action was completed.

References:

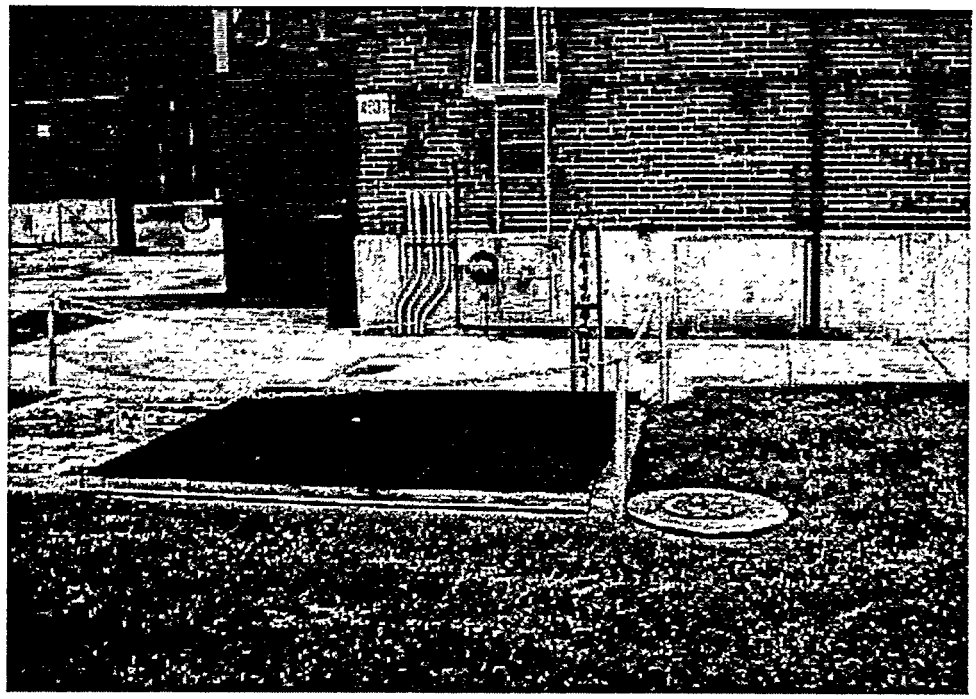
Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996) and Appendix F (updated November 15, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 01_12.JPG; 18_28.JPG





UNIT NAME: White Oak Creek and Tributaries (0853)

Unit Number:

Project Status: Completed cleanout of the main weirs (FFA 1996)

Unit Location: The site is located in Melton and Bethel valleys, and provides drainage for the ORNL installation. The creek flows into the Clinch River about 1.5 miles (2.4 km) north of the junction of Interstate 40 and State Highway 95. (ORNL 1990)

Approximate Dimensions and Capacity: This system drains an area of 3,830 acres (1,550 ha). (ORNL 1990)

Dates Operated: The creek and its tributaries have been used for waste disposal purposes since ORNL was opened. (ORNL 1990)

Present Function: The creek drains the ORNL installation. Treated sewage and process wastes are released to the creek after treatment. Liquid radioactive waste after treatment in the PWTP is also discharged to the creek. (ORNL 1990)

Life Cycle Operation: Not applicable.

Waste Characteristics: Main contaminants are Sr-90, Co-60, Cs-137, H-3, and metals (Hg, Zn, and Cr). Hazardous chemicals, including PCBs, may also be present in the stream sediments. The estimated inventory is Sr-90 (>5.0 Ci), Cs-137 (>100.0 Ci), Pu-239 (0.5 Ci). (ORNL 1990)

Release Data: The flow weighted average concentrations for the White Oak Creek (WOC) and White Oak Lake (WOL) reach, as measured at the White Oak Dam weir in 1995, are 126 pCi/L for Sr-90, 133,000 pCi/L for H-3 and 25.5 pCi/L for Cs-137. The flow weighted average concentrations for the WOC plant reach, as measured at the 7500 bridge weir, are 55 pCi/L for Sr-90, 6,830 pCi/L for H-3 and 31.7 pCi/L for Cs-137. (Clapp et al 1996)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface Water

Comments: In response to a condition of the National Pollutant Discharge Elimination System (NPDES) permit issued to Oak Ridge National Laboratory (ORNL) on April 1, 1986, a Biological Monitoring and Abatement Program (BMAP) was developed for White Oak Creek (WOC); selected tributaries of WOC, including Fifth Creek, First Creek, Melton Branch, and Northwest Tributary; and the Clinch River (Loar et al. 1986). The BMAP currently consists of six major tasks that address both radiological and nonradiological contaminants in the aquatic and terrestrial environs onsite and the aquatic environs offsite. These tasks are: (1) toxicity monitoring, (2) bioaccumulation monitoring of nonradiological contaminants in aquatic biota, (3) biological indicator studies, (4) instream ecological monitoring, (5) assessment of contaminants in the terrestrial environment, and (6) radioecology of WOC and White Oak Lake (WOL). (ORNL 1990)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Clapp, Roger, Todd Scanlon and Dennis Borders, July 1996. *Radionuclide Discharges in the White Oak Creek Watershed, 1995*, ER Surface Water Project at ORNL - Technical Bulletin No. 1.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

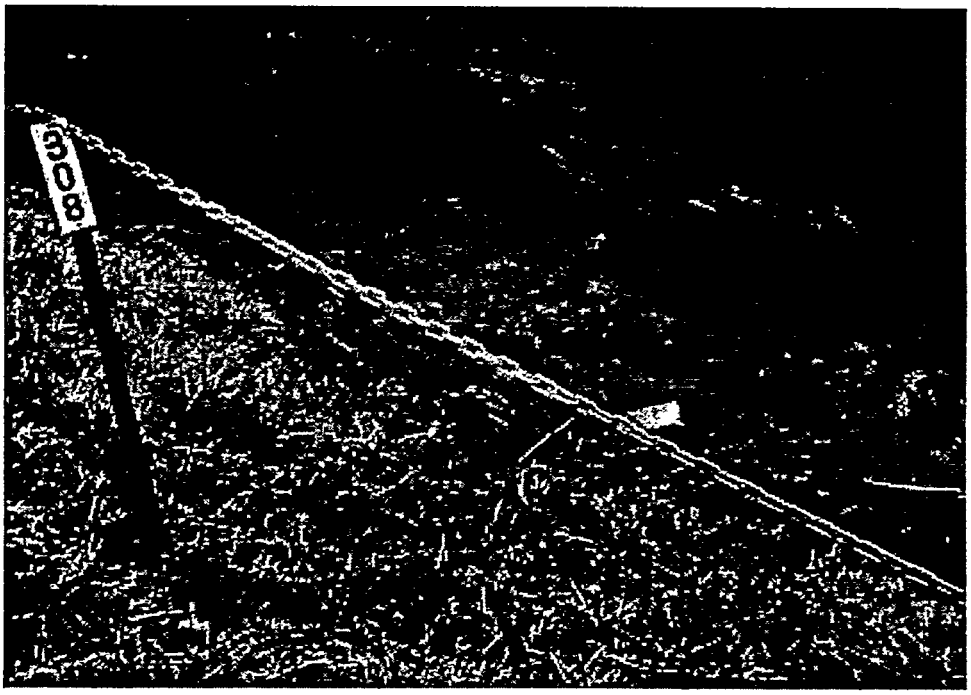
FFA 1996. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation*, DOE/OR-1014, Appendix C, Oak Ridge, Tennessee.

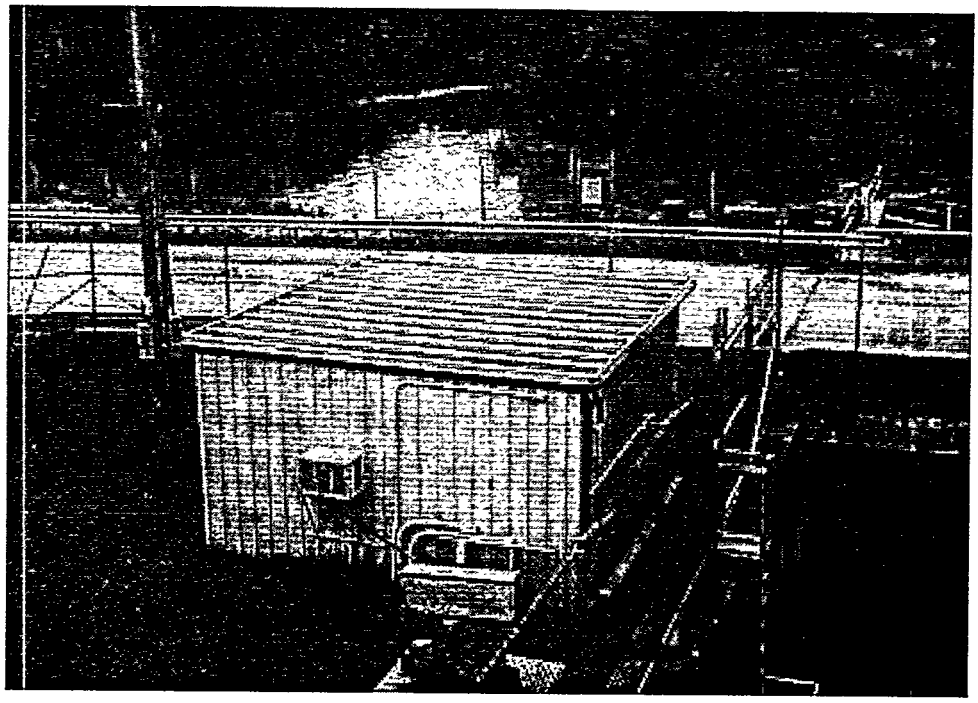
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10597_92.JPG; 26_02.JPG; 23_16.JPG







UNIT NAME: White Oak Lake and Embayment (7846)

Unit Number:

Project Status: Remedial Investigation Completed (DOE 1996)

Unit Location: This site is located upstream and downstream of White Oak Dam, south of the ORNL main complex, and near Clinch River Mile 20.8 (CRK 33.5). The Dam was built about 0.6 miles (1.0 km) upstream from where White Oak Creek empties into the Clinch River. ORNL grid coordinates of the White Oak Dam are N 15,330 ft and E 23,360 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The lake forms a body of water about 20 acres (8 ha) in area. Estimated volume in 1979 was 4,589,000 cubic ft (130,000 cubic m). (ORNL 1990)

Dates Operated: Site commissioned: 1943. Site is still operating (after being drained in 1954). (ORNL 1990)

Present Function: The site is a surface impoundment for radioactive and other hazardous wastes that drain from ORNL via the White Oak Creek Watershed. It serves as a final settling basin for waste released from ORNL operations and waste storage areas. (ORNL 1990)

Life Cycle Operation: Not applicable.

Waste Characteristics: Main contaminants are Sr-90, Co-60, Cs-137, H-3, and metals (Hg, Zn, and Cr). Hazardous chemicals, including PCBs, may also be present in the stream sediments. The estimated inventory is Sr-90 (>5.0 Ci), Cs-137 (>100.0 Ci), Pu-239 (0.5 Ci). (ORNL 1990)

Release Data: The flow weighted average concentrations for the White Oak Creek (WOC) and White Oak Lake (WOL) reach, as measured at the White Oak Dam weir in 1995, are 126 pCi/L for Sr-90, 133,000 pCi/L for H-3 and 25.5 pCi/L for Cs-137. The flow weighted average concentrations for the WOC plant reach, as measured at the 7500 bridge weir, are 55 pCi/L for Sr-90, 6,830 pCi/L for H-3 and 31.7 pCi/L for Cs-137. (Clapp et al 1996)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface water

Comments: In response to a condition of the National Pollutant Discharge Elimination System (NPDES) permit issued to Oak Ridge National Laboratory (ORNL) on April 1, 1986, a Biological Monitoring and Abatement Program (BMAP) was developed for White Oak Creek (WOC); selected tributaries of WOC, including Fifth Creek, First Creek, Melton Branch, and Northwest Tributary; and the Clinch River (Loar et al. 1986). The BMAP currently consists of six major tasks that address both radiological and nonradiological contaminants in the aquatic and terrestrial environs onsite and the aquatic environs offsite. These tasks are: (1) toxicity monitoring, (2) bioaccumulation monitoring of nonradiological contaminants in aquatic biota, (3) biological indicator studies, (4) instream ecological monitoring, (5) assessment of contaminants in the terrestrial environment, and (6) radioecology of WOC and White Oak Lake (WOL). (ORNL 1990)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Clapp, Roger, Todd Scanlon and Dennis Borders, July 1996. *Radionuclide Discharges in the White Oak Creek Watershed, 1995*, ER Surface Water Project at ORNL - Technical Bulletin No. 1.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, 1995. *Oak Ridge Reservation Facility Agreement Quarterly Report for the Environmental Restoration Program*, Vol. 4, July - September 1995, prepared by the Environmental Restoration Division, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 23_12.JPG



UNIT NAME: SWSA 3 (1001)

Unit Number: 03.01

Project Status: Remedial Investigation/Feasibility Study. (ORNL 1990)

Unit Location: SWSA 3 is located in Bethel Valley in a fenced area at the foot of Haw Ridge about 0.6 mile (1.0 km) west of the ORNL main complex. ORNL grid coordinates are N 21,760 ft and E 26,200 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Approximate total area is 7 acres (2.8 ha). It is estimated that 44,000 to 56,000 Ci of radioactive waste was buried in SWSA 3; an estimated 600,000 cu ft of radioactive waste was buried. (ORNL 1990)

Dates Operated: Site commissioned: 1946. Taken out of service: 1951. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The site was used as a landfill for the storage of low-level solid radioactive waste from 1946 to 1951. Aboveground storage of large items of contaminated equipment continued until 1979. (Shoun 1987). The site was also used to store scrap metal. The purpose of the site was to serve as an aboveground storage site for contaminated metal. (ORNL 1990)

Waste Characteristics: Little is known about the kinds of wastes stored at this site. Large items were stored aboveground within the fenced-in area. Alpha wastes contained in drums were deposited in concrete-lined trenches and covered with concrete. Beta-gamma wastes were buried in unlined trenches and backfilled with soil. (ORNL 1990)

Release Data: In 1964, well water samples were analyzed and indicated the presence of small amounts of trivalent rare earths (TRE), Sr-90, and H-3. Well water samples collected in 1973 indicated Sr-90 levels up to 3.0 dpm/mL. Soil samples analyzed in 1978 indicated levels higher than natural background. Geologic and hydrologic factors of this area favor a complex pattern of radionuclide movement. Fractures and solution cavities in the limestone bedrock represent potential pathways for groundwater movement and radionuclide migration. A connection from SWSA 3 to Raccoon Creek has also been demonstrated and is thought to represent a solution channel that allows rapid transmission of water during storms. The quantities of radionuclides transported are small. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater, Soil

Comments: In response to a condition of the National Pollutant Discharge Elimination System (NPDES) permit issued to Oak Ridge National Laboratory (ORNL) on April 1, 1986, a Biological Monitoring and Abatement Program (BMAP) was developed for White Oak Creek (WOC); selected tributaries of WOC, including Fifth Creek, First Creek, Melton Branch, and Northwest Tributary; and the Clinch River (Loar et al. 1986). The BMAP currently consists of six major tasks that address both radiological and nonradiological contaminants in the aquatic and terrestrial environs onsite and the aquatic environs offsite. These tasks are: (1) toxicity monitoring,k (2) bioaccumulation monitoring of nonradiological contaminants in aquatic biota, (3) biological indicator studies, (4) instream ecological monitoring, (5) assessment of contaminants in the terrestrial environment, and (6) radioecology of WOC and White Oak Lake (WOL). (ORNL 1990)

References:

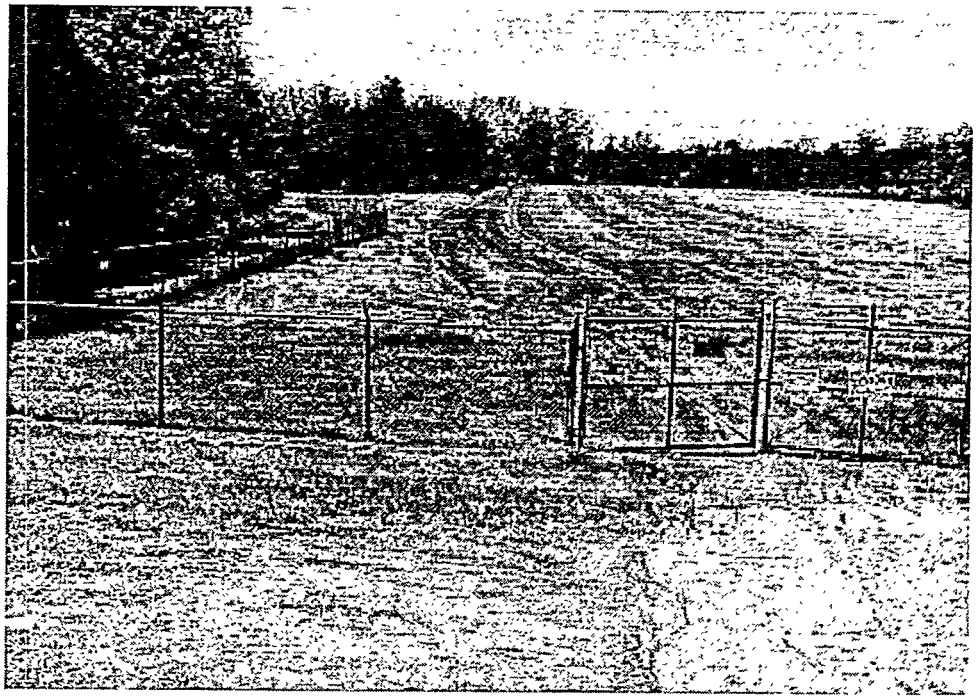
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Shoun, R.R., 1987. *Environmental Data Package for ORNL Waste Area Grouping (WAG 3), Solid Waste Storage Area 3 (SWSA 3)*, ORNL/RAP-21, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 3579_90.JPG



UNIT NAME: Closed Scrap Metal Area (1562)

Unit Number: 03.02

Project Status: Remedial Investigation/Feasibility Study (ORNL 1990)

Unit Location: A triangle-shaped section (approximately 4 acres [1.6 ha]) is situated south of a portion of the fenced area of SWSA 3 and is called the Scrap Metal Area. ORNL grid coordinates are N 21,270 ft and E 26,290 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area covers about 4 acres (1.6 ha). (ORNL 1990)

Dates Operated: Site commissioned: 1951. Site inactive: 1976. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the site was to serve as an aboveground storage site for contaminated metal. (ORNL 1990)

Waste Characteristics: Some contaminated tanks and equipment are still stored aboveground. Tanks may be contaminated. The amount of material stored is not reported. (ORNL 1990)

Release Data: Health Physics surveys of the area indicated that a radioactive tank is buried near the SWSA 3 boundary. One area showed gross radioactivity or Cs-137 levels significantly above background. It is suspected that this contamination came from runoff from SWSA 3. Surveys indicate that contamination of the scrap metal is very low, if present at all. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Most of the scrap metal has been removed and buried in other SWSAs (1984), and the area is posted. (ORNL 1990) No new information received since the 1990 Contaminated Site Summary Sheet was obtained.

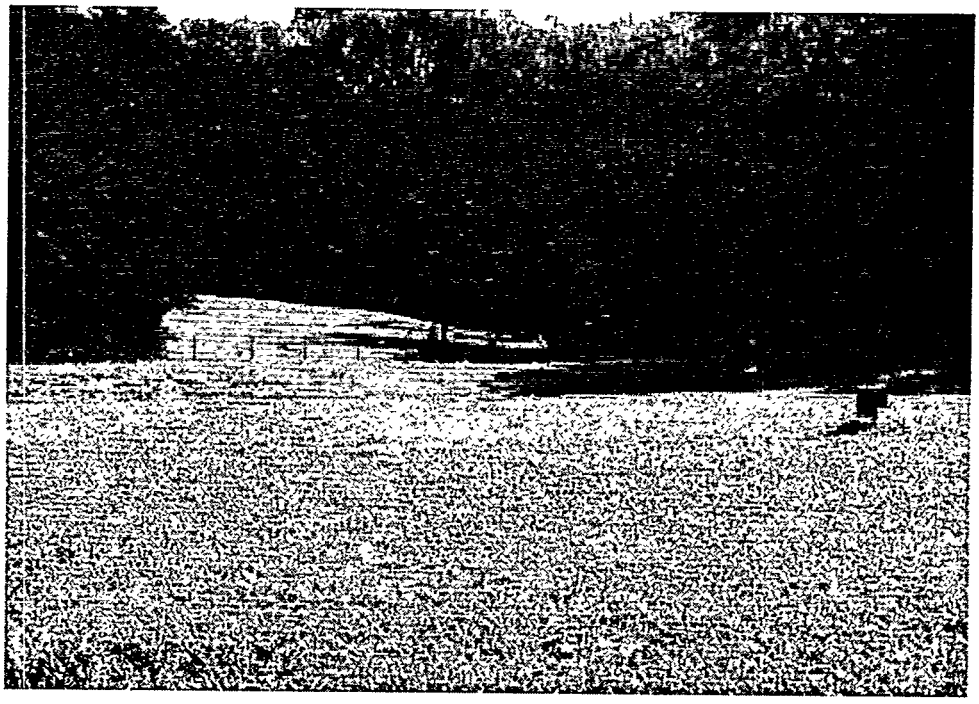
References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_25.JPG; 06_28.JPG





UNIT NAME: Contractors' Landfill (1554)

Unit Number: 03.03

Project Status: Remedial Investigation/Feasibility Study. (ORNL 1990)

Unit Location: The site is located west of SWSA 3, which is located west of the main ORNL plant area. ORNL grid coordinates are N 21,420 ft and E 25,000 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area of the site is approximately 7 acres (2.8 ha). Access is limited by a locked gate. (ORNL 1990)

Dates Operated: Opened: 1975. (ORNL 1990) Site was closed. (Kuhaida 1996)

Present Function: The purpose of the landfill is disposal of debris from construction sites and noncontaminated demolition activities. The site is also used as a disposal area for fly ash from the ORNL steam plant. (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: This facility is now permitted by Tennessee Department of Health and Environment. Only noncontaminated debris and construction materials are allowed in the landfill. No hazardous or radioactive wastes are allowed. Prior to permitting, it is believed that similar materials were disposed of in the Contractors' Landfill; however, there is no documentation to support this and it is possible that contaminated soil from construction activities in the main plant was disposed of here. Monthly inspections are conducted to ensure compliance. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Two small areas were identified as having some Cesium-137 and Strontium-90 contamination. (Shoun 1987). The source of this information was Stueber et al 1981.

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

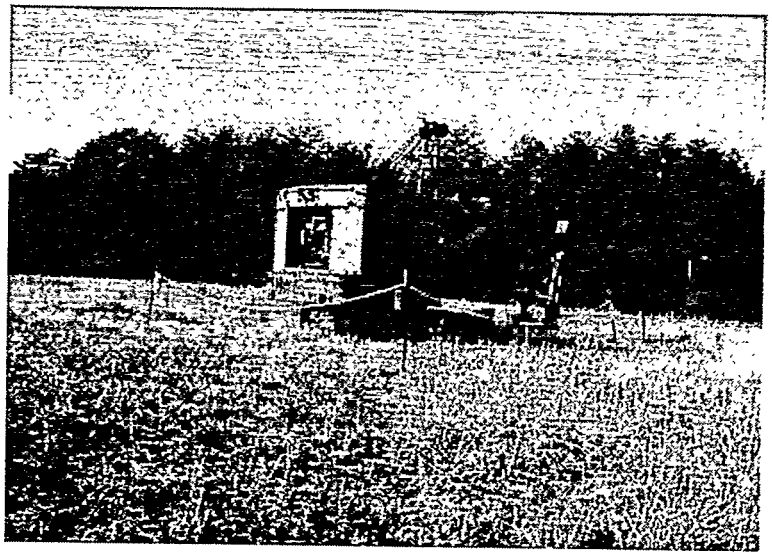
Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

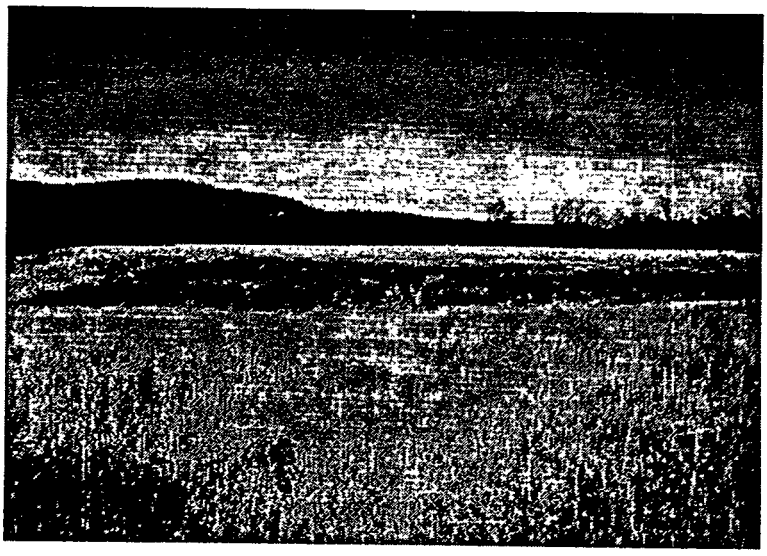
Shoun, R.R., 1987. *Environmental Data Package for ORNL Waste Area Grouping (WAG 3), Solid Waste Storage Area 3 (SWSA 3)*, ORNL/RAP-21, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_26.JPG; 06_28.JPG; 06_29.JPG







UNIT NAME: Inactive Liquid Radioactive Waste Line - North of Lagoon Road (7800)

Unit Number: 04.01

Project Status: Remedial Investigation Completed. (DOE 1996)

Unit Location: The site is located along the north side of Lagoon Road (7800). ORNL grid coordinates are N 19,880 ft and E 29,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unit 4.1 is the liquid radioactive waste transfer line that is located on the north side of Lagoon Road. Line was used to transfer liquid radioactive waste to the pits and trenches in WAG 7. (ORNL 1990)

Dates Operated: Site commissioned: 1960. Site inactive: about 1980. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The first 1.5-mile (2.4-km) section of the waste transfer line is 2-in.-diam (5-cm-diam) cast-iron pipe installed in June 1954 to transfer liquid radioactive waste from the Bethel Valley waste storage tanks to Waste Pit 2. Carbon steel extensions to Trench 5 (1960), Trench 6 (1961), and finally to Trench 7 (1962) completed the transfer line to the waste pit area. (ORNL 1990)

Waste Characteristics: Wastes handled in the transfer system were routinely generated laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams from certain sources.

The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Release Data: Radiation measurements at 3 ft above the ground and at ground surface were systematically made along the entire transfer line with Geiger-Muller (G-M) counters equipped with beta shields. The measurements were made directly above the pipeline and 5 ft (1.5 m) to the right and left of the line. More than 700 readings were made beginning at the hydrofracture site; although three definite areas defining leaks were identified, those areas adjacent to SWSA 4 typically yielded activity rates of only about 0.04 mR/h, thus indicating no leaks detectable at ground level. (ORNL 1990) Greater amounts of contamination could be expected at depths near the pipeline in these areas. (Ohnesorge et al 1981)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: In 1966, a cast-iron line was installed from Trench 7 to the Old Hydrofracture Facility (1.5 miles). This line was replaced in 1971 by a stainless steel line installed next to the old cast-iron line. This line was taken out of service in 1975. (ORNL 1990)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Ohnesorge, W.F., et al, September 1981. *An Environmental Radiological Survey of the Intermediate-Level Waste Pipeline*, ORNL/TM-7858, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: SWSA 4 (7800)

Unit Number: 04.03

Project Status: Remedial Investigation Completed. (DOE 1996)

Unit Location: Latitude 35.91586, longitude 84.31989. SWSA 4 is located in Melton Valley ~ 0.5 mile (805 m) southwest of the main ORNL complex. The site is bounded on the northern side by Lagoon Road. ORNL grid coordinates are N 19,220 ft and E 28,180 ft. (ORNL 1990)

Approximate Dimensions and Capacity: SWSA 4 covers an area of 23 acres (9.3 ha) that includes trenches and auger holes used for disposal. This landfill was used for ~ 8.5 years and contains an estimated 2,000,000 cu ft (57,000 cubic m) of waste. (ORNL 1990)

Dates Operated: Site commissioned: February 1951. Taken out of service: 1959. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The unit was a solid waste landfill designed to contain radioactive solid waste. For a period of time, the landfill was designated as the Southern Regional Burial Ground by the Atomic Energy Commission (AEC) and received wastes from nuclear installations in the eastern United States. (ORNL 1990)

Waste Characteristics: Little information exists to characterize the type, concentration, or quantity of radionuclides placed in SWSA 4. Radioactive elements include Sr-90, Cs-137, Co-60, Po-210, H-3, Sb-125, and Pu-239. Approximately 90,000 to 120,000 Ci of waste has been buried, but the actual amount is difficult to assess. Types of waste include paper, glassware, scrap metal, dirt, filters, oils, powders, depleted uranium, animal carcasses, and large pieces of equipment. (ORNL 1990)

Release Data: Much of the waste in SWSA 4 is located in or very near the water table. Principal radionuclides present in groundwater in and near SWSA 4 are H-3 and Sr-90, with occasional readings of Co-60, Sb-125, and Cs-137. SWSA 4 contributes ~ 35 to 50% of the Sr-90 that is discharged yearly from the WOC basin at White Oak Dam. A surface runoff collector and diversion system was constructed in 1975; a second system was built in 1983. These diversion systems show early indications of reducing Sr-90 releases to WOC. Stream gravel surveys have shown that SWSA 4 is a significant source of Sr-90 and Cs-137. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface Water, Groundwater (ORNL 1995)

Comments: Solid Waste Storage Area 4 (SWSA 4) was surveyed to determine the level and extent of surface radiological contamination. Inside the fenced area, surface gamma exposure rates above background levels were identified at 95 areas and 58 smaller, isolated spots for a total of ~2000 m^2. Most of the elevated gamma exposure rates ranged from 12 to 240 uR/h. Levels ranging from 241 to 420 uR/h were measured at six surface areas, and levels of greater than 1700 uR/h were identified at nine areas. Highest surface gamma radiation levels were found along the southernmost perimeter os SWSA 4 in the "bathtub seeps" area where ground-level gamma exposure rates reached 15 mR/h. A second contaminated area, encompassing 126 m2 and located in grid blocks N 19,200/E 27,700 and N 19,300/E 27,700, had surface gamma exposure rates up to 14 mR/h. (ORNL 1990)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

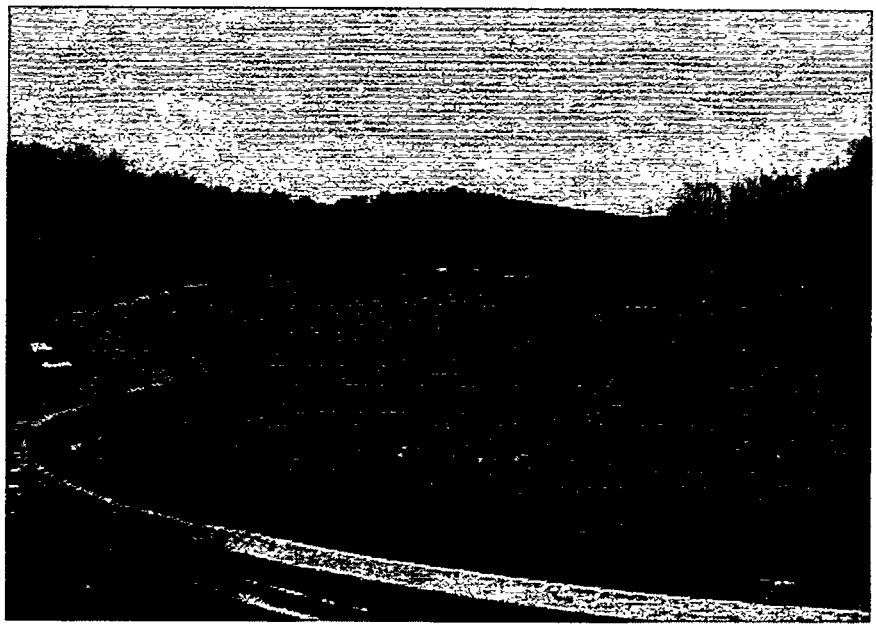
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

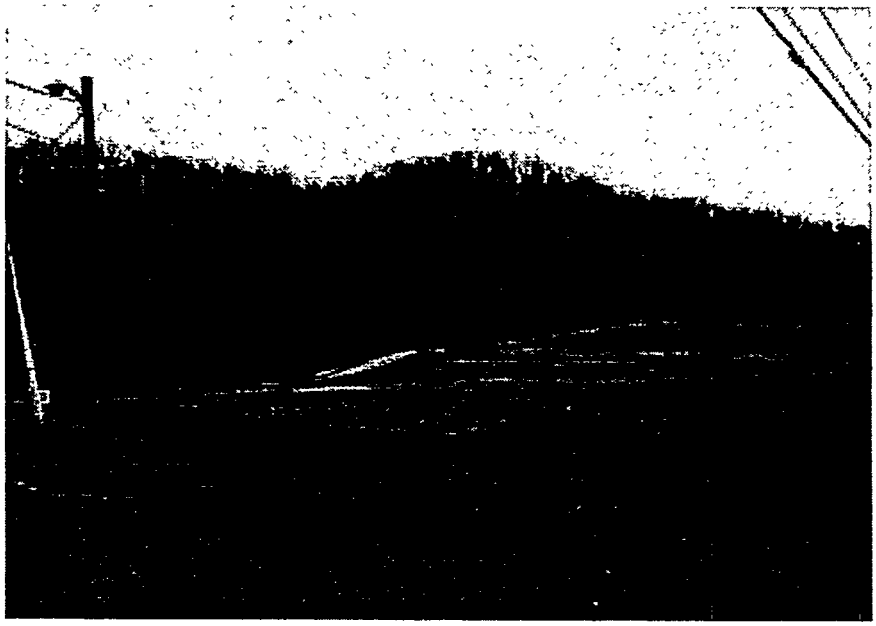
Oak Ridge National Laboratory, September 1990, Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Site Investigation Report for Waste Area Grouping 4 at Oak Ridge National Laboratory, Vol.1, Text,* ORNL/ER-329/VS, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_28.JPG; 17_25.JPG





UNIT NAME: Drainage 1 & 2 in WAG 5

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: Drainage 1 receives runoff from a sub-watershed in the northern portion of Wag 5 and discharges to White Oak Creek. Drainage 2 receives runoff from a sub-watershed in the south-central portion of Wag 5 and discharges to Melton Branch. (Bechtel et al 1995) ORNL grid coordinates for Drainage 1 are N 18,417 ft and E 29,627 ft. ORNL grid coordinates for Drainage 2 are N 17,498 ft and E 29,601 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Drainage 1 receives runoff from an area of 27.9 acres. Drainage 2 receives runoff from an area of 10.6 acres. (Bechtel et al 1995)

Dates Operated: No applicable.

Present Function: Not applicable.

Life Cycle Operation: Drainage D-1 receives runoff from the PWSB, the fissile storage area, 40% of SWSA 5 North, and 12% of the SWSA 5-White Oak Creek Study area. Drainage D-2 consists primarily of grassed-over SWSA 5 South trench areas and wooded area along the stream channel. (Bechtel et al 1995)

Waste Characteristics: The primary sources of contamination are the OHF and PWSB impoundments, the TRU storage facilities in SWSA 5 North, and the trenches and auger holes in the SWSA 5 White Oak Creek Fissile Storage areas. Primary contaminant types in these sources include TRU, fissile, mixed fission/activation products, and VOC's. The principal release mechanism is the inundation of trench wastes by shallow or perched groundwater. Contaminants are then transported through the shallow groundwater and discharged to seeps and surface waters (White Oak Creek, drainage D-1 Northern Tributary).(Bechtel et al 1995)

Release Data: Sampling of the surface water and sediment in drainage D-1 during the 1995 RI event, identified a number of contaminants of concern: Am-241, Cs-137, Pu-239/240, Sr-90. tritium, U-233/234, U-235, and U-238. Strontium-90 concentrations were around 25 Pci/L. Sediment in drainage D-1 had U-233/234 and U-238 concentrations approximately two to five times greater than the background references levels. The corresponding gross alpha levels, however, were at or below background levels. Sr-90 and Cs-137 concentrations were generally at to below background levels, as were the corresponding gross beta results. Flux calculations indicate that the WAG 5 White Oak Creek drainage basin is contributing only a small percentage (less than 5%) of contamination to the total measured flux leaving White Oak Dam. Most contamination measured at White Oak Creek weir is from sources upstream of, or adjacent to, WAG 5. (Bechtel et al 1995)

Sampling of the surface water and sediments in drainage D-2 during the 1995 RI event, identified a number of contaminates of concern: Am-241, Ca-135, Cm-243/244, Cs-137, Pu-238, Sr-90, Tc-99, Th-230, tritium, U-232, U-233/234. Tritium was generally detected between 3,000,000 and 12,000,000 Pci/L. Sr-90 was found at levels between 1300 and 2500 Pci/L, with little difference between storm and baseflow concentrations. Sediment samples also had elevated Sr-90 concentrations (~1000 Pci/L) at each location. Cesium-137 was not detected during baseflow sampling but was detected during storm events - however, only at values at or slightly above background (40 Pci/L). Values of Cs-137 were greatest at SD005 and decreased further upgradient. Gross alpha was detected at a range of 8 to 330 Pci/L. Isotopic analyses were only performed for off-site samples, and Am-241 and Pu-238 were detected each time, at levels as high as 9.7 and 17 Pci/L. Alpha also appears to be at elevated levels in the sediment. Except for U-233/234 and gross alpha, approximately 70 % of the contamination in D-2 is received from groundwater discharge. Alpha emitters generally adsorb tightly to sediment particles, so a higher concentration of gross alpha is expected when increased flow tends to mobilize the sediment in the stream channel. (Bechtel et al 1995)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface water, Groundwater

Comments: Drainage 1 (D-1) is the main surface water contributor from WAG 5 to White Oak Creek (46%) and Drainage 2 (D-2) is in the Melton Branch Drainage System. (Bechtel et al 1995)

This site was included in a CERCLA remedial investigation (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Leak Site - Old Hydrofracture Facility (OHF)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: Located in Melton Valley. Leaks are associated with observation wells S-100 ft and S-220 ft at OHF. (Bechtel et al 1995) ORNL coordinates are N 17,050 ft. and E 28,620 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown.

Dates Operated: Leak date: 1968 for well S-220. Well S-100 drilled in 1964 encountered contaminated groundwater but there is no documentation of release. (Bechtel et al 1995)

Present Function: Not in operation.

Life Cycle Operation: OHF was used for permanent disposal of liquid radioactive waste in shale formation at depths between 780 and 950 ft. (ORNL 1995) In 1968 well S-220 was drilled into a fracture containing contaminated grout from an earlier grout injection at OHF. (Bechtel et al 1995)

Waste Characteristics: More than 2 million gallons of liquid radioactive waste and grout mixture containing several hundred thousand curies of beta-gamma radionuclides (primarily Cs-137, Sr-90, Co-60, and lesser amounts of U-233, Pu-23x, Cm-244, Am-241) were injected over the operational history of OHF. (ORNL 1995)

Release Data: Approximately 2 Ci of SR-90 was released from S-220. No release information is documented for S-100. (Bechtel et al 1995)

Site Status: CERCLA

Media of Concern: Groundwater, Soil (Bechtel et al 1995)

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1995).

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Remedial Investigation Report on Waste Area Grouping 5 at Oak Ridge National Laboratory,* DOE/OR/01-1326&D2/V1 Oak Ridge, Tennessee.

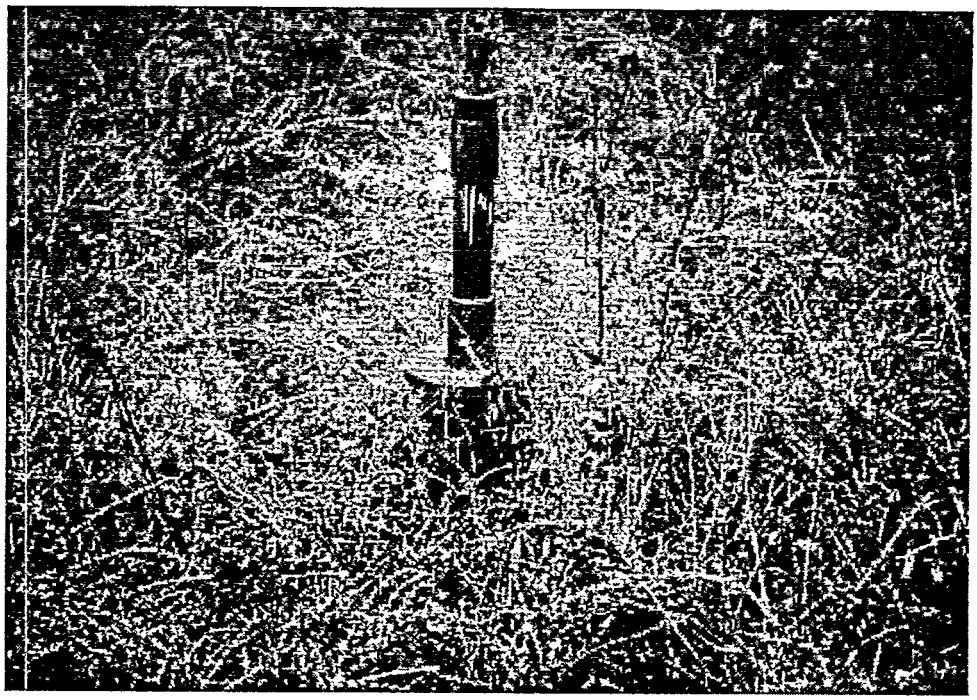
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

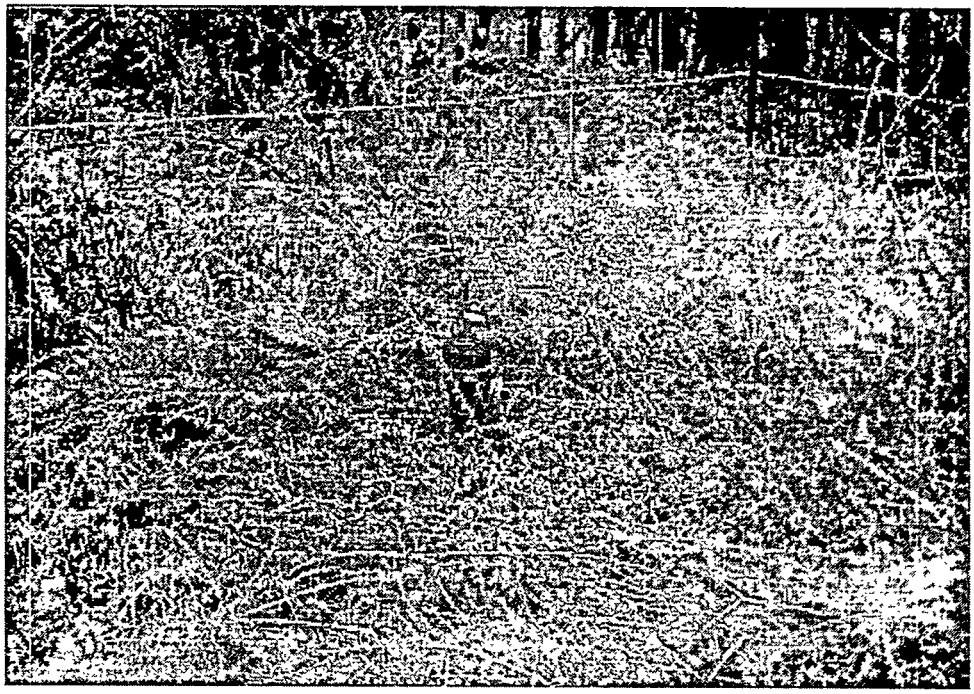
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, October 1995. *Oak Ridge Reservation Federal Facility Agreement Quarterly Report for the Environmental Restoration Program,* Vol. 4 July-Sept 1995, prepared by the Environmental Restoration Division.

Date Prepared: December 1996

Photo: 05_04.JPG; 05_05.JPG





UNIT NAME: Liquid Radioactive Waste Lines and Leak Site - Building 7852

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: This site is a grout leak at the Old Hydrofracture Facility in Melton Valley. ORNL grid coordinates are N 17,200 ft and E 28,550 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This unit is a leak/spill site. No dimensions are available, and the amount of waste leaked or spilled is reported to be approximately 2300 gal (8700 L) of waste-grout slurry released to the waste pit at the facility. (Grimsby 1986)

Dates Operated: Date leak occurred: June 30, 1977 (Grimsby 1986)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: The leak occurred because a valve failed at the Old Hydrofracture Facility. (ORNL 1990) Waste-grout slurry was directed to the waste pit. (Grimsby 1986)

Waste Characteristics: Wastes handled were evaporator concentrated liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams. (ORNL 1990)

Release Data: On June 30, 1977 a valve at the Shale Fracture Facility failed when the waste slurry was being pumped at 130 gal/min to a depth of 820 ft (250 m) at 3200 psi. An estimated 2300 gal (8700 L) of waste slurry leaked into the waste pit designed to handle such events. The injection was terminated. A by-pass was installed around the faulty valve, and the well and the associated pipe system were flushed with water. All of the valves in the high-pressure system were reinspected and cores, seats, and seals were replaced. The contents of the waste pit were retrieved and included in the injection. The injection was completed on July 2, 1977. (Grimsby 1986)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Contaminated Site Summary Sheets lists the leak date as July 31, 1977.

This site was included in a CERCLA site characterization (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Grimsby, H. J., January 1986. *Identification of Low-level Waste Line Leak Sites at Oak Ridge National Laboratory,* Letter Report RAP86-8, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Pipeline from PWSB to Process Waste Treatment Plant

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: From the western corner of the PWSB, the pipeline extends west to the WAG 5 access road, then follows the access road northward to a point just south of the entrance gate to WAG 5 where it turns northwest and intercepts liquid radioactive waste pipeline along Melton Branch Drive. The pipeline extends to the PWTP. (Kuhaida 1996a) ORNL grid coordinates are N 20,075 ft and E 29,818 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Data not available. (ORNL 1990)

Dates Operated: Data not available.

Present Function: This pipeline is still in place but the flow valves have been closed.

Life Cycle Operation: The PWSB pipeline is a subgrade line used to pump the process waste to the basin and, after settling, transfer the supernatant back to the treatment plant. The process waste sludge basin was built between 1974 and 1975 and used from 1976 to 1981 for the storage and decantation of sludge produced by a water-softening process at the Process Waste Treatment Plant. (Bechtel et al 1995)

Waste Characteristics: Sludge constituents were primarily ferrous sulfate and ferric hydroxide but included mixed fission products and minor quantities of TRU radionuclides. (Bechtel et al 1995)

Release Data: Data not available.

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Dates operated are probably similar to operation of the PWSB - 1976 to 1981. (Kuhaida 1996b)

This site was included in a CERCLA site characterization. (Bechtel et al 1995) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, September 3, 1996a. LMES Project Manager, Review Comments.

Kuhaida, Jerry, October 1996b. LMES Project Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

No photo available

UNIT NAME: Old Hydrofracture Facility (OHF) Pond (7852A)

Unit Number: 05.02

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: The pond is located at the southwest corner of SWSA 5, near Building 7852. ORNL grid coordinates are N 17,300 ft and E 28,530 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This site is an unlined pond the dimensions of which are 20 x 100 ft (6 x 30 m) with an average depth of about 6.0 ft (1.8 m). Capacity is about 100,000 gal (380,000 L). The sides are lined with limestone rip-rap. The bottom of the pond contains about 15,000 gal (57,000 L) of contaminated sediment. (ORNL 1990)

Dates Operated: Site commissioned: 1964. Taken out of service: 1980. (ORNL 1990). Received drilling fluid and drill cuttings from an exploratory core boring through the radioactive grout sheets underlying the OHF site in 1984-1985. (Shoun 1987)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: The function of the impoundment was to serve as an emergency containment basin in the event of a spill from the radioactive grout injections, for example, caused by the backflow of grout. (Shoun 1987)

Waste Characteristics: More than 95% of the radioactivity is in the approximately 1-ft-deep sediment. Main radionuclides include Cs-137, Sr-90, Co-60, and Cs-134. Maximum dose rates are 100 and 300 mrad/h at a height of 4 in. (10 cm) above the pond water. Total activity of water, sediment, and clay is 71 mCi, 404 Ci, and 11.7 Ci, respectively. (ORNL 1990)

Release Data: Four quarters of groundwater monitoring indicated that Sr-90 is the major radionuclide contaminating groundwater. (ORNL 1990). Releases of radioactive grout to pond occurred in 1965 and 1977. (Bechtel et al 1995)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface Water, Sediment

Comments: The 9/95 RI (Bechtel et al 1995) indicates the impoundment was used for emergency grout overflow storage during OHF injection. Also the RI indicates that contaminated drilling fluids were placed in the pond in 1984 - 1985.

This site was included in a CERCLA site characterization. (Bechtel et al 1995) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

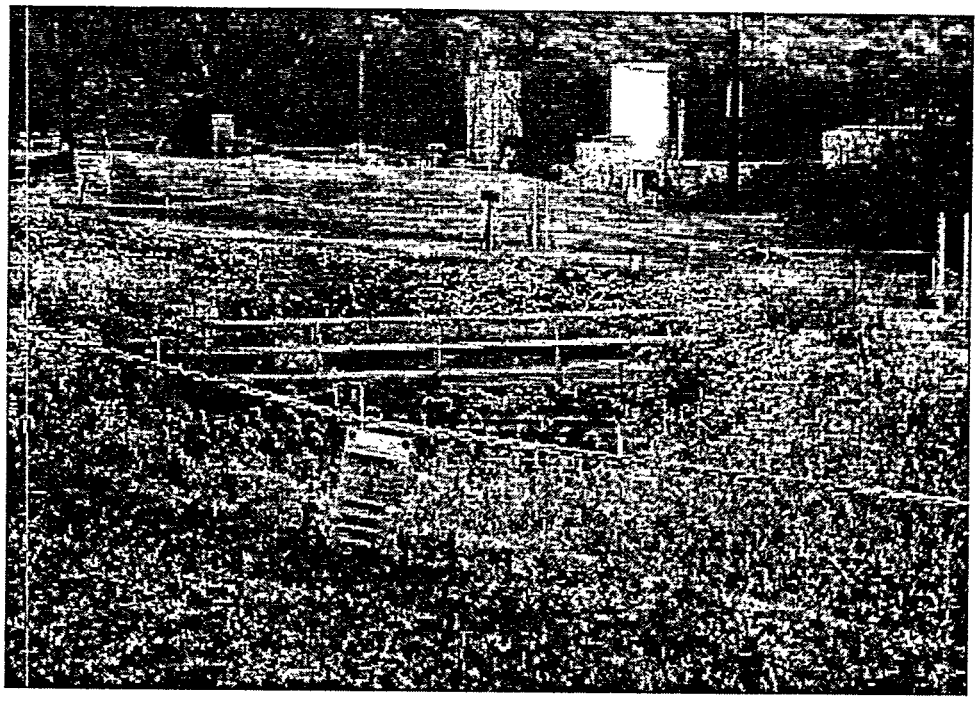
FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Shoun, R.R. 1987. Environmental Data Package for ORNL Waste Area Grouping 5 (WAG 5), Solid Waste Storage Area 5 (SWSA 5), ORNL/RAP-19, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_21.JPG



UNIT NAME: OHF Site Surface Facilities (7852)

Unit Number: 05.03

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: This site is located 1.0 mile (1.6 km) southwest of the main ORNL complex, in the Melton Valley. ORNL grid coordinates are N 17,160 ft and E 28,620 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The hydrofracture units are comprised of two different entities: the surface facilities (well heads, waste tanks, solids tanks, etc.) and the grout sheets in the subsurface (including associated wells). The OHF Site Surface Facilities include building 7852 which consists of a mixing cell, pump cell, well cell, and transit-roof-covered engine pad and a control room. The site also contains three dry storage bins, a water tank, waste pit T-4, and a pump house. (ORNL 1990)

The three cells have 30-cm (12 inch) thick concrete walls and are covered by a metal roof (two 3-layer steel plates on either side of a steel grating). The pumphouse is a 33-m^2 (360-ft^2) concrete block house. The valve pit is 1.9 x 6.4 m (6 ft 4 in x 21 ft) and is located southwest of the pumphouse. It is covered with metal plates. The waste pit is composed of three separate concrete walled cells (3.7 x 3.7 x 2.7 m); the two northern cells are covered with a corrugated plastic roof. (Shoun 1987)

Dates Operated: Site commissioned: 1964. Taken out of service: 1979. (Bechtel et al 1995)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: The OHF Site Surface Facilities include those facilities associated with storage, mixing, and deep well injection of liquid radioactive waste grout mixtures. (Bechtel et al 1995). The function of the OHF was to provide for the permanent disposal of liquid radioactive waste in impermeable shale formations at a depth of about 1000 ft (300 m). This was accomplished by mixing the radioactive waste with solids (such as cement), forming a grout that was pumped into shale, where it solidified in thin sheets. Not covered here are the waste storage tanks, (SWMU 5.5A - 5.5E) and emergency waste pond (SWMU 05.2). (ORNL 1990) The waste pit used for routine/nonroutine, temporary storage of contaminated solutions during injection operations, original cell was permanently filled when grout could not be removed. (Bechtel et al 1995)

Waste Characteristics: Wastes injected were similar to those discharged to the pits and trenches (evaporator concentrated liquid radioactive waste). Main radionuclides were Sr-90, Cs-137, Co-60, and TRU. No analyses of hazardous constituents are reported. In the control room, absorbed dose rates ranged from 75 to 600 mrad/h, while the maximum transferable beta-gamma activity and alpha activities were 49000 dpm/100 sq cm and 40 dpm/100 sq cm, respectively. Higher dose rates were observed in the mixing, pump, and well cells. (ORNL 1990)

Release Data: The operation left at least portions of most of the associated structures at the facility radioactively contaminated and some chemically contaminated. (Bechtel et al 1995)

Site Status: Site is presently in the D&D program. (ORNL 1990)

Media of Concern: Sediment, Surface Water

Comments: Most of the components of SWMU 5.3 were determined to be either insignificant sources of contamination or part of the OHF facilities to be addressed through ongoing decontamination and decommissioning (D&D) activities. Waste pit T-4 is considered to be a potential source or area of concern. (Bechtel et al 1995)

This site was included in a CERCLA remedial investigation (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

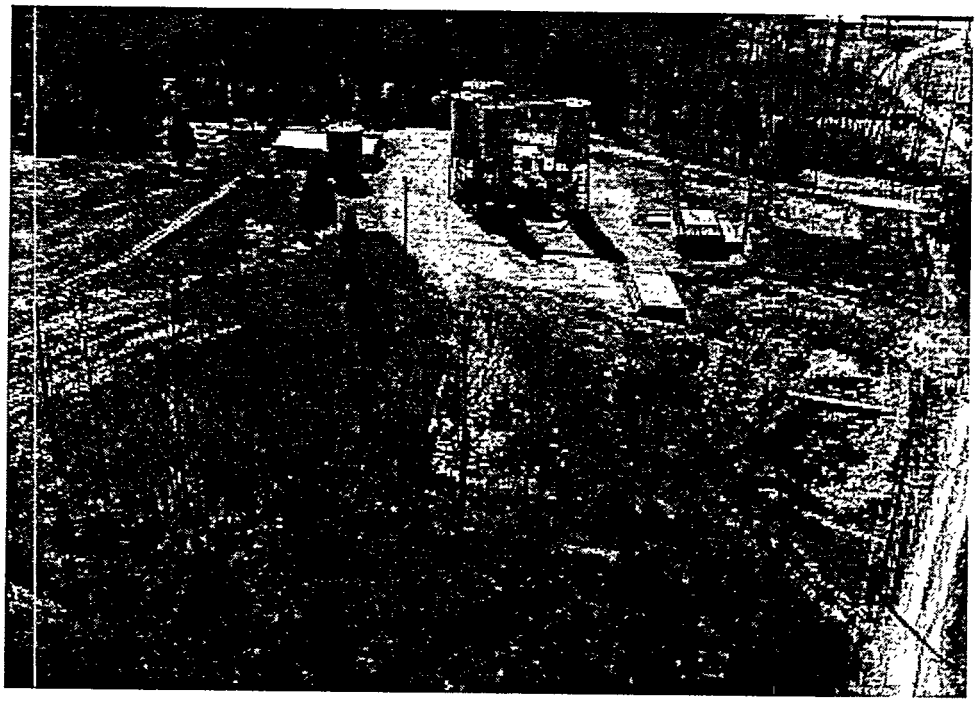
FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Shoun, R.R., 1987. Environmental Data Package for ORNL Waste Area Grouping (WAG 5), Solid Waste Storage Area 5 (SWSA 5), ORNL/RAP-21, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 2525_89.JPG



UNIT NAME: Inactive OHF Waste Storage Tank T-1

Unit Number: 05.05A

Project Status: Engineering Evaluation and Cost Analysis (Whitehead (1996)

Unit Location: ORNL coordinates are N 17,170 ft and E 28,498 ft. Located at the Old Hydrofracture Facility, Building. 7852. (ORNL 1990)

Approximate Dimensions and Capacity: Tank T1: Outside diameter is 8.0 ft (2.4 m). Length is 44.2 ft (13.5 m). The tank is made of carbon steel. The tank is covered with 4.0 ft (1.2 m) of soil (minimum) and is cathodically protected. Capacity is 15,000 gal (56,800 L). (ORNL 1990)

Dates Operated: Site commissioned: 1963. Taken out of service: 1980. (ORNL 1990)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: Tank T-1 is one of five tanks located at the OHF. The tank was used to store radioactive liquid waste prior to the waste being mixed with grout and injected into a fractured shale formation. Tank T-1 was used for this purpose from 1966 through 1980, when the facility was shut down. (ORNL 1990)

Waste Characteristics: The most recent sampling campaign (1988) results were as follows: liquid activities were 210 Bq/ml gross alpha; 79,500 Bq/ml gross beta; 81,000 Bq/ml Cs-137; 3,400 Bq/ml Sr-90; and <50 Bq/ml Co-60. The alpha activity level of the sludge was 1,511 nCi/g, classifying it as TRU; gross beta count in the sludge was 5.9E+7 Bq/ml. These levels are typical of the activity levels in the other OHF tanks. (ORNL 1994)

Release Data: In a direct walk-over survey, the direct beta-gamma absorbed dose rate in the vicinity of the waste storage tanks was less than 1 mrad/h at 0.4 to 1.2 in. (1 to 3 cm) above the surface. No tank leaks have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) Tank T-1 is about 85% full of liquid and sludge. The tank is not known to be inleaking or outleaking. (ORNL 1990) The 1990 Contaminated Site Summary Sheet indicates the site was commissioned in 1963, whereas, the ORNL 1994 reference indicates service date beginning in 1964.

This site was included in a CERCLA remedial investigation (Bechtel et al 1995). A CERCLA removal action has been initiated to remove the contents of the OHF tanks. (Kuhaida 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation*, DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

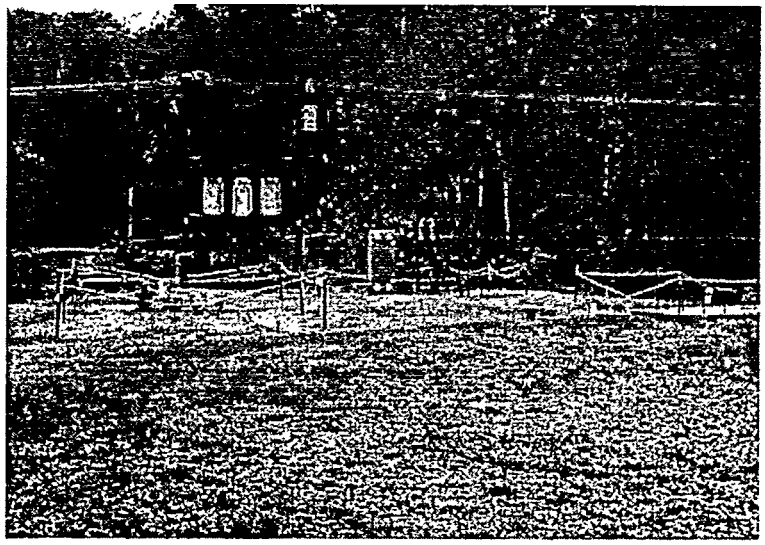
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

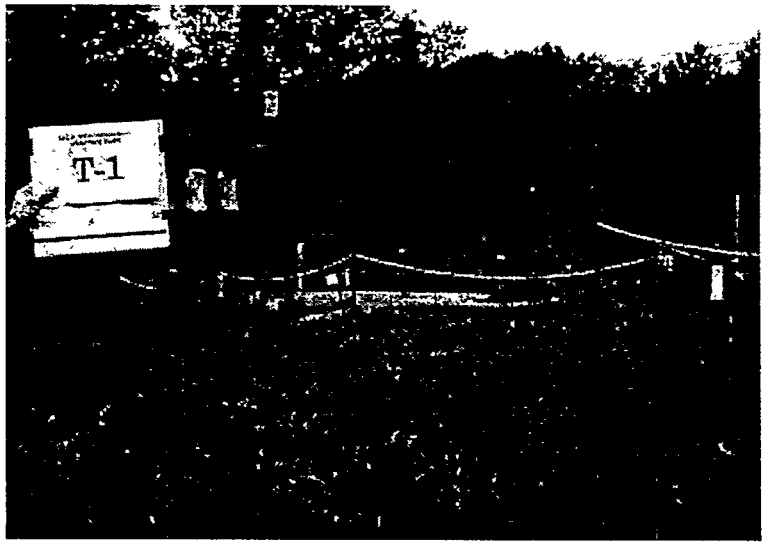
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.

Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 05_15.JPG; 19_29.JPG





UNIT NAME: Inactive OHF Waste Storage Tank T-2

Unit Number: 05.05B

Project Status: Engineering Evaluation and Cost Analysis (Whitehead 1996)

Unit Location: ORNL grid coordinates are N 17,170 ft and E 28,510 ft. The tank is located at the OHF (Building 7852) in Melton Valley. (ORNL 1990)

Approximate Dimensions and Capacity: Tank T-2: Outside diameter is 8.0 ft (2.4 m). Length is 44.2 ft (13.5 m). The tank is made of carbon steel. The tank is covered with 4.0 ft (1.2 m) of soil (minimum) and is cathodically protected. Capacity is 15,000 gal (56,800 L). (ORNL 1990)

Dates Operated: Site commissioned: 1963. Taken out of service: 1980. (ORNL 1990)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: Tank T-2 is one of five tanks located at the OHF. The tank was used to store radioactive liquid waste prior to the waste being mixed with grout and injected into a fractured shale formation. Tank T-2 was used for this purpose from 1966 through 1980, when the facility was shut down. (ORNL 1990)

Waste Characteristics: The most recent sampling campaign (1988) results were as follows: liquid activities were 210 Bq/ml gross alpha; 140,000 Bq/mL gross beta; 140,000 Bq/mL Cs-137; 2,800 Bq/mL Sr-90; and <75 Bq/mL Co-60. The alpha activity level of the sludge was 7,083 nCi/g; gross beta count in the sludge was 2.0E+7 Bq/mL. These levels are typical of the activity levels in the other OHF tanks. (ORNL 1994)

Release Data: In a direct walk-over survey, the direct beta-gamma absorbed dose rate in the vicinity of the waste storage tanks was less than 1 mrad/h at 0.4 to 1.2 in. (1 to 3 cm) above the surface. No tank leaks have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) A CERCLA removal action has been initiated to remove the contents of the OHF tanks. (Kuhaida 1996) Tank T-2 is about 85% full of liquid and sludge. The tank is not known to be inleaking or outleaking. (ORNL 1990) The 1990 Contaminated Site Summary Sheet indicates the site was commissioned in 1963, whereas, the ORNL 1994 reference indicates service date beginning in 1964.

This site was included in a CERCLA site characterization (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

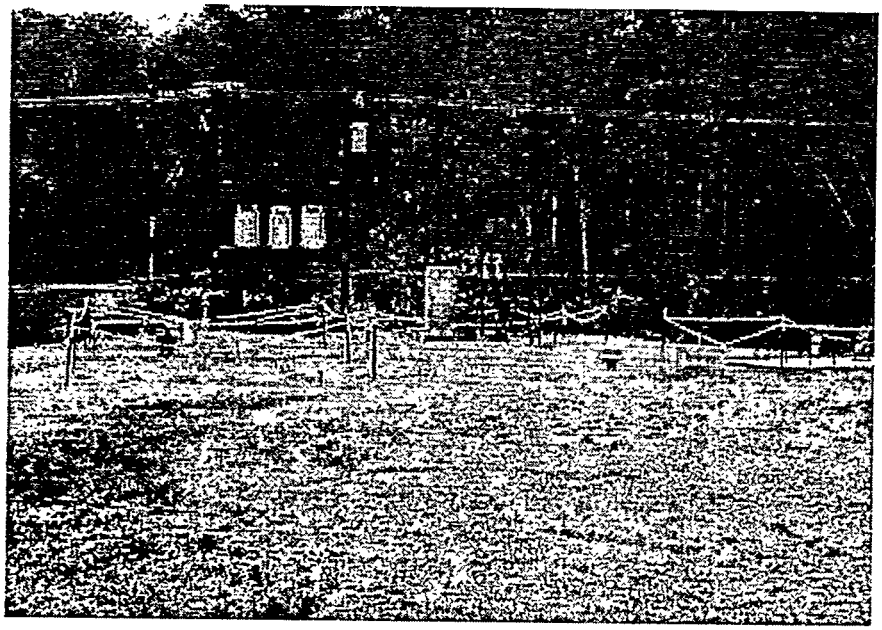
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

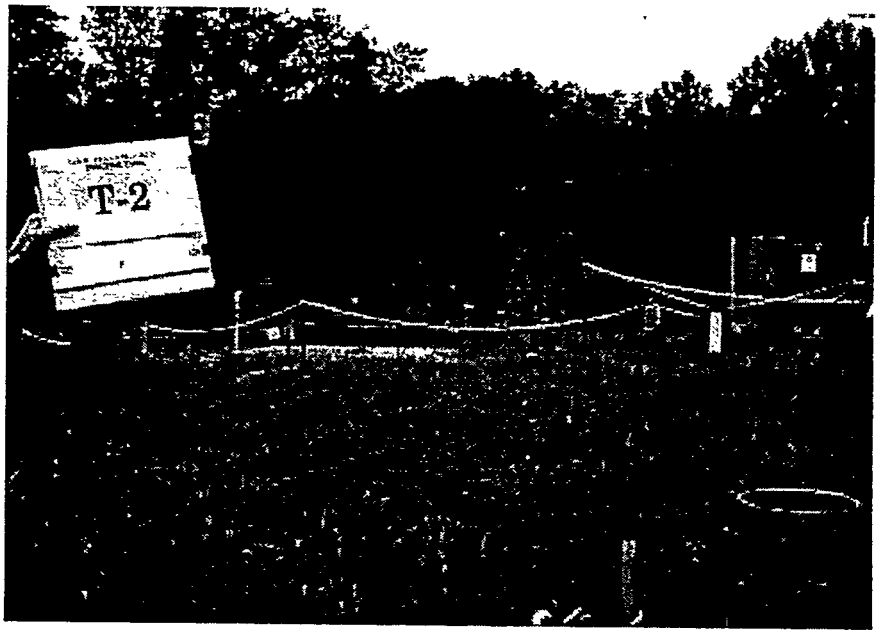
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Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275, Oak Ridge, Tennessee.
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 05_15.JPG; 19_30.JPG





UNIT NAME: Inactive OHF Waste Storage Tank T-3

Unit Number: 05.05C

Project Status: Engineering Evaluation and Cost Analysis (Whitehead 1996)

Unit Location: ORNL grid coordinates are N 17,143 ft and E 28,540 ft. The tank is located at the OHF (Building 7852). (ORNL 1990)

Approximate Dimensions and Capacity: Tank T-3: Outside diameter is 10.5 ft (3.2 m). Length is 42.0 ft (12.8 m). The tank is made of carbon steel with a rubber lining. The tank is covered with 4.0 ft (1.2 m) of soil (minimum) and is cathodically protected. Capacity is 25,000 gal (94,600 L). (ORNL 1990)

Dates Operated: Site commissioned: 1963. Taken out of service: 1980. (ORNL 1990)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: Tank T-3 is one of five tanks located at the OHF. The tank was used to store radioactive liquid waste prior to the waste being mixed with grout and injected into a fractured shale formation. Tank T-3 was used for this purpose from 1966 through 1980, when the facility was shut down. (ORNL 1990)

Waste Characteristics: The most recent sampling campaign (1988) results were as follows: liquid activities were 2 Bq/mL gross alpha; 280,000 Bq/mL gross beta; 270,000 Bq/mL Cs-137; 300 Bq/mL Sr-90; and 360 Bq/mL Co-60. The alpha activity level of the sludge was 1,000 nCi/g; gross beta count in the sludge was 2.5E+7 Bq/mL. These levels are typical of the activity levels in the other OHF tanks. (ORNL 1994)

Release Data: In a direct walk-over survey, the direct beta-gamma absorbed dose rate in the vicinity of the waste storage tanks was less than 1 mrad/h at 0.4 to 1.2 in. (1 to 3 cm) above the surface. No tank leaks have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) Tank T-3 is about 15% full of liquid and sludge. The tank is not known to be inleaking or outleaking. (ORNL 1990) The 1990 Contaminated Site Summary Sheet indicates the site was commissioned in 1963, whereas, the ORNL 1994 reference indicates service date beginning in 1964.

This site was included in a CERCLA site characterization (Bechtel et al 1995). A CERCLA removal action has been initiated to remove the contents of the OHF tanks. (Kuhaida 1996) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

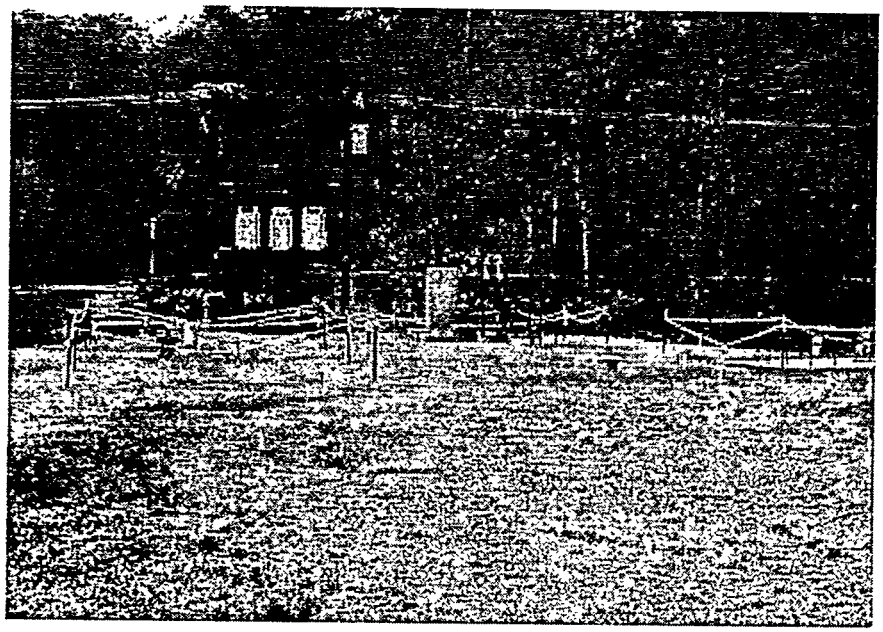
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

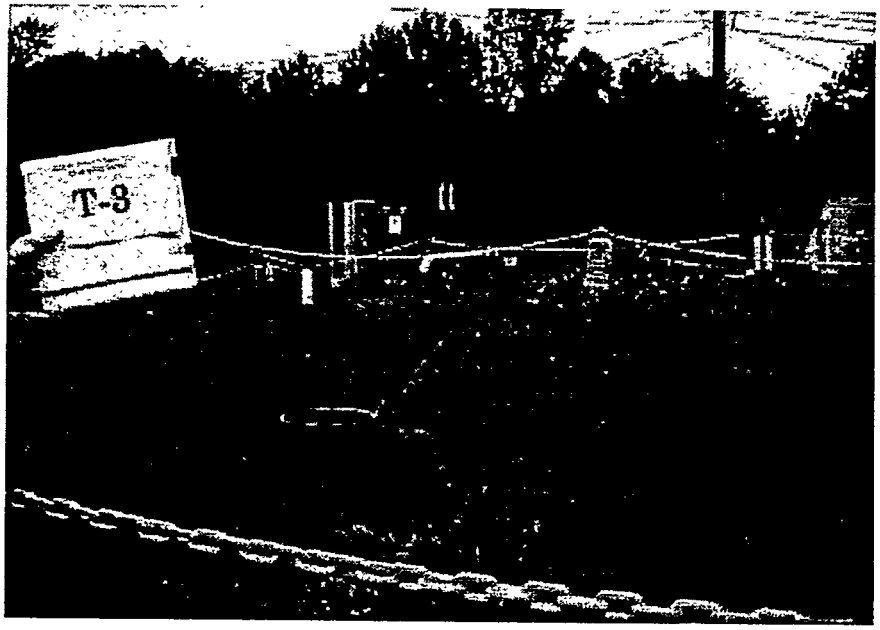
FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996. LMES Project Manager, review comments.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275. Oak Ridge, Tennessee.
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 05_15.JPG; 19_31.JPG





UNIT NAME: Inactive OHF Waste Storage Tank T-4

Unit Number: 05.05D

Project Status: Engineering Evaluation and Cost Analysis (Whitehead 1996)

Unit Location: ORNL grid coordinates are N 17,140 ft and E 28,550 ft. The tanks are located at the OHF (Building 7852). (ORNL 1990)

Approximate Dimensions and Capacity: Tank T-4: Outside diameter is 10.5 ft (3.2 m). Length is 42.0 ft (12.8 m). The tank is made of carbon steel and is rubber lined. The tank is covered with 4.0 ft (1.2 m) of soil (minimum) and is cathodically protected. Capacity is 25,000 gal (94,600 L). (ORNL 1990)

Dates Operated: Site commissioned: 1963. Taken out of service: 1980. (ORNL 1990)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: Tank T-4 is one of five tanks located at the OHF. The tank was used to store radioactive liquid waste prior to the waste being mixed with grout and injected into a fractured shale formation. Tank T-4 was used for this purpose from 1966 through 1980, when the facility was shut down. (ORNL 1994)

Waste Characteristics: The most recent sampling campaign (1988) results were as follows: liquid activities were 49 Bq/mL gross alpha; 300,000 Bq/mL gross beta; 300,000 Bq/mL Cs-137; 1,400 Bq/mL Sr-90; and 64 Bq/mL Co-60. The alpha activity level of the sludge was 1,555 nCi/g; gross beta count in the sludge was 3.6E+7 Bq/mL. These levels are typical of the activity levels in the other OHF tanks. (ORNL 1994)

Release Data: In a direct walk-over survey, the direct beta-gamma absorbed dose rate in the vicinity of the waste storage tanks was less than 1 mrad/h at 0.4 to 1.2 in. (1 to 3 cm) above the surface. No tank leaks have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) Tank T-4 is about 40% full of liquid and sludge. The tank is not known to be inleaking or outleaking. (ORNL 1994) The 1990 Contaminated Site Summary Sheet indicates the site was commissioned in 1963, whereas, the ORNL 1994 reference indicates service date beginning in 1964. This site was included in a CERCLA site characterization (Bechtel et al 1995). A CERCLA removal action has been initiated to remove the contents of the OHF tanks. (Kuhaida 1996) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

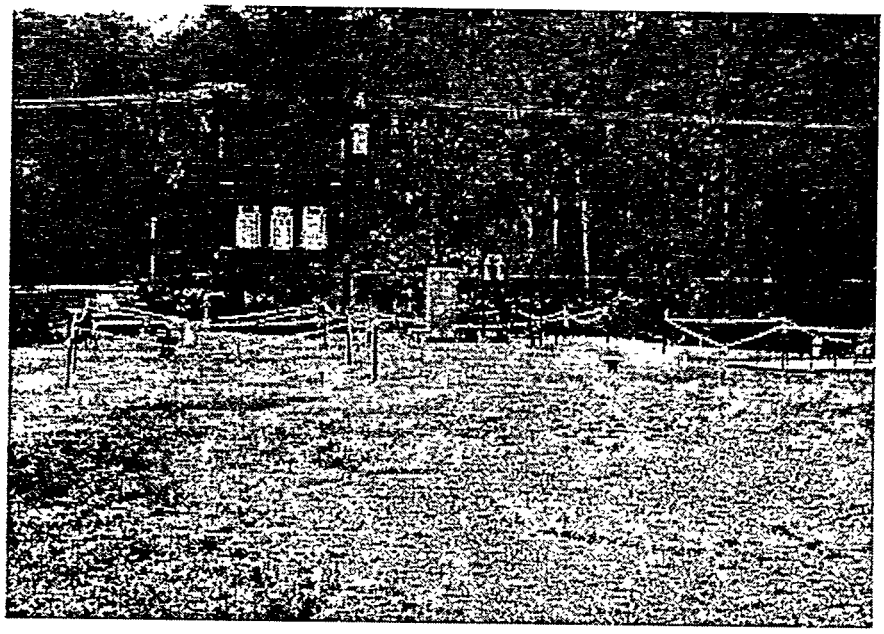
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

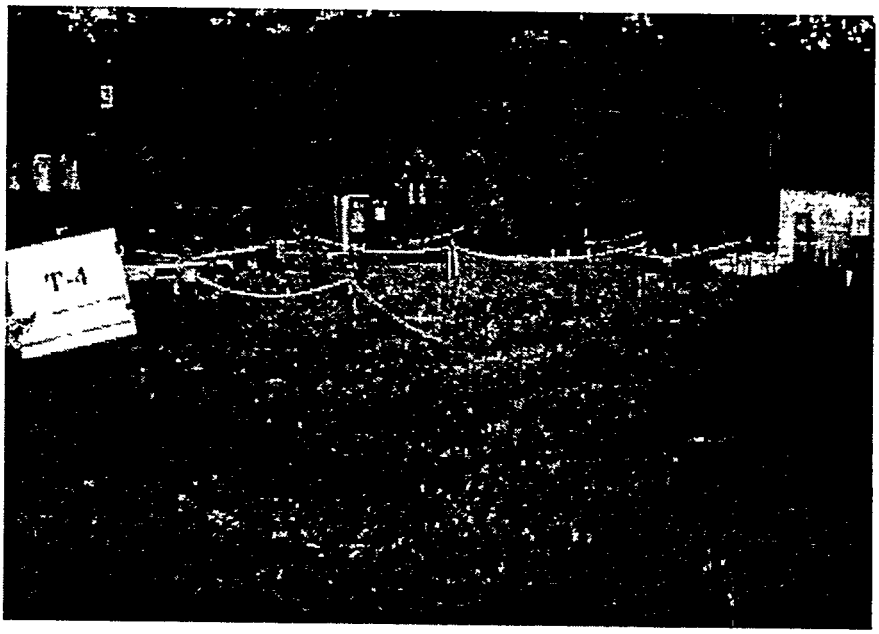
FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.
Oak Ridge National Laboratory, September 1990, Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275. Oak Ridge, Tennessee.
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 05_15.JPG; 19_33.JPG





UNIT NAME: Inactive OHF Waste Storage Tank T-9

Unit Number: 05.05E

Project Status: Engineering Evaluation and Cost Analysis (Whitehead 1996)

Unit Location: ORNL grid coordinates are N 17,170 ft and E 28,520 ft. The tank is located at the OHF and is used to store liquid radioactive waste prior to injection. (ORNL 1990)

Approximate Dimensions and Capacity: Tank T-9: Outside diameter is 10.0 ft (3.0 m). Length is 19.5 ft (5.9 m). The tank is made of carbon steel (straight side dimensions). The tank is covered with 4.0 ft (1.2 m) of soil (minimum) and is cathodically protected. Capacity is 13,000 gal (49,200 L). (ORNL 1990)

Dates Operated: Site commissioned: 1963. Taken out of service: 1980. (ORNL 1990)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: Tank T-9 is one of five tanks located at the OHF. The tank was used to store radioactive liquid waste prior to the waste being mixed with grout and injected into a fractured shale formation. Tank T-9 was used for this purpose from 1966 through 1980, when the facility was shut down. (ORNL 1994)

Waste Characteristics: The most recent sampling campaign (1988) results were as follows: liquid activities were 700 Bq/mL gross alpha; 340,000 Bq/mL gross beta; 290,000 Bq/mL Cs-137; 36,000 Bq/mL Sr-90; and 0.006 Bq/mL Co-60. The alpha activity level of the sludge was 707 nCi/g; gross beta count in the sludge was 1.6E+7 Bq/mL. These levels are typical of the activity levels in the other OHF tanks. (ORNL 1994)

Release Data: In a direct walk-over survey, the direct beta-gamma absorbed dose rate in the vicinity of the waste storage tanks was less than 1 mrad/h at 0.4 to 1.2 in. (1 to 3 cm) above the surface. No tank leaks have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996) Tank T-9 is about 15% full of liquid and sludge. The tank is not known to be inleaking or outleaking. (ORNL 1994) The 1990 Contaminated Site Summary Sheet indicates the site was commissioned in 1963, whereas, the ORNL 1994 reference indicates service date beginning in 1964.
This site was included in a CERCLA site characterization (Bechtel et al 1995). A CERCLA removal action has been initiated to remove the contents of the OHF tanks. (Kuhaida 1996) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

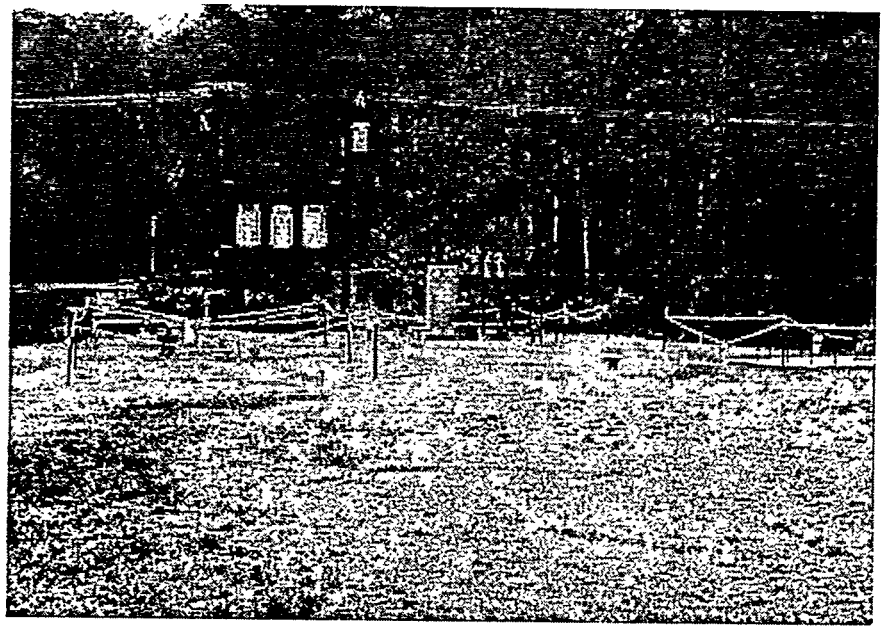
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

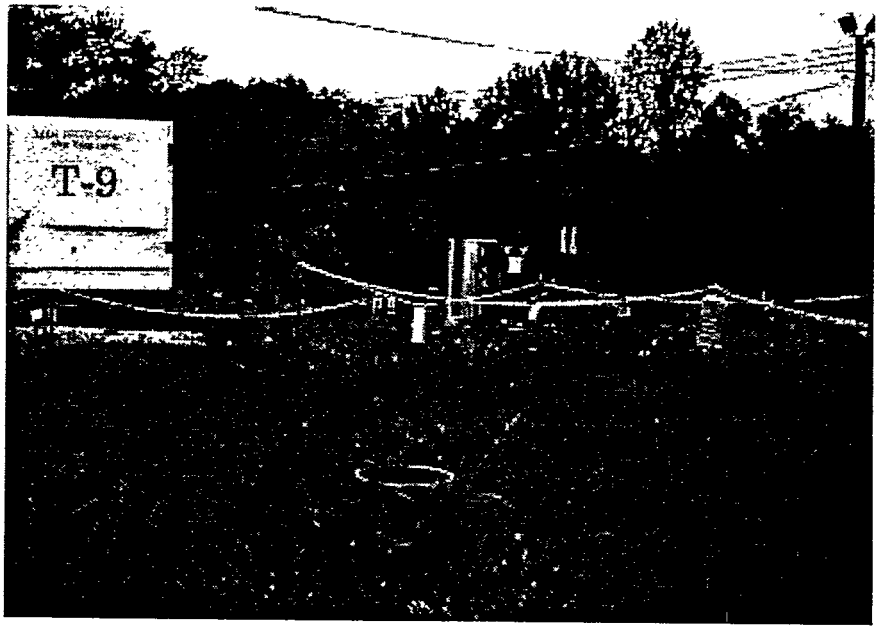
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Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275. Oak Ridge, Tennessee., Nov. 1994.
Whitehead, Lynn, April 11, 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 05_15.JPG; 19_32.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Line from Valve Box to OHF

Unit Number: 05.05F

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: The waste transfer line is connected to a manifold in a valve pit adjacent to the southwest corner of the pump house. (AIMS, Inc. and CDM, Corp. 1996)

Approximate Dimensions and Capacity: The valve pit was below grade and roofed with steel grating covered with lead shielding to reduce the operator's exposure. Extension handles ran through the pit roof to the valves. All the piping to and from the tanks and all of the valves are constructed of carbon steel. (AIMS, Inc. and CDM, Corp. 1996)

Dates Operated: Data not available. (ORNL 1990)

Present Function: Not applicable.

Life Cycle Operation: This line transferred liquid radioactive waste from Building 7852 to the OHF tanks. The waste transfer line is connected to a manifold in a valve pit adjacent to the southwestern corner of the pump house. From there the wastes could be transferred to any of the waste storage tanks. The pumps and piping were designed to pull waste solution from the OHF tanks and discharge to the mixer. (AIMS, Inc. and CDM, Corp. 1996)

Waste Characteristics: Liquid radioactive waste from Building 7852. (AIMS, Inc. and CDM, Corp. 1996)

Release Data: Unknown.

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: These lines are not doubly contained, the valves have corroded and the condition of the lines is not known. Only a small section of the waste transfer line has been tested recently. (AIMS, Inc. and CDM, Corp. 1996)
This site was included in a CERCLA site characterization (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Advanced Integrated Management Services, Inc., and CDM Federal Programs Corporation, April 1996. *Site Characterization Summary Report for the Old Hydrofracture Facility, Waste Area Grouping 5, at the Oak Ridge National Laboratory, Oak Ridge, Tennessee*, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

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Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_19.JPG



UNIT NAME: Process Waste Sludge Basin (7835)

Unit Number: 05.06

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: The site is located in the northern part of SWSA 5 in Melton Valley. ORNL grid coordinates are N 18,450 ft and E 30,020 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Dimensions are 85 x 85 ft (26 x 26 m), with a depth of 8 ft (2.4 m). A PVC (polyvinyl chloride) liner covers a compacted clay bottom. (ORNL 1990)

Dates Operated: The basin was constructed in 1976. Taken out of service: 1981. (ORNL 1990)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: The basin was used to contain and settle sludge produced by the ORNL Process Waste Treatment Plant (3544). Supernatant was pumped back to the PWTP (3544). (ORNL 1990)

Waste Characteristics: Sludge constituents are primarily ferrous sulfate and ferric hydroxide, with fission products present. (ORNL 1990). Radioactively contaminated sludge and sediment — Sr-90, Cs-137, Co-60, U, TRU (Am, Cm, Pu); contaminated water — Sr-90, Cs-137. (Bechtel et al 1995)

Release Data: As much as 50 Ci may be contained in the 4-ft (1.2-m) layer of sediment. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface Water, Groundwater

Comments: This site was included in a CERCLA site characterization. (Bechtel et al 1995) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

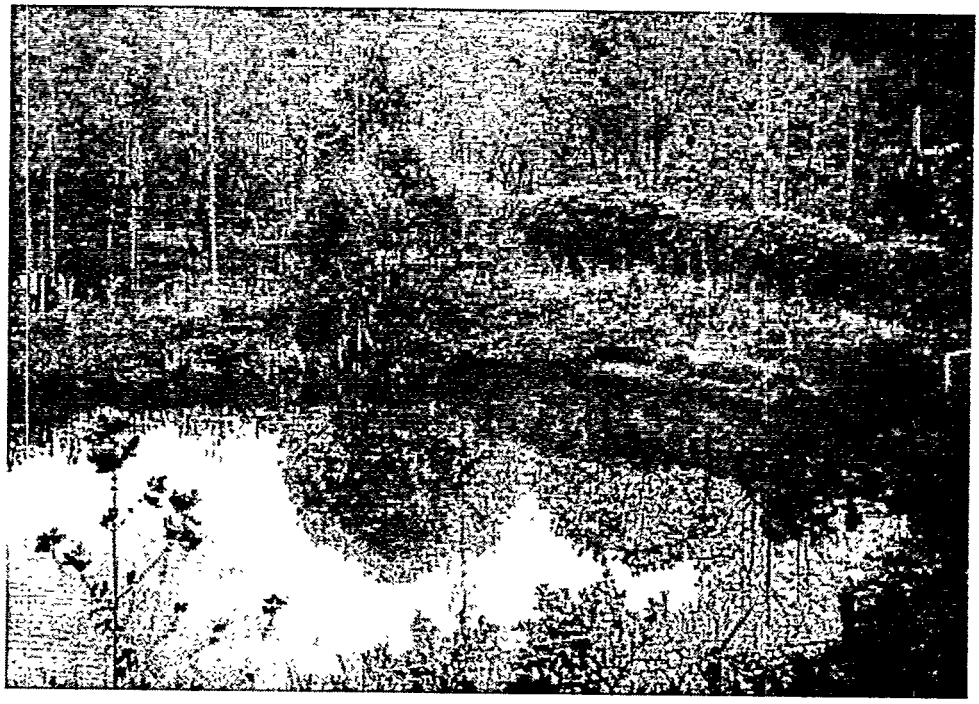
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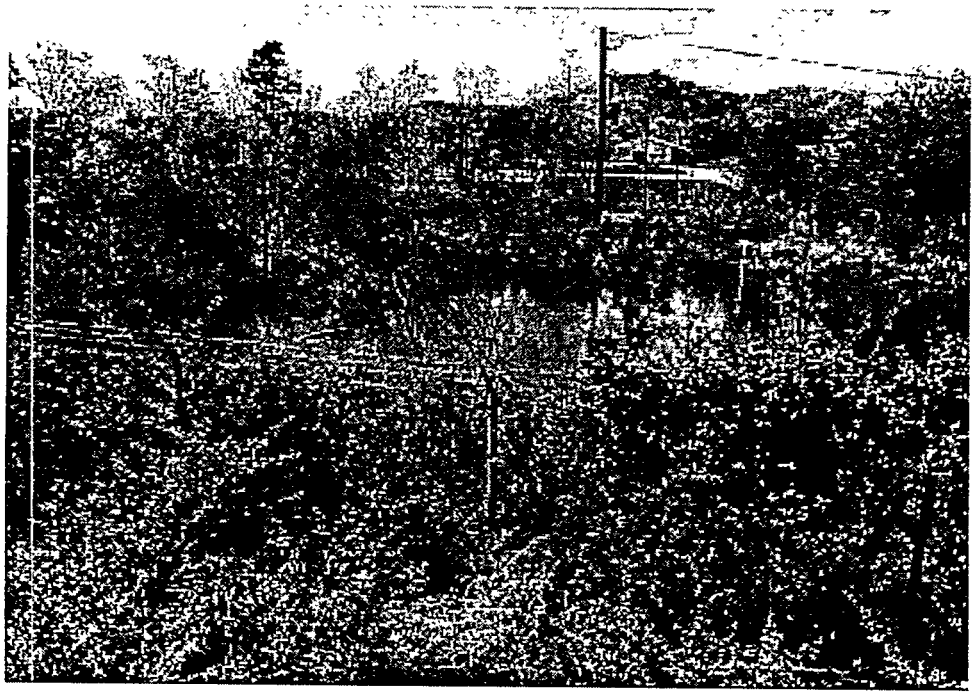
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Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_01.JPG; 3668_91.JPG





UNIT NAME: SWSA 5 (7802) South

Unit Number: 05.07

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: Latitude 35.91401, longitude 84.31295. The site is located on a hillside east of WOC and north of Melton Branch. ORNL grid coordinates are N 17,820 ft and E 29,560 ft. (ORNL 1990)

Approximate Dimensions and Capacity: SWSA 5 (north and south) is a fenced area of about 80.0 acres (32.3 ha). Land used totals 50.0 acres (20.2 ha). It is estimated that 3.09 x 10(E+6) cu ft (86,520 cu m) of waste was buried. (ORNL 1990). SWSA 5 South consists of over 220 unlined trenches and nearly 1000 unlined auger holes. (Bechtel et al 1995)

Dates Operated: Site commissioned: 1959. Taken out of service: 1973. (ORNL 1990)

Present Function: SWSA 5 South is not in operation. (ORNL 1990)

Life Cycle Operation: SWSA 5 is one of the major burial grounds used for disposal of low-level radioactive solid waste at ORNL. It served as the Southeast Regional Burial Ground and off-site wastes including biological wastes were also disposed of at SWSA 5 South. (Bechtel et al 1995). Disposal operation began in 1959 and was consistent with standard practices of the time, which entailed shallow land burial in excavated trenches and drilled auger holes. Several small landfills were also created and in some cases debris and other wastes were dumped on hillsides or into drainage valleys and left exposed. (Bechtel et al 1995)

Waste Characteristics: Retrievable wastes are TRU isotopes and U-233. Major wastes are contaminated with Sr-90, Cm-244, Pu-238, Ru-106, Cs-137, Co-60, and H-3. Total inventory is estimated at < 2.1 x 10(E+5) Ci. (ORNL 1990). The trenches are contaminated with organics, high- and low-activity beta and gamma, TRU miscellaneous, and acid waste. Auger holes were contaminated with organic and miscellaneous wastes and the dump contains radioactive scrap metal. (Bechtel et al 1995)

Release Data: Normal problems caused by infiltration of precipitation were aggravated at SWSA 5 because of poor trench orientation. Fairly high amounts of Sr-90 and measurable amounts of Cm-244 and Pu-238 were detected in one area. Corrective actions were taken. Water from SWSA 5 drains southeast into Melton Branch, and most of the surface water runoff is monitored at Station 4 on Melton Branch. The major contaminants detected in water seepage are Sr-90 and H-3. Average concentration of H-3 was 0.2 mCi/mL. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Surface water, Groundwater

Comments: When the TRU storage facilities were opened in 1970, the SWSA 5 trench and auger hole disposal areas became known as SWSA 5 South and the TRU storage area became SWSA 5 North. (Bechtel et al 1995)

This site was included in a CERCLA site characterization (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

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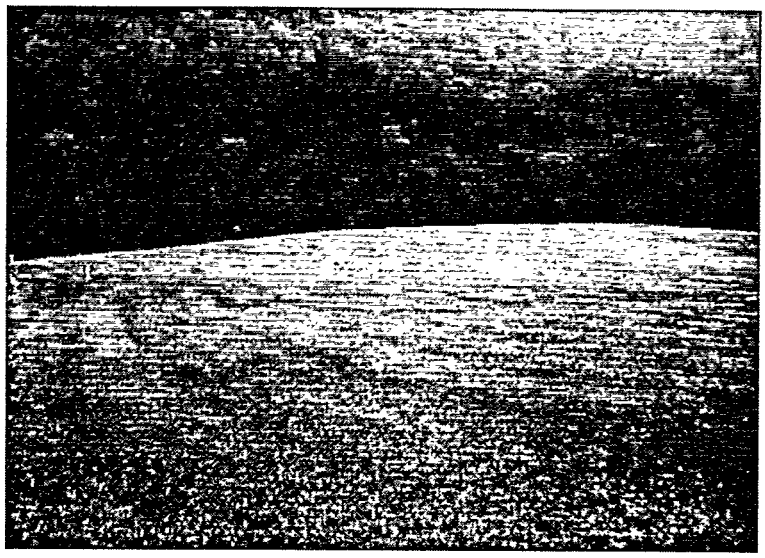
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_02.JPG; 05_03.JPG; 05_06.JPG; 05_08.JPG; 05_09.JPG; 27_33.JPG; 9274_93.JPG

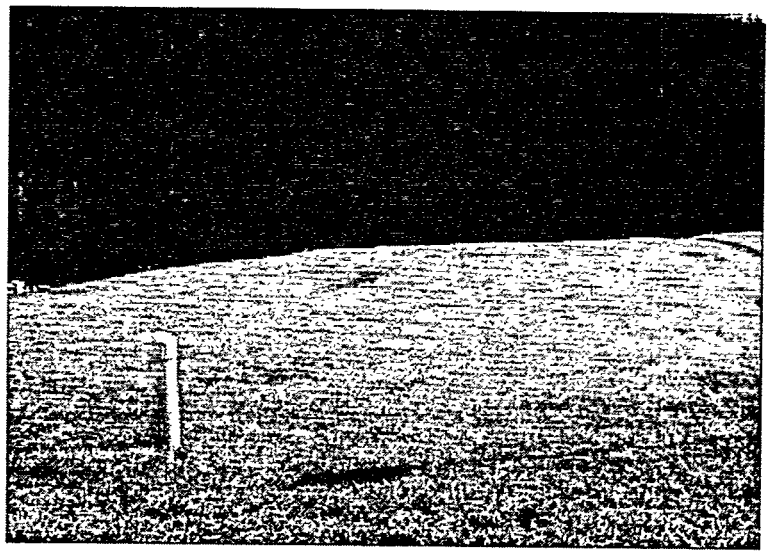


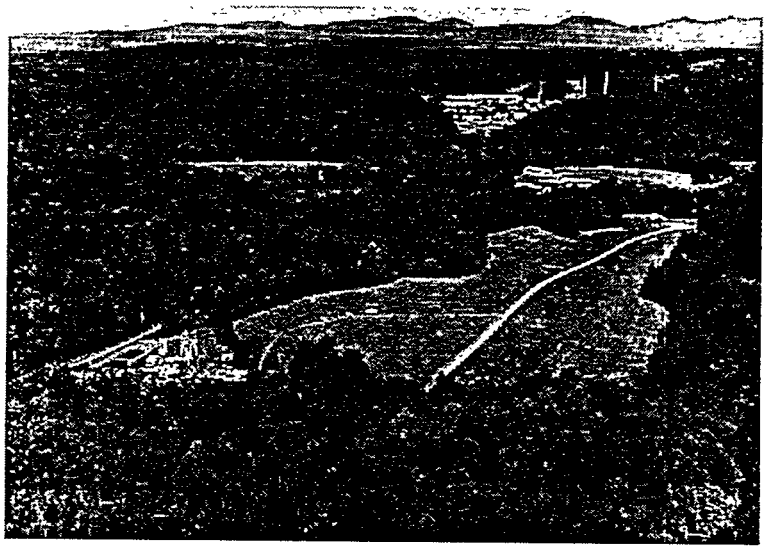












UNIT NAME: Old Landfill (NE edge of SWSA 5)

Unit Number: 05.14

Project Status: Remedial Investigation completed. (Bechtel et al 1995)

Unit Location: Northeast edge of Solid Waste Storage Area 5 (SWSA-5). Approximate ORNL grid coordinates are N 18,170 ft and E 30,150 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown. (ORNL 1990)

Dates Operated: Unknown. (ORNL 1990)

Present Function: Unknown.

Life Cycle Operation: Apparently used as a dump site for noncontaminated rubbish from ORNL operations. (ORNL 1990)

Waste Characteristics: General rubbish, debris, metal containers, and other noncontaminated items. (ORNL 1990)

Release Data: Unknown. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERCLA site characterization. (Bechtel et al 1995) This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

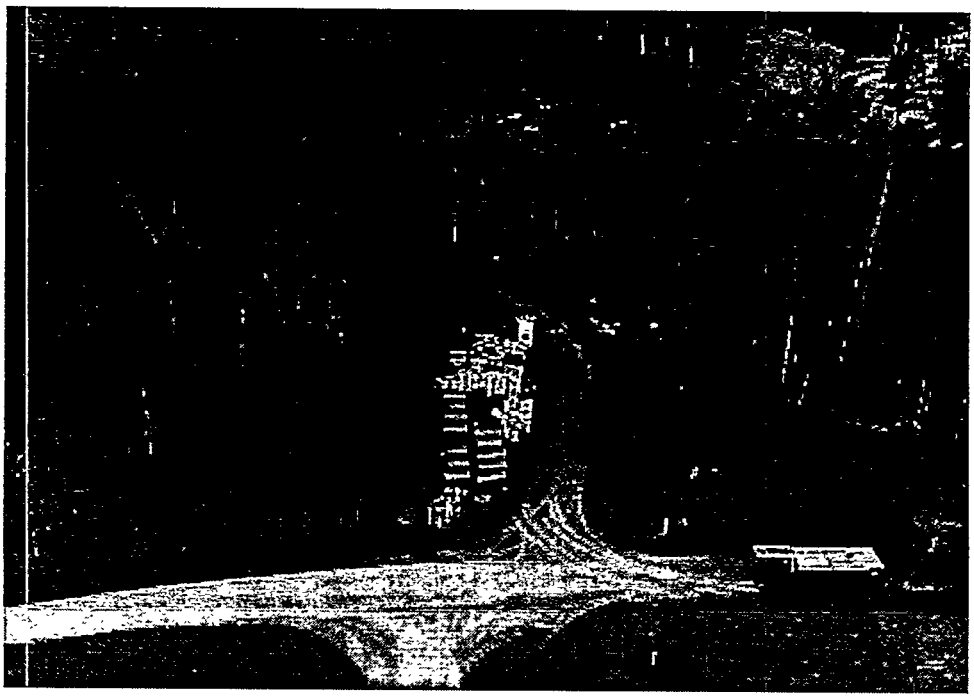
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Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_07.JPG; 10604_92.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Tank T-14

Unit Number: 05.16

Project Status: No activity. (Whitehead 1996)

Unit Location: Tank T-14 is located at the New Hydrofracture Facility (7860). Approximate ORNL grid coordinates are ~N 16,500 ft and E 28,180 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank T-14 is an unlined concrete tank, rectangular in shape and located underground. It measures 29 1/3 ft in length and 11 2/3 ft in height. The reinforced walls are 14 in thick, and the bottom is 20 in thick. The tank has a submersed pump in the bottom of a sump area of the tank. The tank has a 48,500-gal capacity. T-14 has no associated off-gas. (ORNL 1994)

Dates Operated: 1979-1985. Facility has been placed on standby status. (ORNL 1994)

Present Function: Not in operation. (ORNL 1990)

Life Cycle Operation: Tank T-14 was used as an overflow emergency waste tank for the New Hydrofracture Facility. The tank was probably retired in 1984, when hydrofracturing was discontinued. (ORNL 1994)

Waste Characteristics: The tank is empty except for some residual grout mixture in the bottom. This sludge had the following analysis (completed in 1991): 1.9 Bq/ml gross alpha; 6200 Bq/g gross beta; 85.3 Bq/g ^{137}Cs; 3140 Bq/g Sr-90; and <10 Bq/g Co-60. (ORNL 1994)

Release Data: No releases from the tank have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Tank T-14 has some residual grout mixture (sludge-like) in the base of the tank. The tank is believed to be sound. (ORNL 1994)

Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site was included in a CERCLA remedial investigation (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Site Characterization Summary Report for Waste Area Grouping 5 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

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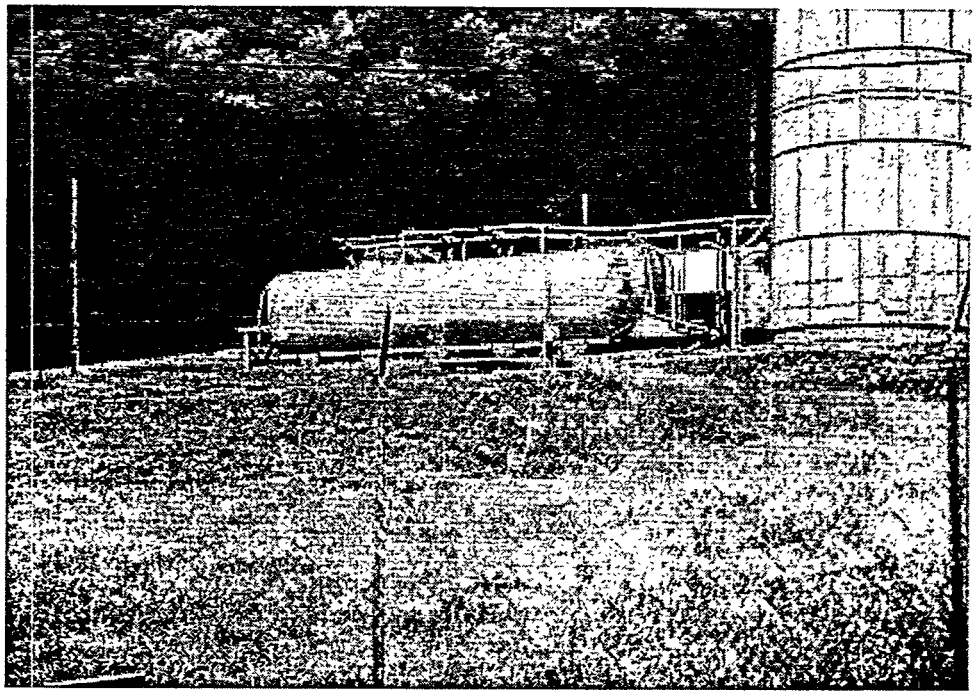
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

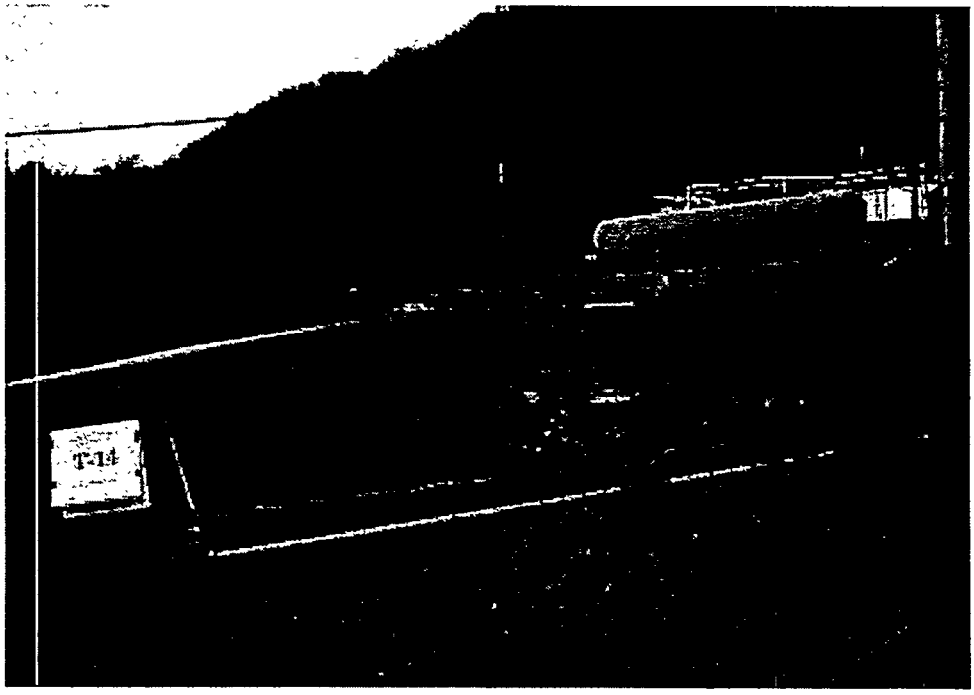
Oak Ridge National Laboratory, November 1994. *Surveillance and Maintenance Plan for the Inactive Liquid Low-Level Tanks at Oak Ridge National Laboratory*, ORNL/ER-275. Oak Ridge, Tennessee.

Whitehead, Lynn, April 1996 and November 12, 1996. ORNL Inactive Tank Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 05_26.JPG; 19_34.JPG





UNIT NAME: Emergency Waste Basin (7821)

Unit Number:

Project Status: Remedial Investigation/Feasibility Study completed 1991; Monitoring ongoing (FFA 1996)

Unit Location: The Emergency Waste Basin is located north of SWSA 6 in Melton Valley. ORNL grid coordinates are N 18,000 ft and E 25,110 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area of the Basin is about 2 acres (0.8 ha). Its volume is reported as 1.5 x 10(E+7) gal (5.6 x 10(E+7) L). (Bechtel et al 1991)

Dates Operated: Basin construction: 1961-1962. No waste has been added to the basin. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The basin was constructed as an LLLW or process waste holding basin for use when ORNL treatment plants were not operational or if treatment plant effluent could not be released to White Oak Creek. The basin has never been used. (Bechtel et al 1991)

Waste Characteristics: No wastes have been added. Water in the basin is the result of runoff from the surrounding areas. (Bechtel et al 1991)

Release Data: No releases have been detected in the stream leaving the basin. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National Inc./CH2M Hill/ERCE/PEER, June 1991. *Oak Ridge National Laboratory WAG 6 Remedial Investigation Report* Vol 1: Main Report, ORNL/ER/Sub-87/99053/33&V1, prepared by Oak Ridge National Laboratory.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

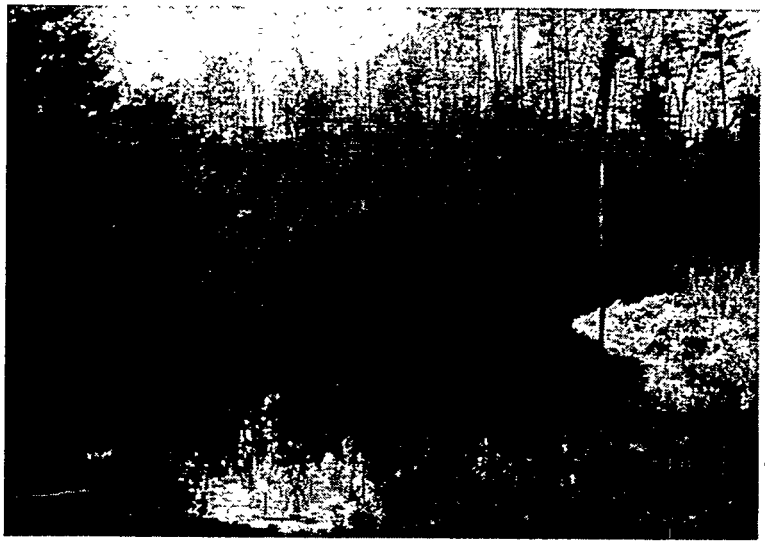
FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_17.JPG; 07_18.JPG; 6054_88.JPG







UNIT NAME: SWSA 6 (7822)

Unit Number: 06.01

Project Status: Monitoring ongoing (FFA 1996)

Unit Location: Latitude 34.90360, longitude 84.32562. The site is located just northwest of White Oak Lake near White Oak Dam and State Highway 95. See ORNL grid coordinates N 16,670 ft and E 24,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Total fenced area is 68.0 acres (27.5 ha), but only about 14.5 acres (5.9 ha) is usable because of rough terrain. The site contains about 776,600 cubic ft (22,000 cubic m) of solid low-level radioactive waste. (ORNL 1990)

Dates Operated: Site commissioned: 1969. Site is still in operation. (ORNL 1990)

Present Function: This site is a waste burial ground; its purpose is to contain solid low-level radioactive waste. Most of SWSA 6 is an active solid waste disposal site, only the interim corrective measures (ICM) portion is considered inactive. The ICM portion closed in 1989. (Ford et al 1992)

Life Cycle Operation: SWSA 6 is a shallow land burial site. A variety of wastes were disposed of in trenches and auger holes until May 1986. The site was reopened only after operational changes were made to standardize waste packaging and to prohibit the disposal of waste regulated by RCRA. Those areas that had received hazardous and/or mixed wastes after November 8, 1980, were designated as "RCRA-regulated sites" and a plan for closure of these areas were developed. Since the installation of a permanent cap was not feasible at the time, high-density polyethylene (HDPE) caps were installed over all RCRA-regulated areas. (Ford et al 1992)

Waste Characteristics: Since April 1986, only LLLW has been disposed of in SWSA 6. Disposal units include trenches, auger holes, silos, and aboveground container storage facilities. SWSA 6 has received LLW chemical, biological, and a variety of other wastes from ORNL. (Bechtel et al 1991) Hazardous chemicals: lead, toluene, and xylene were found in trenches in 1982. Main radionuclides: Co-60, H-3, Sr-90, Cs-137, Eu-152, Eu-154, Eu-155, and U-235 make up 80% of the current inventory of total Ci; a significant amount of U-235 has been placed in SWSA 6. Total activity is 251,000 Ci. Highest totals (in Ci) are as follows: Co-60 (32,200), Cs-137 (5,110), Eu-152 (50,900), Eu-154 (72,600), Eu-155 (31,300), H-3 (7,110), Sr-90 (2,970), Th-232 (<2.5), U-233 (227), U-235 (5.6), U-238 (205). These totals are for the period from 1977 to 1984. (ORNL 1990)

Release Data: Groundwater samples collected from 1971 to 1983 show that H-3 is present in some of the down-gradient wells. Only two wells contained significant Sr-90 concentrations above background. Migration of wastes occurs as trenches become filled with water and as runoff increases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater, Soil

Comments: An interim cover was placed over the RCRA - regulated units in 1989. A closure plan was approved by the Tennessee Department of Health and Environment in September 1988. This closure plan required closure of the site by September 1993. (ORNL 1990)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National Inc./CH2M Hill/ERCE/PEER, June 1991. *Oak Ridge National Laboratory WAG 6 Remedial Investigation Report* Vol 1: Main Report, ORNL/ER/Sub087/99053/33&V1, Prepared by Oak Ridge National Laboratory.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

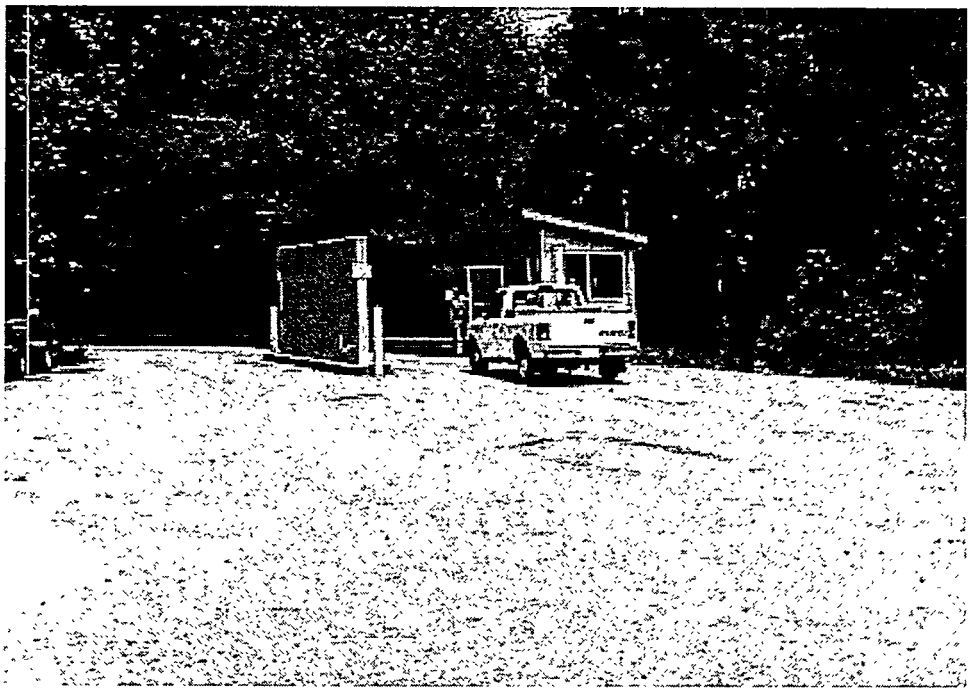
Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Grouping at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002,* ORNL/ER-39.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

FFA, February 13, 1996. EPA, DOE and TDEC, *"Federal Facility Agreement for the Oak Ridge Reservation"*, DOE/OR-1014, Appendix C, Oak Ridge Tennessee.

Date Prepared: December 1996

Photo: 7118_93.JPG



UNIT NAME: Explosives Detonation Trench (7822A)

Unit Number: 06.03

Project Status: Monitoring ongoing (FFA 1996)

Unit Location: This trench is located in the northern part of SWSA 6. (ORNL 1990)

Approximate Dimensions and Capacity: This trench was 15 ft (4.6 m) long, 5 ft (1.5 m) wide, and 4 ft (1.2 m) deep. (Bechtel et al 1991)

Dates Operated: The trench has been filled in and is no longer in operation. Last used in 1987. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The site was used to detonate explosives and shock-sensitive chemicals requiring disposal. Waste was laid in the bottom of the trench and detonated with a small plastic explosive charge. (Bechtel et al 1991)

Waste Characteristics: Items detonated at the trench included chemicals such as picric acid, phosphorus, nitromethane, hydrogen peroxide, and ammonium nitrate, as well as others. (Bechtel et al 1991)

Release Data: Chemicals and explosives were destroyed in the resulting explosion. No trend monitoring was performed. As far as can be determined, no releases occurred. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National Inc./CH2M Hill/ERCE/PEER, June 1991. *Oak Ridge National Laboratory WAG 6 Remedial Investigation Report* Vol 1: Main Report, ORNL/ER/Sub087/99053/33&V1, Prepared by Oak Ridge National Laboratory.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

FFA, February 13, 1996. EPA, DOE and TDEC, *"Federal Facility Agreement for the Oak Ridge Reservation"*, DOE/OR-1014, Appendix C, Oak Ridge Tennessee.

Date Prepared: December 1996

Photo: 07_19.JPG



UNIT NAME: Equipment Storage Area (7841)

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Storage area is on west side of road leading to WAG 7 Pits and Trenches in Melton Valley. ORNL grid coordinates are N 18,500 ft and E 26,670 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Area is fenced; approximately 0.75 acres. (Bechtel et al 1988)

Dates Operated: Area fenced in 1979; still in use. (ORNL 1990)

Present Function: Used as an aboveground storage area for surplus tanks and other equipment, including 2 large stainless steel tanks (approximate capacity of 20,000 and 40,000 gallons), many 55-gal drums of unknown contents, a large wind chamber and many small tanks (~ 500-gal capacity). (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: Soil may be contaminated with fission products. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

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Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_06.JPG; 07_26.JPG





UNIT NAME: Hydrofracture Experimental Site 1, Soil Contamination (HF-S1A)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1988)

Unit Location: The site used for the first experimental injection was south of Lagoon Road in an area called the Four Acre Site. This location is within the boundary of WAG 7. ORNL grid coordinates for the injection well are N 18,920 ft and E 25,890 ft. (Ford et al 1992)

Approximate Dimensions and Capacity: The area contaminated is not documented, nor is the amount of grout spilled documented. The volume of injection was 27,000 gal (102,200 L) of water, cement, and diatomaceous earth. Depth of injection was 300 ft (91 m). (ORNL 1990)

Dates Operated: The injection was performed October 1959. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: The spill occurred when the injected grout sheet intercepted a nearby open core hole and overflowed from the core hole. Grout was being injected to investigate the feasibility of using hydrofracturing as a means of liquid radioactive waste disposal. (Bechtel et al 1988)

Waste Characteristics: The injection was performed using water, cement, and diatomaceous earth. Grout was tagged with 35 Ci of Cs-137 and 8.7 Ci of Ce-144 prior to injection. No liquid radioactive waste was used. The grout should not contain hazardous constituents other than radioactivity. (Bechtel et al 1988)

Release Data: No information is available on the amount of radioactivity contained in the spilled grout or on the extent of the contamination. (ORNL 1990)

A surface radiological survey of the area was conducted in 1988. One large contaminated area encompassing ~57 m^2 (613 ft^2) was found to have levels of gamma radiation ranging from 0.1 to 20 Mr/h at the ground surface. The NaI probe of the portable gamma scintillation survey meter was lowered into excavated holes to define the depth of contamination. (The excavated soil was subsequently placed back into the respective holes). Most of the radioactivity was found at soil depths of 0 to 15 cm (o to 6 in.). This large area is the result of outflow and subsequent spillage on contaminated grout and water onto the ground surface from a monitor well located 60 m (199 ft) north of the injection well in 1959. The injection wellhead showed highly elevated gamma readings of up to 75 Mr/h on contact. Approximately 100 small, spotty areas with elevated surface gamma exposure rates ranging from 25 uR/h to 1 Mr/h were found within an approximate 300-ft radius of the injection well and generally encompassed areas of less than 1 m^2 (10.7 ft^2) each. A few small areas totaling ~6 m^2 (64 ft^2) were identified near the northern boundary of Lagoon Road. Surface gamma exposure (0 to 15 cm) soil samples collected from several hot spots show Cs-137 as the major gamma-emitting radionuclide, as expected. No transferable alpha or beta-gamma contamination was evident at the site. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002,* ORNL/ER-39.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_16.JPG



UNIT NAME: Septic Tank - Building 7819

Unit Number:

Project Status:

Unit Location: The septic tank is located north of SWSA 4 at the intersection of Lagoon Road and the road leading to the WAG 7 pits and Trenches. The ORNL grid coordinates are N 19,320 ft and E 26,980 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank is a concrete structure with a capacity of 540 gal (2040 L). The system consists of a drainfield composed of 3 lines of 4-in diameter vitrified clay pipe. (Bechtel et al 1988)

Dates Operated: Installation date is not known; tank is not in service. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Septic tank was used to collect and dispose of raw domestic sewage from Building 7819 (Decontamination Facility). (Bechtel et al 1988)

Waste Characteristics: Only domestic sewage from Building 7819 has been collected/stored in the tank. (ORNL 1990) No hazardous or radioactive wastes have been added to the system. (Bechtel et al 1988)

Release Data: There have been no reported leaks or releases. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments:

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_08.JPG



UNIT NAME: Homogeneous Reactor Experiment (HRE) Fuel Wells (7809)

Unit Number: 07.02

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The site is located just south of Trench 5 (latitude 35.90950, longitude 84.32054). ORNL coordinates for the seven wells are as follows: (ORNL 1990)

	(Northing)	(Easting)
S1	17,293.40	26,728.25
S2	17,289.05	26,716.61
S3	17,285.78	26,704.82
S4	17,284.34	26,693.26
S5	17,287.20	26,681.22
S6	17,291.50	26,669.70
S7	17,295.24	26,658.46

Approximate Dimensions and Capacity: At the site are seven auger holes (S1-S7) 1 ft in diameter by 17 ft (5 m) deep. The holes are about 10 ft (3 m) apart. The seven auger holes received a total of about 135 gal (510 L) of liquid waste. (Bechtel et al 1988)

Dates Operated: Site commissioned: 1964 (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: The site was designed for the disposal of residual fuel solution from the Homogeneous Reactor Experiment. The fuel was stored in the Homogeneous Reactor Chemical Plant decay tanks. (ORNL 1990)

Waste Characteristics: The fuel wells received 135 gal (510 L) of 4 molar sulfuric acid solution containing about 10 lb (4.5 kg) of uranium and about 20 Ci of fission products, Sr-90, and Ru-106. After disposal of the wastes, each well was filled to ground level with soil and marked with a brass plaque bearing well coordinates, liters of waste disposed, and grams of uranium contained in the solution. Uranium content of the wells is S1, 319 g; S2, 528 g; S3, 704 g; S5, 717 g; S6, 730 g; and S7, 260 g. (ORNL 1990)

Release Data: An investigation to determine if the solution had migrated from the wells was conducted in 1994. No evidence of migration was found. (Bechtel et al 1995)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: The site is adjacent to disposal Trench 5 which received approximately 9.5 million gallons of liquid radioactive waste. (Ketelle et al 1994)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/OGDEN/PEER, January 1995. *Investigation of Migration of Spent Nuclear Fuel from the Homogeneous Reactor Experiment, Oak Ridge National Laboratory Remedial Investigation/Feasibility Study*, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

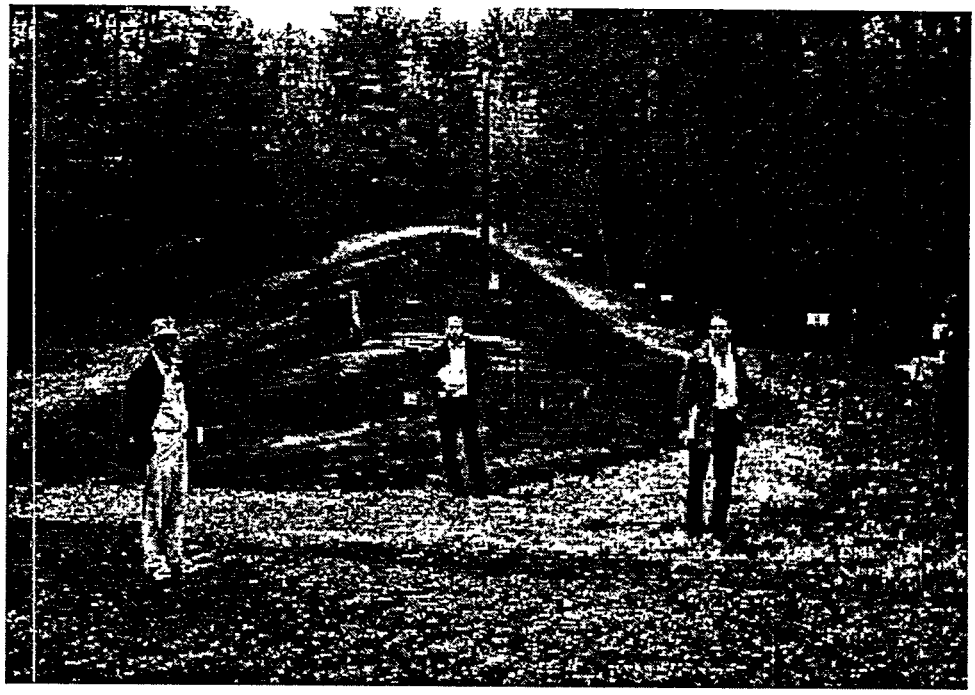
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Ketelle, R.H., Kuhaida, A.J.Jr., Spalding, B.P., Tardiff, M.F., and Howard, R.J., January 1994. *Oak Ridge High Priority Spent Nuclear Fuel Vulnerability, Field Reconnaissance Results of the Homogeneous Reactor Experiment Wells*, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 17_15.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Gauging Station NW of Building 7852

Unit Number: 07.04A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The leak occurred in the liquid radioactive waste transfer line NW of Building 7852 and approximately 200 ft (61 m) west of WOC. Site is also known as leak site 2. The leak occurred at a mechanical, neoprene-gasketed joint. Leak coordinates are N 17,680 ft and E 28,000 ft. (Bechtel et al 1988)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known. This leak is located on the transfer line approximately 200 ft (61 m) west of White Oak Creek. The site drops 15 ft (4.6 m) over a distance of 100 ft (30 m). The waste had seeped from a pipe coupling and had reached ground surface, where it had spread laterally over a small area. (Bechtel et al 1988)

Dates Operated: The first leak at the site occurred July 9, 1970. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: The liquid radioactive waste line transports evaporator-concentrated low-level radioactive liquid wastes to waste disposal facilities in Melton Valley. (Bechtel et al 1988)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the Laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The contamination was removed so that there was no significant release of radiation into the creek. The main section of pipe was repaired, pressure tested, and returned to service. During a 1973 survey, contaminated sediment was observed all the way to the creek. Soil samples ranged from 2 Ci/g to a concentration of 3.7 Ci/g. Three groundwater monitoring wells were installed to determine the effect of the leak on groundwater levels. After concluding that the leak was contributing to groundwater contamination, over 3,000 cu ft (84 cu m) of contaminated soil was removed and disposed of. Later, groundwater monitoring showed decreased levels of radionuclide concentrations. A second survey of the area showed elevated readings at this site, suggesting that either additional leakage had occurred or that there had been inadequate removal of the contaminated soil. At 3 ft above the ground surface, beta-gamma activity ranged from 240 Mr/h to 800 Mr/h along the line. In 1983, a subsurface bentonite clay cap and a surface asphaltic concrete cap were installed at the site. The covered area was fenced with barbed wire and the remaining disturbed area seeded with grass. In 1987, the total area of contamination at this site was ~ 13.9 m^2 (~150 ft^2). Surface measurements indicated primarily gamma activity along a narrow ditchline ~12.2 m (~40 ft) in length, leading from the leak site to a contaminated drainage area of the Trench 7 seep (eastern slope of Trench 7). Surface gamma exposure rates of up to ~1 Mr/h were measured. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Surface water, Groundwater

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

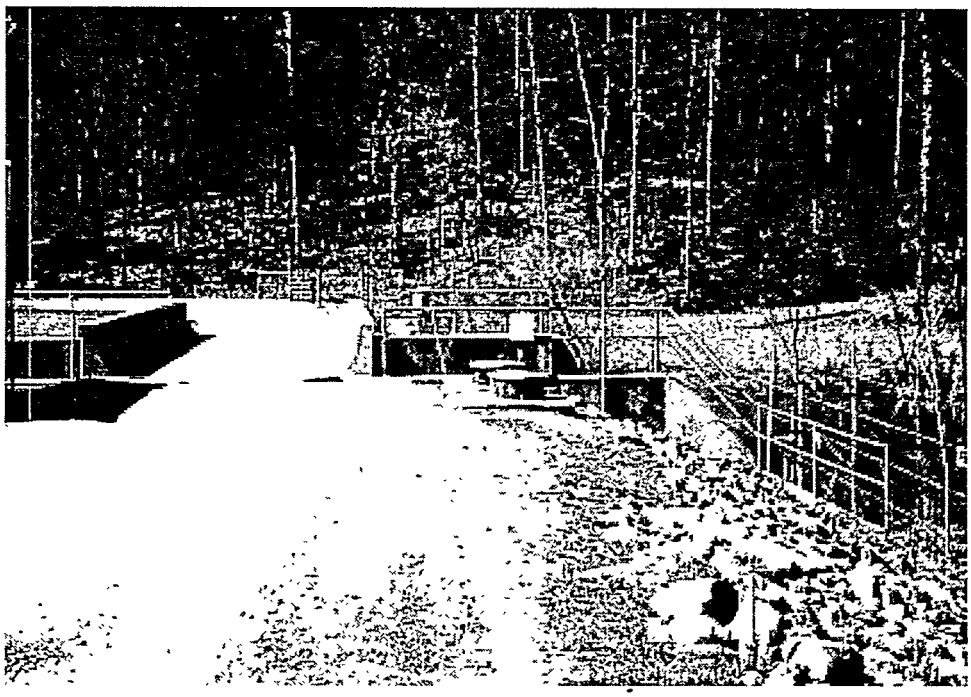
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_14.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Lines and Leak Sites - Pit 6 SE (Leak Site 1)

Unit Number: 07.04B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The leak is at ORNL grid coordinates N 18,363 ft and E 27,976 ft. (ORNL 1990). The leak is located on the cast iron pipeline extension to OHF. The leak is 150 ft south of Waste Trench 6. (Bechtel et al 1988)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: The leak was reported in July 1973 (leak apparently occurred at earlier date). The site was entombed in 1983. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: The leak was in the cast-iron liquid radioactive waste transfer line between ORNL and the Old Hydrofracture Facility, approximately 150 ft (45 m) south of Trench 6. The line was used to transfer waste for disposal by hydrofracture. (Bechtel et al 1988)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the Laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Prior to entombment, beta-gamma dose rates measured at 3 ft above ground surface ranged from 240 Mr/h to 1 R/h. Soil sample analysis revealed significant mixed fission product contamination with concentrations ranging from 0.01 to approximately 50 Ci/g of beta-gamma activity, and gross alpha activities up to 1 mCi/g. Beta-gamma activity was primarily Cs-137 and Sr-90. The primary alpha emitter was Cm-244, with minor concentrations of Am-241, Pu-238, and Pu-239. A multilayer cover was placed over the site, and the area was fenced. (ORNL 1990)

In 1987, surface measurements showed low levels of gamma activity over an area of ~200 ft^2 (~18.6 m^2) that extends along the southwest base of the asphalted site. This contamination area was grassy and is mostly covered with cut trees, vegetative debris, and fill dirt. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: The 1990 Contaminated Site Summary Sheet lists location as: "This leak occurred in the liquid radioactive waste transfer line southeast of Trench 6."

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - End of Trench 7 Access Road (Leak Site 2)

Unit Number: 07.04C

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The leak occurred in a plastic pipe 100 ft north of Trench 7 (WAG 7) along the PVC pipeline extension from Waste Trench 6 to Waste Trench 7. (Bechtel et al 1988)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled was approximately 3,000 gal (11,356 L). (ORNL 1990)

Dates Operated: The spill was reported April 1966. (ORNL 1990)

Present Function: Not applicable.

Life Cycle Operation: The transfer line was designed to transport liquid radioactive waste from Bethel Valley Storage tanks to the Old Hydrofracture Facility. (Bechtel et al 1988)

Waste Characteristics: The waste was evaporator-concentrated liquid radioactive waste. (ORNL 1990)

Release Data: Near the end of the waste transfer to the trenches, a section of plastic pipeline ruptured, and approximately 3,000 gal (11,356 L) of waste spilled in an area just north of Trench 7. The total activity was estimated at 100 Ci, consisting mainly of Cs-137 and Co-60 and about 10 Ci of Sr-90. The contamination was covered with approximately 5 ft (1.5 m) of soil, and the area was contoured to prevent leaching by surface water. None of the contamination was permitted to reach the creek. (ORNL 1990)

Results of 1987 radiological survey in the area near Trench 7 and including the leak site, show extensive contamination (primarily beta-radiation contamination) in soil, ground-cover, and trees. An elongated, contiguous region of residual contamination was identified along the north/northwest sides of the Trench 7 Access Road, and northeast/west sides of Trench 7. Measurements indicate that ~200 ft of the access road is contaminated at the road surface. The total area of surface contamination at the leak site is estimated to be 0.75 acres. It is believed that this leak site is the primary contributing source of identified surface contamination. At the contaminated region west of the access road, surface beta-gamma measurements averaged 3.5 mrad/h, whereas 1 mrad/h reading were recorded at 1 m from the ground surface. Beta-gamma activity levels of up to 70 mrad/h were measured on contact with an American elm tree located near the leak site. Analytical results of three surface soil samples collected from the access road and adjacent contaminated region, demonstrate elevated gross beta and Sr-90 concentrations. Highest concentrations (12,000 pCi/g) of gross beta and 5400 Pci/g of Sr-90) were determined from a soil sample taken in the contaminated soil region. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

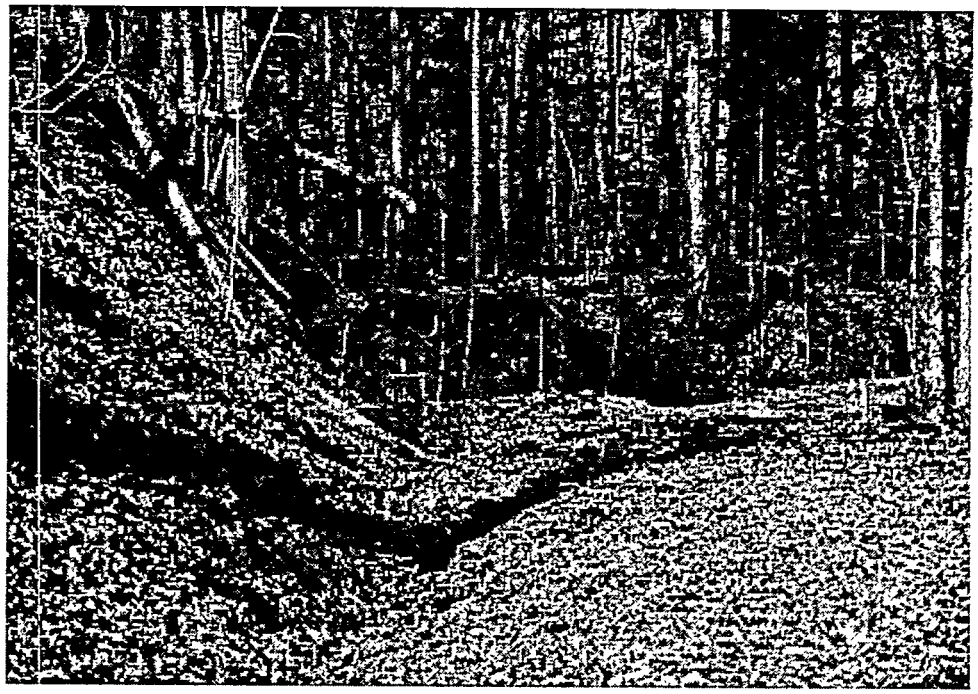
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_25.JPG



UNIT NAME: Leak in Transfer Line from Decontamination Facility (7819) to Pit 1 (7805)

Unit Number: 07.04D

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The leak site is located 120 ft south of Lagoon Road and 70 ft west of Chemical Waste Access Road. The ORNL grid coordinates are N 19,020 ft and E 26,940 ft. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The total area of contamination is reported to encompass about 925 ft^2 (86 m^2). (ORNL 1990)

Dates Operated: The date of the leak is not known; however, the facility was operated from the early 1960s through the early 1970s. (ORNL 1990). The leak was first indicated in 1968 and 1969 when trees began dying in areas where runoff could accumulate along the pipeline. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: A 6-in (15-cm) drain line served to transfer decontamination waste solutions from the Decontamination Facility (Building 7819) to liquid radioactive waste Pit 1 (Building 7805). (Bechtel et al 1988)

Waste Characteristics: A preliminary environmental survey for Building 7819 found Cs-137 to be the dominant radionuclide in soils surrounding the facility. It is believed that the wastes from Building 7819 would consist of corrosive wastes (i.e., acids) and radionuclides associated with the equipment being decontaminated. (ORNL 1990)

Wastes transferred from Building 7819 to Waste Pit 1 via the vitrified pipeline probably consisted of soaps, chelating agents, oxalates, nitric acid, alkalies, and caustics and radioactive waste associated with decontamination procedures. (Bechtel et al 1988)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The dominant detectable radionuclide was Cs-137. There may have been some corrosive wastes and additional radionuclides that were associated with the decontamination procedures. (ORNL 1990). In 1983, approximately 40 ft of the vitrified pipeline was excavated during construction of SWSA 4 surface runoff diversion project. Approximately 200 ft^3 of contaminated soil (~ 5 Mr/h beta-gamma) and pipe sections (~ 120 Mr/h beta-gamma) were disposed in Trench 398 in SWSA 6. The remaining pipe ends were plugged in situ to prevent contamination from continuing to leak. (Bechtel et al 1988) In February 1987, a radiological and hazardous waste scoping survey was conducted of a leak site at the transfer line between Building 7819 and Pit 1. Three regions of contamination were found at the survey site. One of these area (Region A, ~86 m^2) is the result of residual contamination at the point of the line leak. Beta-gamma activity levels on the ground surface in Regions A, B and C ranges to ~20, ~4, and ~4 mrad/h, respectively. Region B (~72 m^2) is the most likely the result of contaminant migration from Pit 1, whereas Region C (~10 m^2) is believed to be associated with residual contamination from the line leak. Results of biased soil samples indicate Cs-137 as the dominate detectable radionuclide, with a maximum of 43,000 Pci/g and an average of 3100 Pci/g. Four RCRA hazardous waste characteristics [extraction procedure (EP) toxicity, ignitabilty, corrosivity, and reactivity] were not exhibited from eight soil samples taken at the survey site. (ORNL 1990)

In 1987, a radiological survey revealed elevated concentrations of cesium-137, strontium-90, cobalt-60, europium-152, and europium-154. No corrective action had been undertaken by 1988. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: The location on the Contaminated Site Summary Sheet is listed as "60 ft south of Lagoon Road and 35 ft west of the access road to the pits and trenches."

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

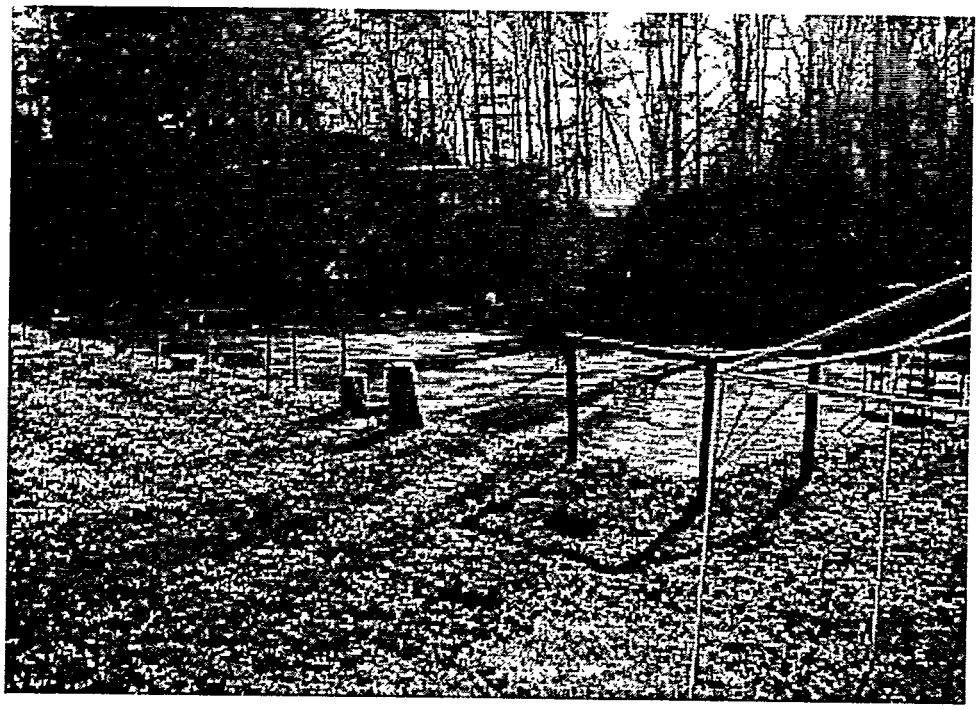
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_33.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Line Leak Site - Leak in Line Between Pit 3 (7807) and Trench 6 (7810)

Unit Number: 07.04E

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The leak site is located at a valve pit at the connection between the pipeline to Waste Pit 3 and the line to Waste Trench 6. ORNL coordinates are N 18,750 ft and E 26,975 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Estimated as approximately 10 cu yd. (ORNL 1990). A 1988 surface scoping survey revealed 371 contaminated trees over a 38,000 ft^2 area. (Bechtel et al 1988)

Dates Operated: Reported to have occurred in 1961. (ORNL 1990) The leak is expected to have existed in 1973, but no remediation activities occurred until 1974. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: The valve box was used to divert waste from the Main Plant Area (WAG 1) to either Waste Pit 3 or Waste Trench 6. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the Laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The site was supposedly remediated in 1974 with the removal of the valve box and some associated pipe. A 1982 radiological walkover survey indicated radiation levels up to 4 Mr/h. It is not known if further remediation was performed. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

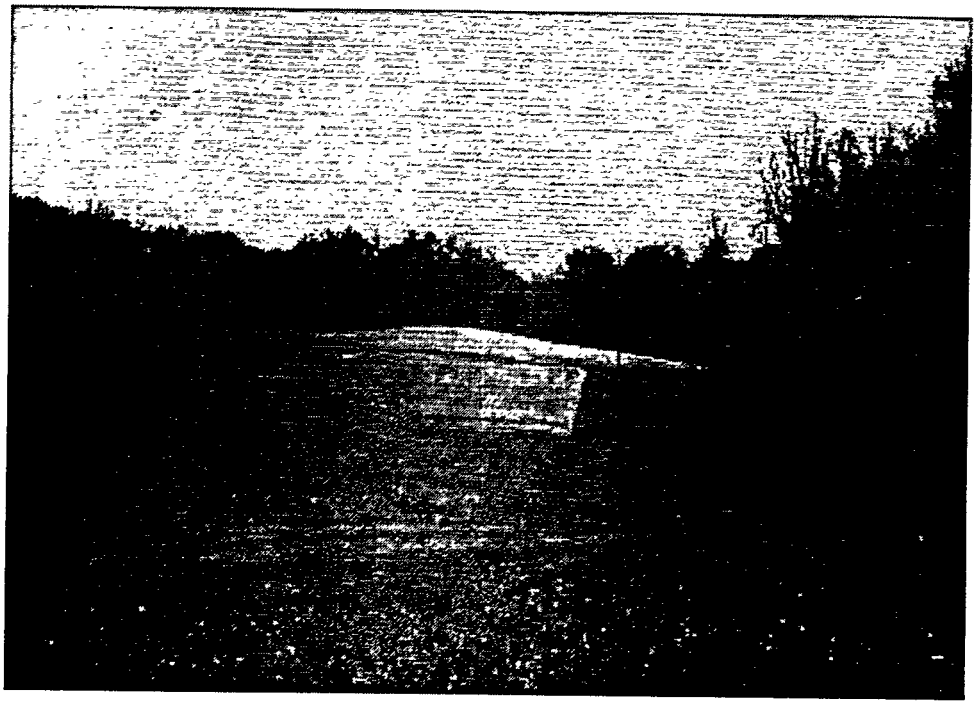
Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_08.JPG; 07_01.JPG





UNIT NAME: Inactive Liquid Radioactive Waste Line Leak Site - Leak at Valve Pit North of Trench 7 (7818)

Unit Number: 07.04F

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Located at a valve pit directly north of Waste Trench 7. Approximate ORNL grid coordinates are N 17,750 ft and E 27,750 ft. (ORNL 1990). The valve pit is located on the 2-in diameter cast iron pipeline that extends to OHF. (Bechtel et al 1988)

Approximate Dimensions and Capacity: Unknown, site includes valve pit with 2 valves and piping. (ORNL 1990)

Dates Operated: Line was in use from 1963-1964 to 1983. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Transfer liquid radioactive waste from the Main Plant Area (WAG 1) to Waste Trench 7 and the Old Hydrofracture Facility. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the Laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is ~ 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Results of a 1987 radiological survey in area near Trench 7 and including this site (07.04F) valve pit, show extensive contamination in soil, groundcover, and trees. An elongated, contiguous region of residual contamination was identified along the north/northwest sides of the Trench 7 Access Road, and northeast/west sides of Trench 7. Surface measurements taken at the valve pit indicate primarily gamma activity on the ground surface. Measurements of backfill soil indicate elevated levels of beta radiation. Surface beta-gamma measurements at a small area on the northwest side of the pit showed readings ranging to 83 mrad/h. In addition, a large green ash tree found near the west side of the pit measured 10 mrad/h on contact with the trunk and attached leaves. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_20.JPG



UNIT NAME: Pit 1 (7805)

Unit Number: 07.05

Project Status: In situ vitrification (ISV) treatability study in progress (FFA 1996)

Unit Location: Pit 1 is located just west of SWSA 4 in Melton Valley. ORNL grid coordinates are N 18,830 ft and E 26,850 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The pit is 100 ft (30 m) long by 20 ft (6 m) wide and 15 ft (4.6 m) deep. The capacity is 180,000 gallons (680,400 L).

Dates Operated: The pit received 122,985 gal (465,550 L) of concentrated liquid waste between July and October 1951. It received additional discharges from the decontamination facility (Building 7819) between 1962 and 1964. (ORNL 1990). In 1981, Waste Pit 1 was backfilled and covered with an asphalt cap. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the pit was to hold concentrated liquid radioactive waste. (ORNL 1990). Waste Pit 1 received 122,200 gal (461,916 L) of waste from the ORNL Main Plant South Tank Farm, mainly from Tanks W-8 and W-10. An unknown volume of fluid was discharged to Waste Pit 1 from Building 7819 through a drainage pipe. (Bechtel et al 1988)

Waste Characteristics: The first waste the pit received was very alkaline (Ph 12.5) and contained Cs-137, Ru-106, U, and Pu. The estimated radionuclide activities for Cs-137 and Ru-106 are 233 Ci and 156 Ci, respectively. In addition, it is estimated that 432 lb (196 kg) of U and 0.59 lb (266 mg) of Pu was discharged into the pit. The nature of the waste that was discharged into the pit between 1962 and 1964 is unknown; the total activity was probably small. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Discharges to the pit were temporarily discontinued on October 5, 1951 when a leak was discovered. The leak contained primarily Ru-106. Discharges from the Decontamination Facility, Building 7819, to the pit starting in 1962 may have continued until 1981. (ORNL 1990)

Gamma exposure rates taken outdoors at Pit 1 and the surrounding area were generally elevated above background with a maximum measurement of 10 Mr/h at the ground surface. Significant beta activity (most likely Sr-90) was detected on contact with many of the trees in the surveyed area. The beta activity levels observed on the leaves and trunks of the hardwood trees in the contaminated area around Pit 1 are believed to result from uptake of residual soil radionuclides from the documented seepage around the pit. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: A CERCLA treatability study was initiated in October 1983 to evaluate the application of the in situ vitrification of Pit 1. (Spalding 1994)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory,* Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C, (updated February 13, 1996) Oak Ridge, Tennessee.

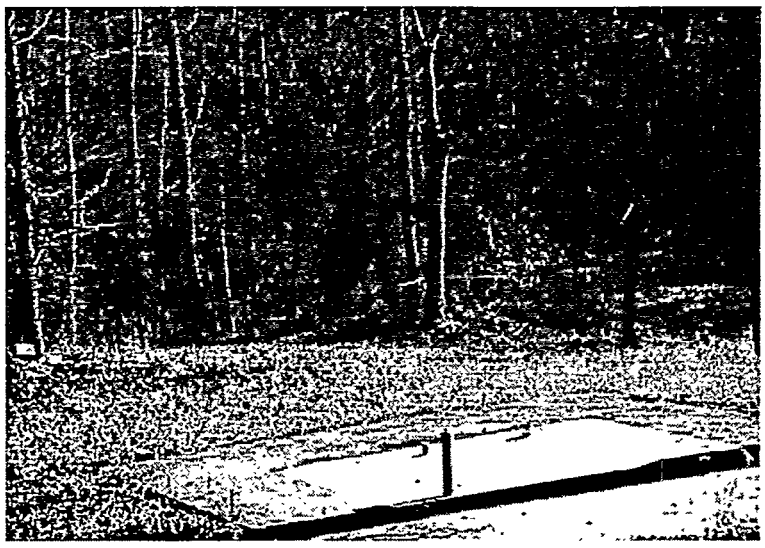
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

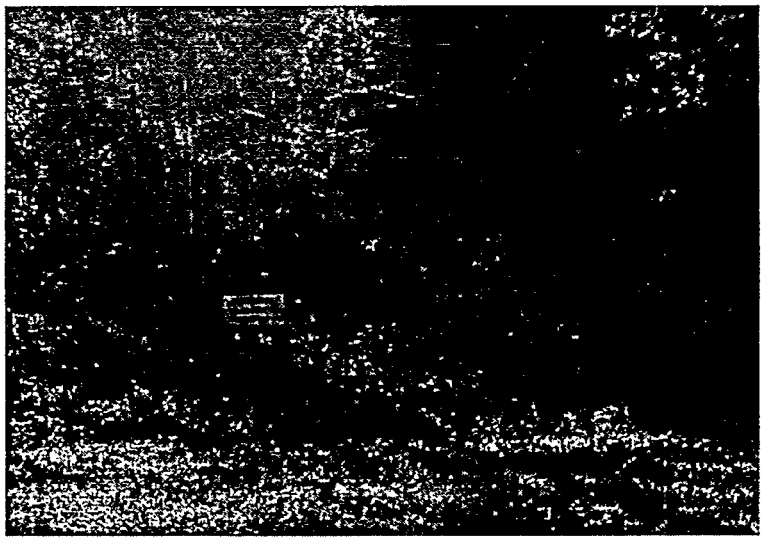
Spalding, B.P., 1994. *Treatability Study Work Plan for the In Situ Vitrification of Seepage Pit 1 in Waste Area Grouping 7 at Oak Ridge National Laboratory, Oak Ridge, Tennessee,* ORNL/ER-190, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge Tennessee.

Date Prepared: December 1996

Photo: 06_33.JPG; 06_32.JPG; 07_14.JPG; 07_21.JPG









UNIT NAME: Pit 2 (7806)

Unit Number: 07.06A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Pit 2 is located just southwest of Pit 1. ORNL grid coordinates are N 17,670 ft and E 26,010 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Pit 2 was 200 ft (61 m) long, 100 ft (30 m) wide, and 15 ft (4.6 m) deep. Pits 2, 3, and 4 have received an estimated 21,000,000 gal (79,500,000 L) of liquid waste. (ORNL 1990)

Dates Operated: Site commissioned: 1952. Taken out of service: 1962. Site backfilled and covered with asphalt in 1963. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The pit was built to dispose of liquid radioactive waste. (ORNL 1990)

Waste Characteristics: Between 1952 and 1954, the pit received 1,294,443 gal (4,900,000 L) of concentrated liquid waste containing 16,600 Ci of beta activity. After 1955, Pit 2 received overflow through pipes from Pit 3. For this reason, it is not possible to determine the amounts of radioactivity it received after 1955. In 1957, sludge from the older process waste treatment plant was also disposed of in the pit. The amount of radioactivity the pit received from the sludge was relatively small. Between 1959 and 1961 pits 2, 3, and 4 received large discharges of Ru-106, but because of the interconnecting overflow pipes between the pits it is impossible to determine the amount of activity Pit 2 received. It is estimated that pits 2, 3, and 4 together are contaminated with Cs-137, Ru-106, Sr-90, and trivalent rare earths (TRE) having activities of 184,000 Ci; 230,000 Ci; 42,000 Ci; and 70,000 Ci, respectively. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The pit seeped Ru-106 during the period of operation. Essentially all of the Ru-106 has now decayed. Stream surveys conducted in drainages in the area indicate past contamination by Sr-90 and Co-60. (ORNL 1990)

A surface radiological investigation was conducted at Pits 2, 3, 4, and environs from January through May of 1989 by the Oak Ridge National Laboratory. Numerous spots with elevated gamma exposure rates were identified in the grassy areas around the pits and in the woods. In comparison, the asphalt caps covering the pits generally showed lower gamma radiation levels. Also, soil, water, and some vegetation and animal life in the area were contaminated. Primary soil contaminants were beta activity and Cs-137; however, strontium was measured on vegetation, so it is most likely present in the soil as well. Water from a wet-weather stream contained beta activity and Cs-137; water from a surface seep contained alpha and beta activity and Co-60. Vegetation samples contained beta activity and Cs-137 or strontium. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, surface water.

Comments: Bechtel (1988) indicates a capacity of 1 million gal for Waste Pits 2, 3, and 4.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_08.JPG; 08_09.JPG





UNIT NAME: Pit 3 (7807)

Unit Number: 07.06B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Pit 3 is located just northeast of Pit 2. ORNL grid coordinates are N 17,840 ft and E 26,290 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Pit 3 was 230 ft (70 m) long, 100 ft (30 m) wide, and 15 ft (4.6 m) deep. Pits 2, 3, and 4 have received an estimated 21,000,000 gal (79,500,000 L) of liquid waste. (ORNL 1990)

Dates Operated: Site commissioned: 1955. Site stopped operating: 1961. Site backfilled and covered with asphalt: 1963. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The pit was built to dispose of liquid radioactive waste. (Bechtel et al 1988)

Waste Characteristics: Because of the interconnecting overflow pipes between Pits 2, 3, and 4, it is impossible to determine the amount of activity Pit 3 received. Pits 2 and 3 together probably contain most of the Sr-90 and Cs-137 discharged to all the pits. It is estimated that Pits 2, 3, and 4 together are contaminated with Cs-137, Ru-106, Sr-90, and TRE having activities of 184,000 Ci; 230,000 Ci; 42,000 Ci; and 70,000 Ci, respectively. (ORNL 1990)

From 1959 to 1961, large amounts of Ru-106 were transferred to the waste pits from experimental processing of material from the Hot Pilot Plant. Several seeps of Ru-106 were reported resulting in curtailing of Ru-106 in 1961. With a half life of 367 days, the Ru-106 will have decayed completely since 1961. (Kuhaida 1996) In addition to liquid wastes, Pits 2, 3, and 4 received sludge from the Process Waste Treatment Plant (PWTP). The actual amount of sludge transferred is not known. The PWTP sludge was a mixture of illite clay and calcium carbonate generated from a lime-soda water softening process. Prior to pit disposal, radioactivity in the sludge was low. However, both cesium and strontium were absorbed by the sludge after disposal. (Bechtel et al 1988)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The pit seeped Ru-106 during period of operation. Essentially all of the Ru-106 has now decayed. Stream surveys conducted in drainages in the area indicate past contamination by Sr-90 and Co-60. (ORNL 1990)

A surface radiological investigation was conducted at Pits 2, 3, 4, and environs from January through May of 1989 by the Oak Ridge National Laboratory. Numerous spots with elevated gamma exposure rates were identified in the grassy areas around the pits and in the woods. In comparison, the asphalt caps covering the pits generally showed lower gamma radiation levels. Also, soil, water, and some vegetation and animal life in the area were contaminated. Primary soil contaminants were beta activity and Cs-137; however, strontium was measured on vegetation, so it is most likely present in the soil as well. Water from a wet-weather stream contained beta activity and Cs-137; water from a surface seep contained alpha and beta activity and Co-60. Vegetation samples contained beta activity and Cs-137 or strontium. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Kuhaida, Jerry, December 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_08.JPG; 08_09.JPG





UNIT NAME: Pit 4 (7808)

Unit Number: 07.06C

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Pit 4 is located just downhill and south from Pit 2. ORNL grid coordinates are N 17,280 ft and E 25,970 ft. (Ford et al 1992)

Approximate Dimensions and Capacity: Pit 4 was 200 ft (70 m) long, 100 ft (30 m) wide, and 15 ft (4.6 m) deep. Pits 2, 3, and 4 have received an estimated 21,000,000 gal (79,500,000 L) of liquid waste. (Ford et al 1992)

Dates Operated: 1956 - 1976 Backfilled: 1976, Paved with asphalt: 1980, Patched and resealed: 1989. (Ford et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The pit was built to dispose of liquid radioactive waste. (ORNL 1990) Pit 4 began receiving overflow of liquid waste from Pit 2 in April 1956. It leaked very rapidly and never held liquid as well as Pits 2 and 3. However, because it was at the end of the overflow train, it did not receive much waste volume and proportionally less radioactivity. In 1959, when large quantities of Ru-106 were discharged to the pits, some rather severe seepage was noted on the east side of Pit 4. An interceptor trench that was 10 ft deep and 175 ft long was dug on the east side. Intercepted seepage was collected and pumped back in to Pit 4. For awhile, ~ 50 Ci of Ru-106 and 8000 gal were pumped back to Pit 4 daily. Copper compounds were put into Pit 4 in an effort to reduce the solubility of Ru-106 and absorb it in the soil. In 1961, in an effort to further reduce the Ru-106 release, another interceptor trench was dug on the west side of Pit 4, and its collected seepage was pumped back into the pit. At the same time, 10 tons of sodium sulfide were placed in the pit system in an effort to enhance Ru-106 absorption. Between 1963 and 1976, Pit 4 was apparently the only pit receiving sludge from the old PWTP because the other pits had been backfilled in 1963. Radioactivity in this sludge is estimated to be relatively low (130 Ci of Sr-90 and 286 Ci of unidentified beta activity). When the new PWTP became operational in 1976, Pit 4 was gradually backfilled and in 1980 was paved with asphalt. (Ford et al 1992)

Waste Characteristics: During their operational period, the pits together received a total inventory if 522,565 Ci of gross beta activity. They are estimated to have received 21 million gal of liquid waste containing 42,000 Ci of Sr-90, 184,000 Ci of Cs-137, 230,000 Ci of Ru-106 (most of which was released to the pits in 1959), and more than 70,000 Ci of the trivalent rare earths. (Ford et al 1992)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The pit has leakage problems. In 1959 and 1961, interceptor trenches were dug and the liquid was pumped back to the pit. (ORNL 1990) Widespread dispersion of radioactive contamination, including hundreds of ground surface hot spots, numerous trees, and understory vegetation, was found in the vicinity of Pits 2, 3, and 4 during a 1989 scoping survey. (Ford et al 1992)

A surface radiological investigation was conducted at Pits 2, 3, 4, and environs from January through May of 1989 by the Oak Ridge National Laboratory. Numerous spots with elevated gamma exposure rates were identified in the grassy areas around the pits and in the woods. In comparison, the asphalt caps covering the pits generally showed lower gamma radiation levels. Also, soil, water, and some vegetation and animal life in the area were contaminated. Primary soil contaminants were beta activity and Cs-137; however, strontium was measured on vegetation, so it is most likely present in the soil as well. Water from a wet-weather stream contained beta activity and Cs-137; water from a surface seep contained alpha and beta activity and Co-60. Vegetation samples contained beta activity and Cs-137 or strontium. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: The 1990 Contaminated Site Summary Sheet indicates the pit is 230 ft long.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.
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FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993-2002.* ORNL/ER-39. Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_09.JPG; 08_10.JPG





UNIT NAME: Trench 5 (7809)

Unit Number: 07.07

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Trench 5 is located on a ridgetop perpendicular to strike just east of pits 2, 3, and 4. ORNL grid coordinates are N 17,470 ft and E 26,760 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Trench 5 is 300 ft (90 m) long by 10 ft (3 m) wide at the ground surface and 4 ft (1.2 m) across at the trench bottom. The capacity was 64,000 gal (241,920 L) at a level of 9 ft. (Bechtel et al 1988)

Dates Operated: The trench was constructed in 1960 and used until 1966. It was paved with an asphalt cover in 1970. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: The site was built to dispose of liquid radioactive waste. (ORNL 1990)

Waste Characteristics: During its operation, Waste Pit 5 received 9.5 million gallons of waste containing 311,824 Ci of gross beta activity. (Bechtel et al 1988). It has received Cs-137, Ru-106, Sr-89 and Sr-90 and Co-60, with radionuclide activities of 205,600 Ci, 96,750 Ci, and 3,045 Ci respectively. Between 1960 and 1966, the trench received about 3,962 gal (15,000 L) per day of liquid waste. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: No visual leakage has been observed from this trench; however, trees in this area contained Ru-106, zirconium-95, niobium-95, Cs-137, and cesium-144. (Bechtel et al 1988)

Preliminary results of a 1990 radiological survey at Trench 5 indicate several surface "hot" spots circumjacent to the trench and on the trench cap. Corrugated venting pipe rising vertically from the trench show gamma exposure rates ranging from 4 Mr/h to near 20 Mr/h. The primary contaminant has been tentatively identified as Cs-137. A value at the end of a buried pipe across the gravel access road show high levels of gamma radiation. The exposure rate is 80 Mr/h on contact with the valve and ~10 Mr/h at 10 ft. Contaminated metal pipe of the east and west sides of the trench have been identified. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

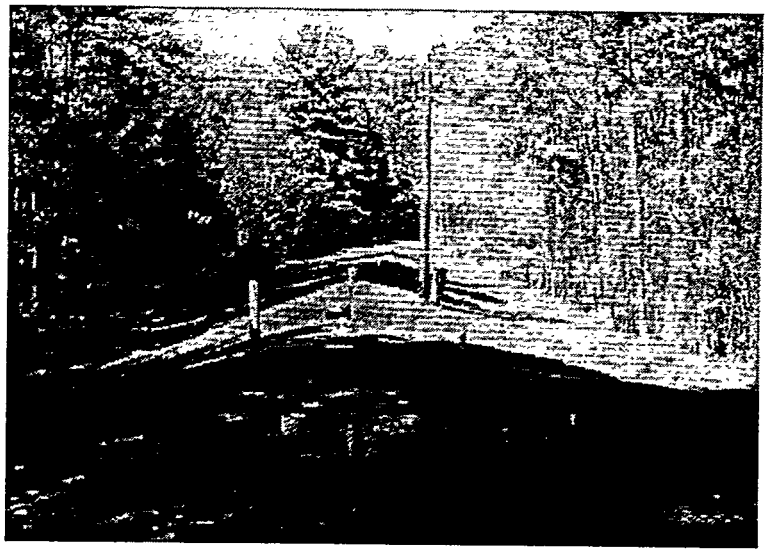
Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

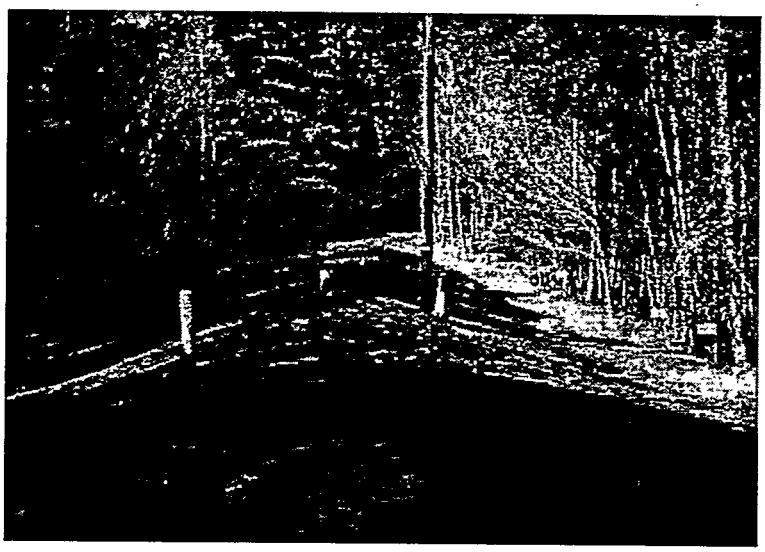
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

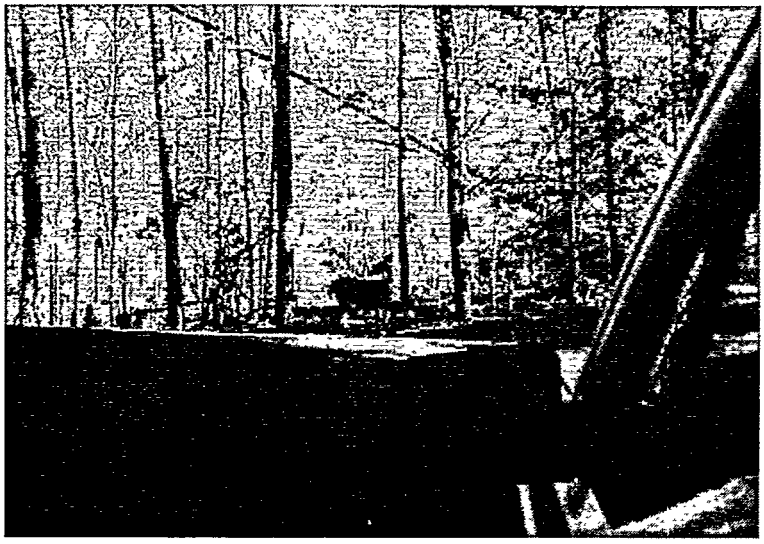
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_10.JPG; 07_11.JPG; 07_12.JPG; 17_10.JPG; 17-01.JPG











UNIT NAME: Trench 6 (7810)

Unit Number: 07.08

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Trench 6 is located on a ridgetop just south of SWSA 4. ORNL grid coordinates are N 18,680 ft and E 27,980 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Trench 6 is U shaped and is 425 ft (129 m) long by 10 ft wide (3 m). (Bechtel et al 1988)

Dates Operated: Trench 6 was constructed in 1961. Because of severe leakage problems, it was used for only about 1 month. It was paved with an asphalt cover in 1981. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: The site was built to dispose of liquid radioactive waste. (ORNL 1990)

Waste Characteristics: Trench 6 received 130,000 gal (491,400 L) of liquid waste. (Bechtel et al 1988). It received Cs-137, Ru-106, Sr-90, and Co-60, with radionuclide activities of 665 Ci, 501 Ci, 145 Ci, and 24 Ci, respectively. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The trench had severe Sr-90 and Cs-137 leakage problems when it was first put into service. For this reason, it was only used about 1 month. (ORNL 1990)

In 1989, ~40 to 50 contaminated trees were found along a line extending from the south end of Trench 6 southwestward into a large contaminated area that extended 20 ft south of the liquid radioactive waste Leak Site (07.04B), westward ~250 ft and beyond the survey boundary. The contamination spread to a width of 100 ft at the widest point. Surface gamma exposure rates ranged from 30 to 560 Ur/h over most of this area. Residual beta contamination in the tree trunks measured 17 mrad/h at breast height, and decaying leaves on the ground measured 1.7 mrad/h. Results of radiological analyses showed that the dried leaves contained 6500 Pci/g gross beta activity, 3.2 Pci/g Co-60 ,and 1.1 Pci/g Cs-137. Fresh leaves from another tree contained 8100 Pci/g gross beta activity and 26 Pci/g Co-60. Surface gamma exposure rates on the asphalt covering Trench 6 ranges from 8 to 17 Ur/h with one spot measuring 50 Ur/h and several vertically protruding pipes (vents) measuring 130 Ur/h on contact. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: The 1990 Contaminated Site Summary Sheet lists the trench as 500 ft long and received 180,000 gal of liquid waste.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

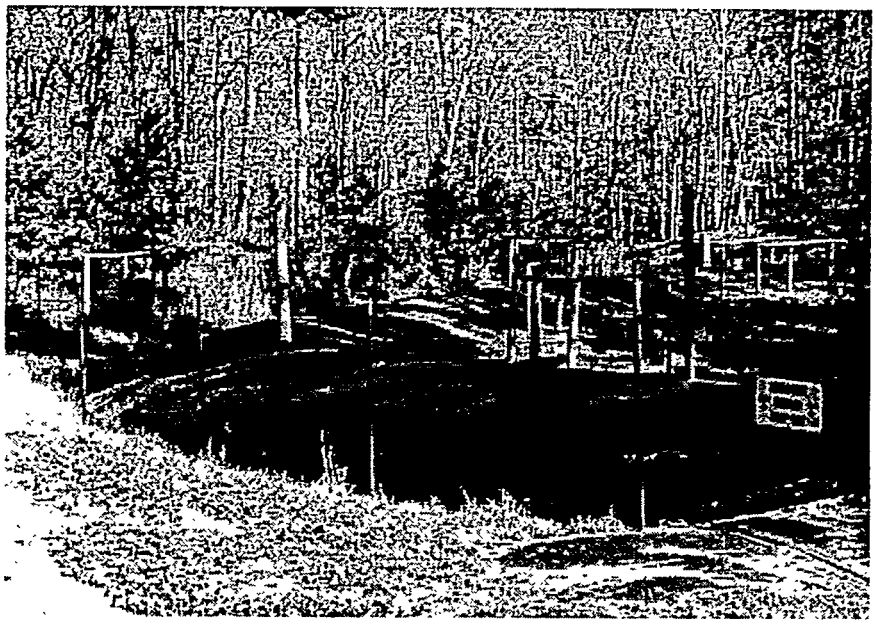
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_35.JPG; 06_37.JPG; 06_36.JPG







UNIT NAME: Trench 7 (7818)

Unit Number: 07.09

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Trench 7 is located on a ridgetop east of Trench 5. ORNL grid coordinates are N 17,440 ft and E 27,600 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Trench 7 consists of 2 segments that are each 100 ft (30 m) long by approximately 10.5 ft (3.2 m) wide and 16 ft (4.9 m) deep. At the bottom of each segment (789 ft above sea level) the dimensions are 80 ft long by 4 ft wide. The total capacity was 50,000 gal. (Bechtel et al 1988)

Dates Operated: Trench 7 was built in 1962. It was used until 1966 and paved with asphalt in 1970. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The site was built to dispose of liquid radioactive waste. (ORNL 1990)

Waste Characteristics: Trench 7 has received an estimated 9,500,000 gal (36,000,000 L) of liquid waste. (Bechtel et al 1988). It has received Cs-137, Ru-106, Sr-90, and Co-60, with radionuclide activities of 231,000 Ci, 3,400 Ci, 48,000 Ci, and 1,500 Ci, respectively. (ORNL 1990)

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: Trench 7 has received more extensive study recently than the other pits and trenches. Little Sr-90 and Cs-137 have been found in groundwater in the vicinity of Trench 7. The lack of Sr-90 mobility is attributed to alkaline treatment of the trench, and the lack of Cs-137 mobility is attributed to irreversible sorption to illicit. However, the treatments to retain Sr-90 may have increased the mobility of U-233, H-3, Co-60, and Tc-99. High concentrations of Tc-99 were found in groundwater and leaves of trees whose roots are apparently very efficient at extracting Tc-99 from the soil and groundwater. Pu-238, Pu-239, and Pu-240 have also been found in soil near Trench 7. The progressive enrichment of Pu-238 and Pu-240 relative to Pu-239 with distance from the trench suggests that much of the Pu contamination in the surrounding soils has resulted from the migration of Cm-242 and Cm-244 and their subsequent decay to Pu-238 and Pu-240, respectively, rather than from the migration of plutonium. (ORNL 1990)

Results of a 1987 radiological survey at Trench 7 and surrounding area show extensive contamination (primarily beta-radiation contamination) in soil, ground-cover, and trees. An elongated, contiguous region of residual contamination was identified along the north/northwest sides of the Trench 7 Access Road, and northeast/west sides of Trench 7. It is believed that 7.9 is the primary source of surface contamination at these identified areas near Trench 7. In general, beta-gamma levels on contact with ground surface and selected tree trunks at the western slope of Trench 7 ranges from typical background to 1 mrad/h. At the north end of Trench 7, beta-gamma measurements were taken on contact with several species of trees known to have deep root systems. Dose-rate measurements generally range from 8 to 14 mrad/h. Radiological measurements on contact with the north end of the asphalt trench cap indicate low levels of gamma radiation. A small group of decaying leaves on the surface of the asphalt cap were found to have significant beta activity, which is believed to be the result of uptake of residual soil radionuclide (most likely Sr-90) by trees in the contaminated area. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater.

Comments: The 1990 Contaminated Site Summary Sheet indicated that the pit was 200 ft long by 12 ft wide.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Revision 1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_11.JPG; 13_23.JPG; 13_20.JPG; 13_22.JPG









UNIT NAME: Shielded Transfer Tank (ST1) (7818 Shed)

Unit Number: 07.10A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Tank ST1 is located in a fenced storage yard. (~0.75 acre) on the west side of the Decontamination Facility. It is a Model III tank referred to as the Gun Barrel Tank. Four Model II tanks are also located in this area. ORNL grid coordinates are N 19,330 ft and E 27,010 ft. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The Model III tank consists of a 198-gal (750-L) stainless steel liner encased in 9 in (23 cm) of steel. The outside tank dimensions are 4 ft in diameter by 8 ft in height. The vessel contains approximately 148 gal (560 L) of AW-500 inorganic ion-exchange medium stripped of the majority of fission products. (Bechtel et al 1988)

Dates Operated: 1958 - 1971. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: ST1 was used to ship Cs-137-loaded ion exchange resins to ORNL from Richland, Washington in the 1960s. (Bechtel et al 1988)

Waste Characteristics: The tank is contaminated with Cs-137. Results from a beta-gamma probe for tanks RD-C-43, RD-C-44, RD-C-47, RD-C-48, and the Gun Barrel Tank gave readings of 2-3 mrad/h, 3-5 mrad/h, 2-3 mrad/h, spots of 10-20 mrad/h, and 2 mrad/h, respectively. Tank RD-C-44 had one spot that gave a reading of 20 mrad/h. Estimated inventory is Cs-137 (2,000 Ci). (ORNL 1990)

Release Data: There is no evidence of leakage. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The FFA lists this tank as 7818 shed; however, it is outside Building 7819. (Beasley 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Beasley, John, May 29, 1996. LMES personal communication with Anita Parker, Advanced Sciences Inc., Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

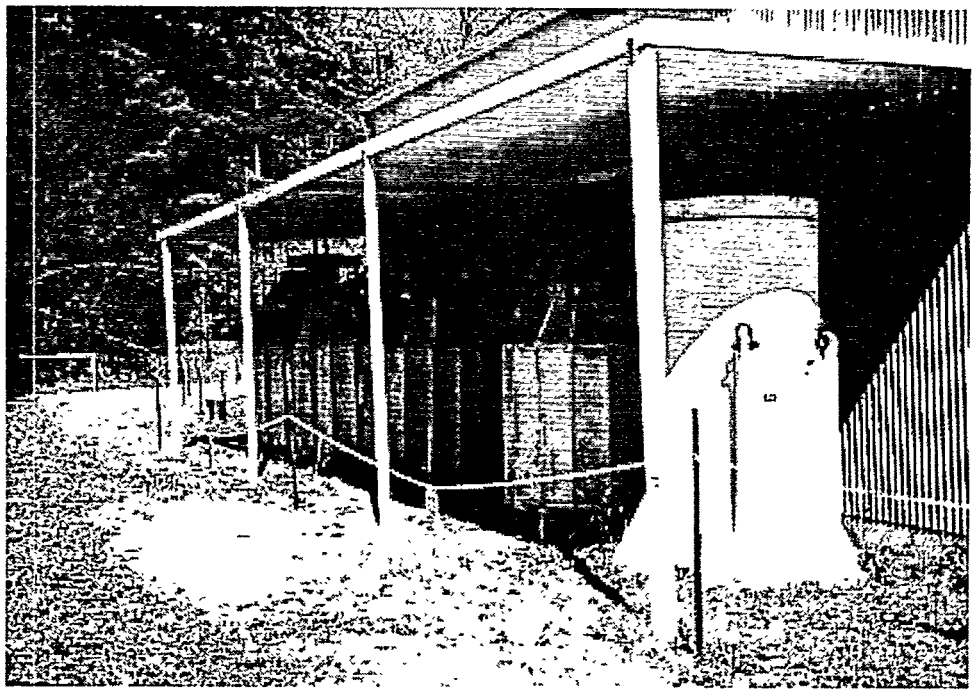
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C, (updated February 13, 1996) Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_07.JPG



UNIT NAME: Shielded Transfer Tank (ST2) (7818 Shed)

Unit Number: 07.10B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Tank ST2 is located in a fenced storage yard (~0.75 acres) on the west side on the Decontamination Facility. ST2 is a Model II tank designated as RD-C-43. Three other Model II tanks and one Model III tank are also located in this area. ORNL grid coordinates are N 19,330 ft and E 27;010 ft. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The Model II tanks consist of a 500-gal (1,900-L) 0.4-in-thick (1.0-cm-thick) stainless steel liner surrounded with 3.5 in (9 cm) of lead shielding encased in a 0.75-in (2-cm) steel outer shell. The outside of the tank measures 6 ft in diameter and 7 ft in height with an empty tank weight of 31,000 lb. (Bechtel et al 1988)

Dates Operated: 1958 - 1971. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: These tanks were used to ship Cs-137-loaded ion exchange resins to ORNL from Richland, Washington in the 1960s. The ST Model II tanks were used in 1958 to transport lower concentrations of liquid Cesium and Strontium waste from Arco, Idaho to ORNL without the use of an ion-exchange medium. The tanks were reused several times over their operational lifetime. (Bechtel et al 1988)

Waste Characteristics: Three of the four Model II vessels contain approximately 395 gal (1,500 L) of Decalso inorganic ion exchange medium that have been stripped of most of the Cesium-137. One of the Model II tanks contains an unknown amount of actinide-contaminated sludge that could not be removed when the final transfer was made from the tank. (Bechtel et al 1988) The tanks are contaminated with Cs-137. Results from a beta-gamma probe for tanks RD-C-43, RD-C-44, RD-C-47, RD-C-48, and the Gun Barrel Tank gave readings of 2-3 mrad/h, 3-5 mrad/h, 2-3 mrad/h, spots of 10-20 mrad/h, and 2 mrad/h, respectively. Tank RD-C-44 had one spot that gave a reading of 20 mrad/h. Estimated inventory is Cs-137 (2,000 Ci). (ORNL 1990)

Release Data: There is no evidence of leakage. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The FFA lists these tanks as 7818 shed: however, they are outside Building 7819. (Beasley 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Beasley, John, May 29, 1996. LMES personal communication with Anita Parker, Advanced Sciences Inc., Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

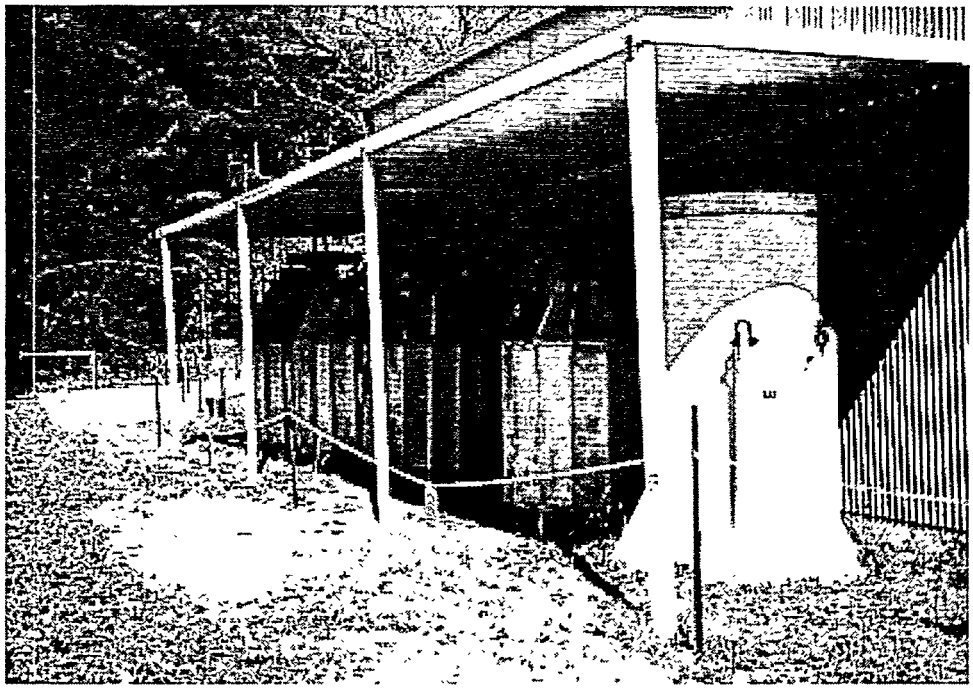
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C, (updated February 13, 1996) Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_07.JPG



UNIT NAME: Shielded Transfer Tank (ST3) (7818 Shed)

Unit Number: 07.10C

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Tank ST3 is located in a fenced storage yard (~0.75 acres) on the west side of the Decontamination Facility. ST3 is a Model II tank designated as RD-C-48. Three other Model II tanks and one Model III tank are also located in this area. ORNL grid coordinates are N 19,330 ft and E 27,010 ft. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The Model II tanks consist of a 500-gal (1,900-L) 0.4-in-thick (1.0-cm-thick) stainless steel liner surrounded with 3.5 in (9 cm) of lead shielding encased in a 0.75-in (2-cm) steel outer shell. The outside of the tank is 6 ft in diameter and 7 ft in height, with an empty tank weight of 31,000 lb. (Bechtel et al 1988)

Dates Operated: 1958 - 1971. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: These tanks were used to ship Cs-137-loaded ion exchange resins to ORNL from Richland, Washington in the 1960s. The ST Model II tanks were used in 1958 to transport lower concentrations of liquid Cesium and Strontium waste from Arco, Idaho to ORNL without the use of an ion-exchange medium. The tanks were reused several times over their operational lifetime. (Bechtel et al 1988)

Waste Characteristics: Three of the four Model II vessels contain approximately 395 gal (1,500 L) of Decalso inorganic ion exchange medium that have been stripped of most of the Cesium-137. One of the Model II tanks contains an unknown amount of actinide-contaminated sludge that could not be removed when the final transfer was made from the tank. (Bechtel et al 1988) The tanks are contaminated with Cs-137. Results from a beta-gamma probe for tanks RD-C-43, RD-C-44, RD-C-47, RD-C-48, and the Gun Barrel Tank gave readings of 2-3 mrad/h, 3-5 mrad/h, 2-3 mrad/h, spots of 10-20 mrad/h, and 2 mrad/h, respectively. Tank RD-C-44 had one spot that gave a reading of 20 mrad/h. Estimated inventory is Cs-137 (2,000 Ci). (ORNL 1990)

Release Data: There is no evidence of leakage. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The FFA lists these tanks as 7818 shed, however, they are outside Building 7819. (Beasley 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Beasley, John, May 29, 1996. LMES personal communication with Anita Parker, Advanced Sciences Inc., Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

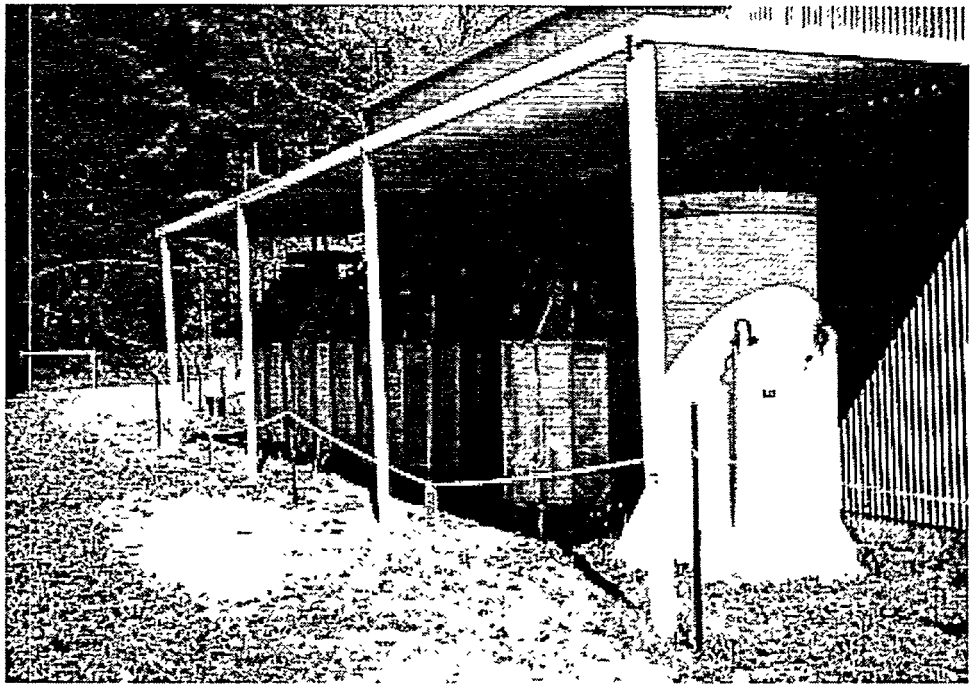
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C, (updated February 13, 1996) Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_07.JPG



UNIT NAME: Shielded Transfer Tank (ST4) (7818 Shed)

Unit Number: 07.10D

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: See ORNL grid coordinates N 19,330 ft and E 27,010 ft. ST4 is located in a fenced storage yard (~0.75 acres) on the west side on the Decontamination Facility. ST4 is a Model II tank designated as RD-C-47. Three other Model II tanks and one Model III tank are also located in this area. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The Model II tanks consist of a 500-gal (1,900-L) 0.4-in-thick (1.0-cm-thick) stainless steel liner surrounded with 3.5 in (9 cm) of lead shielding encased in a 0.75-in (2-cm) steel outer shell. Three of the four Model II vessels contain approximately 395 gal (1,500 L) of Decalso inorganic ion exchange medium that have been stripped of most if the Cesium-137. One of the Model II tanks contains an unknown amount of actinide-contaminated sludge that could not be removed when the final transfer was made from the tank. The outside of the tank measures 6 ft in diameter and 7 ft in height with an empty tank weight of 31,000 lb. (Bechtel et al 1988)

Dates Operated: 1958 - 1971. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: These tanks were used to ship Cs-137-loaded ion exchange resins to ORNL from Richland, Washington in the 1960s. The ST Model II tanks were used in 1958 to transport lower concentrations of liquid Cesium and Strontium waste from Arco, Idaho to ORNL without the use of an ion-exchange medium. The tanks were reused several times over their operational lifetime. (Bechtel et al 1988)

Waste Characteristics: The tanks are contaminated with Cs-137. Results from a beta-gamma probe for tanks RD-C-43, RD-C-44, RD-C-47, RD-C-48, and the Gun Barrel Tank gave readings of 2-3 mrad/h, 3-5 mrad/h, 2-3 mrad/h, spots of 10-20 mrad/h, and 2 mrad/h, respectively. Tank RD-C-44 had one spot that gave a reading of 20 mrad/h. Estimated inventory is Cs-137 (2,000 Ci). (ORNL 1990)

Release Data: There is no evidence of leakage. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The FFA lists these tanks as 7818 shed, however, they are outside Building 7819. (Beasley 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Beasley, John, May 29, 1996. LMES personal communication with Anita Parker, Advanced Sciences Inc., Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

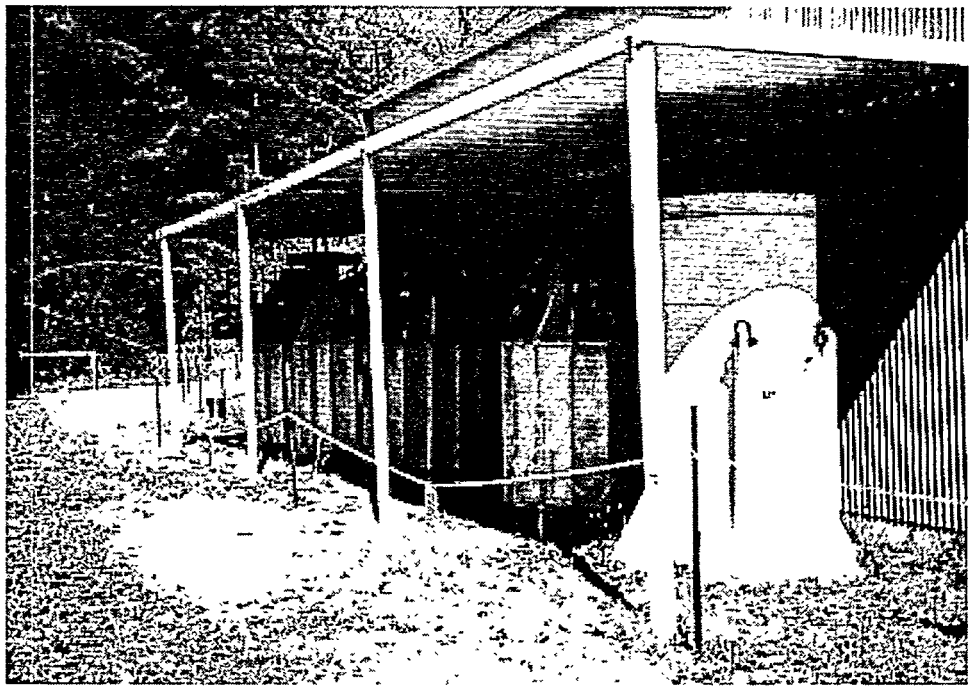
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C, (updated February 13, 1996) Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_07.JPG



UNIT NAME: Shielded Transfer Tank (ST5) (7818 Shed)

Unit Number: 07.10E

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Tank ST5 is located in a fenced storage yard (~0.75 acres) on the west side of the Decontamination Facility. ST5 is a Model II tank designated as RD-C-44. Three other Model II tanks and one Model III tank are also located in this area. ORNL grid coordinates are N 19,330 ft and E 27,010 ft. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The Model II tanks consist of a 500-gal (1,900-L) 0.4-in-thick (1.0-cm-thick) stainless steel liner surrounded with 3.5 in (9 cm) of lead shielding encased in a 0.75-in (2-cm) steel outer shell. The outside of the tank measures 6 ft in diameter and 7 ft in height with an empty tank weight of 31,000 lb. (Bechtel et al 1988)

Dates Operated: 1958 - 1971. (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: These tanks were used to ship Cs-137-loaded ion exchange resins to ORNL from Richland, Washington in the 1960s. The ST Model II tanks were used in 1958 to transport lower concentrations of liquid Cesium and Strontium waste from Arco, Idaho to ORNL without the use of an ion-exchange medium. The tanks were reused several times over their operational lifetime. RD-C-44 was modified and used within ORNL in 1970 and 1971 for transferring caustic solution with high-level fission product waste. (Bechtel et al 1988)

Waste Characteristics: Three of the four Model II vessels contain approximately 395 gal (1,500 L) of Decalso inorganic ion exchange medium that have been stripped of most of the Cesium-137. Tank RD-C-44 is reported to be empty. One of the Model II tanks contains an unknown amount of actinide-contaminated sludge that could not be removed when the final transfer was made from the tank. (Bechtel et al 1988) The tanks are contaminated with Cs-137. Results from a beta-gamma probe for tanks RD-C-43, RD-C-44, RD-C-47, RD-C-48, and the Gun Barrel Tank gave readings of 2-3 mrad/h, 3-5 mrad/h, 2-3 mrad/h, spots of 10-20 mrad/h, and 2 mrad/h, respectively. Tank RD-C-44 had one spot that gave a reading of 20 mrad/h. Estimated inventory is Cs-137 (2,000 Ci). (ORNL 1990)

Release Data: There is no evidence of leakage. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The FFA lists these tanks as 7818 shed, however, they are outside Building 7819. (Beasley 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Beasley, John, May 29, 1996. LMES personal communication with Anita Parker, Advanced Sciences Inc., Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 7, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

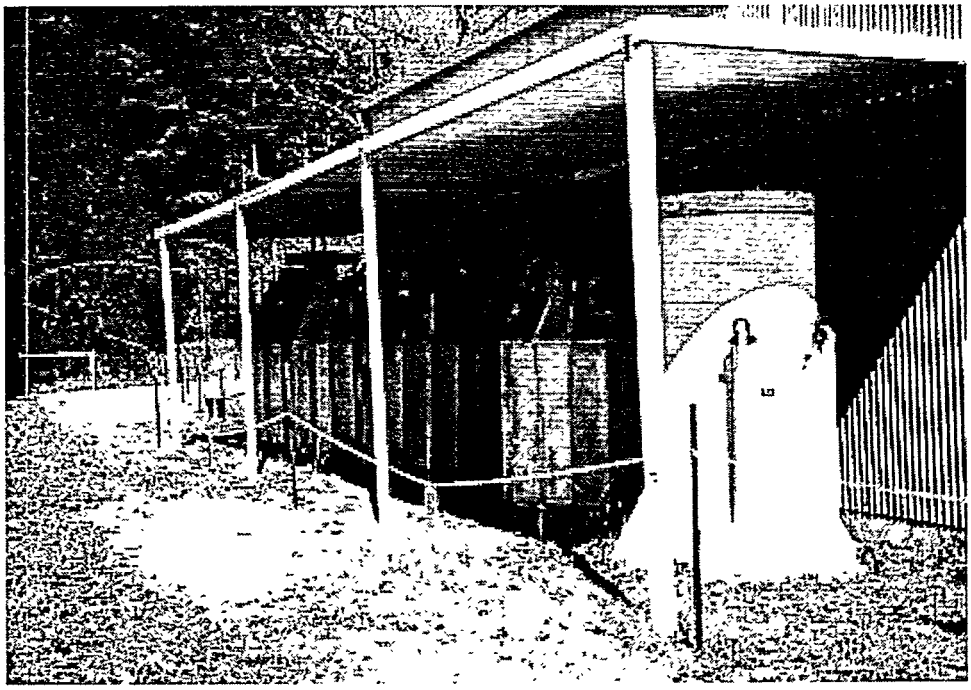
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation*, DOE/OR-1014, Appendix C, (updated February 13, 1996) Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_07.JPG



UNIT NAME: Aircraft Reactor Experiment (ARE) Contaminated Tool Storage

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Reported to be located west of the Molten Salt Reactor Experiment (MSRE) building. No records exist to document the location in any detail. (ORNL 1990)

Approximate Dimensions and Capacity: Not known. (ORNL 1990)

Dates Operated: 1954 - 1957. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Apparently used for storage of contaminated items from the Aircraft Reactor Experiment (ARE). (ORNL 1990)

Waste Characteristics: Not known. (ORNL 1990)

Release Data: A walkover radiation survey indicates only background radiation level at the site. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

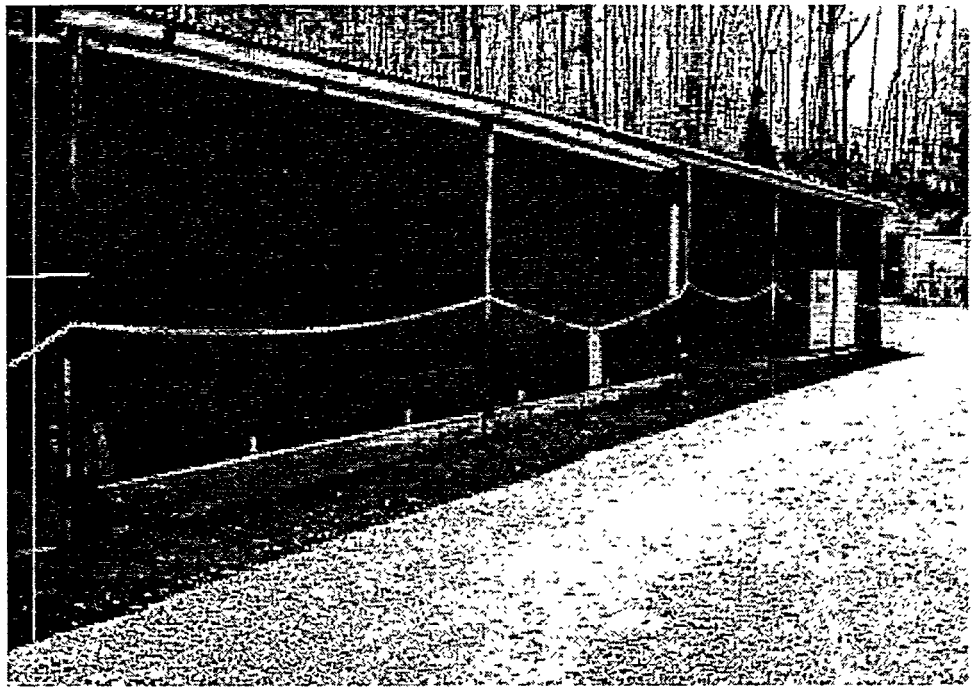
References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_12.JPG



UNIT NAME: Abandoned Sanitary Waste Pipeline and Septic Tank North of 7917

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The site is located in Melton Valley at the High Flux Isotope Reactor area, north of Building 7910, and west of Building 7917. Approximate ORNL grid coordinates are N 17401 ft and E 32276 ft. (ORNL 1990)

Approximate Dimensions and Capacity: 1000 gal (estimated) concrete septic tank and associated 70-ft long, 3 in diameter carbon steel pipeline. Tank contains approximately 500 gal of sludge. (ORNL 1990)

Dates Operated: Unknown; however the 7900 complex was operational in 1965. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Septic tank was used to collect and dispose of raw domestic sewage from Building 7910. (ORNL 1990)

Waste Characteristics: Only domestic sewage has been collected/stored in the tank. No hazardous or radioactive wastes should have been added to the system. (ORNL 1990)

Release Data: Preliminary samples indicate that there is no radioactive contamination, but some organic hazardous constituents are present in the residual waste. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

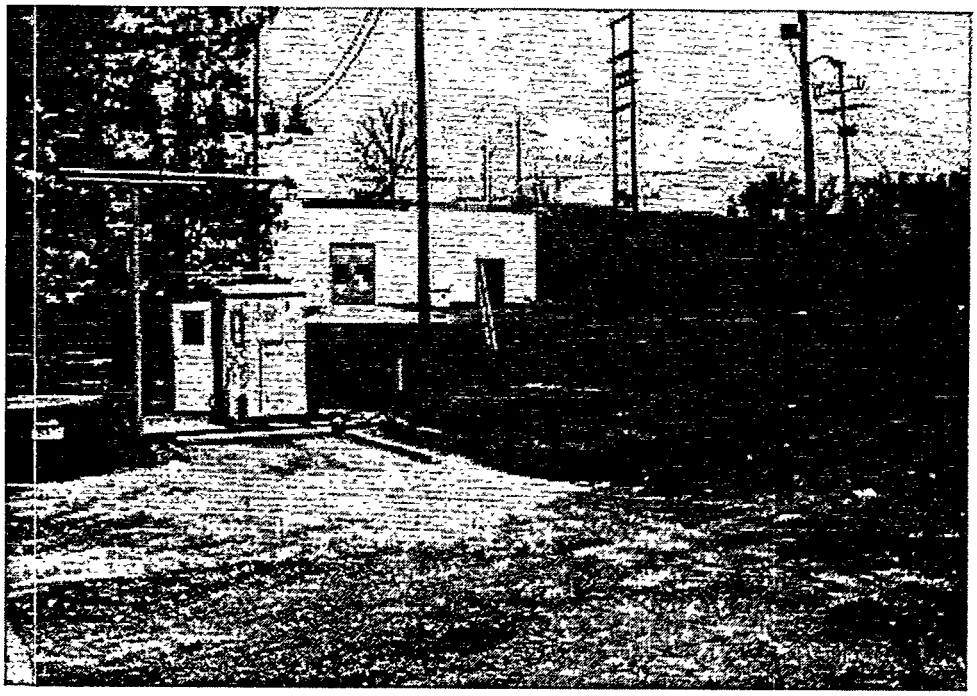
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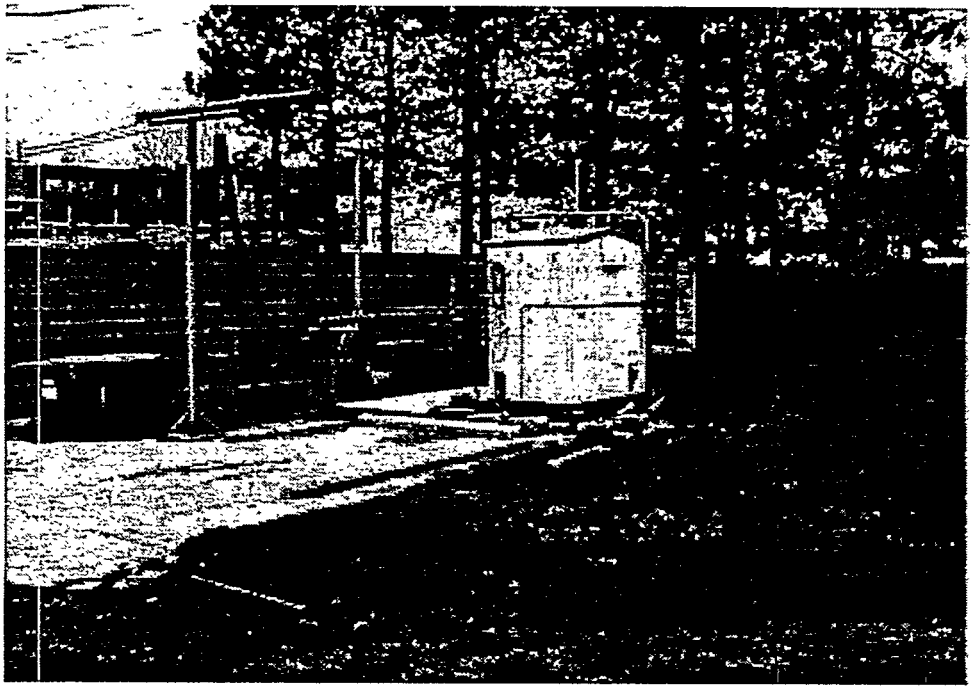
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee

Date Prepared: December 1996

Photo: 13_14.JPG; 13_15.JPG





UNIT NAME: Hydrofracture Experimental Site 2 Soil Contamination (HF-S2A)

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The injection well for Hydrofracture Experimental Site 2 is located in Melton Valley at ORNL grid coordinates N 16,817 ft and E 31,260 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Two injections were performed. The first was at a depth of 934 ft (285 m) and used 91,567 gal (346,618 L) of grout tagged with 25 Ci Cs-137, and the second at 695 ft (212 m) used 132,700 gal (502,324 L) of grout, and 25 Ci of Cs-137 and 2 Ci of Co-60. (ORNL 1990)

Dates Operated: Two injections were performed on September 3 and 10, 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: This site was the second test facility for testing the use of hydrofracturing as a method of liquid radioactive waste disposal. It was set up so that a deeper injection well could be used in an area of known geology. (Bechtel et al 1988)

Waste Characteristics: Both of these tests were also conducted with a grout made of water and grout additives. A total of 50 Ci of Cs-137 was injected. No hazardous chemicals other than the radioactivity were added. (Bechtel et al 1988)

Release Data: No records can be found indicating any spills or leakage at this site. The injection well is currently covered by a road. However, information in a report by de Laguna et al (1968) suggests that some contamination may have occurred. An aerial radiological survey conducted in 1986 showed that the injection well contained Cesium-137 at 180-260 cps. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: Additional information can be found in Bechtel 1995a & 1995b.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/EDGE/PEER. November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Bechtel National, Inc., March 1995 *Site Characterization Summary Report for Waste Area Grouping 10 Wells at the Old Hydrofracture Facility, Oak Ridge National Laboratory,* Oak Ridge, Tennessee, prepared for the U.S. Department of Energy, ORNL/ER/Sub/87-99053/78

Bechtel National, Inc., December 1995 *Site Characterization Summary Report for Waste Area Grouping 10 Wells at the Old Hydrofracture Facility, Oak Ridge National Laboratory,* Oak Ridge, Tennessee, prepared for the U.S. Department of Energy, DOE/OR/01-1437&D2, ORNL/ER-299.

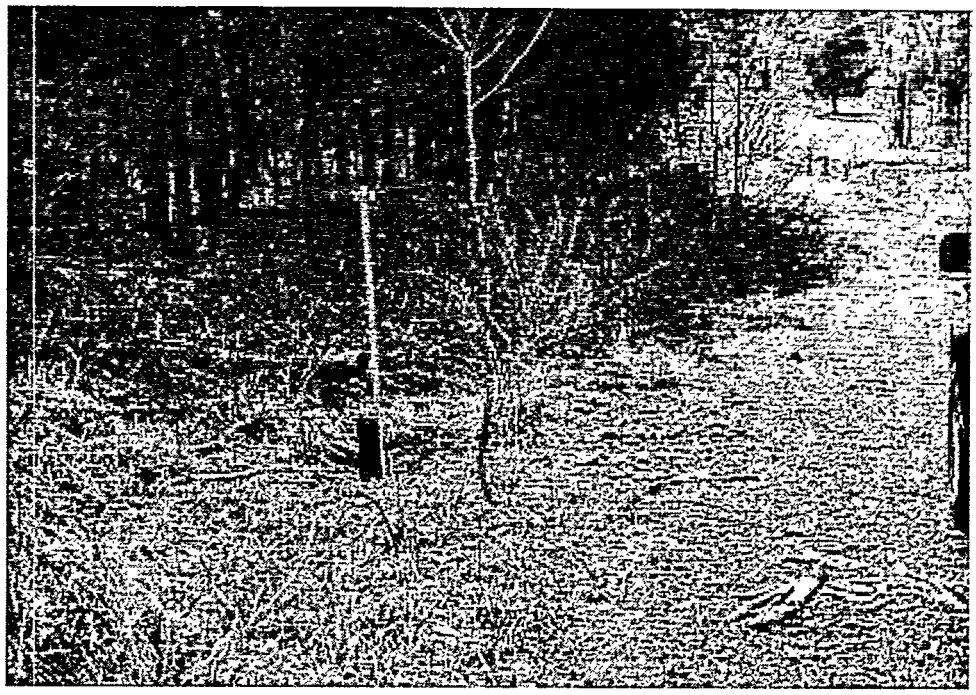
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_27.JPG



UNIT NAME: Molten Salt Reactor Experiment Office Building (7509)

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Building 7509 is located in Melton Valley south of Melton Valley Drive adjacent to the main reactor building (7503) ORNL grid coordinates are N 18,631 and E 32,830 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown

Dates Operated: The MSRE operated from 1965-1969. The office building was closed from 1994 to 1995. It reopened in 1995 to provide office space for personnel involved in remediation of Building 7503. (Faulkner 1996)

Present Function:

Life Cycle Operation: The MSRE office building is an ancillary building associated with the MSRE facility. The MSRE was a single-region, unclad-graphite-moderated, homogeneous-fueled reactor built to investigate the practicality of the molten salt reactor concept for central power station applications. (Ford and Holder 1992)

Waste Characteristics: NA

Release Data: No information is available.

Site Status: CERCLA

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

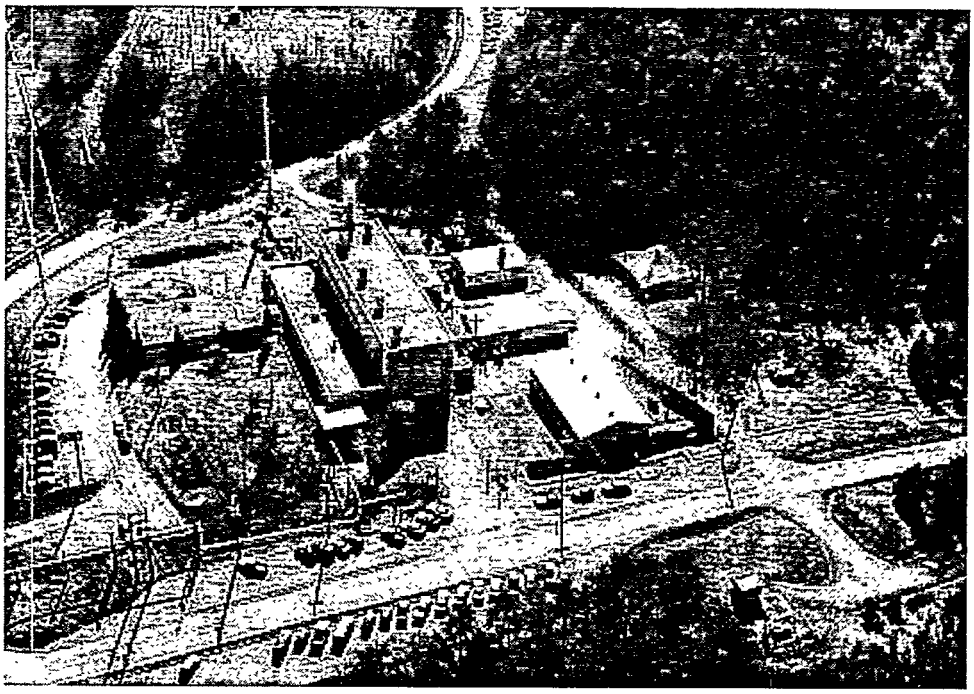
Faulkner, Richard, December 11, 1996. Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division. Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9756_90.JPG



UNIT NAME: Molten Salt Reactor Experiment (MSRE) Stack 7512

Unit Number:

Project Status: No activity. (Faulkner 1996)

Unit Location: Located in Melton Valley southeast of Building 7503. ORNL grid coordinates are N 18,490 ft and E 32,730 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Stack is steel, 3 ft in diameter and 100 ft tall. Two 21,000 cfm blowers are located near the base of the stack. (ORNL 1990)

Dates Operated: 1965 - 1969. (ORNL 1990)

Present Function: Currently in operation to provide exhaust system for MSRE Building 7503 ventilation system. (Faulkner 1996)

Life Cycle Operation: Handle filtered exhaust from the reactor and other cells. (ORNL 1990)

Waste Characteristics: Unknown. (ORNL 1990)

Release Data: Unknown. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

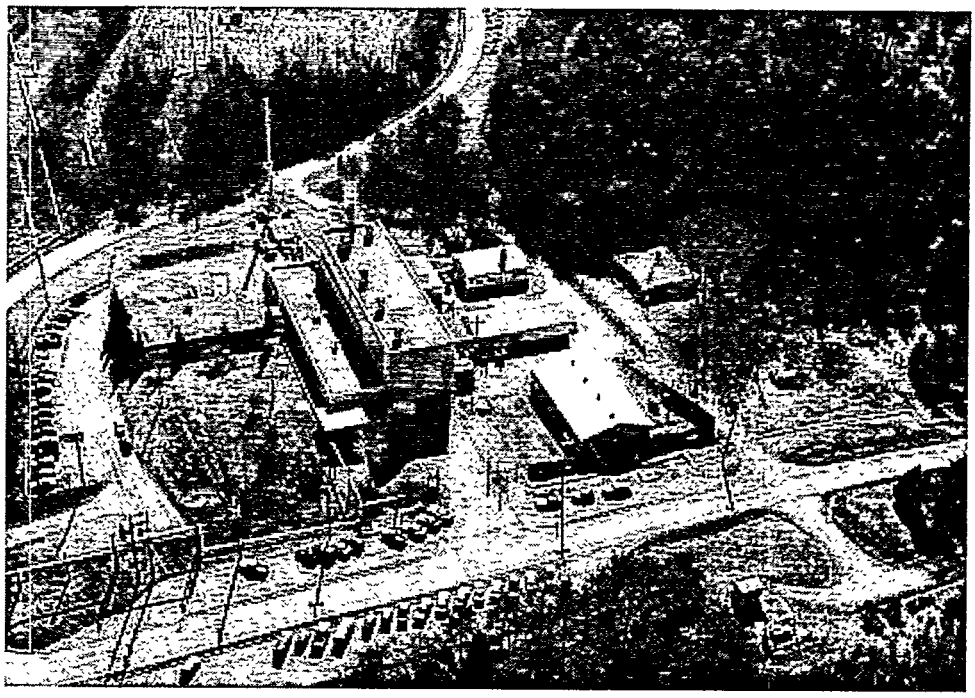
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Faulkner, Richard, December 11, 1996. LMES Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9756_90.JPG



UNIT NAME: Molten Salt Reactor Experiment Storage Well

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Approximately 100 ft south of the MSRE Charcoal Adsorber Pit in Melton Valley. Approximate ORNL grid coordinates are N 18,443 ft, and E 32,678 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Vertical pipe that protrudes several inches above the ground. Depth is not known. It is not known if the well is closed- or open-bottomed. (Bechtel et al 1988)

Dates Operated: Unknown. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Used to store radioactively contaminated maintenance tools. (ORNL 1990)

Waste Characteristics: Sample of water in the well was reported to contain 2.2 X 10^{-5} μCi/ml of Cs-137. (Bechtel et al 1988)

Release Data: No releases have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_19.JPG



UNIT NAME: Molten Salt Reactor Experiment (MSRE) Supply Air Filter House Building 7514

Unit Number:

Project Status: No activity. (Faulkner 1996)

Unit Location: The inlet air Filter House is located west of the MSRE building in Melton Valley. ORNL grid coordinates are N 18,710 ft and E 32,640 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building is steel structure 12 ft by 20 ft. (ORNL 1990)

Dates Operated: 1965 - 1969. (ORNL 1990)

Present Function: Building 7514 is still used to supply a ventilation system for MSRE Building 7503. (Faulkner 1996)

Life Cycle Operation: Contains filters and steam heating coils for the reactor by inlet air. (ORNL 1990)

Waste Characteristics: Unknown. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

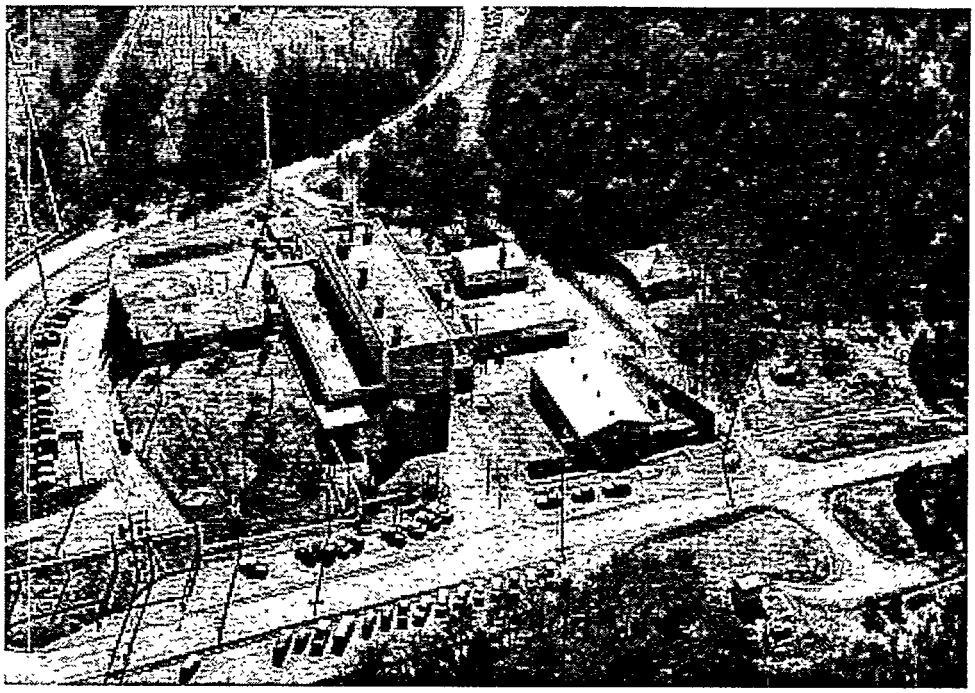
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Faulkner, Richard, December 11, 1996. LMES Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9756_90.JPG



UNIT NAME: Aircraft Reactor Experiment (ARE) Surface Impoundment

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The impoundment was located Approximately 1/4 mile southeast of Building 7503 in Melton Valley. This location is presently between and under Building 9730 and 9720. Approximate ORNL grid coordinates are N 17,611 ft and E 32,578 ft. (ORNL 1990)

Approximate Dimensions and Capacity: 100,000 gal capacity. Approximate dimensions are 115 ft by 160 ft. (ORNL 1990)

Dates Operated: Constructed 1952. No record exists that pond was ever used. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The impoundment was used to contain flood water from the ARE reactor pit. Since the reactor design allowed up to 15 percent of the fuel to remain in the cell, the flood water was exposed to radioactivity, although the liquid fuel was dumped prior to flooding the cell. Water used for shielding during postoperative service was also pumped to the impoundment through a buried steel pipeline connected to the ARE impoundment and other impoundments. The impoundment has been closed; Transuranium Processing Plant (TPP) and Thorium Uranium Recycling Facility (TURF) have since been constructed where it was located. (Bechtel et al 1988)

Waste Characteristics: No reported information. (ORNL 1990)

Release Data: It is not known if any radioactive sediments remain in the impoundment area or if they were removed to the rubble/dump area during construction of TPP and TURF. If contaminated soils or sediments remain, it is possible that releases to soils or to groundwater have occurred. No further information is available. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater.

Comments: CSSS (1990) indicates the impoundment was to be used to handle water used to flood the reactor pits after operation. Following operation of the reactor the liquid fuel could be drained from the reactor, leaving about 15 percent of the fuel in the reactor and piping. Apparently water flooding was not used in the ARE. ARE was located in Building 7503, the current site of the inactive MSRE. (ORNL 1990)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

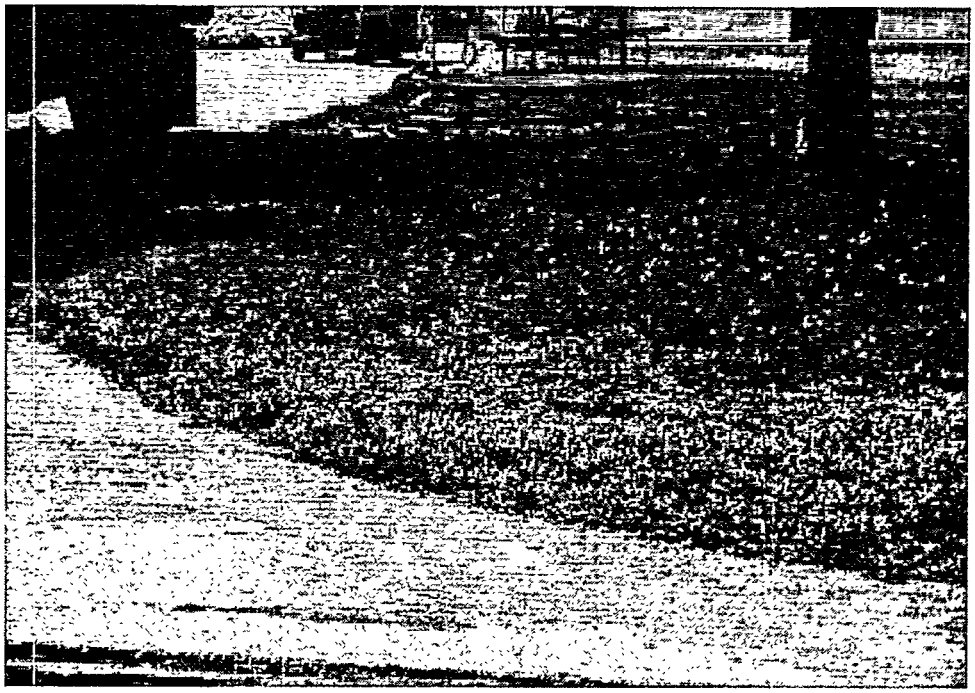
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 16_23.JPG



UNIT NAME: HFIR/TRU Waste Collection Basin (7905)

Unit Number: 08.01A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The unit is located south of the High Flux Isotope Reactor (HFIR), Building 7900, at the Melton Valley ORNL facilities complex. ORNL grid coordinates are N 16,740 ft and E 32,620 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The site was an unlined waste collection basin Capacity: 240,000 gal (900,000 L). Dimensions: 86 x 116 ft (26 x 35 m) at the top of the berm and 40 x 70 ft (12 x 21 m) at the bottom of the pond. Maximum depth is 7.0 ft (2.1 m). Elevation at the top of the pond is 804 ft (245 m) MSL. (Boegley and Iglar 1987) As-built depth appears to be approximately 20 ft at the north end of the impoundment. (Bechtel et al 1988)

Dates Operated: Site commissioned: 1965. (ORNL 1990)

Present Function: Site is still in use as an emergency storage basin for radioactive blowdown water from the HFIR cooling tower. (Boegley and Iglar 1987)

Life Cycle Operation: This basin was called the Cold Pond and was formerly used as an intermediate storage and collection basin for liquid wastes from the HFIR facility. The basin also served as an emergency storage basin for the radiologically contaminated blowdown water from the cooling tower in Building 7902. (Boegley and Iglar 1987)

Waste Characteristics: The waste streams collected consist of floor drain, laboratory drains, steam condensates, process vessel cooling water, and precipitation falling directly on the basin. (Boegley and Iglar 1987) Wastes streams consisted of floor drains, laboratory drains, stream condensates, and process vessel cooling water containing nitric acid, sodium hydroxide, and sulfuric acid. Co-60 is the major radionuclide present. Recent sludge analysis indicates that none of the data for metals, pesticides, or herbicides exceeded the maximum concentrations of contaminants for the characteristics of EP toxicity. Among the non-EP-TOX limited volatile organics, only a few were identified as present above the analytical detection limits. There is about 12 in (30 cm) of sludge in the pond. (Bechtel et al 1988)

Release Data: Effluent from the pond was released to Melton Branch or pumped to the Equalization Basin (3524) in Bethel Valley for treatment. (Bechtel et al 1988). Because the pond was not lined, some leakage probably occurred. For example, four quarters of groundwater monitoring have shown significantly higher levels of Mn, Na, sulfate, nitrate, gross alpha, and gross beta in groundwater downgradient as compared to groundwater upgradient of the basin. No accidental releases from the pond were reported. (ORNL 1990)

A surface radiological investigation was conducted at HFIR/TRU Waste Collection Basins 7905, 7906, 7907, and 7908 from May to July 1989 and February to March of 1990. Surface gamma exposure rates over the site generally ranged from 24 to 48 uR/h. Most elevated gamma levels were attributed to radiation emanating from Basin 7905 and 7906, with measurements reaching 180 uR/h near the Contamination Area fence. Nine scattered spots of surface contamination ranging from 60 to 960 uR/h were identified inside the HFIR/TRU fence. Soil sample analysis indicated that the primary soil contaminant was Co-60. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater, Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

UNIT NAME: HFIR/TRU Waste Collection Basin (7906)

Unit Number: 08.01B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The unit is located south of the High Flux Isotope Reactor (HFIR), Building 7900, at the Melton Valley, ORNL facilities complex. ORNL grid coordinates are N 16,700 ft and E 32,490 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This site was an unlined waste collection basin. Capacity: 500,000 gal (1,890,000 L). Dimensions: 167 x 116 ft (51 x 35 m) at top and 121 x 70 ft (37 x 21 m) at bottom. Average sediment depth is about 8 in (20 cm). (Boegly and Iglar 1987)

Dates Operated: Site commissioned: 1965. Site is still in use as an emergency storage basin only. (ORNL 1990)

Present Function: In addition to receiving liquid wastes from HFIR, Basin 7906 could also receive diverted waste streams from the Thorium Uranium Recycling Facility (TURF) and the Transuranium Processing Plant (TPP). This basin was called the Hot Pond because it received wastes that were thought to contain radionuclides. (Boegly and Iglar 1987)

Life Cycle Operation:

Waste Characteristics: Contaminants from the TPP and TURF facilities (if released) were primarily plutonium and daughter nuclides with alpha-emitting particles and atomic weights greater than 93. The major radionuclide from the HFIR was Co-60. Nonradioactive wastes included sodium and potassium hydroxide and acids. Recent sludge analysis indicates that none of the data for metals, pesticides, or herbicides exceeded the maximum concentrations of contaminants for the characteristics of EP toxicity. (ORNL 1990) Waste water from TPP and TURF contain plutonium and its daughter products, primarily Cm-244. (Bechtel et al 1988)

Release Data: Basins 7905, 7906, 7907, and 7908 are reported to contain less than 10 Ci of radioactivity. Effluent from the basin was released to Melton Branch or pumped to the Equalization Basin (3524) for treatment. No accidental releases from the pond were reported. Four quarters of groundwater monitoring have indicated significantly higher levels of Mn, Na, nitrate, sulfate, and gross beta activity in a groundwater well downgradient as compared to upgradient of the basin. (ORNL 1990)

A surface radiological investigation was conducted at HFIR/TRU Waste Collection Basins 7905, 7906, 7907, and 7908 from May to July 1989 and February to March of 1990. Surface gamma exposure rates over the site generally ranged from 24 to 48 uR/h. Most elevated gamma levels were attributed to radiation emanating from Basin 7905 and 7906, with measurements at 1 m reaching 180 uR/h near the Contamination Area fence. Nine scattered spots of surface contamination ranging from 60 to 960 uR/h were identified inside the HFIR/TRU fence. Soil sample analysis indicated that the primary soil contaminant was Co-60. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

UNIT NAME: HFIR/TRU Waste Collection Basin (7907)

Unit Number: 08.01C

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The site is located south of the High Flux Isotope Reactor (HFIR), Building 7900, in Melton Valley. ORNL grid coordinates are N 16,680 ft and E 32,380 ft. (ORNL 1990)

Approximate Dimensions and Capacity: This site was an unlined waste collection basin. Capacity: 50,000 gal (180,000 L). Dimensions: 60 x 80 ft (18 x 24 m) at the top of the berm; depth is about 11 ft (3.4 m). Average depth of sediments is 2.4 in (6.0 cm). (ORNL 1990)

Dates Operated: Site commissioned: 1965. Site is still in use as an emergency storage basin only. (ORNL 1990)

Present Function: The basin was designed to receive process waste streams from the Transuranium Processing Plant (TPP). During operation, Basin 7907 was filled and emptied alternately with Basin 7908. The basin was also called the Number 3 Pond or the TRU A Pond. (Boegly and Iglar 1987)

Life Cycle Operation:

Waste Characteristics: Waste streams were derived from floor drains, laboratory drains, steam condensates, and process vessel cooling waters. (Boegly and Iglar 1987) The major radionuclide in the process waste was Cm-244. Recent sludge analyses indicate that none of the data for metals or pesticides and herbicides exceeded the maximum concentration of contaminants for characteristics of EP Toxicity. (ORNL 1990)

Release Data: If radioactive contamination was detected, the wastes were formerly pumped to Basin 3524 in the ORNL Bethel Valley complex. Noncontaminated water was discharged to Melton Branch. No accidental releases from the pond were reported. (ORNL 1990)

A surface radiological investigation was conducted at HFIR/TRU Waste Collection Basins 7905, 7906, 7907, and 7908 from May to July 1989 and February to March of 1990. Surface gamma exposure rates over the site generally ranged from 24 to 48 uR/h. Most elevated gamma levels were attributed to radiation emanating from Basin 7905 and 7906, with measurements at 1 m reaching 180 uR/h near the Contamination Area fence. Nine scattered spots of surface contamination ranging from 60 to 960 uR/h were identified inside the HFIR/TRU fence. Soil sample analysis indicated that the primary soil contaminant was Co-60. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

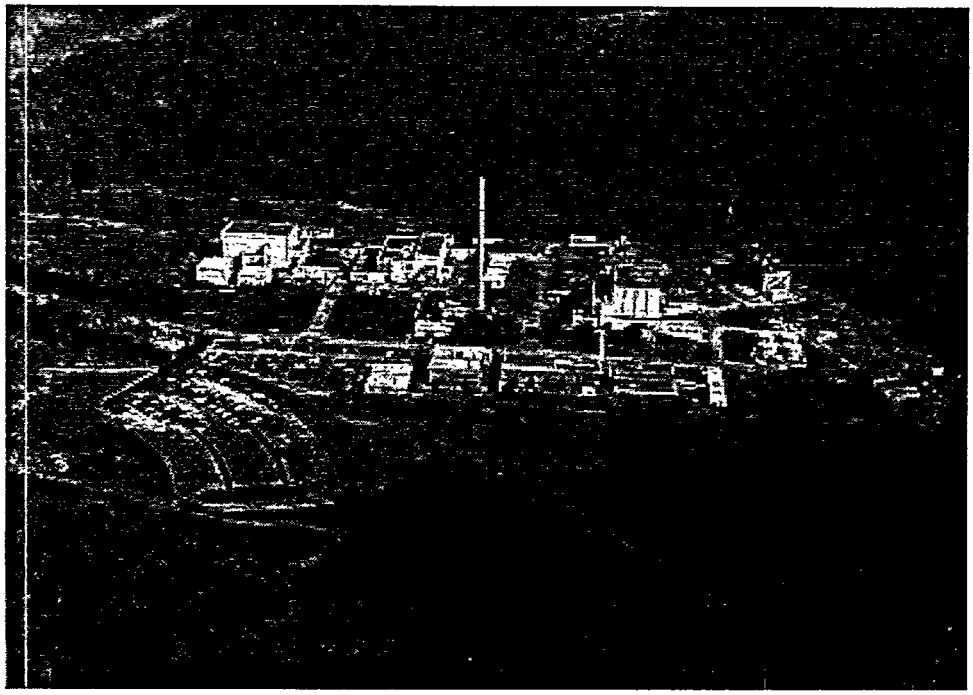
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10563_93.JPG



UNIT NAME: HFIR/TRU Waste Collection Basin (7908)

Unit Number: 08.01D

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The site is located south of High Flux Isotope Reactor (HFIR), Building 7900, in Melton Valley. ORNL grid coordinates are N 16,660 ft and E 32,310 ft. (Boegly and Iglar 1987)

Approximate Dimensions and Capacity: The site was an unlined waste collection basin. Capacity: 50,000 gal (180,000 L). Dimensions: 60 x 80 ft (12 x 24 m) at the top of the berm; depth is about 11 ft (3.4 m). Average depth of sediments is 2.4 in (6.0 cm). (ORNL 1990)

Dates Operated: Site commissioned: 1965. Site is still in use as an emergency storage basin only. (ORNL 1990)

Present Function: The basin was designed to receive process waste streams from the Transuranium Processing Plant (TPP) and the Thorium Uranium Recycling Facility (TURF). During operation, Basin 7908 was filled and emptied alternately with Basin 7907. This basin was also called the TRU B pond. (Boegly and Iglar 1987)

Life Cycle Operation:

Waste Characteristics: Waste streams were derived from floor drains, laboratory drains, steam condensates, and process vessel cooling waters. (Boegly and Iglar 1987) The major radionuclide in the process waste was Cm-244. Recent sludge analyses indicate that none of the data for metals or pesticides and herbicides exceeded the maximum concentration of contaminants for characteristics of EP Toxicity, and only a few of the organics exceeded detection limits. (ORNL 1990)

Release Data: If radioactive contamination was detected, the wastes were pumped to Basin 3524 in the ORNL Bethel Valley complex. Noncontaminated water was discharged to Melton Branch. No accidental releases from the pond were reported. (ORNL 1990)

A surface radiological investigation was conducted at HFIR/TRU Waste Collection Basins 7905, 7906, 7907, and 7908 from May to July 1989 and February to March of 1990. Surface gamma exposure rates over the site generally ranged from 24 to 48 Ur/h. Most elevated gamma levels were attributed to radiation emanating from Basin 7905 and 7906, with measurements at 1 m reaching 180 Ur/h near the Contamination Area fence. Nine scattered spots of surface contamination ranging from 60 to 960 Ur/h were identified inside the HFIR/TRU fence. Soil sample analysis indicated that the primary soil contaminant was Co-60. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10563_93.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Lagoon Road and Melton Valley Drive

Unit Number: 08.03A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: This site was located in the transfer line at the Lagoon Road and Melton Valley Drive intersection, where the transfer line crosses White Oak Creek near the bridge to the 7500 Area. (Bechtel et al 1988)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known. (Bechtel et al 1988)

Dates Operated: Liquid radioactive waste transfer system commissioned: June 1954. Site leak date: April-June 1960. The pipeline was removed from service in 1970. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: The Melton Valley Liquid Radioactive Waste Transfer Line was installed to allow wastes generated in Buildings 7500 (Homogeneous Reactor Experiment, now Nuclear Safety Pilot Plant) and 753 (Molton Salt Reactor Experiment) to be pumped to the main plant storage tanks and the evaporator prior to disposal. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage.

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The break was due to damage by heavy equipment. The leak did not result in a serious hazard but could have seriously contaminated the creek if it had occurred at a time when waste transfer was being made. An inspection of the line at the creek, while repairs were in progress, indicated that there may have been other leaks in the line. (Boegly and Iglar 1987)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Surface water

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

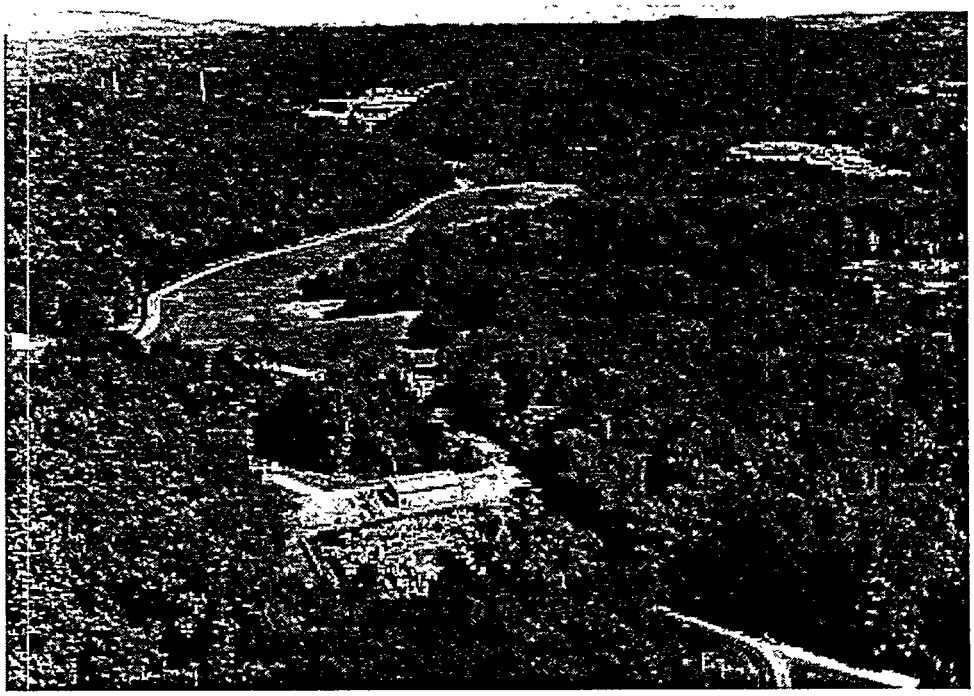
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9316_93.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Melton Valley Drive and SWSA 5 Access Road

Unit Number: 08.03B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: This site refers to 2 leaks located in the transfer line near the Melton Valley Drive and SWSA 5 Access Road intersection. Both failures occurred at mechanical, neoprene-gasketed pipe joints. (ORNL 1990)

Approximate Dimensions and Capacity: Because this is a leak/spill site, no dimensions are available. The amount of waste leaked or spilled is not known. The original system was constructed of cast-iron pipe; more recent additions and modifications are of stainless steel. (ORNL 1990)

Dates Operated: Liquid radioactive waste transfer system commissioned: June 1954. Site leak date: July 9 and 31, 1970. (ORNL 1990)

Present Function: Not applicable.

Life Cycle Operation: The main plant area liquid radioactive waste collection system was installed in the 1940s to transfer wastes from various sources to the collection and storage tanks. The Melton Valley Liquid Radioactive Waste Transfer Line was installed to allow wastes generated in Buildings 7500 (Homogeneous Reactor Experiment, now Nuclear Safety Pilot Plant) and 753 (Molton Salt Reactor Experiment) to be pumped to the main plant storage tanks and the evaporator prior to disposal. (ORNL 1990)

Waste Characteristics: The volume and composition of waste handled by the liquid radioactive waste collection and transfer system have varied along with the R&D activities during the operating history of the laboratory. No routine effort was made to determine the composition of the waste streams. Most sources generate dilute liquid radioactive waste at the mCi/gal level, although wastes containing up to 20 Ci/gal were produced in certain operations and diluted to around 0.05 Ci/gal before entering the collection system. It has been estimated that the average activity of liquid radioactive waste is about 30 mCi/gal. The major radionuclides present are Sr-90, Cs-137, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes are also present. Wastes are generally nitrate solutions, although acid chlorides or other corrosive wastes were also generated. Wastes were normally neutralized prior to evaporation and tank storage.

Because of the sample dilutions required to allow handling of radioactive tank liquids, the detection limits are above those required for RCRA hazardous waste determination. As a result, only limited chemical analyses have been conducted. These analyses appear to indicate a greater concern due to the radionuclides than to the hazardous waste constituents.

Release Data: The contamination in both locations was removed so that there was no significant release of activity into the creek. The main section of pipe was repaired, pressure tested, and returned to service. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

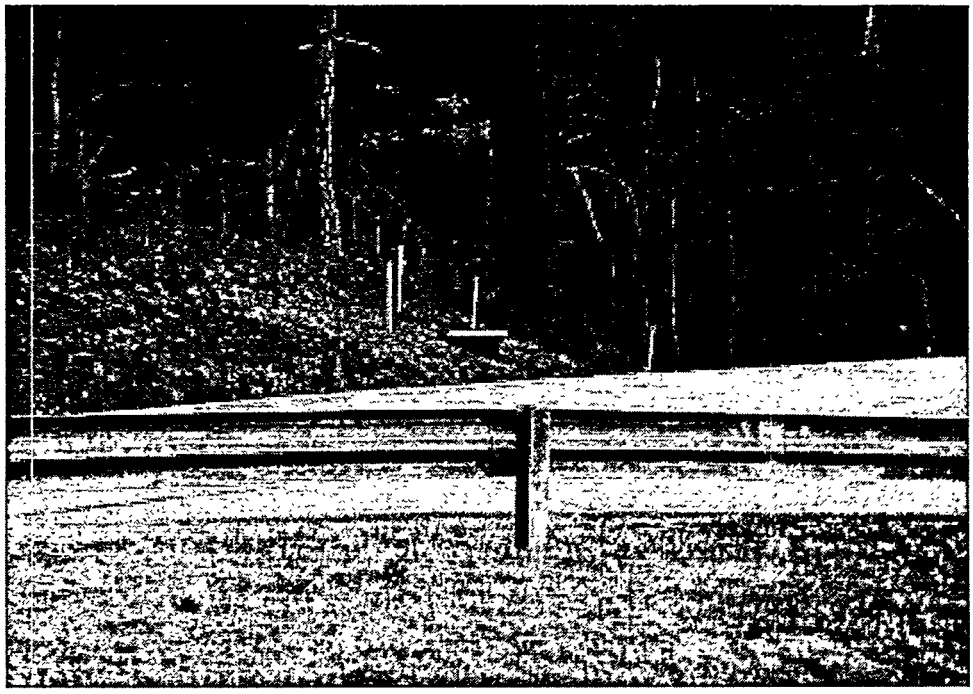
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_03.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - 7500 Area

Unit Number: 08.03C

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The leak was located approximately 400 ft northeast of Building 7500, north of Melton Valley Drive, and east of the WAG9 Tributary that runs along the eastern boundary of the HRE area. The spill occurred when a coupling failed in the waste transfer line. (Bechtel et al 1988)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled was reported to be 2,100 gal (7,950 L). (ORNL 1990)

Dates Operated: Site leak date: July 21, 1969. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: The Melton Valley Liquid Radioactive Waste Transfer Pipeline was used to transport liquid radioactive waste from Melton Valley reactor facilities to the main ORNL plant area for storage and treatment prior to disposal. (ORNL 1990)

Waste Characteristics: Wastes handled in the collection system were routinely generated laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present. The contamination was Cm-244 and a mixture of fission products. (ORNL 1990)

Release Data: A 2,100-gal (7,950-L) spill occurred when a coupling in the waste transfer line failed, resulting in a loss of curium-244 and other mixed fission products. The contamination was cleaned up in about two weeks by excavation of contaminated soil. The amount of radioactivity released into the Clinch River from the spill was not significant. In another spill that occurred, the purge water from the hot storage pool in Building 7500 was discharged to the ground and flowed along natural drainage east of Building 7500. (ORNL 1990) It was reported that some low-level contamination still remains in a swampy area on the south side of Melton Valley Drive. (Boegly and Iglar 1987)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: According to 1990 Contaminated Site Summary Sheet: This leak is located in the area north of the Nuclear Safety Pilot Plant (NSPP), Building 7500. Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - West of Melton Valley Pumping Station

Unit Number: 08.03D

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: This site is located 330 ft west of the Melton Valley Pumping Station, east of Melton Branch Circle and north of Melton Valley Drive. (Bechtel et al 1988)

Approximate Dimensions and Capacity: The transfer line is a 2-in (5-cm) stainless steel line. (ORNL 1990)

Dates Operated: Site leak date: January 15, 1971. (Bechtel et al 1988)

Present Function: Not applicable.

Life Cycle Operation: This pipeline was used to transfer liquid waste the Melton Valley Pumping Station to Bethel Valley that came from HFIR and T1 and T2 collection and storage tanks. (Bechtel et al 1988)

Waste Characteristics: Wastes handled in the collection system were routinely generated laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams. (ORNL 1990)

Release Data: A 100-sq-ft (9-sq-m) area was contaminated while liquid waste was being transferred from Melton Valley to the Tank Farm. The area was subsequently excavated. There was no spread of contamination outside the immediate area and no contamination of personnel. Exposures were not beyond normal working limits. (ORNL 1990). Surface readings at the time of the leak were up to 2.5×10^4 dpm for alpha, mainly from curium-244. Reportedly the leak did not reach any surface drainages. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_05.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - Building 7920 and Melton Valley Pumping Station Area

Unit Number: 08.03E

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: This site is on the Liquid Radioactive Waste Transfer Line between the Transuranium Processing Plant (Building 7920) and the Melton Valley Pumping Station. (ORNL 1990)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known. (ORNL 1990)

Dates Operated: Site leak date: July 31, 1970. (Boegly & Iglar 1987)

Present Function: Not applicable.

Life Cycle Operation: The pipeline was used to transport waste from the Transuranium Processing Plant (Building 7920) to the Melton Valley Pumping Station where it was transferred to the main ORNL plant area via another pipeline. (ORNL 1990)

Waste Characteristics: Liquid radioactive waste resulting from hot cell operations in Building 7920 (Transuranium Pilot Plant) related to recovery of certain transuranic elements for R&D operations. Liquid radioactive waste should contain some plutonium, uranium, and transuranic isotopes plus the usual nuclides found in ORNL liquid radioactive waste. (ORNL 1990)

Release Data: The leak occurred at a mechanical, neoprene-gasketed pipe joint in the transfer line. (Boegly and Iglar 1987). The waste had accumulated on the soil surface and contaminated an area which extended 200 to 300 ft south of the leak. Soil contamination on the day of the leak was as high as 10^5 dpm of alpha and approximately 30 mrad/hr at a 6 in depth. A liquid sample taken from a ditch was 1.1×10^5 dpm/Ml of alpha due primarily to curium-244. The contamination was removed so that there was no significant release of activity into the creek. The line from the Transuranium Processing Plant could not pass the pressure test after the repairs were made and was removed from service. It was replaced, on an emergency basis, with a new line. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: The 1990 Contaminated Site Summary Sheet indicated the spill occurred July 1980. Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

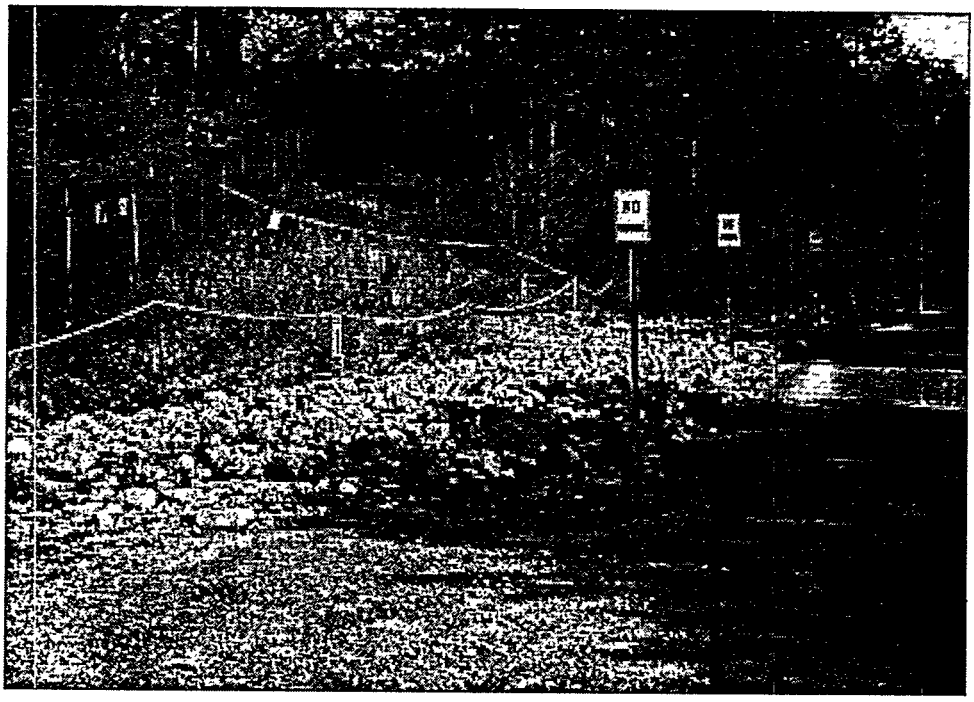
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_11.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - 7920 Ditch Line

Unit Number: 08.03F

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: This site is in the liquid radioactive waste pipeline from the Transuranium Processing Plant (Building 7920) along the HFIR access road to the Melton Valley Pumping Station. (Boegly and Iglar 1987)

Approximate Dimensions and Capacity: No dimensions are available, and the amount of waste leaked or spilled is not known. (Bechtel et al 1988)

Dates Operated: Date leak reported: January 31, 1972. (Boegly and Igler 1987)

Present Function: Not applicable.

Life Cycle Operation: The pipeline transported waste from Building 7920 to the Melton Valley Pumping Station where it was transferred to the main ORNL plant area via another pipeline. (Boegly and Iglar 1987)

Waste Characteristics: Liquid radioactive waste resulting from hot cell operations in Building 7920 (Transuranium Pilot Plant) related to recovery of certain transuranic elements for R&D operations. Liquid radioactive waste should contain some plutonium, uranium, and transuranic isotopes plus the usual nuclides found in ORNL liquid radioactive waste. (ORNL 1990)

Release Data: The liquid from this leak crossed under the road through the culverts and flowed along the natural drainage parallel to Melton Branch Circle in a southerly direction. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, surface water

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Boegly, W.J., Jr., and Iglar, A.F., September 1987. *Environmental Data Package for the Melton Valley Area (WAG 8)*, ORNL/RAP-28, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_10.JPG



UNIT NAME: Liquid Radioactive Waste Lines and Leak Sites - The Melton Valley Transfer Line

Unit Number: 08.03G

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The Melton Valley Liquid Radioactive Waste Transfer Pipeline extended from the ORNL main plant area in Bethel Valley, parallel to Melton Valley Drive to the Melton Valley Pumping Station. (ORNL 1990)

Approximate Dimensions and Capacity: This unit included the entire Melton Valley Liquid Radioactive Waste Transfer Pipeline because of expected leaks. (Kuhaida 1996) The transfer line was a flange and gasketed carbon steel pipeline. (Grimsby 1986)

Dates Operated: Liquid radioactive waste transfer system commissioned: June 1954. Date line replaced: 1973. (Grimsby 1986)

Present Function: Not applicable.

Life Cycle Operation: The Melton Valley Liquid Radioactive Waste Transfer Pipeline was a flanged and gasketed carbon steel pipeline used to transport liquid radioactive waste from the Melton Valley reactor facilities to the ORNL main plant area for storage and treatment prior to disposal. (Kuhaida 1996) A new line replaces the earlier cast-iron line and is a 2-in-diam (5-cm-diam) stainless steel line with a cathodic protection system. (Grimsby 1986)

Waste Characteristics: Wastes handled in the collection system were routinely generated laboratory liquid radioactive waste. Major radionuclides were Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some plutonium, uranium, and TRU isotopes were also present in the waste streams from certain sources. (ORNL 1990)

Release Data: Leaks have been reported in the old transfer line; no reported leaks in the new line. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Many of the reported leak/spill sites are located near the collection and storage tanks serving the liquid radioactive waste lines; others are along the lines themselves; and still others are not leaks at all but are spills, e.g., from pumping accidents. (ORNL 1990) Location according to Boegly and Iglar 1987: The first leak was reported to be south of Melton Valley Drive and just west of SWSA 5 access road. The other site is approximately 300 ft east of the first site, on the north side of Melton Valley Drive. (Boegly and Iglar 1987)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

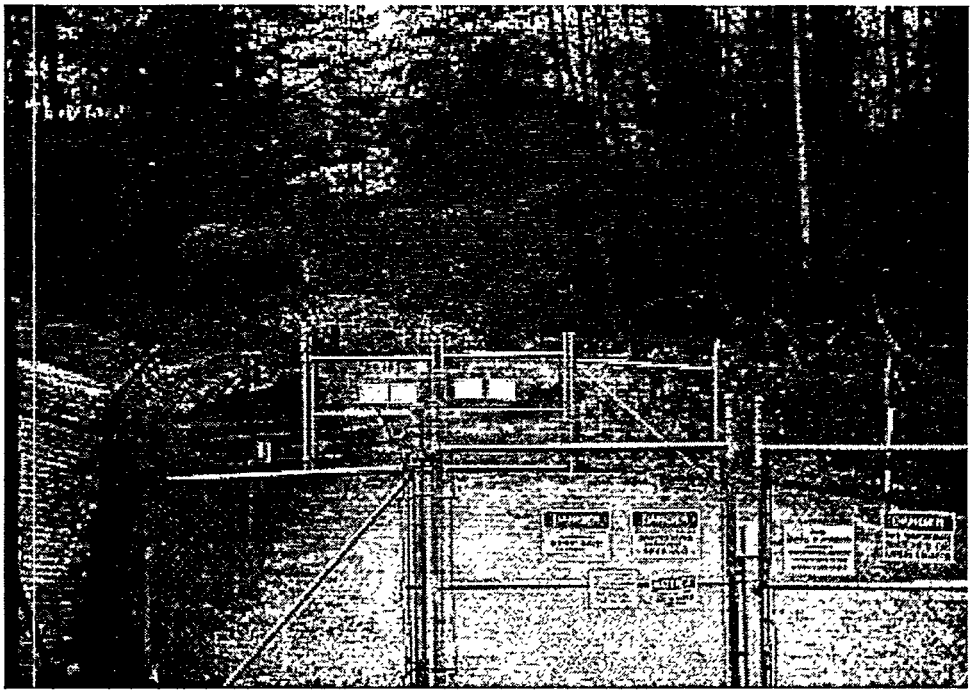
Grimsby, H.J. January 1986. *Identification of Low-Level Waste Line Leak Site at Oak Ridge National Laboratory,* Letter Report, RAP86-8,Oak Ridge, Tennessee.

Kuhaida, Jerry, December 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_07.JPG



UNIT NAME: Contractor Spoils Area - Melton Valley, W-SW of 7900

Unit Number: 08.13

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: In Melton Valley, west of the 7900 Area (High Flux Isotope Reactor/Transuranium Processing Plant/Thorium Uranium Recycling Facility (TURF)). Approximate ORNL grid coordinates are N 17,450 ft and E 31,600 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown, however the suspect area is ~ 6 acres. (ORNL 1990)

Dates Operated: Unknown. HFIR construction was initiated in 1962. Site is currently inactive. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: This site is believed to have been used as a dump site for the disposal of general construction debris. It was used during construction operations at the 7900 Area, the HFIR/TURF facilities. (ORNL 1990)

Waste Characteristics: Types of material observed at the site include scrap wood, scrap metal, empty paint cans, empty drums and 5-gallon cans, asphalt. In addition to the general construction debris, a small piece of sheet lead was found. The presence of any additional hazardous material is undetermined. (ORNL 1990)

Release Data: No releases have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

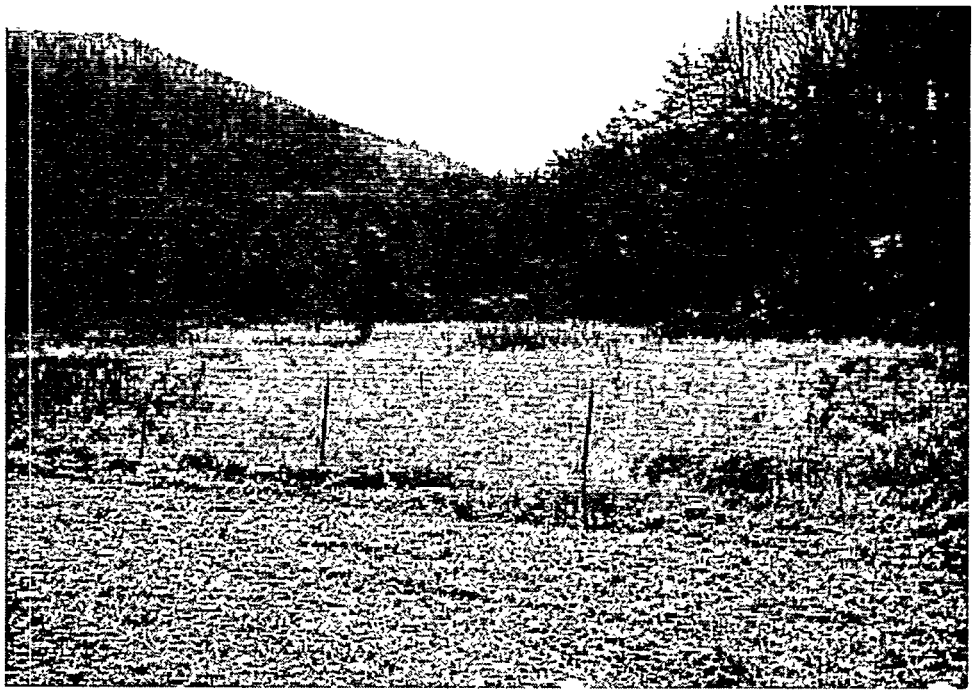
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_11.JPG



UNIT NAME: HFIR Cooling Tower Surface Impoundment

Unit Number: 08.14

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Adjacent to the south corner of Building 7902 (HFIR Cooling Tower). ORNL grid coordinates are N 16,736 ft and E 32,724 ft. (ORNL 1990)

Approximate Dimensions and Capacity: A small unlined earthen surface impoundment.

Dates Operated: Unknown (Bechtel et al 1988)

Present Function: Not in operation.

Life Cycle Operation: Used to study chromate removal from cooling tower blowdown prior to its release to Melton Branch. It has since been filled. (Bechtel et al 1988)

Waste Characteristics: Typical cooling tower blowdown which contained Co-60 and chromium. (ORNL 1990)

Release Data: Waste, after treatment, probably released to HFIR ponds or to Melton Branch. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 8, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_16.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection Tank 7503A

Unit Number: 08.20

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Tank 7503A is located within the Molten Salt Reactor Building (7503), within the liquid waste cell. Approximate ORNL grid coordinates of Building 7503 are N 18,670 ft and E 32,725 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Vertical cylindrical stainless steel tank 11-ft diameter by 16-ft high. (ORNL 1990) Capacity is 11,000 gal. (ORNL 1990)

Dates Operated: 1965 - 1969.

Present Function: Not in operation. The tank is empty. (Bechtel 1994)

Life Cycle Operation: Collected liquid radioactive waste from MSRE reactor operations. (ORNL 1990)

Waste Characteristics: Not reported. Probably contained Sr-90, Cs-137, Co-60 and uranium isotopes. Waste was discharged to the Melton Valley liquid radioactive waste system and pumped to the main ORNL plant area. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/PEER, September 1994. *Level Trend Analysis Summary Report for Oak Ridge National Laboratory, Inactive Low-Level Waste Tanks*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_17.JPG



UNIT NAME: Molten Salt Reactor Experiment (MSRE) Cooling Tower 7513

Unit Number: 08A.01B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Cooling Tower is located southwest of the MSRE Reactor Building (7503). ORNL grid coordinates are N 18,560 ft and E 32,605 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The cooling tower was sized to discharge about 3.6 million BTU/h. (ORNL 1990)

Dates Operated: 1965 - 1969. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The cooling tower discharged heat generated in Building 7503. Reactor heat was not handled by this cooling tower. (ORNL 1990)

Waste Characteristics: No hazardous chemical or radioactive wastes should have been generated by the cooling tower. (ORNL 1990)

Release Data: No releases have been reported. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

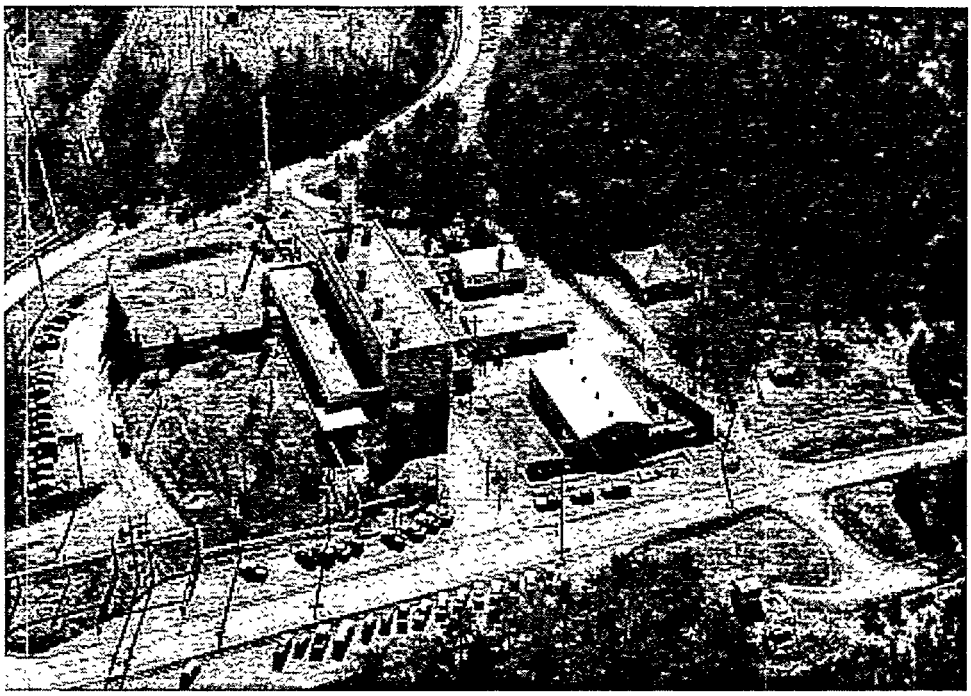
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9756_90.JPG



UNIT NAME: Molten Salt Reactor Experiment (MSRE) Diesel Generator House 7555

Unit Number: 08A.01C

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The MSRE Diesel Generator House (7555) is located west of the main reactor building (7503). ORNL grid coordinates are N 18,680 ft and E 32,600 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building is a 30 ft by 72 ft corrugated asbestos structure. (ORNL 1990)

Dates Operated: 1965 - 1969. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Supply emergency power in case of electrical system failure. The diesel house contains two 1200 rpm engines with 300 kw generators and a third engine configured for 300 kw. House also contains air compressors, air and helium tanks, and batteries for the diesels. (ORNL 1990)

Waste Characteristics: Unknown. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

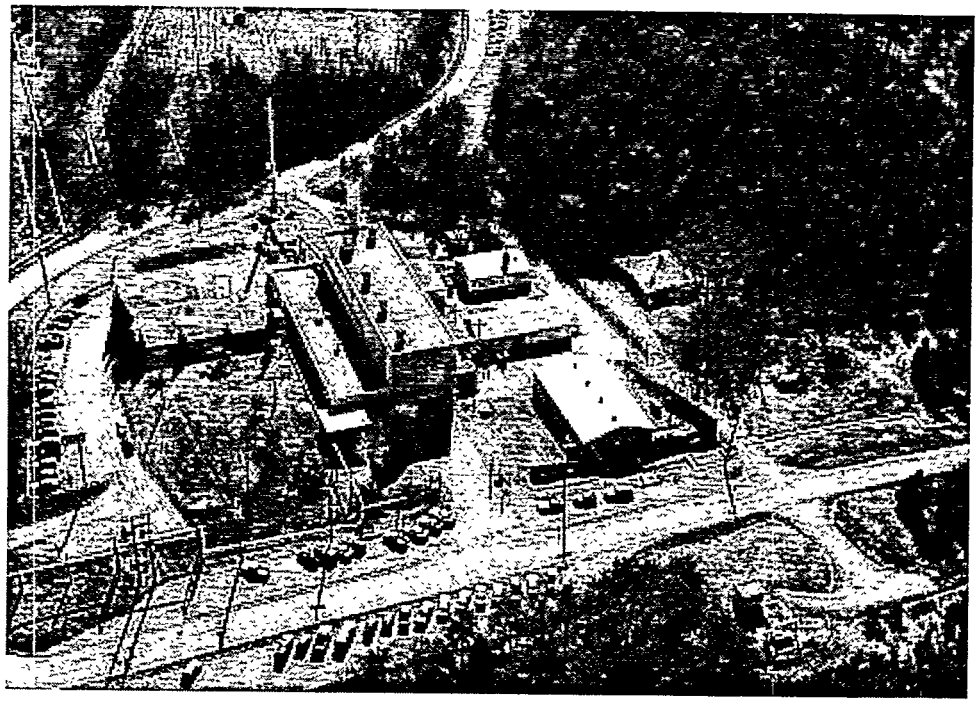
References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9756_90.JPG



UNIT NAME: Molten Salt Reactor Experiment (MSRE) Reactor Building 7503

Unit Number: 08A.01D

Project Status: Time-critical removed action in progress. Stabilization activities in progress. (FFA 1996)

Unit Location: The site is located on Melton Valley Drive, about 0.6 mile (1.0 km) south of the main ORNL complex. See ORNL grid coordinates N 18,670 ft and E 32,725 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The facility includes an 8-MW (thermal) fluid-filled reactor, an liquid radioactive waste pumping station, an liquid radioactive waste collection tank, an absorber pit, a filter house (Building 7511), and a stack. (ORNL 1990)

Dates Operated: Site commissioned: 1965. Taken out of service: 1969. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The reactor was constructed to demonstrate the molten-salt breeder concept for commercial power generation. (ORNL 1990)

Waste Characteristics: Wastes from the site are radioactive salts and flush salts. Radioactive wastes are Sr-90, Cs-137, Y-90, and Ba-137. Co-60 has also been detected. Total radioactivity measures 35,800 Ci (estimated). (ORNL 1990)

Release Data: No site contamination concerns outside of Building 7503 other than the filter pit area have been identified. Potential chemical toxicity of the fuel and flush salts is recognized and will be considered during final decommissioning. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

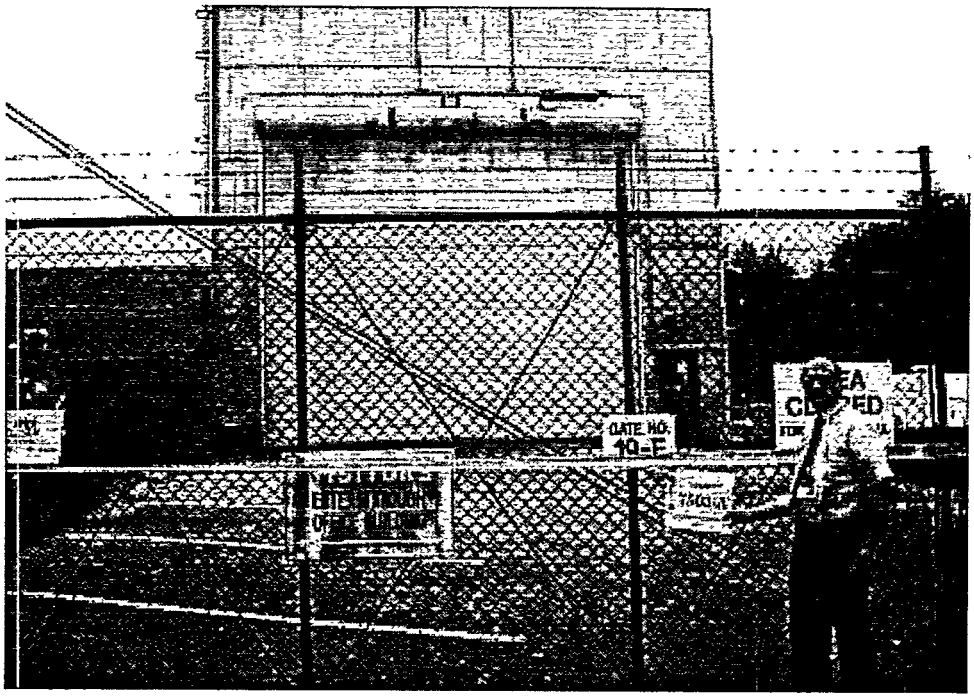
References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 19_28.JPG


GATE NO.
10-E

UNIT NAME: Molten Salt Reactor Experiment (MSRE) Filter Pit [Off-Gas Filter House (7511)]

Unit Number: 08A.01F

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Filter house is located south of MSRE (Building 7503). ORNL grid coordinates are N 18,520 ft and E 32,730 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Filter house is a 26.5 ft by 18.75 ft pit with 1 ft thick concrete walls and with a caulked 18-in. thick concrete roof plugs. (ORNL 1990)

Dates Operated: 1965 - 1969. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Filter chemical bed and reactor contaminant exhaust prior to release up stack. (ORNL 1990)

Waste Characteristics: No analyses are available. (ORNL 1990)

Release Data: No reported releases from the filter house. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

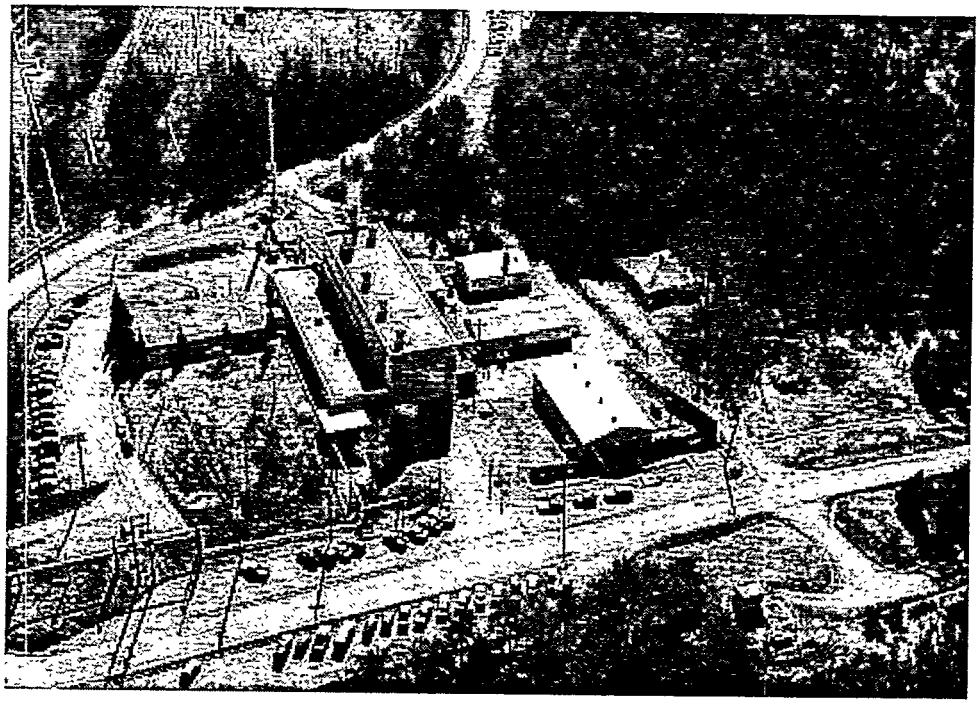
References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9756_90.JPG



UNIT NAME: Absorber Valve Pit 7559

Unit Number:

Project Status: Surveillance and Maintenance Program. (Mandry 1996)

Unit Location: Valve Pit is located on the north side of the Homogenous Reactor Experiment (HRE) absorber pit in Melton Valley. (Bechtel et al 1988) Approximate ORNL grid coordinates are N 18,820 ft and E 31,500 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Pit is underground and constructed of reinforced concrete. Dimensions are 9 ft by 6 ft. (ORNL 1990)

Dates Operated: 1958 - 1961. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Conjugates the inflow lines from the east pit prior to their entering the charcoal adsorber beds. (Bechtel et al 1988)

Waste Characteristics: Not known. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA/surplus facility (ORNL 1990)

Media of Concern:

Comments: Bechtel et al (1988) indicates the dimensions are 2 x 6 ft. Also refers to the pit as Absorber Valve Pit but the Contaminated Site Summary Sheets (CSSS) (ORNL 1990) refers to it as the Adsorber Valve Pit. The FFA Appendix C lists it as the Absorber Valve Pit.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 9, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Mandry, Jerry, December 3, 1996. LMES Facility Manager. Personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Homogenous Reactor Experiment (HRE) Reactor Building 7500

Unit Number:

Project Status: Surveillance and Maintenance Program. (Mandry 1996)

Unit Location: Located in Melton Valley just south of Melton Valley Drive. ORNL grid coordinates are N 18,740 ft and E 31,370 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Main reactor building is 90 ft by 105 ft with a height of 26 ft and 42 ft in the high bay area. (ORNL 1990)

Dates Operated: 1958 - 1961. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: Contained the Homogeneous Reactor Test (HRT) which included a fluid-fuel reactor, chemical processing equipment, and related reactor components. The facility was originally constructed to house HRE-1, the first of two experimental aqueous homogenous reactors to be developed for nuclear power application analysis. In 1953, HRE-2 replaced HRE-1 and the second reactor was constructed during 1953-1956. The reactor reached criticality in 1957, operating at a normal full-power level 5MW. In 1961, after approximately 16,295 mwh of operation, the reactor was shut down due to a hole which developed in the reactors core tank allowing mixing between fuel and blanket regions. (Ford and Holder 1992)

Waste Characteristics: The most highly contaminated portions of the reactor system are located in the reactor cell. This cell was routinely flooded during maintenance operations, resulting in widespread contamination of cell walls and equipment surfaces. Exposure levels of up to 600 R/h have been measured in the cell area. The contaminants are believed to be primarily Sr-90 and Cs-137. The estimated inventory of fission and corrosion products remaining in the process piping is 30-40 Kg. Personnel accessible areas outside the reactor and process cells are relatively free of contamination, with only isolated area os elevated activity remaining. Of the ancillary facilities, the waste evaporator and holding pond are known to contain significant quantities of radionuclides but have not been adequately characterized to date. (Ford and Holder 1992)

Release Data: No information. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

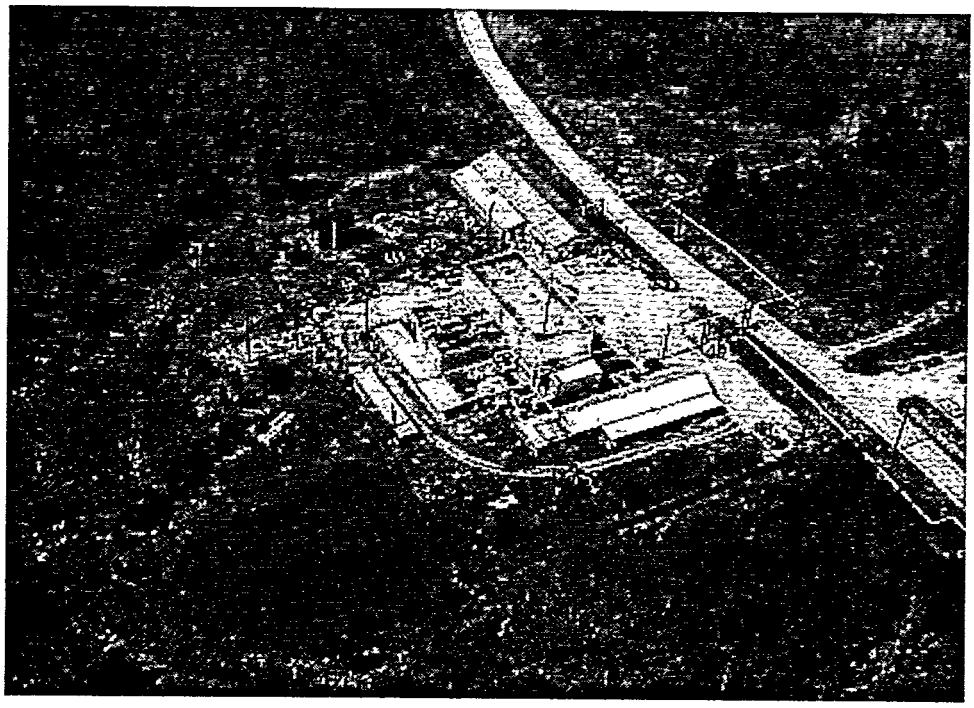
Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division. Oak Ridge, Tennessee.

Mandry, Jerry, December 3, 1996. LMES Facility Manager. Personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 1921_83.JPG



UNIT NAME: Homogenous Reactor Experiment (HRE) Absorber Pit 7557

Unit Number:

Project Status: Surveillance and Maintenance Program. (Mandry 1996)

Unit Location: The pit is located about 100 ft east of the Homogenous Reactor Experiment (Building 7500) in Melton Valley. (Bechtel et al 1988) Approximate ORNL grid coordinates are N 18,768 ft and E 31,523 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The pit is 12 ft by 24 ft by 3 ft deep and is buried under 10 ft of soil. A 1 ft thick concrete slab covers the pit. (Bechtel et al 1988)

Dates Operated: 1958 - 1961. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Housed the charcoal adsorber beds through which radioactive off-gas from the reactor cells was passed for treatment. The treatment was accomplished by adsorption and decay of the radioactive fission products on activated carbon. Gases, Kr-85, and oxygen were then discharged to the atmosphere. During operation, cooling water was continuously passed through the pit and then discharged to a tributary of Melton Branch. (Bechtel et al 1988)

Waste Characteristics: Radionuclides adsorbed on charcoal. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA/Surplus facility (ORNL 1990)

Media of Concern:

Comments: The Bechtel et al document (1988) indicates that the pit is called the Adsorber Pit but the FFA Appendix C lists it as the Absorber Pit.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 9, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

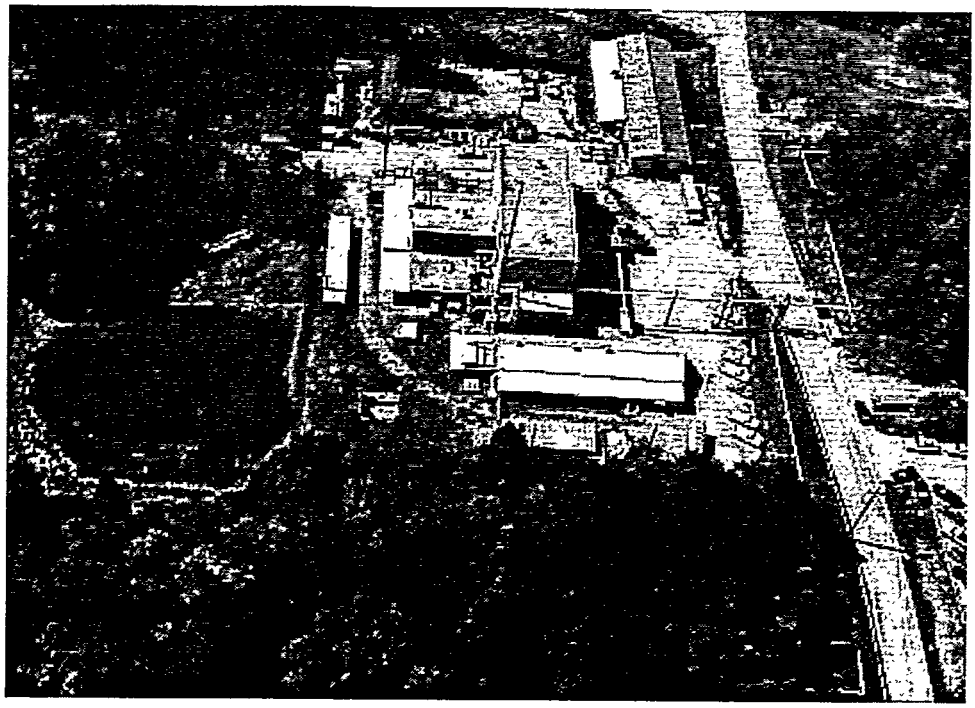
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Mandry, Jerry, December 3, 1996. LMES Facility Manager. Personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9282_93.JPG



UNIT NAME: Homogeneous Reactor Experiment (HRE) Pond (7556)

Unit Number: 09.01

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The Homogeneous Reactor Experiment (HRE) Pond is located in Melton Valley, 0.5 mile (800 m) southeast of the ORNL complex. It is situated south of Building 7500, above Melton Branch. ORNL grid coordinates are N 18,590 ft and E 31,480 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Capacity: 300,000 gal (1,136,000 L). Rectangular shape: 76 x 79 ft (23 x 24 m), and average depth is 12.8 ft (3.9 m). In 1970, the pond was filled, graded, and sprayed with weed killer before a top layer of crushed stone and asphalt was applied. (Ford et al 1992)

Dates Operated: Site commissioned: 1955 (began operation in 1958). Taken out of service: 1962. (Ford et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Early in the HRE program, the pond received slightly contaminated condensate from the waste evaporator, located in Building 7502. Later, the most significant flow into the pond came from shielding water discarded after use from the reactor shield tank in Building 7500. A water diversion ditch was constructed around the west end of the pond to divert surface runoff. The water was retained in the pond until the activity was met for dumping the waste to the creek. (Ford et al 1992)

Waste Characteristics: Contamination is mainly from Cs-137 and Sr-90, with lesser amounts of Pu-238, Pu-239, Am-241, and Cm-244. (Ford et al 1992)

Release Data: The maximum direct beta-gamma exposure near the pond was 2.2 mrad/h. Eight areas exceeded 0.1 mrad/h. Soil samples showed activity between 0.06 pCi/g and 6.0 pCi/g. Subsurface soil samples showed Cs-137, Co-60, and Sr-90. Alpha-emitting contaminants were Pu-238, Pu-239, Am-241, and Cm-244. All samples contained Sr-90 activity. Radioactivity inside the perimeter of the filled-in pond was not determined, but it was estimated that from 50 to 100 Ci of radioactivity is present in the pond. A more recent study estimated a total inventory in the impoundment fill and sediment of: Sr-90 (75 Ci), Cs-137 (16 Ci), U-234 (3.2 mCi), U-235 (0.5 mCi), U-238 (2.2 mCi), Pu-239 (0.3 mCi), and Co-60 (1.6 mCi). Groundwater monitoring data collected through mid-1985 indicate both beta (primarily H-3 and Sr-90) and alpha contamination. Levels of Ba, Cr, and Pb exceeded drinking water MCLs in some sampling records. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Groundwater

Comments: Contaminated Site Summary Sheets (CSSS) indicates this site was taken out of service in 19610.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002*, ORNL/ER-39.
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

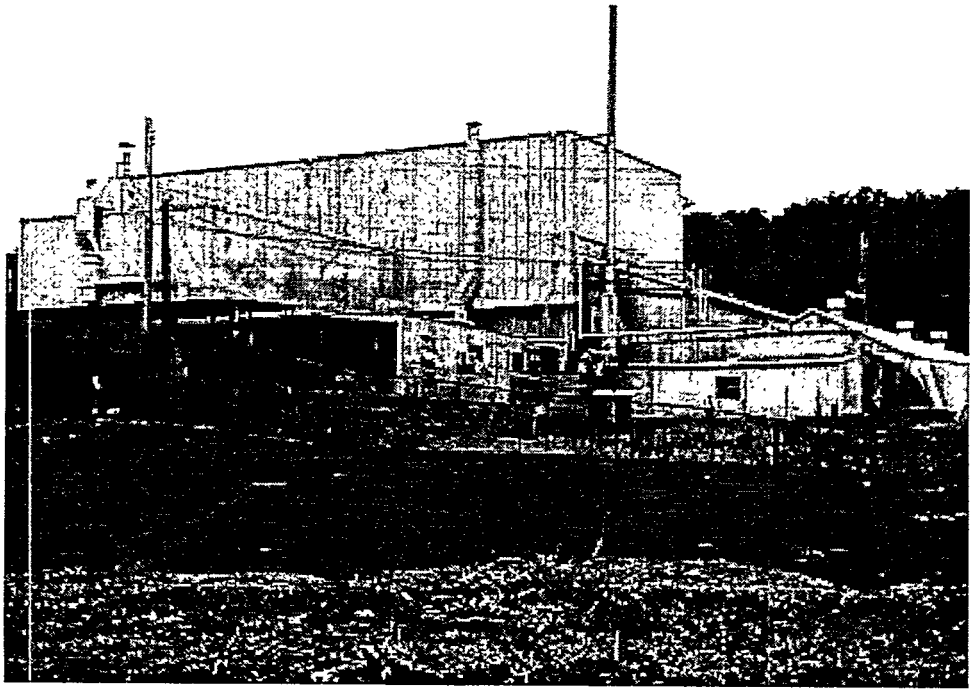
Date Prepared: December 1996

Photo: 05_30.JPG 05_31.JPG; 05_32.JPG; 05_33.JPG









UNIT NAME: Liquid Radioactive Waste Collection and Storage Tank 7560

Unit Number: 09.02A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The 1,000-gal (3,780-L) tank (7560) is located just south of the Waste Evaporator (7502). ORNL grid coordinates are approximately N 18,716 ft and E 31,455 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank 7560 is a small, horizontal, stainless steel tank with an outside diameter of 4.5 ft, a length of 9 ft, and a capacity of ~1000 gal. The tank does not have an interior liner and rests on a concrete pad (6 x 12 x 1 ft) connected by anchor bolts. The tank is limestone backfilled with compacted dirt coverage. (Bechtel et al 1988)

Dates Operated: 1957-1961 (empty since 1961). (Ford et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Tank 7560 was part of the HRE Waste Treatment facilities, serving as an interim storage tank during evaporation of liquid wastes from the HRE. Following shutdown of the HRE, tank 7560 was deactivated. This tank was also used as the clean vapor condensate tank for evaporator associated with HRE-2. All wastes were neutralized prior to placement in either of the tanks to prevent corrosive attack on concrete. (Ford et al 1992)

Waste Characteristics: No analysis of the waste has been reported. Major radionuclides of concern in liquid radioactive waste are considered to be Sr-90, Cs-137, Co-60, and TRU. Various short-half-life radionuclides and some uranium or plutonium isotopes may also be contained in the waste. Initial chemical analysis of liquid radioactive waste indicates that radionuclides are of greater concern than hazardous waste constituents. (ORNL 1990)

Release Data: Some spills occurred, as evidenced by soil sampling (Sr-90 and Cs-137 contamination). Adjacent dry wells indicate that leakage occurred from the tanks from past radiological characterizations of soil samples. (Ford et al 1992)

Results of a 1987 soil sampling survey near 7560 and 7662 tanks show Cs-137 as the dominant gamma-emitting radionuclide. Highest concentration of Cs-137 reached 590 pCi/g. Results of the EPTC test for eight RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury), for insecticides (Lindane, Endrin, Toxaphene, and Methoxychlor), and two herbicides [2,4-D and 2,4,5-TP (Silvex)] in 13 soil samples indicate that all contaminants were below their respective regulatory levels. In addition, soil samples did not exhibit RCRA hazardous waste characteristics for ignitability, corrosivity, or reactivity. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: The tank was emptied in 1961 following the termination of HRE. (Ford et al 1992) Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning. (Whitehead 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002,* ORNL/ER-39.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc,

Date Prepared: December 1996

Photo: 19_27.JPG



UNIT NAME: Inactive Liquid Radioactive Waste Collection and Storage Tank 7562

Unit Number: 09.02B

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Tank 7562 is located in Melton Valley just north of the Waste Holding Pond (7556) at the Homogenous Reactor Experiment (HRE) Complex. ORNL grid coordinates are approximately N 18,661 ft and E 31,460 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Tank 7562 is an intermediate size, horizontal, stainless steel tank with an outside diameter of 10 ft, length 22.3 ft, and a capacity of 12,000 gal (45,425 L). The tank does not have an inside liner and rests on a concrete pad (13 x 25 x 1.5 ft), with a 1.5 ft layer of limestone fill and earth compaction. (Ford et al 1992)

Dates Operated: 1957-1987. (Ford et al 1992)

Present Function: Not in operation.

Life Cycle Operation: Tank 7562 was part of the HRE Waste Treatment facilities, serving as an interim storage tank during evaporation of liquid wastes from HRE. Tank 7562 was used to store high-level liquid wastes from the HRE facility prior to concentration by the evaporator. Evidence indicates the tank was used as a reservoir for runoff from the decontamination pad at the south of Building 7500. The tank was pumped in 1988 of 1200 gal of aqueous waste (liquid radioactive waste). (Ford et al 1992)

Waste Characteristics: No analysis of the waste has been reported. Major radionuclides of concern in liquid radioactive waste are considered to be Sr-90, Cs-137, Co-60, and TRU. Various short-half-life radionuclides and some uranium or plutonium isotopes may also be contained in the waste. Initial chemical analysis of liquid radioactive waste indicates that radionuclides are of greater concern than hazardous waste constituents. (ORNL 1990) The tank was pumped in 1988 of 1200 gal of aqueous waste (liquid radioactive waste). (Ford et al 1992)

Release Data: There is some indication that spillage occurred during transfer of liquid radioactive waste from the large tank. Soil sampling indicates contamination by Sr-90 and Cs-137. (ORNL 1990)

Surface soil samples (0-15 abd 15-30 cm depths), collected near the 12,000 gal (45,425 L) tank in May 1987, contained 2.9 to 590 pCi/g (dry weight) of Cs-137. No strontium analysis was performed. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Contaminated Site Summary Sheets (CSSS) listed the date tank was taken out of service as 1986. Liquid levels are measured periodically for those tanks that receive nonprogrammatic inputs (inleakage) and the tanks are occasionally pumped to maintain the liquid levels. In addition, the tanks may have retained their contents even after decommissioning.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002*, ORNL/ER-39.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Whitehead, Lynn, November 12, 1996. ORNL Inactive Tank Facilities Manager, personal communication with Anita Parker, Advanced Sciences, Inc,

Date Prepared: December 1996

Photo: 14_14.JPG



UNIT NAME: Trash Area East of HRE Parking Lot

Unit Number: 09.04

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: North of Melton Valley Drive across from Building 7500 (formerly HRE and HRT, now the Nuclear Safety Pilot Plant). Approximate ORNL grid coordinates are N 19,000 ft and E 31,680 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown. (ORNL 1990)

Dates Operated: Unknown. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The site formerly contained an old farm house that was used by HRE-1 and HRE-2 for storage. During the early to middle 1960s, all stored material, some contaminated with radioactivity, was removed for disposal. The farm house was demolished and most of the debris was removed. The site was leveled and converted into a parking lot. Later, the parking lot was expanded and it appears that the visible debris (wood, concrete, plastic) at the east end of the area may have been placed at this site at the time of expansion. Current use of the site includes a parking lot and a storage area for construction materials. (Bechtel et al 1988)

Waste Characteristics: Construction debris, perhaps some waste contaminated with radionuclides. (Bechtel et al 1988)

Release Data: No reported releases; however, some of the construction debris disposed of at this site may have been contaminated with radionuclides. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 9, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Waste Evaporator 7502

Unit Number: 09.05

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: The evaporator is located in Building 7502 on Melton Valley Road, 0.6 mile (1.0 km) southeast of the main ORNL complex. ORNL grid coordinates are N 18,730 ft and E 31,450 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The Waste Evaporator is a ground-level, asbestos-lined, reinforced concrete cell with dimensions of 12 x 12 x 8 ft high and 3 ft thick concrete walls. In 1957 the evaporator was enclosed in Building 7502 along with its instruments and the evaporator pit. (Bechtel et al 1988)

Dates Operated: Site constructed: 1951. Site commissioned: 1958. Taken out of service: 1961. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: During HRE-1 and HRE-2 the evaporator concentrated high-activity waste from tanks 7560 and 7562, respectively, prior to transfer to the liquid radioactive waste handling system. During HRE-1 concentrated waste was transferred from the evaporator to the evaporator loading pit and into a shielded carrier for disposal or further processing; waste passed from the evaporator through an entrainment separator for liquid removal, vapors were condensed and the condensate discharged to a drainage ditch. During HRE-2, wastes were jetted to the evaporator via the waste valve pit. (Bechtel et al 1988)

Waste Characteristics: Wastes from the site are Cs-137, Sr-90, and Co-60. (ORNL 1990)

Release Data: The evaporator cell, chemical processing cell C, and the storage pool also provide a small probability for significant exposure. An estimated 30-40 kg of highly radioactive insoluble corrosion and fission products remain in the process piping. There are no published reports of releases, however the presence of contamination in the evaporator building indicates that some releases may have occurred. (ORNL 1990)

The evaporator itself was not surveyed but other findings indicate past leaks and spills in the area and a strong likelihood that the area within the evaporator cell was also highly contaminated. A surface radiation survey at this site in 1982, revealed extensive soil contamination over a 1600 ft^2 area between Building 7500 and the waste evaporator. (Bechtel et al 1988)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: Bechtel et al (1988) indicates the location is 16 ft east of Building 7500. The CSSS (1990) indicates the facility was intended for three phases of experimentation. Due to accelerated corrosion during the first experiment, the second and third experiments were never begun however, Bechtel et al indicates a fall operational history of the evaporator from 1951 - 1961 as described above. This site was included in a CERCLA remedial investigation and will be remediated in accordance with the FFA.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 9, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

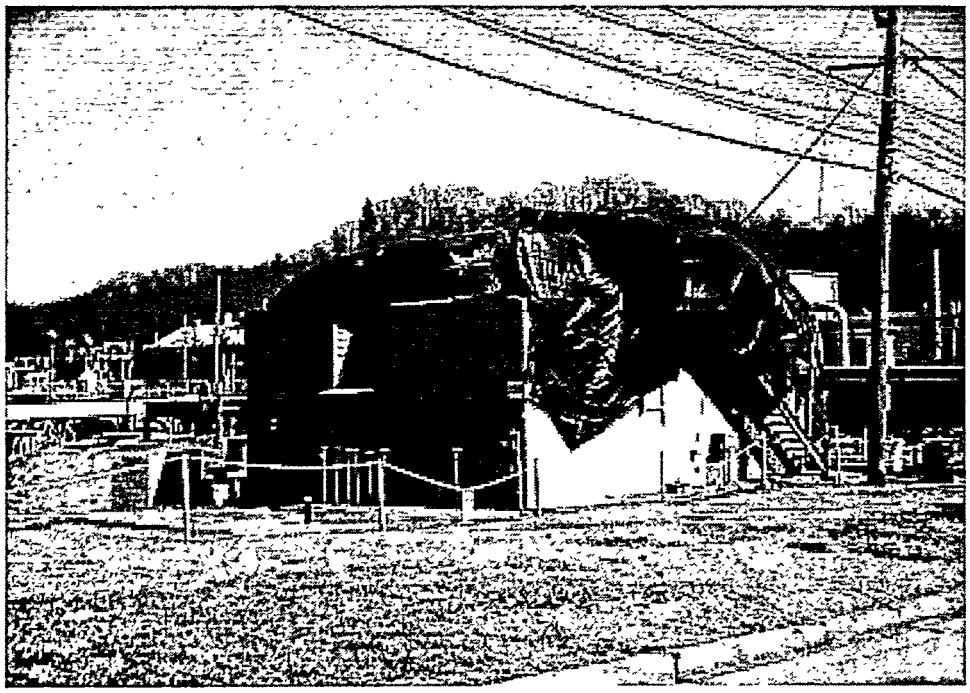
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_18.JPG



UNIT NAME: Waste Evaporator Loading Pit (HRE) 7558

Unit Number: 09.06

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Located outside and adjacent to the east wall of the Waste Evaporator (7502). (Bechtel et al 1988) ORNL grid coordinates are N 18,740 ft and E 31,460 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Pit is 6-ft by 6-ft by 10.5-ft deep. (ORNL 1990)

Dates Operated: 1951-1954, 1958-1961. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: During HRE-1, the pit was used to transfer concentrated high-activity waste from the evaporator into a shielded carrier which was then transported offsite for treatment and disposal. (Bechtel et al 1988)

Waste Characteristics: Pit is contaminated. Major radionuclides are probably Sr-90, Cs-137, and Co-60. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: RCRA/CERCLA (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Groupings 9, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

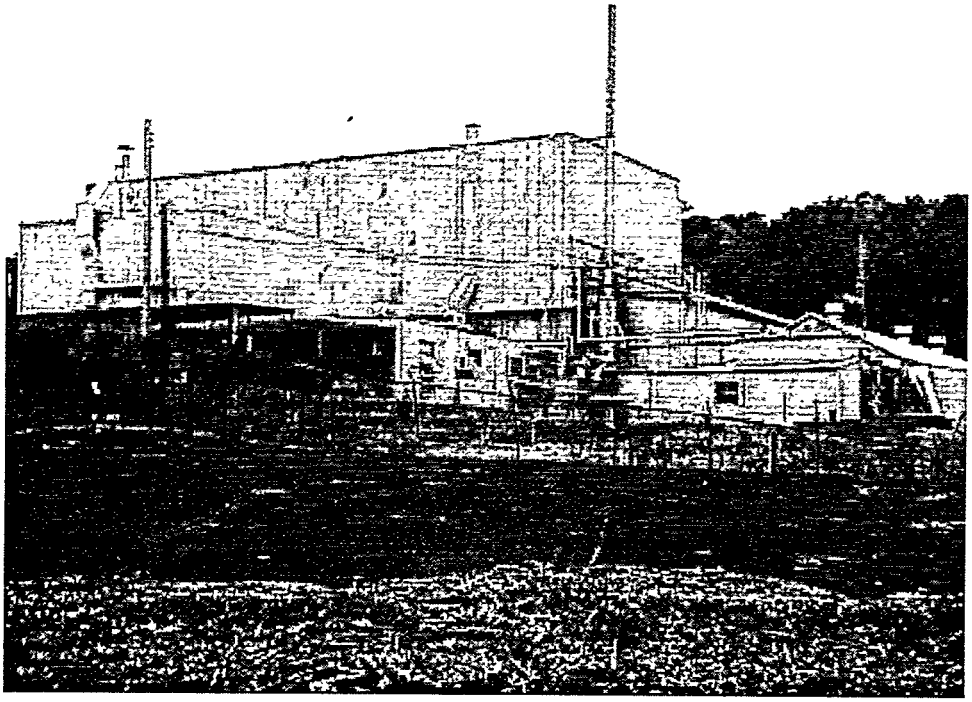
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_18.JPG (Facility picture)



UNIT NAME: Homogenous Reactor Experiment (HRE) Cooling Tower 7554

Unit Number: 09A.01A

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Cooling tower is located southwest of Building 7500. ORNL grid coordinates are N 18,700 ft and E 31,210 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown. (ORNL 1990)

Dates Operated: 1958 - 1961. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: Used to reject heat from the air conditioning system for Building 7500. (ORNL 1990) Provided auxiliary dissipation for the HRE. The cooling tower is a wooden water-to-air heat exchanger. (Ford and Holder 1992)

Waste Characteristics: Unknown. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA/SF (ORNL 1990)

Media of Concern:

Comments: This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division. Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_26.JPG


DODGE RAM

UNIT NAME: Hydrofracture Experimental Site 1 (HF-S1)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel 1990)

Unit Location: The site used for the first experimental injection was south of Lagoon Road in an area called the Four Acre Site. This location is within the boundary of WAG 7. ORNL grid coordinates for the injection well are N 18,920 ft and E 25,890 ft. (Ford et al 1992)

Approximate Dimensions and Capacity: The hydrofracture units are comprised of two different entities: the surface facilities (well heads, waste tanks, solids tanks, etc.) and the grout sheets in the subsurface (including associated wells). The hydrofracture experimental site 1 (HF-1) consists of an injection well cased with 3.5-in. (9-cm) casing to a depth of 300 ft (91 m). The injection was performed at a depth of 290 ft (88 m). A total of 27,000 gal (102,200 L) of grout was injected. (ORNL 1990)

Dates Operated: Injection occurred October 16, 1959. (Ford et al 1992)

Present Function: The site is presently abandoned and covered with small pine trees, but most bench marks and some well castings are still visible. The site is fenced with warning signs in place. (Ford et al 1992)

Life Cycle Operation: This site was first used for studies in relation to the seepage pits and trenches in 1955. A groundwater tracer test was conducted and wells were drilled for that purpose. On October 15, 1959, a slot was cut in the well 73 casing, and the fracture was initiated with water. The next day, 27,000 gal of grout was injected using 35 Ci of Cs-137 and 8.7 Ci of Ce-114 at a depth of 290 ft. Then 400 gal of water was used to flush the injection well of the last of the grout. (Ford et al 1992)

Waste Characteristics: Waste injected was water tagged with 35 Ci of Cs-137 and 8.7 Ci of Ce-141. Grout consisted of diatomaceous earth and cement. No liquid radioactive waste was used. No hazardous waste constituents should have been present in the grout. (ORNL 1990)

Release Data: Grout was observed flowing at a very slow rate from the 3-in core hole 200 m north of the injection well, until about 200 gal of grout had come out in a few hours. The next morning, clear water was flowing out and continued to flow at a decreasing rate for 2 months. The grout and the soil around the well were dug up a few days later, after the grout had set, and were disposed of in SWSA 5. (Ford et al 1992)

The 1987 airborne radiation survey revealed Ce-144 has decayed to trivial levels and Cs-137 has decreased to about 18 Ci. A follow-up surface survey in March 1988 indicated the injection wellhead showed highly elevated gamma readings of up to 75 mR/h on contact. Also, one large contaminated area encompassing 613 ft^2 was found to have levels of gamma radiation from 0.01 to 20 mR/h at the ground service. Approximately 100 small, spotty areas with elevated surface gamma exposure rates ranging from 25 µR/h to 1 mR/h were found within an approximate 300-ft radius of the injection wellhead. (Ford et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: WAG 10 addresses only the subsurface facilities including wells and grout sheets. Surface facilities are included in the WAG on which they are located.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc., March 1990. *Remedial Investigation Implementation Plan for ORNL WAG 10, Oak Ridge National Lab, Remedial Investigation/Feasibility Study,* ORNL/RAP/Sub-87/99053/6 & R2, ES/ER-4 & D1, Oak Ridge, Tennessee.

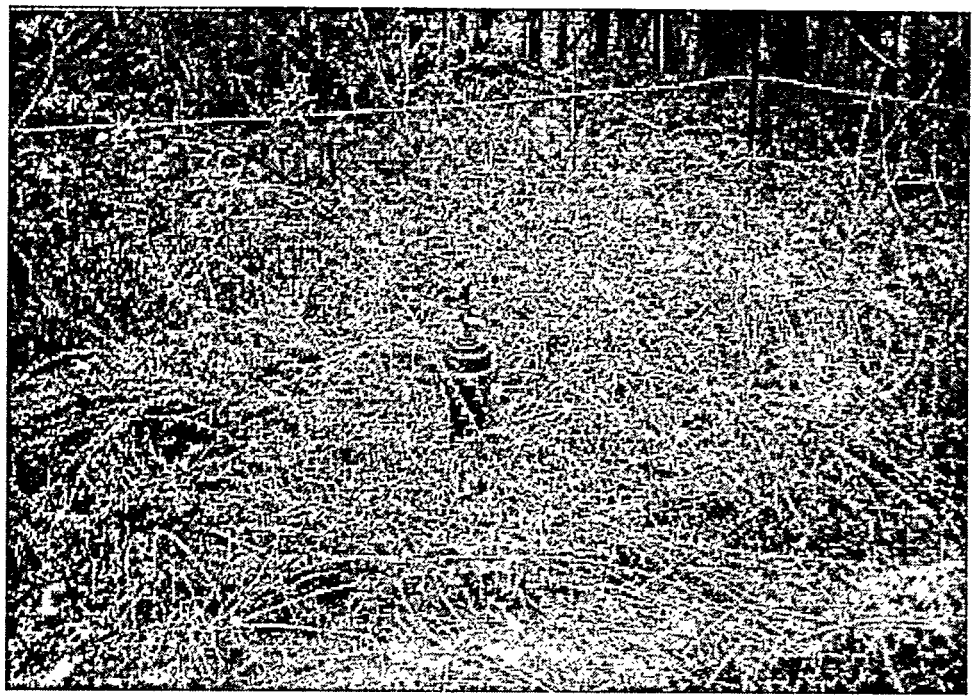
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002,* ORNL/ER-39, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_05.JPG



UNIT NAME: Hydrofracture Experimental Site 2 (HF-S2)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel 1990)

Unit Location: The site is in Melton Valley, about 0.5 mile (800 m) south of the 7500 (experimental reactor) Area. The injection well was cased with 4.5-in. (11-cm) casing to a depth of 1,050 ft (320 m). ORNL grid coordinates for the injection well are N 16,817 ft and E 31,260 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The hydrofracture units are comprised of two different entities: the surface facilities (well heads, waste tanks, solids tanks, etc.) and the grout sheets in the subsurface (including associated wells). Hydrofracture Experimental Site 2 consists of two separate injections. Grout volumes injected were 91,600 and 132,700 gal (346,745 and 502,325 L), respectively. Injection depths were 934 ft (284 m) and 695 ft (212 m). (ORNL 1990)

Dates Operated: The injection occurred September 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The second hydrofracture experiment was designed to duplicate in scale an actual disposal operation. However, radioactive tracers were used instead of actual waste. (ORNL 1990)

Waste Characteristics: Water tagged with Cs-137 (50 Ci for the two injections), cement, and bentonite were used in formulating the grout. No nonradioactive hazardous constituents should be contained in the grout. The volume of grout injected was 224,000 gal. (Bechtel 1990)

Release Data: No releases or spills have been reported. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site description applies to solidified grout and contaminated rock layered between or surrounding the grout sheets. (Bechtel 1990) WAG 10 addreses only the subsurface facilities including wells and grout sheets. Surface facilities are included in the WAG on which they are located.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

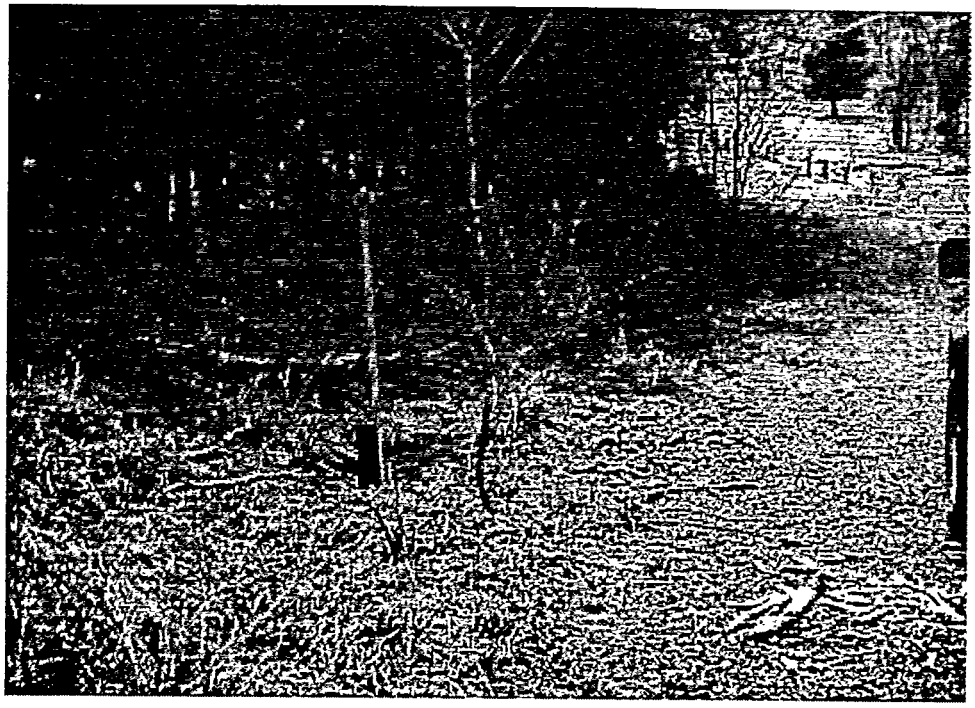
Bechtel National, Inc. March 1990. *Remedial Investigation Implementation Plan for ORNL WAG 10, Oak Ridge National Lab, Remedial Investigation/Feasibility Study*, ORNL/RAP/Sub-87/99053/6&R2, ES/ER-4&D1, Oak Ridge, Tennessee.

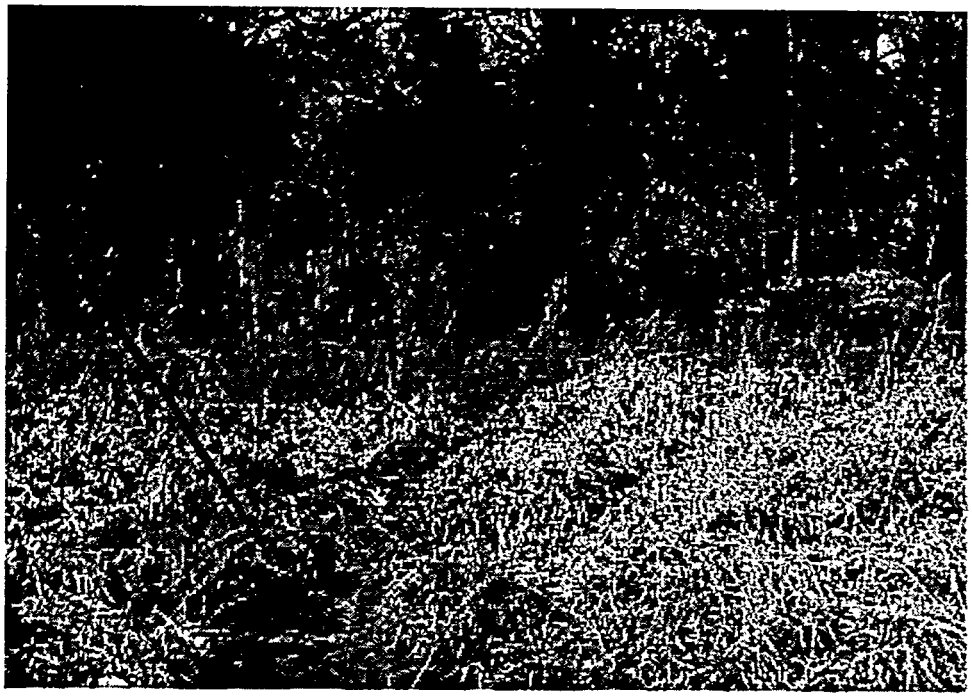
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_27.JPG; 13_28.JPG





UNIT NAME: Old Hydrofracture Facility (HF-3)

Unit Number: 10.03A (Old Hydrofracture Facility Grout Sheets)

Project Status: Site Characterization (Bechtel 1995)

Unit Location: The Old Hydrofracture Facility (OHF) is located 1.0 mile (1.8 km) southwest of the main ORNL complex and west of SWSA 5. ORNL grid coordinates are N 17,155 ft and E 28,617 ft. The grout sheets are located at depths of 300-100 ft (90 - 300 m) below the ground surface. (ORNL 1990)

Approximate Dimensions and Capacity: The hydrofracture units are comprised of two different entities: the surface facilities (well heads, waste tanks, solids tanks, etc.) and the grout sheets in the subsurface (including associated wells). The Old Hydrofracture Facility (HF-3) consists of a total of 25 injections. The first 7 were experimental or pilot injections followed by 18 production type injections. Injections ranged in depth from 784 ft to 945 ft.

Dates Operated: 1964 - 1980 (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: The facility served as a pilot plant to demonstrate the feasibility of permanent disposal of liquid radioactive waste in impermeable shale formations by hydrofracture methods. (ORNL 1990)

Waste Characteristics: A total of 645,000 Ci of activity were injected at OHF 3 between 1966 and 1979. Waste used in the experiments was evaporator concentrated liquid radioactive waste transferred from the Bethel Valley waste storage tanks. Eleven experimental injections were conducted from 1963 - 1965. Eighteen operational injections were conducted from 1966 -1979. A total of 2.3 x 10^6 gal of grout were injected. The grout contained 40,076 Ci of Sr-90, 609, Ci-118 of Cs-137, Ci-233 of Cm-244, and 5.8 Ci of TRU. (Bechtel 1990)

Release Data: There were no reported surface releases of grout, with the exception of an incident in which it was necessary to divert grout to the OHF waste pit until it could be retrieved and pumped down the well. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: This SDDS combines the Hydrofracture Experimental Site 3 and the Old Hydrofracture Facility Grout Sheets (10.03A). Contaminated Site Summary Sheet (CSSS) (ORNL 1990) indicated date commissioned as 1963. Additional information can be found in Bechtel 1995a & 1995b. WAG 10 addresses only the subsurface facilities including wells and grout sheets. Surface facilities are included in the WAG on which they are located.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc., March 1995a *Site Characterization Summary Report for Waste Area Grouping 10 Wells at the Old Hydrofracture Facility, Oak Ridge National Laboratory,* Oak Ridge, Tennessee, prepared for the U.S. Department of Energy, ORNL/ER/Sub/87-99053/78.

Bechtel National, Inc., December 1995b *Site Characterization Summary Report for Waste Area Grouping 10 Wells at the Old Hydrofracture Facility, Oak Ridge National Laboratory,* Oak Ridge, Tennessee, prepared for the U.S. Department of Energy, DOE/OR/01-1437&D2, ORNL/ER-299.

Bechtel National, Inc. March 1990. *Remedial Investigation Implementation Plan for ORNL WAG 10, Oak Ridge National Lab, Remedial Investigation/Feasibility Study*, ORNL/RAP/Sub-87/99053/6&R2, ES/ER-4 & D1, Oak Ridge, Tennessee.

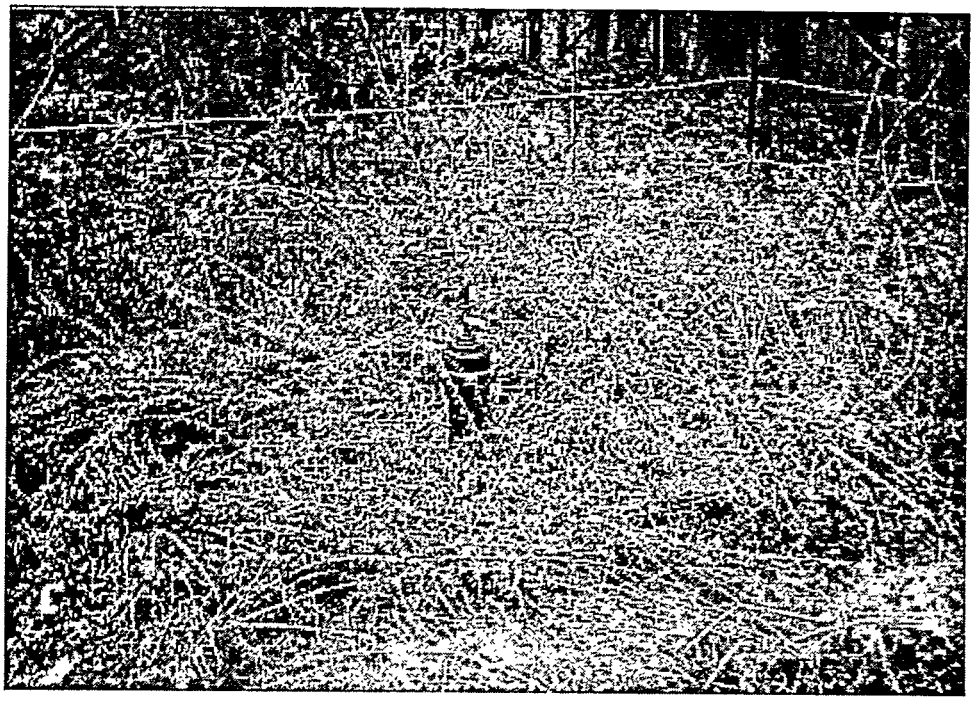
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, Prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_05.JPG



UNIT NAME: New Hydrofracture Facility

Unit Number: 10.04

Project Status: Remedial Site Evaluation (Bechtel et al 1996)

Unit Location: The New hydrofracture Facility (NHF) is located 900 ft (300 m) southwest of OHF, on the south side of Melton Branch. The grout sheets are located at depths of 300 - 1000 ft. (90 - 300 m) below the ground surface. The injection well is located at ORNL grid coordinates N 16,502 ft and E 28,178 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The hydrofracture units are comprised of two different entities; the surface facilities (well heads, waste tanks, solids tanks, etc.) and the grout sheets in the subsurface (including associated wells). The New Hydrofracture Facility (10.04) consists of a injection well within a 5.5 in. diameter casing; the well is 1,069 ft (326 m) deep. Injections occurred at depths between 990 ft (300 m) and 1,069 ft. (Bechtel et al 1996)

Dates Operated: Test injection: 1974. Site commissioned: 1982. In December 1982, the injection well failed and was placed back in operation in 1983. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The facility was constructed to replace the OHF and serve as the operational liquid radioactive waste disposal system for ORNL. The NHF was designed to inject about 14,000 gal of grout per injection, although actual grout and waste injections averaged about 220,000 gal for each of the 13 injections. The facility operated in a batch mode, in which solids were blended in blending tanks and then stored in bulk storage tanks prior to being mixed with waste and subsequent injection. The grout sheets are thin (1 in) layers of solidified cement-based liquid radioactive waste slurry that was injected into the underground geologic structure. The fracture was initiated by pumping water under pressure into a slot cut into the injection well casing. The grout was then pumped into the formation and allowed to harden. One experimental injection was conducted in 1982 and 13 operational injections were conducted from 1982 - 1984. (Bechtel et al 1996)

Waste Characteristics: Waste used in the injections was concentrated liquid radioactive waste and sludge removed from the gunite tanks in the South Tank Farm (SWMU 1.26A-F). During the period of operation, one experimental injection (water plus tracer) and 13 operational injections were conducted. A total of 2.9 million gal (1.1×10^7 L) of grout was injected. The grout contained 644,000 Ci of Sr-90, 83,800 Ci of Cs-137, 7,500 Ci of Cm-244, 2,100 Ci of TRU, and 13,300 Ci of other nuclides. (Bechtel et al 1996)

Release Data: No releases were reported during operations. In 1984, three deep monitoring (DM) wells were dug, and contaminated water was found in two of the wells (Sr-90 up to 140,000 Bg/L, Co-60 up to 180 Bg/L, Tc-99 up to 8.3 Bg/L and Cs-137 up to 1,100 Bg/L). Depths at which the contamination was observed are approximately the depths at which some of the NHF grout sheets occur. The NHF is now inactive, and closure of the facility is being planned. (Bechtel et al 1996)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: This combines Hydrofracture Experimental Site 4 and New Hydrofracture Facility (7860) (SWMU 10.04) Additional information can be found in Bechtel 1990. WAG 10 addresses only the subsurface facilities including wells and grout sheets. Surface facilities are included in the WAG on which they are located.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/OGDEN/PEER, August 1996. *Remedial Site Evaluation Report for the Waste Area Grouping 10 Wells Associated with the New Hydrofracture Facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee,* 2 volumes, DOE/OR/01-1471/V1 &D1 Evaluation Interpretation, and Data Summary, DOE/OR/01-1471/V1 &D1 - Volume 2: Field Activities and Well Summaries.

Bechtel National, Inc. March 1990. *Remedial Investigation Implementation Plan for ORNL WAG 10, Oak Ridge National Lab, Remedial Investigation/Feasibility Study*, ORNL/RAP/Sub-87/99053/6&R2, ES/ER-4 & D1, Oak Ridge, Tennessee.

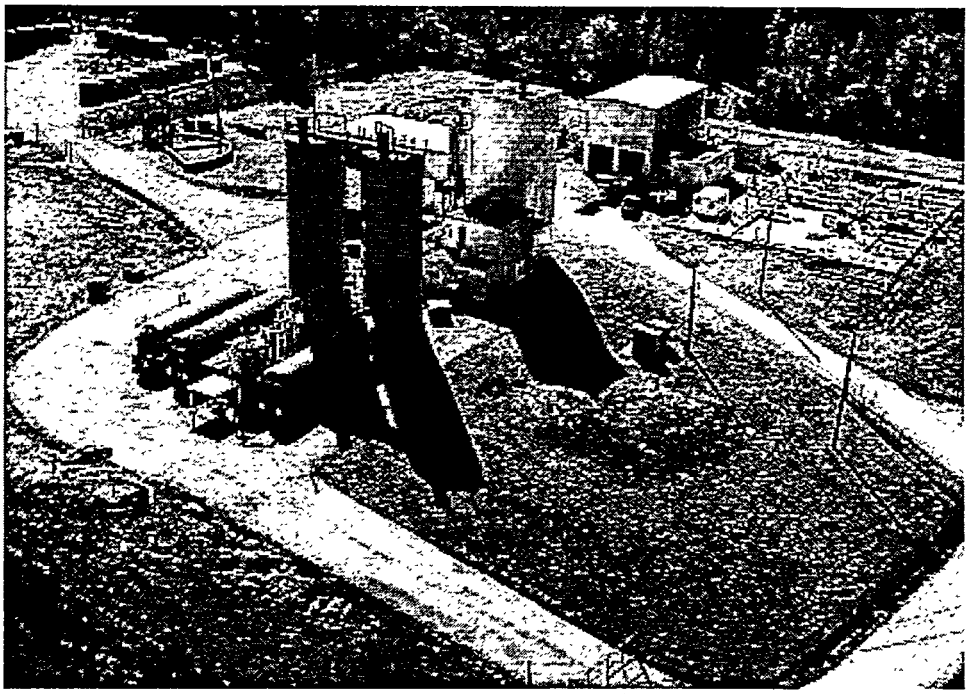
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

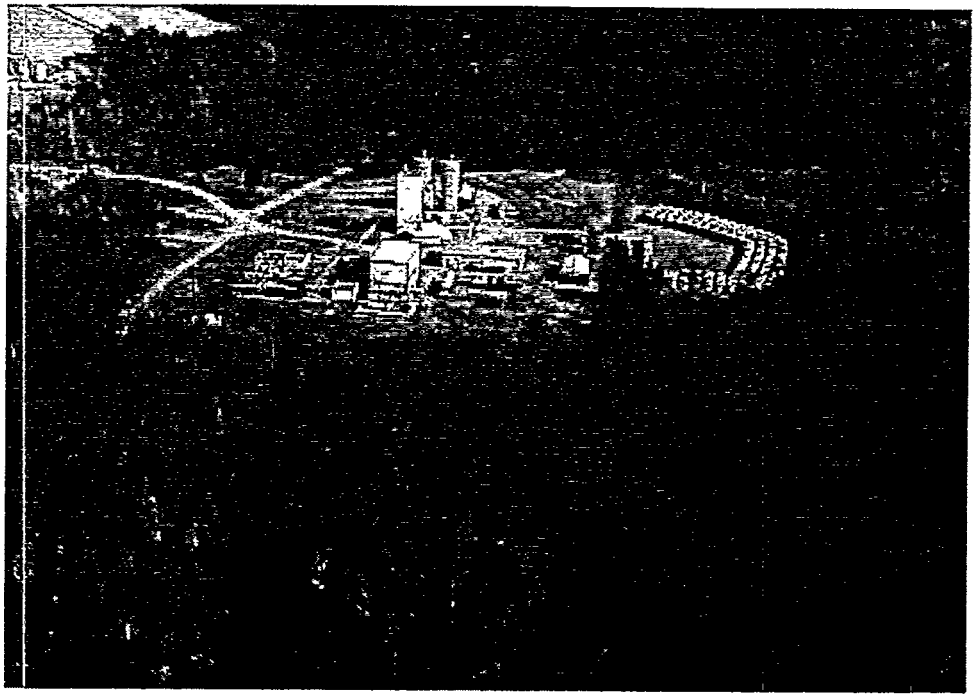
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

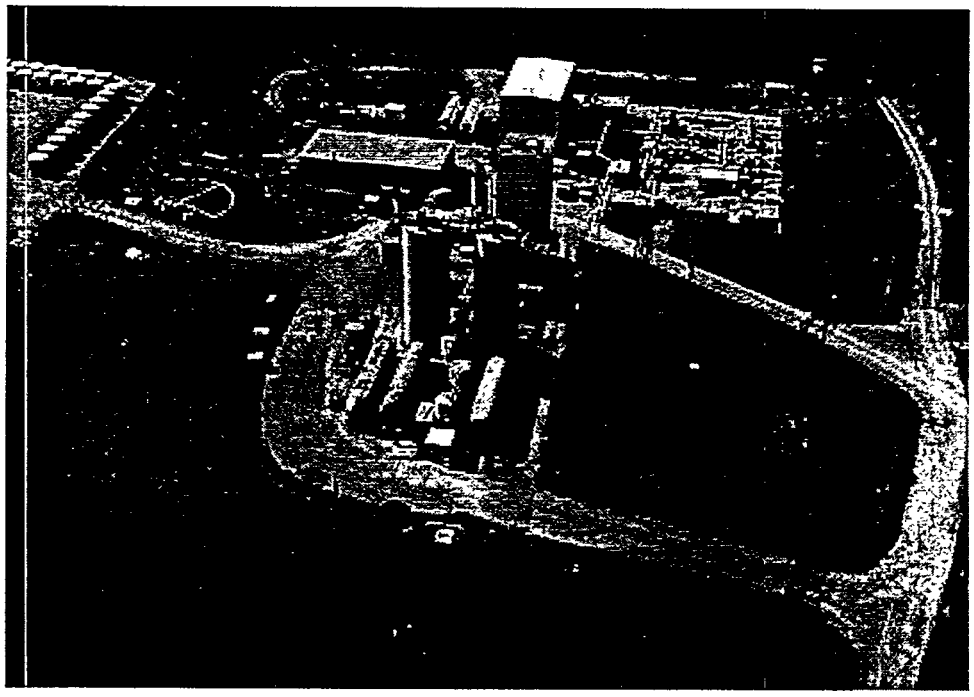
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 9946_88.JPG; 10612_92; 11366_91.JPG







UNIT NAME: New Hydrofracture Facility Grout Sheets (7860)

Unit Number: 10.04A

Project Status: Remedial Site Evaluation for monitoring wells completed 1996. (ORNL 1996)

Unit Location: The new hydrofracture facility is located 900 ft (300 m) southwest of OHF on the south side of Melton Branch. (ORNL 1990) The grout sheets are located at depths of 300-1000 ft (90 - 300 m) below the ground surface. (Bechtel 1990) ORNL grid coordinates of N 16,502 ft and E 28,178 ft.

Approximate Dimensions and Capacity: The hydrofracture units are comprised of two different entities; the surface facilities (well heads, waste tanks, solids tanks, etc.) and the grout sheets in the subsurface (including associated wells). The New Hydrofracture Facility Grout Sheets consist of grout sheets which are thin (1 in) layers of solidified cement-based liquid radioactive waste slurry that was injected into the Pumpkin Valley Shale.
(Bechtel et al 1996)

Dates Operated: 1974-1985.

Present Function: Not in operation.

Life Cycle Operation: The facility was constructed to replace the OHF and serve as the operational liquid radioactive waste disposal system for ORNL. The fracture was initiated by pumping water under pressure into a slot cut into the injection well casing. The grout was then pumped into the formation and allowed to harden. One experimental injection was conducted in 1982 and 13 operational injections were conducted from 1982 - 1984. (Bechtel et al 1996)

Waste Characteristics: Waste used in the injections was concentrated liquid radioactive waste and sludge removed from the gunite tanks in the South Tank Farm. During the period of operation, one experimental injection (water plus tracer) and 13 operational injections were conducted. A total of 2.9 million gal (1.1×10^7 L) of grout was injected. The grout contained 644,000 Ci of Sr-90, 83,800 Ci of Cs-137, 7,500 Ci of Cm-244, 2,100 Ci of TRU, and 13,300 Ci of other nuclides. (Bechtel et al 1996)

Release Data: No releases were reported during operations. In 1984, three deep monitoring (DM) wells were dug, and contaminated water was found in two of the wells (Sr-90 up to 140,000 Bg/L, Co-60 up to 180 Bg/L, Tc-99 up to 8.3 Bg/L and Cs-137 up to 1,100 Bg/L). Depths at which the contamination was observed are approximately the depths at which some of the NHF grout sheets occur. The NHF is now inactive, and closure of the facility is being planned. (Bechtel et al 1996)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: This SDDS combines the Hydrofracture Experimental Site 4 with the New Hydrofracture Facility Grout Sheets. WAG 10 addresses only the subsurface facilities including wells and grout sheets. Surface facilities are included in the WAG on which they are located.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/OGDEN/PEER, August 1996. *Remedial Site Evaluation Report for the Waste Area Grouping 10 Wells Associated with the New Hydrofracture Facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee,* 2 volumes, DOE/OR/01-1471/V1 &D1 Evaluation Interpretation, and Data Summary, DOE/OR/01-1471/V1 &D1 - Volume 2: Field Activities and Well Summaries.

Bechtel National, Inc. March 1990. *Remedial Investigation Implementation Plan for ORNL WAG 10, Oak Ridge National Lab, Remedial Investigation/Feasibility Study*, ORNL/RAP/Sub-87/99053/6&R2, ES/ER-4 & D1, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: White Wing Scrap Yard (XD0751)

Unit Number: 11.01

Project Status: Record of Decision for Interim Action (ORNL 1994)

Unit Location: White Wing Scrap Yard (WWSY) is located in the McNew Hollow area on the western edge of East Fork Ridge. It is one mile east of the junction of White Wing Road (Highway 95) and the Oak Ridge Turnpike. ORNL grid coordinates are N 34,500-N 35,800 ft and E 27,500-E 29,250 ft. (Ford et al 1992)

Approximate Dimensions and Capacity: The area covers about 30.4 acres (12 ha). (Ford et al 1992)

Dates Operated: Site commissioned: early 1950s. Taken out of service: 1964. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Hot Yard Road divides the area into north and south components, the northern used by the Oak Ridge K-25 Site and the Oak Ridge Y-12 Plant and the southern by ORNL. No description exists for the materials stored by ORGDP and Y-12. The material stored by ORNL (estimated to be 500,00 ft^3) was reported to consist of 10 x 40-ft mild steel tanks, dump trucks, two pieces of earth-moving equipment (one weighing 22 tons), large glass-lined tanks, walk-in hoods, support frames, steel and stainless steel, and aluminum of many sizes and shapes. During active use, the north part was enclosed by a chain link fence and the south portion with barbed wire fence. In 1966, efforts were begun to clean up the area, and these fences were removed. Contaminated scrap materials were removed and buried in SWSA 5, and the uncontaminated material was sold to a contractor for scrap recovery. Site cleanup continued until March 1970, and in October 1970, removal of about 6000 yd^3 of contaminated soil from the southern portion of the site was initiated, however, some scrap metal, concrete, and other waste remains at the site. (Ford et al 1992)

Waste Characteristics: About 0.05 lb (25 g) of Pu-239 was estimated to be on or in the material from ORNL that was stored at the site. No records are available on wastes from the other Oak Ridge plants. (ORNL 1990)

Release Data: In 1971, a radiation survey detected 0.8 to 6.0 mR/h gamma exposure rate and 0.5 to 4.0 mR/h exposure rate for Cs-137. An aerial survey in 1974 indicated the presence of Cs-137 (estimated at 25 to 100 mCi), Th-234, and U-235. (ORNL 1990)

In 1989, a scoping survey revealed that many pieces of debris at the site are contaminated. (Ford et al 1992)

Groundwater samples were taken from selected piezometer wells in WAG 11. Most of the valves obtained from the downgradient wells are not significantly above those observed in the upgradient well; however, the concentration of chromium in the upgradient well is above the National Interim Primary Drinking Water Standard. Analysis of groundwater samples for volatile and semivolatile organics established the presence of three volatile contaminants, methylene chloride, trichloroethylene, and acetone at concentrations of 6 ppb, 184 ppb, and 23 ppb respectively. Only methylene chloride was detected in more than one sample. Concentrations of all the semivolatile organics were below detection limits. The concentration of trichloroethylene was significantly above the recently determined allowable limit of 5 ppb in drinking water. Previous radiological surveys detected surface radiation levels up to 5 mrad/h; however, the source of these "hot spots" remains undetermined. Based on the results from previous scoping studies it appears that WAG 11 is not a significant source of releases of hazardous constituents. There remain, however, uncertainties concerning the source of elevated levels of Cr, Cd, some organic contaminants, and surface radiation "hot spots". Further investigations are needed to resolve these concerns. Two additional findings of significance in a 1989-90 survey of the area are (1) the presence of buried 55-gal metal drums and (2) elevated concentrations of PCBs (~10 ppm total PCBs) in three soil samples collected from a region of dead vegetation. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: A Record of Decision for Interim Action was completed in July 1994. (ORNL 1994) Contaminated Site Summary Sheets (CSSS) indicates the area is ~ 20 acres.

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13,1996), Oak Ridge, Tennessee.

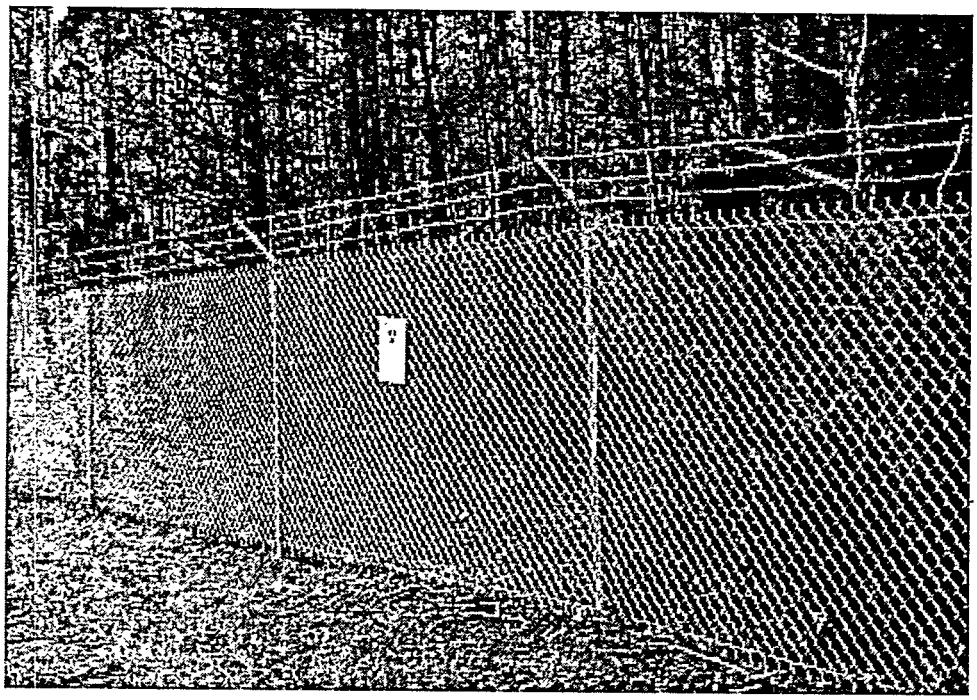
Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002,* ORNL/ER-39.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, July 1994. *Interim Remedial Action Post Construction Report for Waste Area Grouping 11,* ORNL/ER-236 D2, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 25_09.JPG



UNIT NAME: Cesium-137 Contaminated Field (0800)

Unit Number:

Project Status: Interim Record of Decision, 1993 (ORNL 1994)

Unit Location: These areas are located about 330 ft (100 m) north of the Clinch River at Clinch River Mile 20.5 (CRK 32.8). Grid coordinates are N 17,480 ft and E 20,370 ft. (ORNL 1987)

Approximate Dimensions and Capacity: The 0800 Area is a 50-acre (20-ha) fescue-dominated field. Contained within the field is a 5-acre (2-ha) fenced area with four smaller enclosures contaminated with Cs-137. (ORNL 1987)

Dates Operated: Site commissioned: 1966

Present Function: Not in operation.

Life Cycle Operation: The area was set aside to study simulated fallout of Cs-137, which would occur in the event of a nuclear war. (ORNL 1987)

Waste Characteristics: The contaminant consisted of Cs-137 fused at high temperature to silica particles. Each of the four enclosures received about 2.2 Ci of radioactivity, for a total of 8.8 Ci. After 20 years (since contamination), about 5.5 Ci of activity should remain. (ORNL 1987)

Release Data: Radiation walkover study has been completed for this site. A surface radiological investigation was conducted at the 0800 Environmental Research Area between June 1987 and March 1988. Outside the fenced area, radiation levels were measured at 23 points on the Clinch River and 9 points along the riverbank. Gamma exposure rates on the river and Jones Island rarely exceeded background. Along the shoreline, the closest point to the Cs-137 contaminated field approached three times background levels, a value well below the guideline. Thus, this site poses no hazard to the public. Inside the fenced area, the average gamma exposure rate at 1 m above the ground surface was approximately 3 to 4 Mr/h. Maximum exposures exceeded 27 Mr/h at one of the above contaminated enclosure. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Sediment

Comments: Removal Action addressed only the 4 small enclosures. Areas of contamination are still present within the 5-acre fenced area. (Kuhaida 1996)

References:

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory* ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, June 1994. *Interim Remedial Action Post Construction Report for Waste Area Grouping 13,* DOE/OR/01-1218 & D1, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Cesium-137 Erosion/Runoff Study Area (0807)

Unit Number:

Project Status: Interim Record of Decision, 1993 (ORNL 1994)

Unit Location: The site is located on a bearing of E 83 degrees S, about 1.2 miles (2.0 km) from the junction of Bethel Valley Road and State Highway 95. The site is due north of the confluence of White Oak Creek and the Clinch River [0.2 mile (0.3 km)]. Grid coordinates N 16,690 ft and E 21,530 ft. (ORNL 1987)

Approximate Dimensions and Capacity: Total land area contaminated was < 215 sq ft (< 20 sq m). (ORNL 1987)

Dates Operated: Site was contaminated on October 20, 1964.

Present Function: Site is still being studied. (ORNL 1987)

Life Cycle Operation: The objective was to use the field contamination to study runoff, erosion, and infiltration of Cs-137 on a silt-loam soil. (ORNL 1987)

Waste Characteristics: Cs-137 was applied to the soil in a liquid spray. (ORNL 1987)

Release Data: The amount of isotope applied was 15 Mci total. After 21.6 years of decay, 9.15 Mci should remain, providing no losses from the system occurred. (ORNL 1987)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil, Sediment

Comments:

References:

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory* ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 08_17.JPG; 08_18.JPG





3. ORNL SITE DESCRIPTION DATA SHEETS FOR OPERABLE UNITS

UNIT NAME: Corehole 8

Unit Number:

Project Status: Removal Action completed. (FFA 1996)

Unit Location: Located in ORNL Main plant area south of the cafeteria (Building 2010). ORNL grid coordinates are N 22,213 ft and E 30,629 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown.

Dates Operated: Not applicable.

Present Function: Not applicable.

Life Cycle Operation: Corehole 8 was drilled as part of the WAG 1 remedial investigation. (Kuhaida 1996)

Waste Characteristics: During the 1991 remedial investigation sampling event, a strontium concentration of 312,050 pCi/L was detected during drilling of the corehole. This was the highest concentration of strontium found at WAG 1. (Bechtel et al 1992)

Release Data: The Corehole 8 contaminated groundwater plume was discovered during groundwater investigations at WAG 1. The plume originally flowed into the ORNL storm sewer system and from there into First Creek. First Creek empties into White Oak Creek which then feeds the Clinch River near ORNL. The source of the contamination in the plume is unknown. (Jacobs Engineering Group, Inc. 1994)

Site Status: CERCLA

Media of Concern: Groundwater, Surface water

Comments: The Removal Action was completed in March 1995. (FFA 1996)

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V2 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC. *Federal Facility Agreement for the Oak Ridge Reservation*, DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Jacobs Engineering Group Inc., September 1994 *Engineering Evaluation/Cost Analysis for the Waste Area Grouping 1 Corehole 8 Removal Action at the Oak Ridge National Laboratory*, DOE/OR/02-1303&D2, Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996, LMES Project Manager, review comment.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

ORNL, July 1995. *Oak Ridge Reservation Federal Facility Agreement Quarterly Report for the Environmental Restoration Program, Volume 3, April - June 1995,* DOE/OR/01-1347/V3, prepared by the Environmental Restoration Program, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 26_05.JPG


STOP

4. ORNL SITE DESCRIPTION DATA SHEETS FOR REMEDIAL SITE EVALUATION AREAS

UNIT NAME: Abandoned Burn Pit

Unit Number: 0.01

Project Status: No activity planned.

Unit Location: Located north of WAG 17 on Chestnut Ridge Road in the area of the Sanitary Waste Compactor. ORNL grid coordinates N 23,100 ft and E 37,950 ft. (ORNL 1990)

Approximate Dimensions and Capacity: No records of the exact dimensions exist. (ORNL 1990)

Dates Operated: Approximately 1959 - 1969. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The site was used to burn combustible trash during early operation of the laboratory. The pit where trash was burned has been backfilled. (ORNL 1990)

Waste Characteristics: Wood, refuse, and combustible construction debris were burned in the pit. However, no records exist of the exact material burned. Reportedly, on two occasions laundry material contaminated with very low levels of radioactivity were burned in the pit. (ORNL 1990)

Release Data: There are no documented releases of hazardous or radioactive materials. However, sampling surveys reported elevated levels of Cd, Cu, Pb, and Zn. Cs-137 activity was detected at 5-15 times background. (ORNL 1990)

Site Status: CERCLA

Media of Concern: Soil

Comments: Previously designated as unit number OS-1. The Sanitary Waste Compactor is currently located at the site. (ORNL 1990)

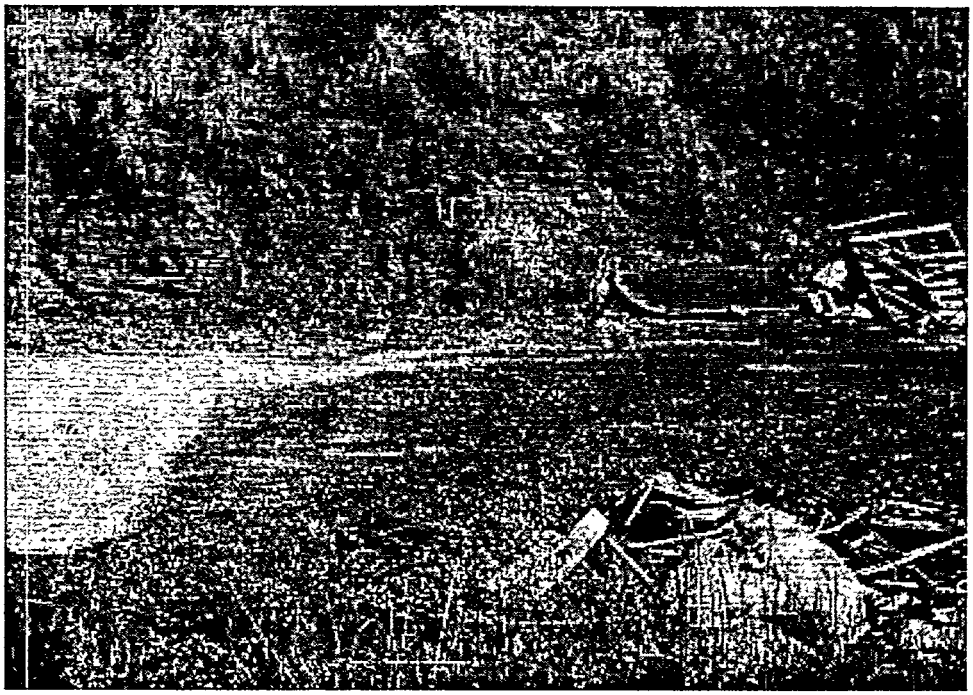
References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_13.JPG



UNIT NAME: C-14 Allocation In White Oak Trees - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located 1.9 miles (3.1 km) on an azimuth of N 25 E from the intersection of Bethel Valley Road and the Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: The area of contamination is reported to be 2150 ft^2 (200 m^2). (Taylor 1986)

Dates Operated: The studies were conducted between 1972 and 1977. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: Two studies were conducted in this area. The purpose of the first was to determine seasonal changes in photosynthate translocation and allocation by following the rates of movement of the C-14 from labeled foliage, and the second was to follow the rate and efficiency of the utilization of food reserves. (Taylor 1986)

Waste Characteristics: In the first study, two were contaminated by foliar tagging using C-14. Each of the two trees received 50 μCi. In the second study, two trees received inoculations of 5 μCi of C-14 sucrose. The half-life of C-14 is 5479 years. (Taylor 1986)

Release Data: Upon completion of the study, tagged trees were removed. One large oak remained; however, all tagged branches were removed from the oak tree. Radiocarbon has a long half-life, but because of the weak beta energy (0.156 Mev) it does not constitute an exposure hazard. As the plant material decomposed, a portion of radiocarbon was dispersed into the atmosphere as carbon dioxide. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-31 is the designated I.D. number. (Taylor 1986)

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: C-14 Allocation In White Pine Trees - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved. (4/10/96). (Salamacha 1996)

Unit Location: Located along a power line right-of-way south of Bethel Valley Road, near the Wallen Branch Embayment of Melton Hill Lake. (Boston 1995) ORNL coordinates are N 22,439 ft and E 45,624 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown.

Dates Operated: Between June and November 1979. (Boston 1995)

Present Function: Not applicable.

Life Cycle Operation: Nine white pine trees were labeled by foliar tagging with a total of 360 μCi of C-14. At the end of the study, the tagged branches were cut and removed. (Boston 1995)

Waste Characteristics: C-14 has a half-life of 5730 years. It is a low energy beta emitter that does not present an exposure hazard. (Boston 1995)

Release Data: A walk over survey in 1995 showed only background radiation levels. No C-14 was detected. Based on the history and survey results, this site does not constitute a radiation hazard. (Boston 1995)

Site Status: CERCLA

Media of Concern:

Comments:

References:

Boston, H.L. September 20, 1995, ORNL Environmental Program Manager, letter to J.T. Sweeny, Program Manager, ORNL Environmental Restoration Division, DOE, Oak Ridge, Tennessee. (Ltr #ER-ORNL-95/208).

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: C-14 Allocation in Woody Biomass Plantation Species - Research Area

Unit Number:

Project Status: No planned activities.

Unit Location: Located at the ORNL site in the Woody Biomass Plantation south of Building 1503. (Taylor 1986) ORNL coordinates are N 21,098 ft and E 29,423 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area of contamination is reportedly 1.25 acres (0.05 ha). (Taylor 1986)

Dates Operated: Unknown

Present Function: Not applicable.

Life Cycle Operation: The study site was used to determine photosynthate allocations. (Taylor 1986)

Waste Characteristics: All labeled material was removed. C-14 was introduced as a gas to foliage contained in exposure cruets. A total of 1 nCi of C-14 carbon dioxide was used in the study. (Taylor 1986)

Release Data: Radiocarbon has a long half-life (5.7×10^3 years) but because of the weak beta energy (0.156 MeV) it does not constitute an exposure hazard. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-34 is the designated I.D. number (ORNL 1987)

References:

Oak Ridge National Laboratory, August 25, 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory,* Addendum, ORNL/RAP-12/V3, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: C-14 Efflux In Yellow Poplar Stand - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: Located at a distance of 1.8 miles on an azimuth of E 76 S from the intersection of Bethel Valley Road and the Melton Road Access Road. (Boston 1995)

Approximate Dimensions and Capacity: The contamination is reported to 2150 ft^2. (Boston 1995)

Dates Operated: The trees were contaminated in 1976. (Boston 1995)

Present Function: Not applicable.

Life Cycle Operation: The purpose of the study was to measure carbon dioxide efflux of the roots through the soil. Following introduction of the C-14 to three trees, the trees were girdled to inhibit upward translocation. (Boston 1995)

Waste Characteristics: A total of 3 mCi of C-14 was inoculated into the three yellow popular trees as a C-14 sucrose. At the end of the study, roots, trees, and/or labeled branches were removed. Radiocarbon has a long half-life, but because of the weak beta energy (0.156 MeV) it does not constitute an exposure hazard. (Boston 1995)

Release Data: A walkover survey was conducted in the spring of 1995 that showed only background radiation levels, with no C-14 detected. Beta-gamma measurements made during this walkover were slightly higher than the average for background soil in this area; however, this effect was deemed to be due to the type of soil and rock in the area rather than to any contamination from residual C-14. Soil samples collected at the site showed no elevated radionuclide levels. Based on the history and survey results, this site does not constitute a radiation hazard. (Boston 1995)

Site Status: CERCLA

Media of Concern:

Comments: ER-33 is the designated I.D. number (Boston 1995)

References:

Boston, H.L., September 20, 1995, ORNL Environmental Program Manager, letter to J.T. Sweeny, Program Manager, ORNL Environmental Restoration Division, DOE, Oak Ridge, Tennessee. (Ltr #ER-ORNL-95/208).

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: C-14 Maintenance-Respiration Study - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: Located a distance of 1.7 miles on an azimuth of N 22 from the intersection of Bear Creek Road and Gum Branch Road. Site is on the north side of Pine Ridge. (Boston 1995)

Approximate Dimensions and Capacity: The area involved in the study was 2150 ft^2. (Boston 1995)

Dates Operated: Twenty trees were contaminated with the C-14 in June of 1983 and another 16 trees on June of 1984. (Boston 1995)

Present Function: Not in operation.

Life Cycle Operation: Thirty-six trees were contaminated with C-14 to study the movement of carbon during the respiration. The isotope was introduced as carbon dioxide. (Boston 1995)

Waste Characteristics: The first group of 20 trees was contaminated by foliar tagging with a total of ~ 1 mCi of C-14, and the second group with 2 mCi. Experimental protocol identifies C-14 labeled branches with tags. All tagged branches were removed upon completion of the study. (Boston 1995)

Release Data: Radiocarbon has a long half-life (5.7×10^3 years), but because of the weak beta energy (0.156 MeV) it does not constitute an exposure hazard. Although radioactive decay would not have significantly reduced the total activity, the walkover survey conducted in April and May of 1995 revealed no detectable C-14. Radiation levels at the site were determined to be within the background range for ORNL. (Boston 1995)

Site Status: CERCLA

Media of Concern:

Comments: ER-29 is the designated I.D. number. (Boston 1995)

References:

Boston, H.L., September 20, 1995, ORNL Environmental Program Manager, letter to J.T. Sweeny, Program Manager, ORNL Environmental Restoration Division, DOE, Oak Ridge, Tennessee. (Ltr #ER-ORNL-95 /208).

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Date Prepared: December 1996

Photo: No Photo Available

UNIT NAME: C-14 Sucrose Inoculation of Oak and Pine Trees - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: This area is 1.8 miles on an azimuth of E 66 S from the intersection of Bethel Valley Road and the Melton Valley Access Road. This research area is located near the Cs-134 contaminated forest. (Boston 1995) ORNL coordinates are N 13,105 ft and E 34,534 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area of contamination is reported to be 1100 ft^2 (101.2m^2). (Boston 1995)

Dates Operated: In October 1972, three trees were inoculated with C-14. (Boston 1995) In 1976, a single White Oak tree was inoculated with C-14 Sucrose. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the study was to determine the spatial and temporal pattern of carbohydrate movement and respiratory use by the root systems of trees. (Boston 1995)

Waste Characteristics: Each of the three trees received 1.65 mCi of C-14, and the fourth tree received 5 mCi (total of 9.95 mCi). (Boston 1995)

Release Data: Radiocarbon has a long half-life (5.7×10^3 years), but because of the weak beta energy (0.156 MeV) it does not constitute an exposure hazard. (Boston 1995)

Site Status: CERCLA

Media of Concern:

Comments: ER-30 is the designated I.D. number. (Boston 1995)

References:

Boston, H.L., September 20, 1995, ORNL Environmental Program Manager, letter to J.T. Sweeny, Program Manager, ORNL Environmental Restoration Division, DOE, Oak Ridge, Tennessee. (Ltr #ER-ORNL-95/208).

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Ca-45 Tagged Forest - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: This site is located 0.45 mile (0.7 km) on an azimuth of W 25 S from the intersection of Bethel Valley Road and State Highway 95. (ORNL 1987)

Approximate Dimensions and Capacity: The extent of the contamination is unknown but is assumed to be less than 2.47 acres (1ha). (Taylor 1986)

Dates Operated: The dogwood trees were inoculated with the Ca-45 (half-life 165 d) on May 4, 1966. (Taylor 1986)

Present Function: Not applicable.

Life Cycle Operation: The purpose of the study was to document the accumulation of calcium by various plant organs and to determine the rate of calcium cycling in the tree-soil system. Twelve dogwood trees were inoculated with amounts of isotope ranging from 0.67 to 2.51 mCi per tree. (Taylor 1986)

Waste Characteristics: The total amount of isotope used in this study was approximately 30 mCi. Sampling of wood, foliage, and plant organs (i.e., flowers, etc.) was conducted. (Taylor 1986)

Release Data: Because all experimental material was removed at the termination of the study and more than 40 half-lives have lapsed since the site was contaminated, no detectable Ca-45 should be present. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-7 is the designated I.D. number. (Taylor 1986)

References:

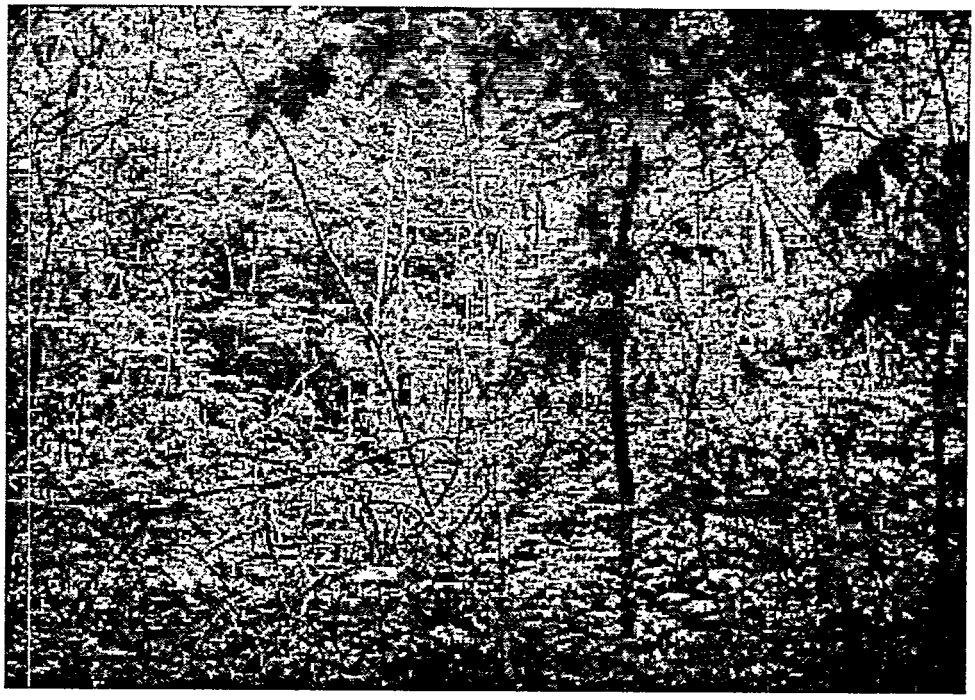
Oak Ridge National Laboratory, August 25, 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory,* Addendum, ORNL/RAP-12/V3, Oak Ridge, Tennessee.

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 22_15.JPG



UNIT NAME: Ca-45 Tagged Soil and Vegetation - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (10/25/94). (Salamacha 1996)

Unit Location: The site is located in an oak/hickory forest on the Walker Branch watershed (Chestnut Ridge), a distance of 2.2 miles (3.6 km) on an azimuth of N 31 E from the intersection of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: Approximately 160 ft^2 (15 m^2) of land surface was included in the experimental plot. (Taylor 1986)

Dates Operated: The radioactivity (Ca-45) was introduced on December 20, 1969. The duration of the study was 72 weeks. (Taylor 1986)

Present Function: Not applicable.

Life Cycle Operation: The site was contaminated with Ca-45 labeled foliage to determine the movement of the isotope into soil and soil-water solution. The method of contamination was to introduce maple leaves containing Ca-45 (from ER-1) to the soil at ER-2. A quantity of contaminated leaves were places in mesh bags and were dispersed at the site. (Taylor 1986)

Waste Characteristics: It is reported that 136 mCi of Ca-45 (half-life 165 d) was contained in the leaves. (Taylor 1986)

Release Data: At the termination of the experiment, all leaves contained in the mesh bags were removed and disposed of. Because the half-life of Ca-45 is only 165 d, no detectable radioactivity from the experiment is present at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-2 was the I.D. number for the Ca-45 Tagged Soil and Vegetation Site. (Taylor 1986)

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_05.JPG



UNIT NAME: Ca-45 Tagged Trees - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (10/25/94). (Salamacha 1996)

Unit Location: This site is located on the Walker Branch watershed on Chestnut Ridge, a distance of 2 miles (3.2 km) on an azimuth of N 24 E from the intersection of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: The contaminated area was probably less than 1.2 acre (0.5 ha). (Taylor 1986)

Dates Operated: The isotope was injected into the trees on June 7, 1969. Leaves were removed and processed prior to December 20, 1969. (Taylor 1986)

Present Function: Not applicable.

Life Cycle Operation: Several red maple trees were inoculated with Ca-45, which was allowed to move in the transpiration stream throughout the tree. Objective was to produce Ca-45 containing leaves for use in experiments at ER-2. (Taylor 1986)

Waste Characteristics: The maples were injected with 1.25 Ci of Ca-45 (half-life 165 d) in solution. (Taylor 1986)

Release Data: Following several days of posttagging, all foliage from the trees was removed, processed, and prepared for use at Site ER-2. Due to the short half-life, all of the remaining Ca-45 at ER-1 will have decayed to nondetectable levels. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-1 was the I.D. number for the Ca-45 Tagged Trees Site. (Taylor 1986)

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_03.JPG



UNIT NAME: Co-60 and Mn-54 Animal Study - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located 0.52 mile (0.8 km) on an azimuth of S 40 W from the intersection of the Oak Ridge Turnpike and the North Perimeter Patrol Road (ORGDP). (Taylor 1986)

Approximate Dimensions and Capacity: The site was a 2.5 acre (1 ha) field. (Taylor 1986)

Dates Operated: In July of 1970, 34 pine voles were gamma-irradiated; of these, 17 were injected with Co-60 and the other 17 were injected with Mn-54 and released into the field. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the experiment was to determine the effects of near-fatal irradiation and natural environmental factors on the retention and excretion of the two nuclides used (Co-60 and Mn-54) in members of a field population. (Taylor 1986)

Waste Characteristics: The animals were injected with a total of 17 µCi of Co-60 (half-life 5.27 years) and 17 µCi of Mn-54 (half-life 0.82 years). (Taylor 1986)

Release Data: Considering that over three half-lives have lapsed in the decay of Co-60, less than 1 µCi of this isotope would remain today provided that all 17 animals remained within the 2.5 acre field. In the case of the Mn-54, radiological decay would have reduced the remaining amount to less than 1 pCi. The amounts of radioactivity present at the site are expected to be much less than these values and this would be undetectable. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-28 is the designated I.D. number. (Taylor 1986) Release data has been updated to reflect 1996 conditions.

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_19.JPG



UNIT NAME: Cr-51 Contaminated Grass Plots - Research Area

Unit Number:

Project Status: No planned activities.

Unit Location: Located in the 0800 area approximately 0.2 mile (0.3 km) on an azimuth of N 6 E of the northeast corner of the 0800 area enclosure. (Taylor 1986)

Approximate Dimensions and Capacity: Twenty-five 10.8 ft^2 (1 m^2) plots were exposed. (Taylor 1986)

Dates Operated: Chromium-51 was applied to the grass plots in July 1976. Duration of the study was nine weeks. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the study was to investigate the interception and retention of simulated cooling tower drift on vegetation (pine, yellow popular, and fescue grass foliage). (Taylor 1986)

Waste Characteristics: The plots were contaminated with an aerosol spray containing Cr-51 (half-life 27.8 d). The 25 exposed plots received a total of 125 μCi of Cr-51. (Taylor 1986)

Release Data: Because Cr-51 has a short half-life and over 7300 days have passed since plots were contaminated, no detectable radioactivity remains at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-22 is the designated I.D. number. (Taylor 1986) Release data has been updated to reflect 1996 conditions.

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Cs-134 Contaminated Grasses - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located in the 0800 area 1.1 miles (1.7 km) on an azimuth of S 18 W from the intersection of State Highway 95 and the New Zion Patrol Road. (Taylor 1986)

Approximate Dimensions and Capacity: Four 8 by 33 ft (2.5 by 10 m) plots totaling 1080 ft^2 (100 m^2) were used in this study. (Taylor 1986)

Dates Operated: Each of the four plots were contaminated in June 1970. The duration of the study was seven weeks. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The study was designed to investigate the interception and retention of Cs-134 contaminated particles on forage and turf grasses. Each of the four study plots contained different grass species. (Taylor 1986)

Waste Characteristics: Each plot received particles contaminated with 307 μCi of CS-134 (half-live 2.06 years); a total of 1.23 mCi of Cs-134 was utilized. (Taylor 1986)

Release Data: The removal of plant materials combined with radioactive decay of the isotope reduced the amount of radioactivity of the site after each sampling period. Considering that nearly thirteen years have lapsed since contamination, approximately 0.2 μCi (total) of Cs-134 would remain if all of the experimental materials had remained at the site. Since all materials were removed, the remaining radioactivity should be negligible.
(Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-17 is the designated I.D. number. (Taylor 1986) The release data has been adjusted to reflect 1996 conditions.

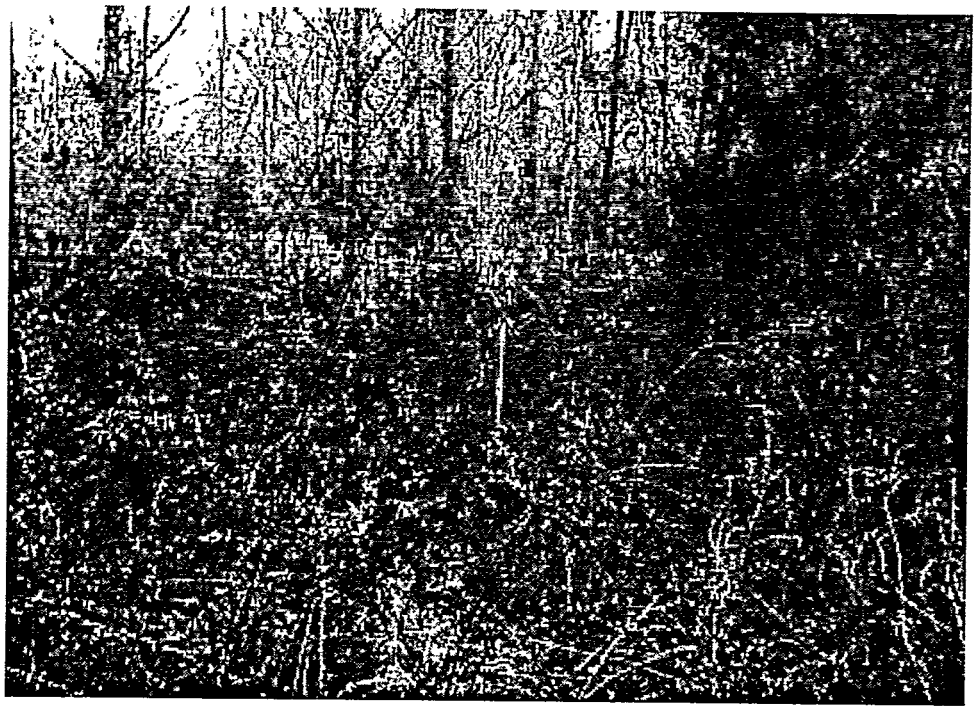
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_33.JPG



UNIT NAME: Cs-134 Contaminated Oak Trees - Research Area

Unit Number:

Project Status: No planned activities.

Unit Location: This site consists of four subsets, each selected to represent a different soil type. Two of the sites (Landisburg and Fullerton) are on the north slope of Chestnut Ridge and azimuths of N 29 E and W 32 N at distances of 2.7 miles (4.4 km) and 1 mile (1.6 km), respectively, from the intersection of Bethel Valley Road and Melton Valley Access Road. The other two sites (Monongahela and Sequoia) are in Melton valley on azimuths of E 30 S and E 36 S at distances of 1.3 miles 2.1 km) and 1.4 miles (2.2 km) from the intersection of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: Each of the four sites covers an area of less than 550 ft^2 (50 m^2). (Taylor 1986)

Dates Operated: The trees were injected with Cs-134 in April of 1960. Two trees were double-tagged by injection with K-42. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The study was conducted on 12 White Oak trees at 4 sites on contrasting soil types and moisture conditions. Throughout the growing season leaves were collected and analyzed for radionuclide distribution. (Taylor 1986)

Waste Characteristics: All trees in the study were injected with 2 mCi of Cs-134 (half-life 2.05 years), and two trees in each plot were injected with 2 mCi of K-42 (half-life 12.4 h). Total activity used was 24 mCi of Cs-134 and 4 Ci of K-42. (Taylor 1986)

Release Data: If all of the original cesium inoculum remained in any single tree, less than 0.3 μCi of activity would remain. Because the trees were harvested at the end of the study, it was estimated that only 25% of the inoculum would remain. This would result in less than 0.1 μCi remaining at any tree site. Radioactive decay has eliminated the K-42 (half-life 12.4 h). (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-12 is the designated I.D. number. (Taylor 1986)

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Cs-134 Contaminated Persimmon Tree - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located 0.3 mile (0.4 km) on an azimuth of E 73 S from the intersection of the Oak Ridge Turnpike and Blair Road. (Taylor 1986)

Approximate Dimensions and Capacity: The contaminated area is estimated to be 65 ft^2 (6 m^2). (Taylor 1986)

Dates Operated: In June 1970, a single persimmon tree was inoculated with Cs-134. Duration of the study was approximately ten weeks. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The study was designed to determine the transfer of the Cs-134 radionuclide from the contaminated canopy to the understory by rainout. (Taylor 1986)

Waste Characteristics: The tree was inoculated with approximately 2 mCi of Cs-134 (half-life 2.05 years). (Taylor 1986)

Release Data: Over 26 years (or 13 half-lives) have passed since the radionuclide was introduced at the site. The maximum possible contaminant remaining would be approximately 0.32 μCi, providing there was no losses from the site by rain (runoff or leaching), wind, or animal consumption. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-27 is the designated I.D. number. (Taylor 1986) Release data has been updated to reflect 1996 conditions.

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_16.JPG



UNIT NAME: Cs-134 Contaminated Pine And Oak Seedlings - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located in the 0800 area a near the Clinch River, distance of 1.1 miles (1.7 km) on an azimuth of S 18 W from the intersection of State Highway 95 and the New Zion Patrol Road. (Taylor 1986)

Approximate Dimensions and Capacity: The total contaminated area is reported to be less than 1100 ft^2 (100 m^2). (Taylor 1986)

Dates Operated: In June 1968 White Pine and Red Oak seedings were contaminated with Cs-134 particles and sampling was carried out over a 33-d period. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: A number of short-term experiments conducted on the 0800 area were designed to determine initial interception and retention of fallout particles by various plant taxa. (Taylor 1986)

Waste Characteristics: A total of 261 μCi of Cs-134 particles (half-life 2.05 years) was applied to 30 seedlings (8.7 μCi/container). (Taylor 1986)

Release Data: By the end of the study all experimental materials had been removed for sampling and analysis. There is a possibility that some contamination of the soil and grass at the site may have occurred due to dislodged particles. Considering that 28 years have lapsed, less than 1 μCi (total) would still be present if all of the radioactive material had been left in the field. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-14 is the designated I.D. number. (Taylor 1986) The release data has been updated to reflect 1996 conditions.

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_33.JPG



UNIT NAME: Cs-134 Contaminated Soybean and Sorghum - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located in the 0800 area near the Clinch River 1.1 miles (1.7 km) on an azimuth of S 18 W from the intersection of State Highway 95 and the New Zion Patrol Road. (Taylor 1986)

Approximate Dimensions and Capacity: The contaminated area utilized was about 2150 ft^2 (200 m^2). (Taylor 1986)

Dates Operated: The site was contaminated in July 1970. The study lasted seven weeks. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: This study was a continuation of research in plants and fallout effects. Twenty-five plants each of soybeans and sorghum were contaminated with Cs-134. Particle sizes used in this study were less than 10 μ in diameter. (Taylor 1986)

Waste Characteristics: A total of 682 μCi of Cs-134 (half-life 2.05 years) was used in this study. Each week three plants of each species were removed for radiological determinations. (Taylor 1986)

Release Data: The removal of the plants reduced the amount of radioactivity at the site each week. At the end of the experiment all remaining experimental materials were removed. Considering that about 26 years have now lapsed, only 0.1 μCi (total) would remain if all the experimental materials had been left at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-16 is the designated I.D. number. (Taylor 1986) The release data has been adjusted to reflect the 1996 conditions.

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_35.JPG



UNIT NAME: Cs-134 Contaminated Lichens and Mosses - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: This site is located in the 0800 area near the Clinch River 1.1 miles (1.7 km) on an azimuth of S 18 W from the intersection of State Highway 95 and the New Zion Patrol Road. (Taylor 1986)

Approximate Dimensions and Capacity: One of 33 ft by 33 ft (10 m by 10 m) plots used in previous fallout studies was used. (Taylor 1986)

Dates Operated: In June 1971, the Cs-134 contaminated particles were applied to individual moss and lichen tussocks (21 for each species). (Taylor 1986)

Present Function: Not applicable.

Life Cycle Operation: This was the final fallout study and examined the effects on lower plants (lichens and mosses) due to fallout particles. Cesium-134 was used as the contaminant. (Taylor 1986)

Waste Characteristics: Each contaminated point (155 in^2 [1000 cm^2]) received 3.5 μCi of Cs-134 (half-life 2.06 years); a total of 147 μCi was used in the study. (Taylor 1986)

Release Data: All contaminated moss and lichen tussocks were removed for radiological examination during the study. All experimental materials were also removed from the study area; however, if all of the radioactivity had been left at the site, less than 0.033 μCi (total) of Cs-134 would remain following radioactive decay. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-18 is the designated I.D. number. (Taylor 1986) The release data has been adjusted to reflect 1996 conditions.

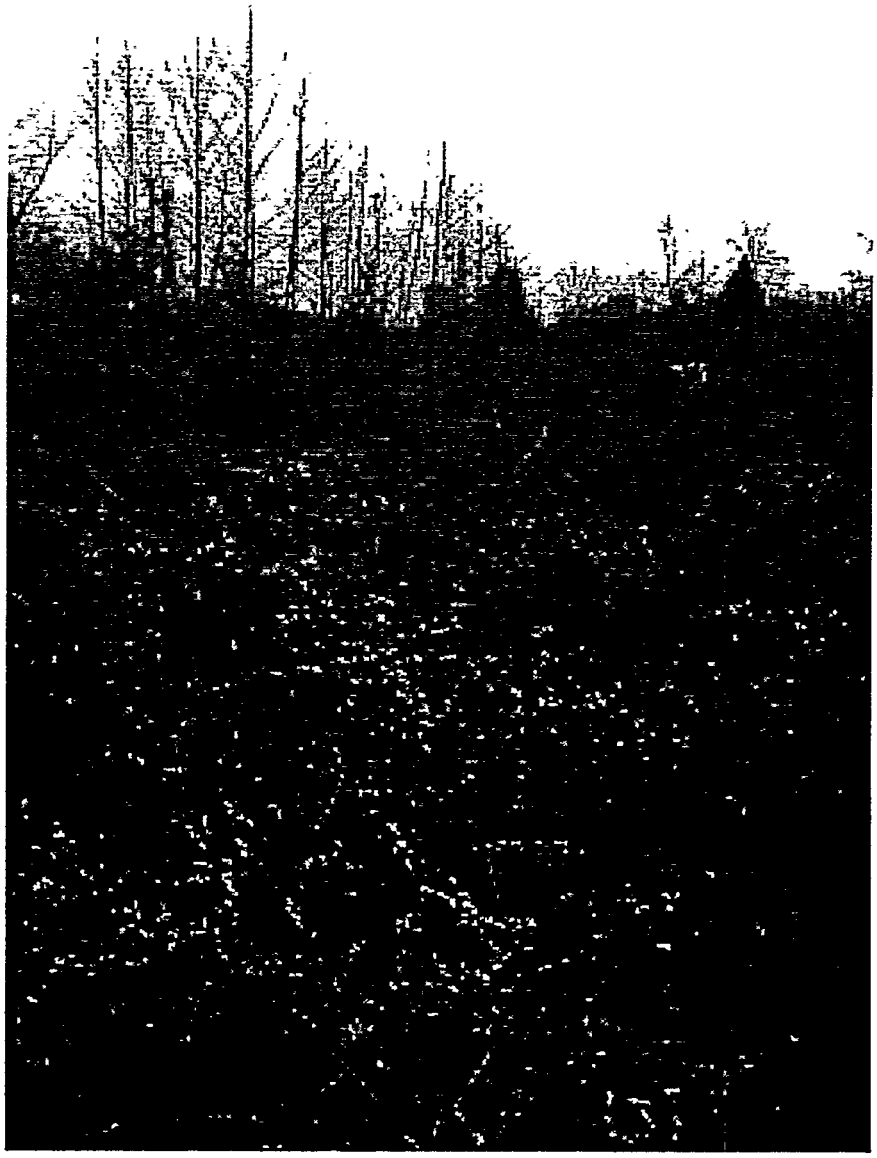
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_36.JPG



UNIT NAME: Cs-134 Tagged Tree - Research Area

Unit Number:

Project Status: No planned activities.

Unit Location: This site is located 2.2 miles (4.5 km) on an azimuth of N 55 from the intersection of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: Approximately 1100 ft^2 ($100m^2$) of area containing a Red Cedar tree was involved. (Taylor 1986)

Dates Operated: The cedar tree was inoculated with Cs-134 on August 15, 1964. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: This study was designed to determine the uptake and transfer of Cs-134 through metamorphosis of the bagworm moth. A Red Cedar tree was inoculated with Cs-134 and the insects were contained in cages suspended by wires near the canopy of the host tree. (Taylor 1986)

Waste Characteristics: 5.69 mCi of Cs-134 (half-life 2.62 years) was injected into the tree. (Taylor 1986)

Release Data: Approximately 15.5 half-lives have lapsed since the tree was contaminated, potentially leaving a maximum of 0.121 µCi of radioactivity. However, this quantity has been further diluted by natural processes, weathering, leaf transport, and soil leaching. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-6 is the designated I.D. number. (Taylor 1986) Release data has been adjusted for 1996 conditions.

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Cs-137 Bagged Leaves Study - Research Area

Unit Number:

Project Status: No Further Investigation approved (10/25/94). (Salamacha 1996)

Unit Location: Located south of Melton Valley Drive, a distance of 0.8 miles (1.3 km) on an azimuth of E 83 S from the intersection of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: Information on the size of the contaminated area is unknown. (Taylor 1986)

Dates Operated: The initial date of contamination occurred at an unknown time during early 1961 and the site was utilized for about one year. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The site was used as a bagged leaves study area to determine differences in isotope solubility from leaves under natural conditions. Leaves were contaminated with Cs-137 and Co-60 in mesh bags within a pine oak forest. The bags leaves were periodically removed for analysis during a one-year period. (Taylor 1986)

Waste Characteristics: Foliage and soil were contaminated with approximately 2 mCi equally divided between Cs-137 and Co-60. It has also been reported that some bags containing leaves contaminated with Ru-106 and Sr-90 were placed at the site. The quantity of radionuclides involved is not known. (Taylor 1986)

Release Data: Approximately 35 years have elapsed (0.8 half-life for the Cs-137 and 7 half-lives for the Co-60) since the mesh bags were first placed in the field. If all the bags and foliage contents had remained at the site approximately 0.47 mCi and 0.001 mCi would remain for the Cs-137 and Co-60, respectively. Since all experimental materials were removed at the completion of the study, no detectable contamination remains at the site. (Taylor 1986)
Site Status: CERCLA

Media of Concern:

Comments: ER-4 is the designated I.D. number. (Taylor 1986) Release data was adjusted to reflect 1996 conditions.

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Cs-137 Contaminated Forest Floor

Unit Number:

Project Status: No activity scheduled.

Unit Location: Located near (160 ft [50 m]) the lower slope forest of Copper Ridge, a distance of 1.8 miles (2.92 km) on an azimuth of E 66 S from the intersection of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: A 16.5- by 16.5-ft (5- by 5-m) plot was contaminated with Cs-137. Estimated contaminated area is 270 ft^2 (25 m^2). (Taylor 1986)

Dates Operated: The forest floor was contaminated by spraying with Cs-137 in April 1964. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the study was to determine the transfer of the cesium from the litter to successive soil depths following rain-leaching and decay of the litter. (Taylor 1986)

Waste Characteristics: The exact amount of Cs-137 (half-life 30 years) applied is not known; however, it is thought to have been in the order of 1 Mci or less. (Taylor 1986)

Release Data: Since the initial contamination occurred, about 30 years have lapsed. If the initial radioactivity was about 1 Mci, then about 0.5 Mci would remain, subject to dilution by leaching and decay of the litter. (Taylor 1986)

Site Status: CERCLA (Taylor 1986)

Media of Concern:

Comments: No additional information obtained. The designated identification number is E-24. The release data was revised to reflect 1996 conditions.

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_07.JPG



UNIT NAME: Cs-137 Contaminated Forest Understory

Unit Number:

Project Status: No activity scheduled.

Unit Location: Site ER-25 is located about 33 ft (10 m) west of the cesium forest study enclosure. The site is 1.8 miles (2.92 km) on an azimuth of E 66 S from the intersection of Bethel Valley Road and the Melton Valley Access Road near the lower slope forest of Copper Ridge. (Taylor 1986) ORNL grid coordinates are N 11,468 and E 34,596 ft. (ORNL 1990)

Approximate Dimensions and Capacity: A 110-ft^2 (10-m^2) plot was contaminated with Cs-137. (Taylor 1986)

Dates Operated: The area was sprayed with Cs-137 on June 27, 1966. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The study was designed to determine the movement of radiocesium to litter and soil from the understory canopy. (Taylor 1986)

Waste Characteristics: Plants, soil, and litter were contaminated with 360 Mci of Cs-137 (half-life 30 years). (Taylor 1986)

Release Data: Thirty years have passed (1 half-life) since the radionuclide was applied. The maximum residual radioactivity today would be about 180 Mci. Because of annual leaf-fall and wind dispersal, decomposition of the litter, runoff, and infiltration, it is unlikely that detectable levels remain. (Taylor 1986)

Site Status: CERCLA (Taylor 1986)

Media of Concern:

Comments: No additional information was obtained. The released data was revised to reflect 1996 conditions. The designated identification number is ER-25.

References:

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_15.JPG



UNIT NAME: Cs-137 Contaminated Meadow

Unit Number:

Project Status: No activity scheduled.

Unit Location: This site is thought to be an area of detectable radioactive contamination adjacent (65 ft [20 m] north) to the Cs-137 runoff plot. The exact position is not known. (Taylor 1986) ORNL grid coordinates are N 16,617 ft and E 21,474 ft. (ORNL 1990)

Approximate Dimensions and Capacity: An 8- by 8-ft (2.4- by 2.4-m) plot was contaminated with Cs-137. Total area contaminated was 64 ft^2 (10 m^2). (Taylor 1986)

Dates Operated: The exact date of isotope application is not known but is thought to be in June 1964. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: This area served as a pilot study for the runoff soil-erosion study. (Taylor 1986)

Waste Characteristics: 5 Mci of Cs-137 (half-life 30 years) was applied in the form of a spray to clipped (short meadow) and unclipped (long meadow) grass cover within the plot. (Taylor 1986)

Release Data: If the June 1964 date is correct, nearly 32 years (approximately 1 half-life) have elapsed since the field was contaminated. If the only loss of radioactivity were through radiological decay, approximately 2.5 Mci would remain. Much less would actually be present due to losses from rainout, plant fragmentation, and wind dispersal. (Taylor 1986)

Site Status: CERCLA (Taylor 1986)

Media of Concern:

Comments: No additional information obtained. The designated identification number is ER-26. The release data was revised to reflect 1996 conditions.

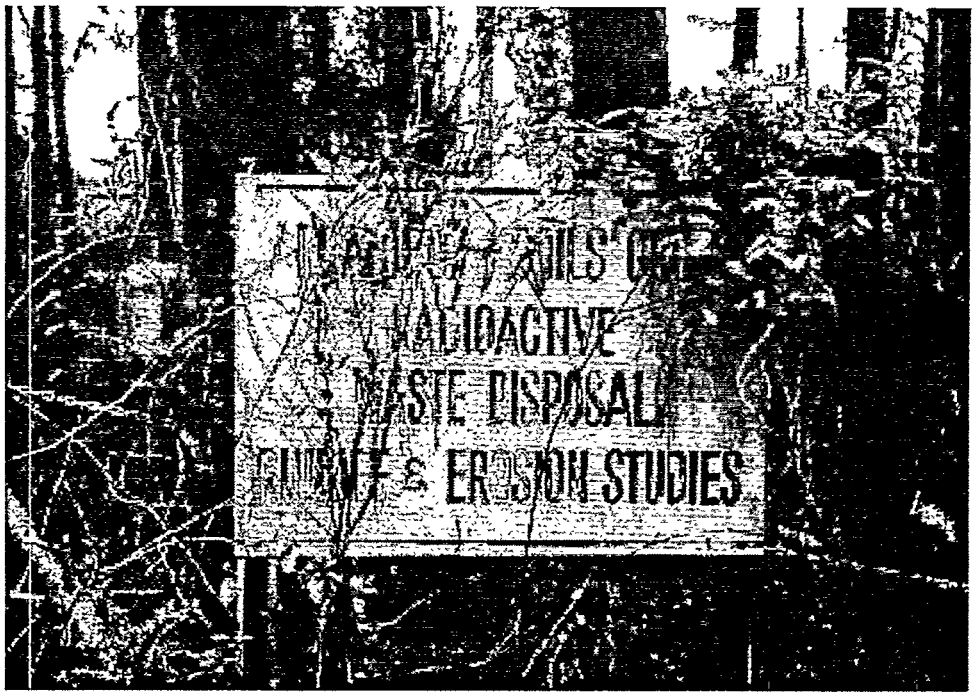
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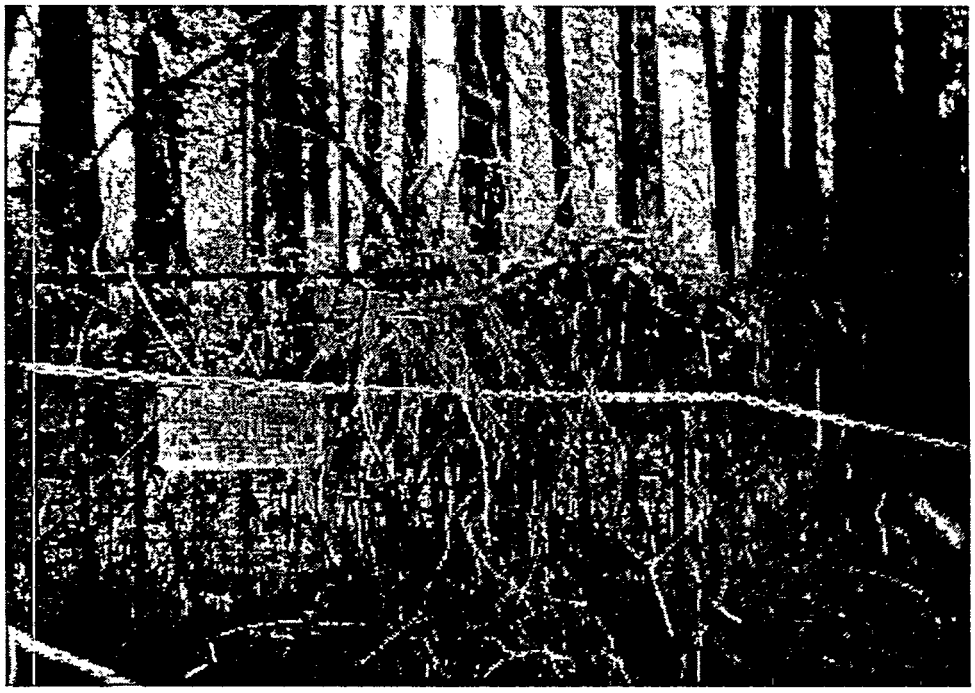
Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_23.JPG; 10_25.JPG


RADIOACTIVE
WASTE DISPOSAL
EROSION STUDIES



UNIT NAME: Cs-137, Co-60 Contaminated Forest Area

Unit Number:

Project Status: No activity scheduled.

Unit Location: This site contained two radioisotope treatment plots on Chestnut Ridge. One plot was located 0.8 mile (1.35 km) on an azimuth of S 84 W from Building 2001 at ORNL, and the other 1.55 miles (2.51 km) on an azimuth of N 49 E. A third plot (location undefined) served as a control. (Taylor 1986)

Approximate Dimensions and Capacity: The treatment plots were 4.85 acres (1.96 ha) each. A total of about 9.7 acres (4 ha) was involved in the study. (Taylor 1986)

Dates Operated: Each of the two study areas received applications of contaminated seeds (tagged with Cs-137 and Co-60) between July 31, 1969 and September 3, 1970. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The objective of the study was to utilize the radioisotopes to determine annual and seasonal consumption rates of white pine seeds by small forest mammals. Animals in the study plots were live-trapped, isotopic body burdens determined in the laboratory, and the animals returned to the forest at the point of trapping. (Taylor 1986)

Waste Characteristics: The total amount of isotope in the applied seeds was approximately 5.8 Mci of Cs-137 (half-life 30 years) and 49.7 Mci of Co-60 (half-life 5.2 years) for each plot. (Taylor 1986)

Release Data: As a result of the long-term study, the radioactive materials were constantly being removed from the site by feeding, but a fraction was being returned through body-elimination processes. Correcting for radiological decay, approximately 4 Mci of Cs-137 and 5.5 Mci of Co-60 would be the maximum amount of activity that would remain at the site if none were removed. These quantities would be further diluted by feed (food) placement by the resident animals, in excrement of animals meandering from the site, and scavenging by animals passing through the area. Field radiological surveys indicate that there may be some "hot spots" (1-2 Mr/h) present in the plots. (Taylor 1986)

Site Status: CERCLA (Taylor 1986)

Media of Concern:

Comments: No additional information obtained. The designated identification number is ER-11.

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_08.JPG



UNIT NAME: Cs-137, Fe-59 Contaminated Animal Pens (McNew Hollow) - Research Area

Unit Number:

Project Status: No planned activities.

Unit Location: The site is located 2.1 miles (3.4 km) on an azimuth of N 18 W from the intersection of Bethel Valley Road and State Highway 95 in an area called McNew Hollow. (Taylor 1986)

Approximate Dimensions and Capacity: Four pens (each 33 ft by 33 ft [10 m by 10 m]) were used. The extent of contamination is about 4300 ft^3 (400 m^2). (Taylor 1986)

Dates Operated: Cotton rats, contaminated using a dual isotope technique, were released in the pens in January 1969. (Taylor 1986)

Present Function: Not applicable.

Life Cycle Operation: This field study was conducted to determine the elimination of Cs-137 and Fe-59 by wild small rodents. Periodically, the animals were live-trapped and taken to the laboratory for radiological analysis. (Taylor 1986)

Waste Characteristics: The cotton rats were contaminated by injection with Cs-137 (half-life 30.17 years) and Fe-59 (half-life 44.63 d). A total of 32 μCi of Cs-137 and 12.8 μCi of Fe-59 was utilized. (Taylor 1986)

Release Data: All animals in the pens were removed at the end of the experiment. Correcting for radiological decay, approximately 17.2 μCi of Cs-137 would remain at the site if all of the isotope remained there. Iron-59 would have decayed to nondetectible levels. No detectable radioactivity remains at the site. (Taylor 1986)

Site Status:

Media of Concern:

Comments: ER-8 is the designated I.D. number. (Taylor 1986) Release data has been adjusted to reflect 1996 conditions.

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_08.JPG; 10_12.JPG





UNIT NAME: Environmental Restoration Program Office Trailer Site

Unit Number:

Project Status: No planned activities.

Unit Location: Located east of the ORNL main plant area on Melton Valley Access Road south of White Oak Avenue. ORNL coordinates are N 20,698 ft and E 36,260 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Unknown.

Dates Operated: Approximate date of operation: 1991 to present. (Kuhaida 1996b)

Present Function: Site contains trailers and parking lots for LMES Environmental Restoration personnel.

Life Cycle Operation: An unsubstantiated report indicated that historically (dates unknown) the site was used as a construction debris dump site. (Kuhaida 1996a)

Waste Characteristics: Unknown.

Release Data: Sampling was conducted prior to locating trailers on site. No releases have been reported. (Kuhaida 1996b)

Site Status: CERCLA

Media of Concern:

Comments:

References:

Kuhaida, Jerry, May 6, 1996a and October 1996b, LMES Project Manager, Personal communication with Anita Parker, Advanced Sciences, Inc., Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: H-3 Contaminated Trees - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: Located 1.6 miles (2.6 km) on an azimuth of W 8 S from the intersection of the East Ridge Patrol Road and the Oak Ridge Turnpike on Blackoak Ridge adjacent to the East Ridge Patrol Road. (Taylor 1986)

Approximate Dimensions and Capacity: The area involved in the study was about 0.6 acre (0.25 ha). The area included two yellow popular trees, one hickory tree, and a 43 ft^2 (4 m^2) soil plot. (Taylor 1986)

Dates Operated: The tritium was introduced into the trees on May 16, 1971. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: This ridgetop site was used in a pilot study to investigate the feasibility of using tritiated water to measure rates of transpiration of deciduous tree species (yellow popular and hickory) under field conditions. (Taylor 1986)

Waste Characteristics: Approximately 180 mCi of tritiated water (half-life 12.28 years) was injected into the trees (Taylor 1986)

Release Data: Correcting for radiological decay, approximately 43.9 mCi of tritium would be the maximum amount present at the site; however, following completion of the study all materials were removed from the site. Because tritium is mobile, it is doubtful that any residual tritium could be detected at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-10 is the designated I.D. number. (Taylor 1986) The 1987 RFA incorrectly listed the remaining tritium as 77 μCi. The release data was updated to reflect 1996 conditions.

References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Hg-197 Tagged Stream - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: This site is located 2.2 miles (3.6 km) on an azimuth of N 41 E from the intersection of Bethel Valley Road and Melton Valley Access Road. The site is downstream from the Walker Branch watershed weirs (Taylor 1986)

Approximate Dimensions and Capacity: The study area involves a 330 ft (100 m) section of stream in Walker Branch. (Taylor 1986)

Dates Operated: The radioactivity was introduced into Walker Branch on October 5, 1971. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: A section of Walker Branch was tagged with radioactive mercuric nitrate [$^{197}Hg(N_03_2)$] determine the fate of that mercury compound in a natural stream ecosystem. The sample matrix consisted of water, fish, watercress, periphyton, and sediments. (Taylor 1986)

Waste Characteristics: 4.48 mCi of mercuric nitrate (Hg-197; half-life 65 h) was applied to the stream. (Taylor 1986)

Release Data: At a streamflow rate of 347.8 L/min, 75% of the mercury isotope was retained in the first 300 ft (100 m) of the stream. Because of the isotope's short half-life, no detectable Hg-197 remains at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-5 is the designated I.D. number. (Taylor 1986)

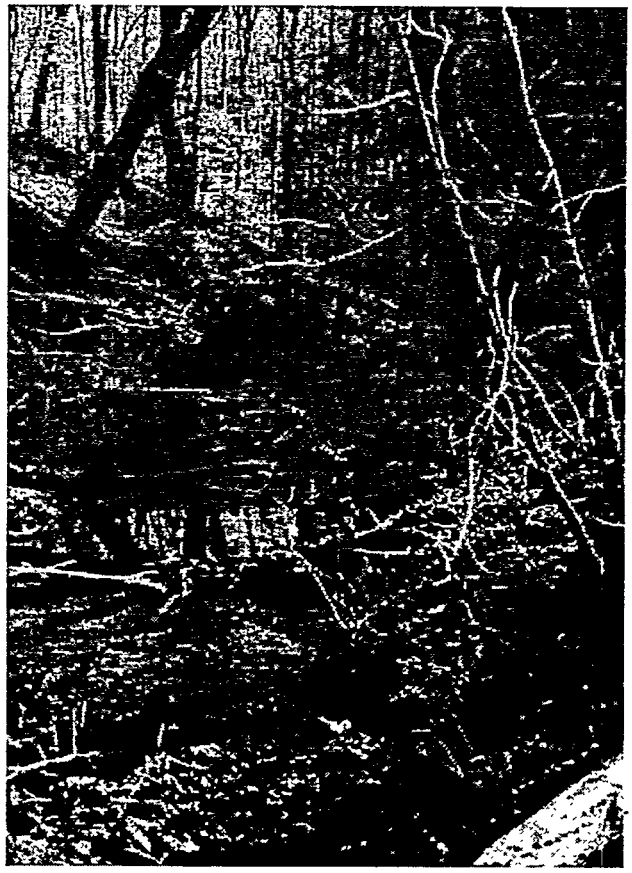
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_15.JPG; 12_16.JPG





UNIT NAME: Hg-203 Tagged Stream - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved. (4/10/96). (Salamacha 1996)

Unit Location: This site is a portion of White Oak Creek located in Bethel Valley 0.5 mile (0.8 km) on an azimuth of N 12 E from the junction of Bethel Valley Road and Melton Valley Access Road. (Taylor 1986)

Approximate Dimensions and Capacity: The contaminated area encompasses 330 ft (100 m) of stream length. (Taylor 1986)

Dates Operated: The methylmercury was introduced into the stream on September 1, 1971. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The site was utilized to clarify the fate of methylmercury ($CH_3{}^{203}HgCl$) in a natural stream ecosystem. (Taylor 1986)

Waste Characteristics: Water, fish, plants, and sediments were contaminated with 1.65 mCi of methylmercury containing Hg-203 (half-life 46.9 d). (Taylor 1986)

Release Data: At a streamflow of 325.6 L/min, 81% of the radioisotope was retained in the first 330 ft (100 m) below the point of release. No detectable radionuclides are present at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-9 is the designated I.D. number (Taylor 1986)

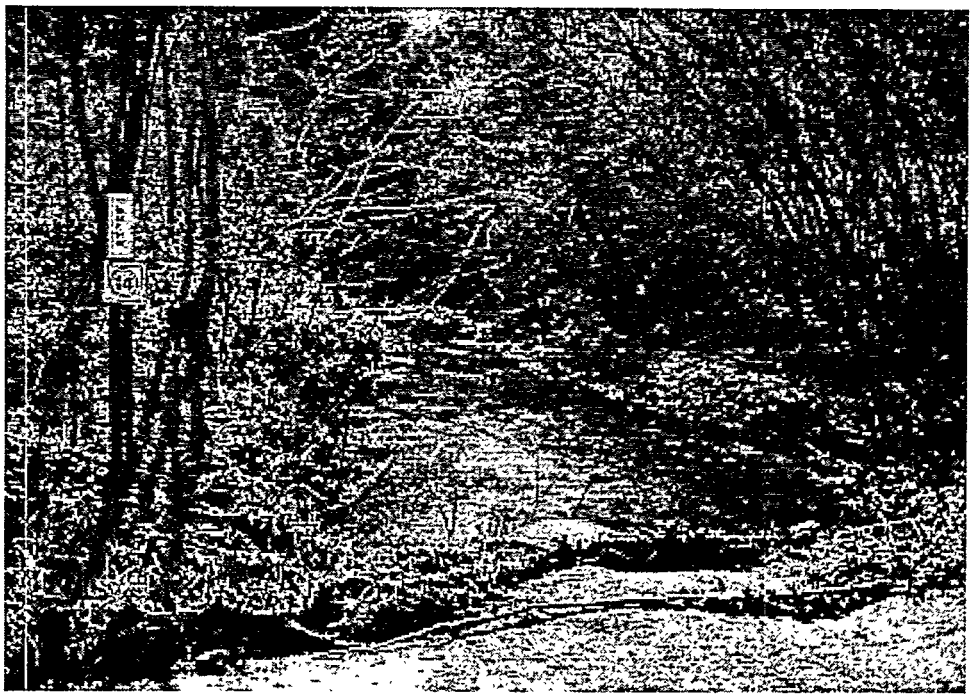
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 12_08.JPG



UNIT NAME: Na-22 Contaminated Soil - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located in the vicinity of the 0800 area near the Clinch River. It is located off Jones Island Patrol Road near the Clinch River, a distance of 1.1 miles (1.6 km) on an azimuth of S 10 W from the intersection of Bethel Valley Road and State Highway 95. (Taylor 1986)

Approximate Dimensions and Capacity: Area of the site was 1.2 acres (0.5 ha). (Taylor 1986)

Dates Operated: The exact dates of isotope contamination are unknown, however, activities occurred during 1968-1969. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: Activities at this site span several years and involved Ca-47, K-42, and Na-22. It is believed that isotopes were applied to vegetation in the laboratory and the contaminated vegetation fed to grasshoppers and crickets housed in cages in the field. (Taylor 1986)

Waste Characteristics: Foliage was contaminated with an unknown quantity of Ca-47, K-42, and Na-22. Sodium was the most significant isotope because of the longer half-life (2.62 years). (Taylor 1986)

Release Data: Although the exact amounts of radionuclides involved are unknown, almost 10 half-lives have lapsed since the tracer was introduced. No records exist to indicate that contaminated animal residues were removed; however, the insects and foliage were removed from the site. It is doubtful that detectable radionuclides remain at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-3 is the designated I.D. number. (Taylor 1986)

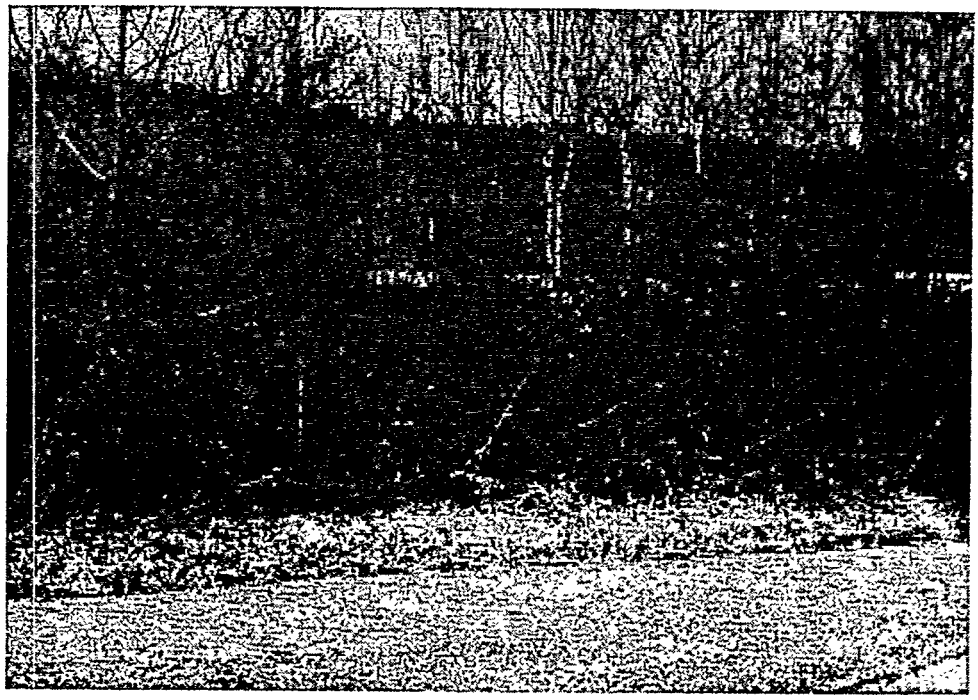
References:

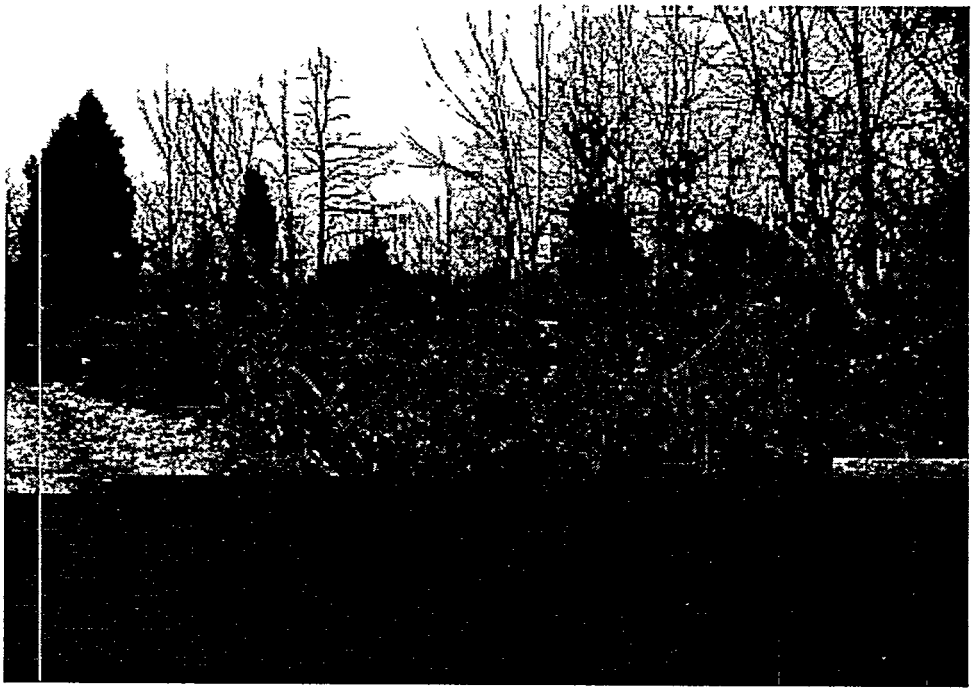
Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_31.JPG; 10_32.JPG





UNIT NAME: Rb-86 Contaminated Plants - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located at the site of the pine-oak contamination study in the 0800 area near the Clinch River. The site is a distance of 1.1 miles (1.7 km) on an azimuth of S 8 W from the intersection of State Highway 95 and the New Zion Patrol Road. (Taylor 1986)

Approximate Dimensions and Capacity: Two plots (33 ft by 33 ft [10 m by 10m]) were used in this study. (Taylor 1986)

Dates Operated: The particles were applied to the plots in June 1969. The study was completed after seven weeks. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: This was another fall-out study. Agricultural species were sprayed with particles contaminated with Rb-86 to determine fractional interception of retention times of particles in two size classes. (Taylor 1986)

Waste Characteristics: A total of 12.48 mCi of Rb-86 (half-life 18.66 d) was applied to one plot, and the other plot received 19.8 mCi. (Taylor 1986)

Release Data: Approximately 27 years have lapsed, and no detectable Rb-86 activity remains at the site (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-15 is the designated I.D. number. (Taylor 1986) The release data has been adjusted to reflect 1996 conditions.

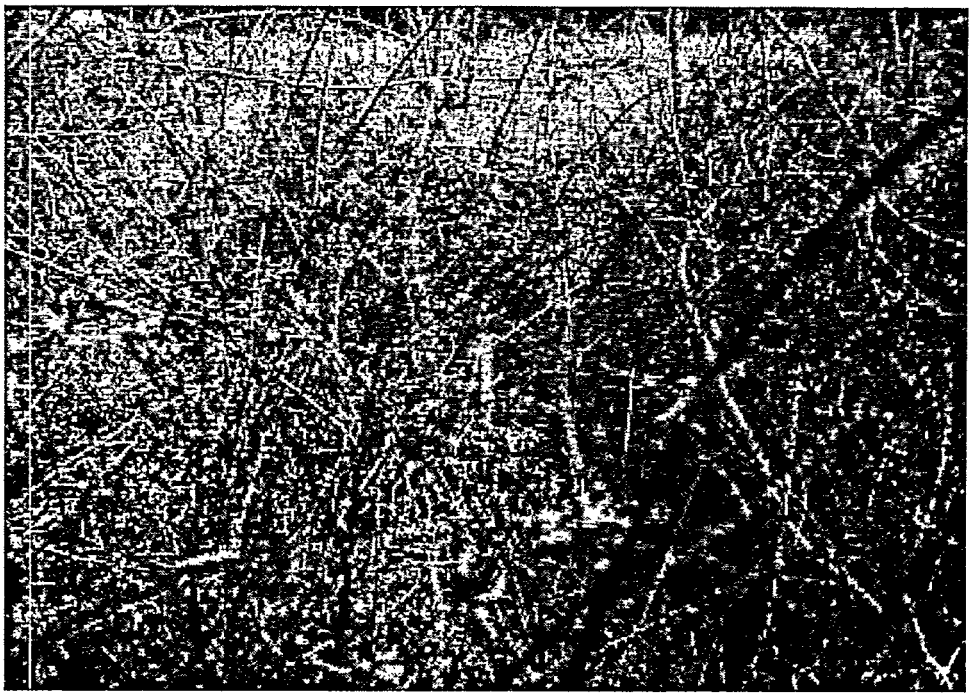
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 10_34.JPG



UNIT NAME: Tc-95m Contaminated Soil and Plants - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: Located in the 0800 area near the Clinch River about 330 ft (100 m) north of the western end of the fenced enclosure east of the Clinch River at mile 20.5 (km 33.2). Located on an azimuth south, 1.3 miles (2.1 km) from the intersection of Bethel Valley Road and State Highway 95. (Taylor 1986)

Approximate Dimensions and Capacity: Approximately 3200 ft^2 (300 m^2) of land area was used in this study. Twenty-two separate 10.8 ft^2 (1 m^2) plots were used during this study. (Taylor 1986)

Dates Operated: Three separate applications of Tc-95m occurred: 15 plots during September 1978, 4 plots during April 1979, and 3 plots during July of 1979. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: Used to evaluate the interception and retention of fission products by grasses and soils. The method of radioisotope application differed from previous retention studies in that the nuclide was applied by liquid spray. (Taylor 1986)

Waste Characteristics: The Tc-95m (half-life 61 d) was sprayed on the grass. In the first application, 200 μCi was applied to each of the 15 plots (34 mCi); in the second application 10 μCi was applied to each of the four plots (40 μCi); and in the final application 10 μCi was applied to each of the three plots (30 μCi). Total Tc-95m applied was 3.07 mCi. (Taylor 1986)

Release Data: Because of the short half-life and the amount of time that has lapsed since application (15 or more years), radioactive decay has reduced the concentration levels and are not detectable at the site. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-19 is the designated I.D. number. (Taylor 1986) Release data has been adjusted to reflect 1996 conditions.

References:

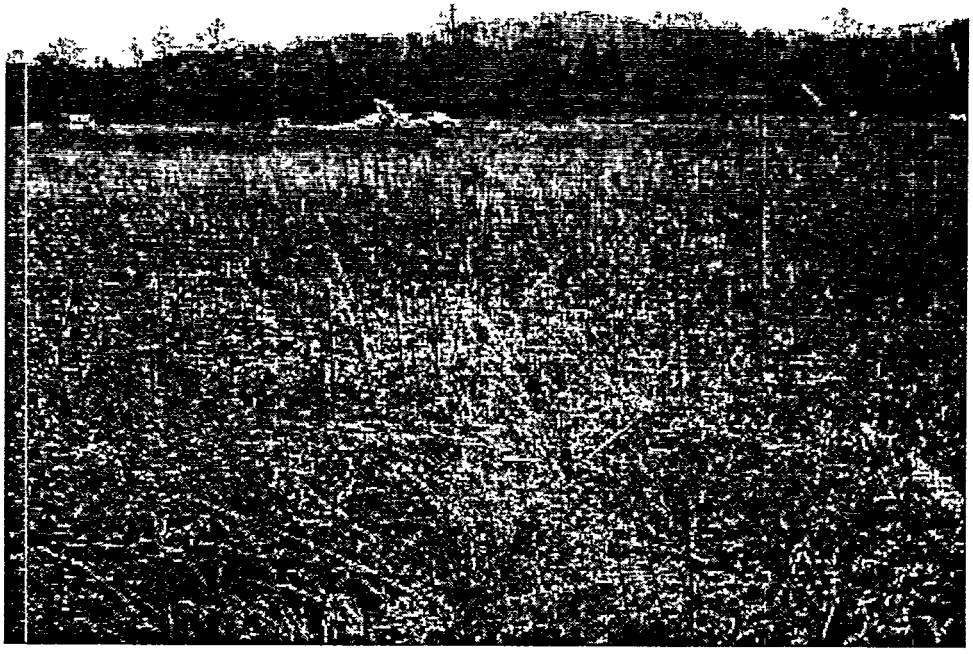
Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

RNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_04.JPG



UNIT NAME: Tc-95m Uptake Studies - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (4/10/96). (Salamacha 1996)

Unit Location: Located in 0800 area near the Clinch River. (Taylor 1986) ORNL coordinates are N 18,008 ft and E 21,678 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Three 10.8 ft^2 (1 m^2) plots were contaminated. Estimated area used was 108 ft^2 (10 m^2). (Taylor 1986)

Dates Operated: The field portion of the study was performed in late February 1981. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The uptake of technetium by emerging plants in the field was compared with uptake in a companion greenhouse study in which soil columns were contaminated and emerging plants analyzed. (Taylor 1986)

Waste Characteristics: Each plot was contaminated with 112 μCi to Tc-95m (half-life 61 d) in solution (total 336 μCi). (Taylor 1986)

Release Data: Approximately 96 half-lives have lapsed since initial field contamination. Considering the original microcurie quantities and the radiological decay, the presence of the isotope at the site is below detection. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-20 is the designated I.D. number. (Taylor 1986) Release data has been revised to reflect 1996 conditions.

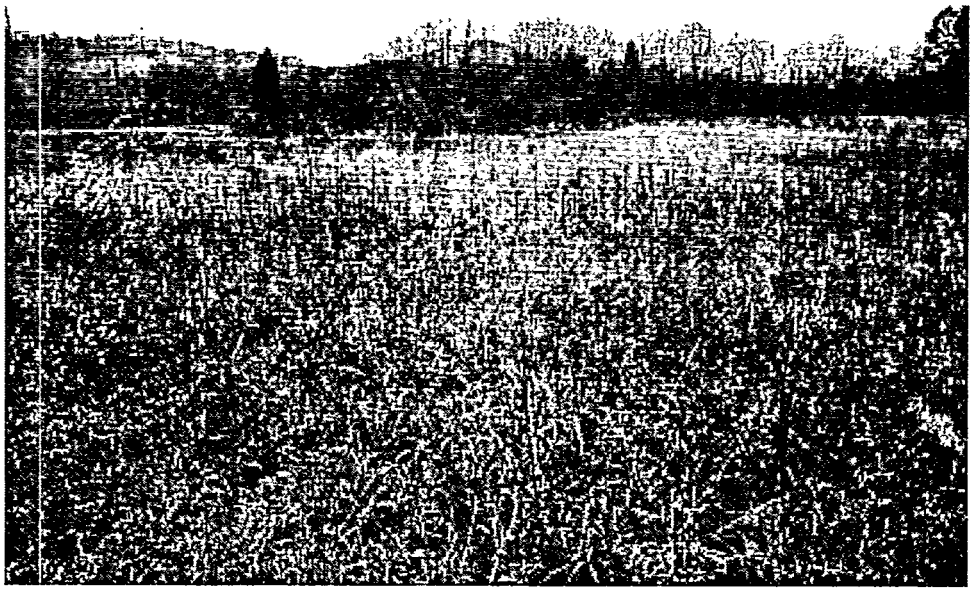
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_05.JPG



UNIT NAME: Tc-95m and I-131 Contaminated Pasture - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved (7/11/96). (Salamacha 1996)

Unit Location: Located approximately 330 ft (100 m) north of the Clinch River at Clinch River Mile 20.5 (CRK 32.8). Grid coordinated are N 17,480 ft and E 20,370 ft. (Taylor 1986)

Approximate Dimensions and Capacity: The contaminated pasture area encompassed 43,000 ft^2 (4000 m^2). (Taylor 1986)

Dates Operated: In May, July, and September of 1983 I-131 was sprayed on the site. In September Tc-95 was also sprayed on the site. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: The purpose of the study was to assess the transfer of radioisotopes Tc-95m and I-131 from forage grass to milk in goats. (Taylor 1986)

Waste Characteristics: The total amount of I-131 (half-life 8.05 d) applied was 60 mCi., and the Tc-95m (half-life 61 d) was 10 mCi. (Taylor 1986)

Release Data: Radioactivity of both isotopes is not detectable because of radiological decay, the technetium having gone through approximately 78 half-lives and the iodine 593 half-lives. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-21 is the designated I.D. number. (Taylor 1986) Release data has been adjusted to reflect 1996 conditions.

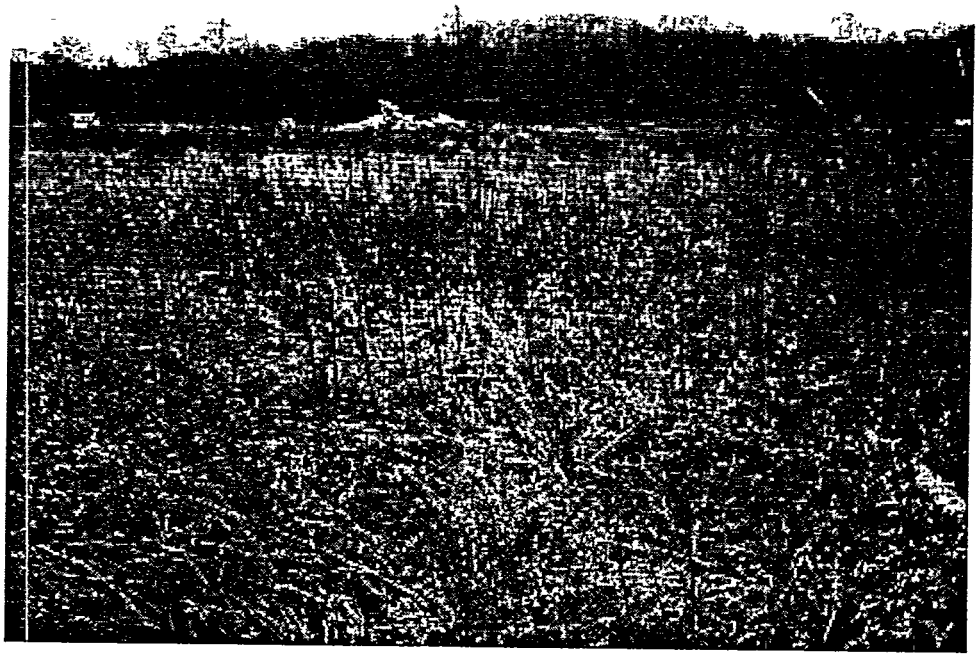
References:

Salamacha, Tanya, November 11, 1996. LMES Regulatory Agreement Implementation Specialist, NFI Spreadsheet.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_04.JPG



UNIT NAME: Tc-99 and Np-237 Contaminated Soil Lysimeters - Research Area

Unit Number:

Project Status: No planned activities.

Unit Location: Located 0.3 mile (0.5 km) on an azimuth of E 75 S from the intersection of Melton Valley Drive and Lagoon Road southeast of SWSA 4. (Taylor 1986)

Approximate Dimensions and Capacity: The contaminated area was about 43.2 ft^2 (4 m^2). (Taylor 1986)

Dates Operated: The study was performed in June 1984. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: Eight lysimeter cylinders 11 in (28 cm) in diameter were contaminated with Np-237 and four additional cylinders were contaminated with Tc-99. The cylinders were covered on the bottom with mesh such that the downward migration of the radionuclide could occur. The cylinders were lowered into a hole such that the soil level in the cylinders was the same as that of the surrounding soil. Agricultural species were cultured in the lysimeters, harvested, and analyzed for concentration ratio calculations. (Taylor 1986)

Waste Characteristics: A total of 64 µCi of Np-237 (half-life 2.14 x $10.^6$) and 32 µCi of Tc-99 (half-life 2.12 x 10^5) was added to the 12 lysimeter cylinders. (Taylor 1986)

Release Data: At the termination of the study, all the cylinders were removed from the soil and encased in plastic; they are presently in storage awaiting disposal. No radioactivity remains at the site. (Taylor 1986) If the radioactivity had remained at the site, less than 1 µCi would remain of Np-237 or Tc-99.

Site Status: CERCLA

Media of Concern:

Comments: ER-23 is the designated I.D. number. (Taylor 1986)

References:

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Thorium Storage Wells

Unit Number:

Project Status: No activity planned.

Unit Location: Storage wells are located in the High Flux Isotope Reactor Area east of 7019 (Thorium Handling Facility) in Melton Valley. Approximate ORNL grid coordinates are N 21,320 ft and E 38,920 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Wells are 3 ft in diameter and 10 ft deep. There are 10 wells and all are covered with metal lids. (ORNL 1990)

Dates Operated: Mid 1960s to mid 1970s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Initially used to store zirconium sponge which is explosive when wet or overheated. Later the wells were used to store thorium. Wells are empty at this time. (ORNL 1990)

Waste Characteristics: Zirconium and thorium. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: No additional information was obtained.

References:

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: West End Dump Site

Unit Number: 0.61

Project Status: No planned activities.

Unit Location: Wooded area approximately 300 ft west of Building 1061. ORNL grid coordinates E 28180 ft and N 22330 ft. (ORNL 1990)

Approximate Dimensions and Capacity: 10 ft by 8 ft. (ORNL 1990)

Dates Operated: Unknown, not active at present. (ORNL 1990)

Present Function: Not in use. (ORNL 1990)

Life Cycle Operation: Not applicable.

Waste Characteristics: This area has several mounds of debris consisting of: rusted drums, a garbage can, different size drums (30 gal, 5 gal, etc.), tile, old porcelain fixtures, metal, galvanized, pipe, brick, possible tar buckets, incandescent light bulbs (base only), and asbestos. Part of the area is flagged off with tape stating: CAUTION: ASBESTOS - DO NOT ENTER. (ORNL 1990)

Release Data: Not applicable.

Site Status: RCRA (ORNL 1990)

Media of Concern: Surface water and groundwater. (ORNL 1990)

Comments: Reference for the information appearing on the Contaminated Site Summary Sheet is Surveillance Record, Control Number ORNL-95-X11.

A request has been made to analyze the debris for radioactive materials, hazardous waste constituents and PCBs. (ORNL 1990)

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No Photo Available.

UNIT NAME: Zn-65 Tagged Red Oak Seedlings - Research Area

Unit Number:

Project Status: No Further Investigation (NFI) approved. (4/10/96). (Salamacha 1996)

Unit Location: Located 1.6 miles (2.5 km) on an azimuth of S 46 W from the intersection of State Highway 95 and the New Zion Patrol Road. The site is about 660 ft (200 m) north of Clinch River Mile 19.25. (ORNL 1987)

Approximate Dimensions and Capacity: Approximately 1100 ft^2 (100 m^2) of land was involved in this study. (Taylor 1986)

Dates Operated: The 12-week study period was initiated in June 1975. (Taylor 1986)

Present Function: Not in operation.

Life Cycle Operation: Gamma-irradiated Red Oak seedings were contaminated with Zn-65 to investigate the effects of ionizing in zinc uptake. A total of 26 containers of seedlings were used. (Taylor 1986)

Waste Characteristics: A total of 1.3 mCi of Zn-65 (half-life 244.4 d) was introduced into the 26 seedling containers. (Taylor 1986)

Release Data: Planted seedlings and all experimental materials were removed from the site when the study was completed. If the materials had been allowed to remain, approximately 46 pCi (total) of Zn-65 would exist at this site and would not be detectable. (Taylor 1986)

Site Status: CERCLA

Media of Concern:

Comments: ER-13 is the designated I.D. number. (Taylor 1986) The release data was adjusted to reflect 1996 conditions. The 1987 RFA incorrectly listed the remaining Zn-65 as < 1 pCi.

References:

Oak Ridge National Laboratory, August 25, 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory,* Addendum, ORNL/RAP-12/V3, Oak Ridge, Tennessee.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_01.JPG



UNIT NAME: Isotopes Ductwork/3110 Filter House

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Located on Hillside Avenue, between Third Street and Fifth Street in the ORNL main plant area. ORNL grid coordinates are N 22,400 ft and E 31,290 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Site consists of a filter house connected to nearby buildings by underground ductwork. For specific information, see engineering drawings D39120 - D39125, D43475, D45152, and D45155. (ORNL 1990)

Dates Operated: Site began operation in early 1960s. Site was removed from service in 1986. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Filter House was designed to handle air exhaust from cell ventilation in the isotopes area (Buildings 3028, 3029, 3030, 3031, 3032, 3033, and 3033A). This site also served Building 3038 and Building 3047. The Filter House received exhaust from connected buildings and transfer air to the 3039 stack. Inside the Filter House are 42 HEPA filters. Also inside is a floor drain that collected groundwater and transported it by gravity to a sump; water was then pumped to Tank WC-10 (liquid radioactive waste system). (ORNL 1990)

Waste Characteristics: Type of wastes are not identified but are known to include radionuclides. (ORNL 1990)

Release Data: Contamination results from continuous operation of the Filter House. Specific details of characterization and release data are not available. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Pilot Pits 1, 2 (7811)

Unit Number: 04.02

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: This site is located south of SWSA 4 on the left side of the road leading to the waste pits and trenches. ORNL grid coordinates are N 18,620 ft and E 26,980 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area is fenced and paved with asphalt. Approximate size is 150 ft x 150 ft (46 m x 46 m). (ORNL 1990)

Dates Operated: As experimental facility: 1955-1959. Site inactive: 1976. (ORNL 1990)

Present Function: Not in operation. The site is now used for storage of equipment from leaching tests on coal and municipal solid wastes. (ORNL 1990)

Life Cycle Operation: The site was originally constructed to perform pilot scale experiments related to fixation of high-level radioactive wastes. (ORNL 1990)

Waste Characteristics: The only radioactivity used at the site was ~ 100 mCi of mixed fission products. This activity was removed. Some sediment cores from a previous Clinch River study are stored at the site, as are certain radionuclides. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern: None

Comments: This site was included in a CERCLA remedial investigation. (CDM & SAIC 1996) A CERCLA Treatability Study using *is situ* vitrification is being conducted at the site. (Kuhaida 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996. LMES Program Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 13_19.JPG



UNIT NAME: Drainage 3 in WAG 5

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Located along the eastern portion of WAG 5. It lies almost completely outside of WAG 5. (Bechtel et al 1995) ORNL grid coordinates are N 17,702 ft and E 30,730 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Drainage 3 receives runoff from an area of approximately 9.3 acres. (Bechtel et al 1995)

Dates Operated: Not applicable.

Present Function: Receives runoff from the east side of WAG 5. (Kuhaida 1996)

Life Cycle Operation: Not applicable.

Waste Characteristics: Contaminant concentrations are variable during storms and do not correspond to flow. (Bechtel et al 1995)

Release Data: Sampling of the surface water and sediments in drainage D-3 identified a number of contaminants of concern: Am-241, CM-243/244, Co-60, Cs-137, Pu-238, Pu-239/240, Sr-90 and tritium. Tritium was consistently detected at relatively low levels between 1100 and 6600 pCi/L. Sr-90 and Cs-137 were generally detected during storms and not during baseflow. Gross alpha values were low, with the highest value of 32 pCi/L (<3 times background). After the March 1994 storm, TRU constituents Pu-238/239/240 and Cm 243/244 were detected in filtered grab samples only. (Bechtel et al 1995)

Site Status: CERCLA

Media of Concern: Surface water, soil

Comments: Previously designated as unit number 5.07C.

This site was included in a CERCLA remedial investigation (Bechtel et al 1995). This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1995. *Remedial Investigation Report on Waste Area Grouping 5 at Oak Ridge National Laboratory,* DOE/OR/01-1326&D2/V1 Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 05_28.JPG



UNIT NAME: SWSA 6 TVA Easement

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Located in Melton Valley near the intersection of Raccoon Road and State Highway 95. Area is approximately 500 ft south of State Highway 95. (Kuhaida 1996) ORNL grid coordinates are N 16,802 ft and E 24,509 ft (ORNL)

Approximate Dimensions and Capacity: Unknown

Dates Operated: Not applicable.

Present Function: Not applicable.

Life Cycle Operation: Not applicable.

Waste Characteristics: A roped radiological area extending approximately 500 ft south of State Highway 95 in the cleared area beneath the transmission lines contained numerous scattered spots with elevated surface-gamma exposure rates and beta-gamma dose rates. Two spots were detected outside the magenta and yellow contamination control rope near State Highway 95. (S.M. Stoller Corporation 1995)

Release Data: The primary contaminant was Cs-137 both inside and outside of the contamination control boundary. (S.M. Stoller Corporation 1995)

Site Status: CERCLA

Media of Concern:

Comments: Reportedly this site is an area where deer congregate and it was the deer droppings that contributed to the elevated gamma detections. (Swinney 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

S.M. Stoller Corporation, November 1995. *Annual Summary Report on the Surveillance and Maintenance Activities of the Oak Ridge National Laboratory Environmental Restoration Program for the Fiscal Year 1995,* prepared for US/DOE, Office of Environmental Management, Oak Ridge, Tennessee.

Swinney, Chuck, May 1996. LMES Facility Manager, personal communication with Anita Parker, Advanced Sciences, Inc., Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Waste Valve Pit 7561

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Pit is located near the southeast corner of the Homogeneous Reactor Experiment (HRE) Waste Evaporator Building (7502) in Melton Valley. Approximate ORNL grid coordinates are N 18,700 ft and E 31,436 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Pit is underground and is constructed of reinforced concrete. Approximate dimensions are 9 x 7.2 x 11 ft. The walls are 1 ft thick and the pit extends 1 ft above ground. The pit has a plywood cover. (Bechtel et al 1988)

Dates Operated: 1958 - 1961. (ORNL 1990)

Present Function: Not in operation

Life Cycle Operation: Served as a central control point for directing waste movement between major components of the HRE waste system. (Bechtel et al 1988)

Waste Characteristics: Not known. Probably liquid radioactive waste containing Sr-90, Cs-137, and Co-60 as main constituents. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: RCRA/CERCLA (ORNL 1990)

Media of Concern:

Comments: The Contaminated Site Summary Sheet (CSSS) (ORNL 1990) lists the dimensions as 6 ft by 9ft.

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

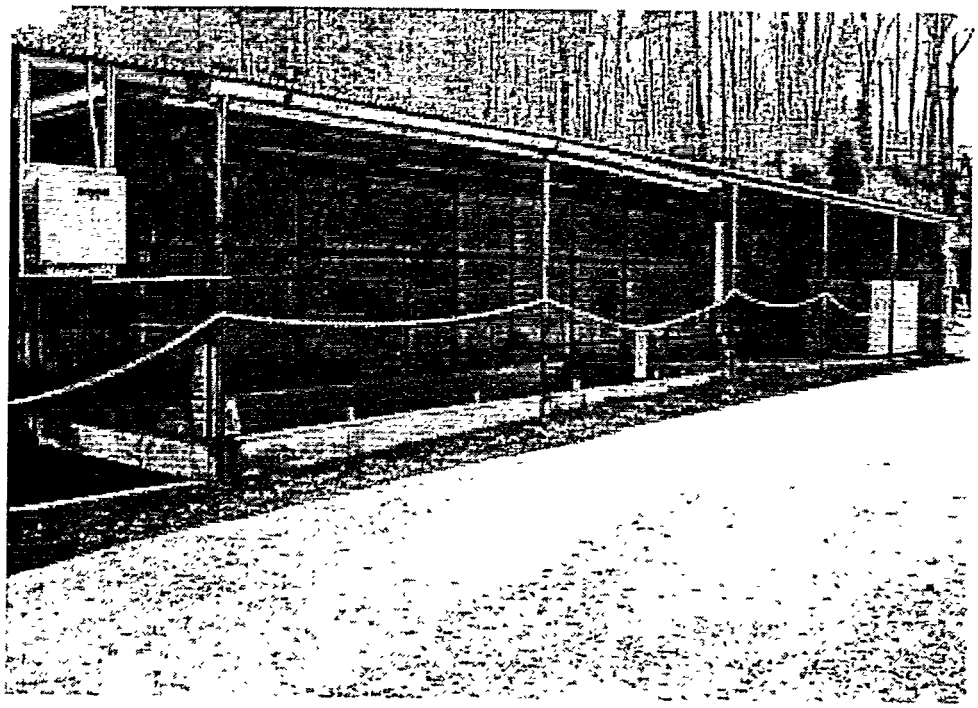
Bechtel National/CH2M Hill/EDGe/PEER, November 1988. *Remedial Investigation Plan for Waste Area Grouping 9, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_13.JPG



UNIT NAME: Soil at HRE Decontamination Pad/Shed (7561)

Unit Number:

Project Status: Remedial Investigation completed. (DOE 1996)

Unit Location: Located south of Building 7500 in Melton Valley south of Melton Valley Drive. ORNL grid coordinates are N 18,660 and E 31,380. (ORNL 1990)

Approximate Dimensions and Capacity: Pad is 12 ft by 60 ft. The east half of the pad contains a stainless steel floor equipped with drains to 12,000 gal water tanks. The west half was used for storage of contaminated equipment and tools. (ORNL 1990)

Dates Operated: 1954 to present. (ORNL 1990)

Present Function: Used for decontamination and storage of equipment and tools used in HRE operations. (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: Liquid waste from decontamination of tools and equipment. Probably contains Sr-90, Cs-137, Co-60, and uranium isotopes. (ORNL 1990)

Release Data: The decontamination and storage-pad (Building 7561) was surveyed and no transferable radiation was found. Most of the elevated, beta/gamma direct readings, presumably including the 16 mrad/hr hot spots, were due to nearby equipment, but readings of up to 6.4 mrad/hr in one area were said to occur outside the curbed area, indicating possible leaching of contamination in the ground. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: The FFA, Appendix C, lists this site as Soil at HRE Decontamination Pad/Shed (7500). (FFA 1996)

This site is included in the area covered by the White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report (DOE 1996) and will be remediated in accordance with the FFA.

References:

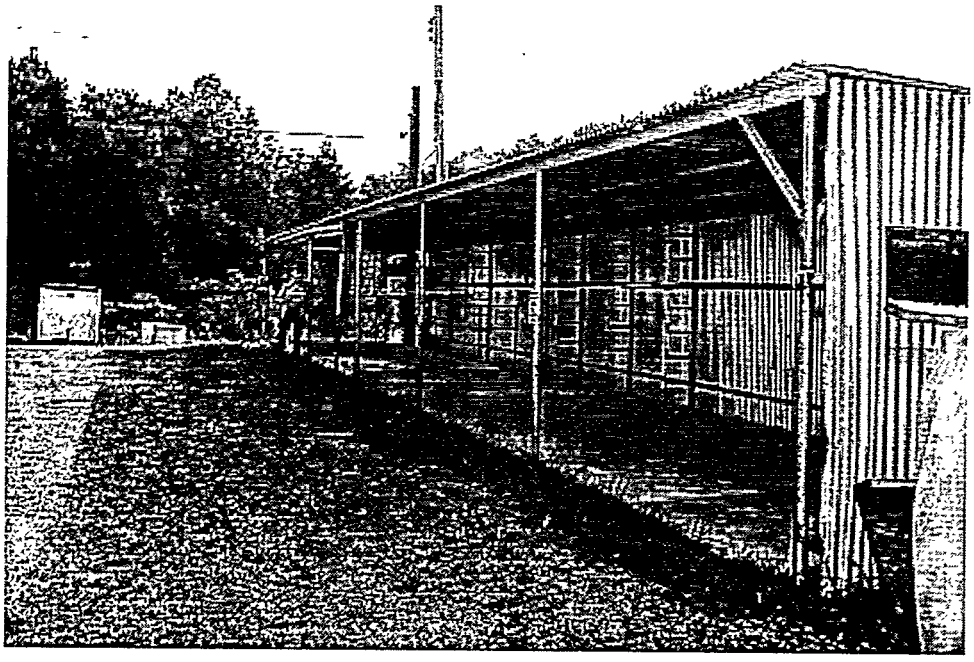
Department of Energy, November 22, 1996. *White Oak Creek Watershed: Melton Valley Area Remedial Investigation Report, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Vol. 1, Main Text,* DOE/OR/01-1546/V1 & D1, Oak Ridge, Tennessee.

FFA, January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 7527_88.JPG



UNIT NAME: Closed Contractors' Landfill (7658)

Unit Number: 12.01

Project Status: No activity planned.

Unit Location: The site is located in Melton Valley south of the 7000 Area and east of Melton Valley Access Road. ORNL grid coordinates are N 18,650 ft and E 37,500 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The site is ~3 acres and is ~500 ft long and 260 ft wide. The original land surface sloped from north to south so that the depth of fill probably ranges from less than 6 ft on the north side to ~30 ft on the south. (Ford et al 1992)

Dates Operated: Site commissioned: 1960s. Taken out of service: 1975. (Ford et al 1992)

Present Function: The site has a gravel surface and is presently used as aboveground storage from noncontaminated scrap metal dumpsters. (Ford et al 1992)

Life Cycle Operation: The site was used to bury general construction debris generated by construction contractors working at ORNL. Material to be buried was not contaminated with radioactive materials. (ORNL 1990)

Waste Characteristics: The volume and nature of waste buried is unknown. No waste specific records were kept on the landfill operation. (ORNL 1990)

Release Data: The area is inactive, and no radioactive contamination has been reported. (Ford et al 1992) Results from previous surveys were inconclusive concerning the possible release of organic contaminants. Accordingly, additional samples were collected at two site adjacent to the landfill and analyzed for semivolatile organic constituents. As was the case in previous surveys, the only semivolatile organics detected were the phthalates, a fairly common component found in sediments. Since a number of piezometer wells have been installed in and around WAG 12, groundwater samples were taken for metal analysis. Relatively high concentrations of Al, Ba, Fe, Mg, and Mn were found in one of the downgradient wells (915), while elevated levels of Cr were seen in another (13). Volatile organics detected included methylene chloride and 1,2-dichloroethane at concentrations at a level of 10 ppb. Based on the previous results and of additional surveys, including analysis of groundwater (reported here), it does not appear that WAG 12 is a source of continuing release. A surface radiological walkover survey at the Closed Contractors' Landfill in 1989 showed no evidence of detectable surface radioactivity above typical ORR background values. (ORNL 1990)

Site Status: CERCLA/RCRA (ORNL 1990)

Media of Concern:

Comments:

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Ford, M.K., L. Holder Jr., and R. G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993 - 2002,* ORNL/ER-39.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_28.JPG



UNIT NAME: Buried Scrap Metal Area

Unit Number: 16.03

Project Status: No activity planned.

Unit Location: The site is located south of Building 7710 at the point where the road to the reactor (Building 7709) turns west. The ORNL grid coordinates are N 11,150 ft and E 36,250 ft. (ORNL 1987)

Approximate Dimensions and Capacity: The size of the burial trench is undetermined. It is estimated that the total area is approximately 40 ft by 50 ft (12.2 m by 15.2 m). (ORNL 1987)

Dates Operated: Material was stored on the surface from the early 1960s to the early 1980s when some of the material was removed to other areas and the remainder was buried in place. (ORNL 1987)

Present Function: Not in operation.

Life Cycle Operation: The area was used as a waste pile prior to burial in place. (ORNL 1987)

Waste Characteristics: The known materials buried included a container (4 ft by 3 ft [1.2 m by 0.9 ml) of polyethylene beads and a collection of Japanese building construction materials. These were uncontaminated materials which originated from the Nevada Test Site. Three sealed radiation sources, cesium and cobalt, were stored in the area but were removed to SWSA 6 in 1983. (ORNL 1987)

Release Data: There have been no reported releases. (ORNL 1987)

Site Status: CERCLA/RCRA (ORNL 1990)

Media of Concern:

Comments:

References:

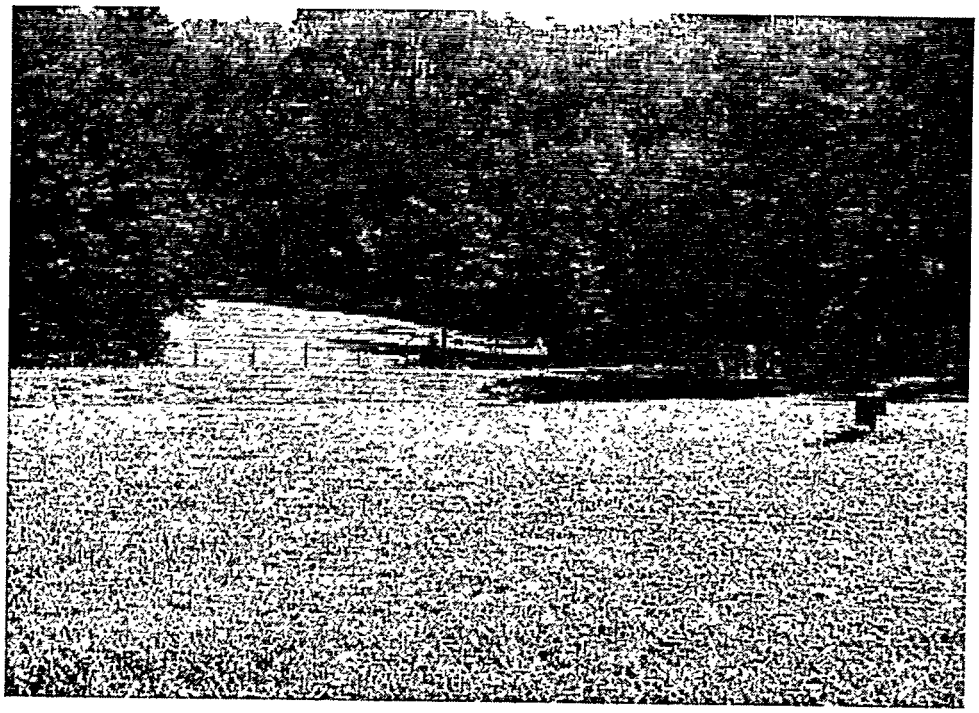
FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory, Addendum*, ORNL/RAP-12/V3, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 06_25.JPG



UNIT NAME: Cesium-137 "Forest" Research Area (7759)

Unit Number:

Project Status: No activities are planned.

Unit Location: The site containing the contaminated trees is located on the azimuth bearing of E66 degrees S, a distance of 1.8 mile (2.9 km) from the intersection of Bethel Valley Road and Melton Valley Access Road. ORNL grid coordinates are N 13,000 ft and E 34,500 ft. (ORNL 1987)

Approximate Dimensions and Capacity: The site is a 20 x 25 m plot (66 x 82 ft). Thirty yellow-poplar trees ranging up to approximately 100 ft (30 m) tall were used in this study. A total of 467 Mci of Cs-137 was introduced into the transpiration stream of the trees. (ORNL 1987)

Dates Operated: Site commissioned: May 20-23, 1962. Site still remains today. (ORNL 1987)

Present Function: Not in operation.

Life Cycle Operation: Trees were inoculated with cesium to determine the movement of this nuclide and as an analog to the essential element potassium. (ORNL 1987)

Waste Characteristics: Cs-137 is the primary waste. Nearly 24 years have passed (approximately 0.8 half-life) since the isotope was injected into the trees. Correcting only for radiological decay, approximately 270 Mci would remain today. This amount has been further decreased by wind distribution of leaves, movement through soil, and runoff. (ORNL 1987)

Release Data: No releases reported. (ORNL 1987)

Site Status: CERCLA (Taylor 1986)

Media of Concern: Soil, Sediment

Comments:

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory* ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Taylor, F.G., June 1986. *Inventory of ORNL Remedial Action Sites: 6. Environmental Research Areas,* ORNL/RAP/LTR/86/18, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11_09.JPG; 11_10.JPG; 11_12.JPG; 11_14.JPG









UNIT NAME: Process Waste Basin (7711)

Unit Number:

Project Status: No Further Investigation (NFI) approved March 1994. (Jolly 1996)

Unit Location: Site is located on Copper Ridge west of the reactor building at the Dosimetry Application Research (DOSAR) facility, Health Physics Research Reactor (HPRR). ORNL grid coordinates are N 12,260 ft and E 35,830 ft. (ORNL 1987)

Approximate Dimensions and Capacity: The basin is approximately 10 x 20 m (34 x 64 ft) at the top of the berm with sides sloping 4 m (12 ft) inward to a 2-m- (6-ft-) deep bottom that is 2 x 12 m (10 x 40 ft). The basin is lined with a deteriorating Hydromat asphalt liner. When filled to a depth of 1 m (3.75 ft), the basin holds approximately 95,000 L (25,000 gal). (ORNL 1990)

Dates Operated: Unknown

Present Function: Not in operation.

Life Cycle Operation: The retention basin was installed to collect groundwater seepage into the reactor storage vaults. The facility was never used for its intended purpose.(ORNL 1987)

Waste Characteristics: No waste has been added. The only water in the basin results from precipitation and checks by fire department personnel who make sure the drain system is free of obstructions by flushing water through the drain port. (ORNL 1990)

Release Data: No waste has ever been diverted to the basin. The major use of the basin is to check out fire protection systems. (ORNL 1987)

Results of a 1989 radiological walkover survey show surface gamma exposure rates ranging from 6 to 14 μR/h. These values represent typical background levels for uncontaminated areas. Directly measured alpha activity at three locations ranges from 9 to 54 dpm/100 cm^2; whereas, beta-gamma dose rates at the same locations ranged from 0.13 to 0.016 mrad/h. These values are within the range of typical background levels. (ORNL 1990)

Site Status: CERCLA/RCRA (ORNL 1990)

Media of Concern:

Comments:

References:

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory*, ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Jolley, Robert, December 5, 1996. Tennessee Department of Environment and Conservation, personal communication with Anita Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Abandoned Underground Waste Oil Storage Tank 7002A

Unit Number:

Project Status: Removal completed. (Kuhaida 1996)

Unit Location: The tank was located near the southwest corner of Building 7002 in the 7000 area east of the ORNL main complex. Approximate ORNL grid coordinates are N 21,700 ft and E 36,780 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The underground steel tank is approximately 27 inches wide, 4 feet tall and 5 feet long. Its capacity is estimated at 275 gallons. (ORNL 1990)

Dates Operated: Existing records suggest the tank was installed around 1948 and that it was abandoned in place in 1977. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The tank was used to store waste oil from the ORNL Garage. The tank was believed to store only waste oil; however, records have not been located. (ORNL 1990) The tank was removed in 1989 and stored in a diked Toxic Substance Control Act (TSCA) Storage Area in the 7000 area of ORNL. (Finger 1994a)

Waste Characteristics: Analytical results indicated the tank contents were contaminated with 1,1,1-trichloroethane (a common degreaser) and polychlorinated biphenyls. PCB levels ranged up to 209 ppm. PCB concentrations found in residual material in the tank were less than 30 ppm. (Finger 1994a)

Release Data: The tank was uncovered during October 1989 in an attempt to determine whether it had been permanently closed. It was then discovered that the tank contained an oily/sludge water mixture. However, visual observations of the tank suggested that the level of material fluctuated which, in turn, suggested that the tank was not tight and that the contents could have been a source of continuing release to the environment. During an attempt to remove the UST, all material (estimated at 148 gallons) in the tank was released through existing corrosion holes on the sides of the tank into the pit. (Finger 1994b) Cleanup of the site has been completed. Notifications of a release of PCB-contaminated material were made to DOE/ORO, DOE/HG, EPA Region IV, and the National Response Center. The tank was wrapped in plastic and moved to a secured, diked location. (Nix 1989)

This tank had been listed on ORNL's Underground Storage Tank (UST) Notification Forms as a tank regulated under Subtitle I of the Resource Conservation and Recovery Act. (ORNL 1990)

Site Status: CERCLA/RCRA (ORNL 1990)

Media of Concern:

Comments: Finger (1994a) indicated the tank has a capacity of 2000 gallons. The tank was decontaminated and cut up in 1994 and is being stored as PCB waste until the U.S. EPA's approval for salvage. (Smith 1994).

References:

Finger, J.M., February 4, 1994a. Memorandum to J.A. Mayo, Subject: GSX98 Project - Clean Tanks 7002A and 7009E. Martin Marietta Energy Systems, Oak Ridge National Laboratory, Oak Ridge,Tennessee.

Finger, J.M., February 8, 1994b. Memorandum to David Scott Zill. Subject: Tank 7002A. Martin MariettaEnergy Systems, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

Nix, C.E., November 9, 1989. Letter to D.A. Underwood, Laboratory Waste Management Division withattached report, "Report of Release of Polychlorinated Biphenyls from an Abandoned Underground Storage Tank (UST) at Oak Ridge National Laboratory Garage, Building 7002," Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Smith, Winston, December 10, 1994. U.S. EPA, Letter to Ronald Hultgren U.S. DOE, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Waste Oil Storage Tank (7002W)

Unit Number: 17.02A

Project Status: No activity planned.

Unit Location: The tank is located on the west side of Building 7002. ORNL grid coordinates are N 21,800 ft and E 36,800 ft. (Boegly and Moore, 1987)

Approximate Dimensions and Capacity: The tank is 5 ft 4 in (1.7 m) diameter by 15 ft (4.6 m) long, horizontal, steel, and located above ground. Tank capacity is 2,500 gal (9,463 L). (ORNL 1990)

Dates Operated: The tank was installed in 1984. It is still in service. (ORNL 1990)

Present Function: The tank is used to store waste oil. (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: The tank contains waste oil. No records exist of hazardous materials or radionuclides being present. The oil has not been analyzed. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: Clean Water Act/CERCLA (ORNL 1990)

Media of Concern:

Comments: Contaminated Site Summary Sheet (CSSS) 1990 lists the grid coordinate at N 21,840.

References:

Boegly W.J. Jr., and G.K. Moore, January 1987. *Environmental Data Package For the ORNL Services Area (WAG 17),* Oak Ridge National Laboratory, Oak Ridge Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Paint Solvents Storage Tank (7615)

Unit Number: 18.02

Project Status: No activity planned.

Unit Location: This site is located at the north end of the 7615 storage building. ORNL grid coordinates are N 18,320 ft and E 43,600 ft. (ORNL 1987)

Approximate Dimensions and Capacity: This unit is an underground steel tank. Dimensions are 2.5 ft diameter (7.6 m) and 7 ft (2 m) high. Capacity is 280 gal (1,060 L). (ORNL 1987)

Dates Operated: Installation date: 1962. The tank is inactive. (ORNL 1987)

Present Function: Not in operation.

Life Cycle Operation: The contents of this tank (and its function) are unknown. Reports indicate that the tank may have stored paint solvents. (ORNL 1990)

Waste Characteristics: No information exists on the nature and amount of waste stored in this tank. (ORNL 1987) On September 29, 1989, the Environmental Sampling group sampled the pit after tank 7615 had been removed. Samples were collected and analyzed for petroleum hydrocarbons as requested by the UST Tank Program. These results are not available. At a later date, the soil was analyzed for organics. Results indicate no organics, volatile or semivolatile, present in the soil tested. (Murphy 1990)

Release Data: No releases reported. (ORNL 1987)

Site Status: CERCLA/RCRA (ORNL 1990)

Media of Concern:

Comments: Results of the 9/29/89 sampling for petroleum hydrocarbons mentioned in the 10/9/90 memo were not available. This memo was found in file materials given to Jerry Kuhaida by Linda Kaiser.

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Murphy, John, October 9, 1990. Memorandum to Nancy Dailey, ORNL Compliance Group. Subject: Sampling and Results - 7615 Tank Pit Resample, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory*, ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Waste Retention Basin (7613)

Unit Number:

Project Status: No activity scheduled.

Unit Location: ORNL grid coordinates are N 18,600 ft and E 43,050 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The basin measures about 30 ft (9 m) by 40 ft (12 m). A concrete divider divides the basin. (ORNL 1990)

Dates Operated: Installed: 1960. Basin is still in service. (ORNL 1990)

Present Function: It is currently used as an emergency water supply for fire protection. (ORNL 1990)

Life Cycle Operation: The basin may have been installed as a waste retention basin for the Environmental Gas Cooled Reactor (EGCR) but was never used for its intended purpose. (ORNL 1987)

Waste Characteristics:

Release Data: No releases are reported. (ORNL 1987)

Site Status: No applicable regulation.

Media of Concern:

Comments:

References:

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory*, ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Explosive and Shock-Sensitive Waste Detonation Area

Unit Number: 19.08

Project Status: No activity planned.

Unit Location: The facility is located about 200 ft (blm) northwest of the Hazardous Waste Management Area. The ORNL gird coordinated are N 16,550 ft and E 37,000 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The site of two explosive materials storage magazines, a detonation trench, and a control site. The site is surrounded by a security fence. The trench is 10 ft long, 5 ft wide, and 4 ft deep (3.0m x 1.5m x 1.2m) and surrounded by a security fence. (ORNL 1990)

Dates Operated: Has not been used since August 1987. (ORNL 1990)

Present Function: Provides a safe, effective, and environmentally acceptable method for disposal of explosive shock sensitive chemicals. (ORNL 1990)

Life Cycle Operation: The site replaced a detonation trench at SWSA 6 that had been used for a number of years. (ORNL 1990)

Waste Characteristics: Wastes detonated included picric acid, phosphorous, hydrogen peroxide, ammonium nitrate, and other shock sensitive materials. (ORNL 1990)

Release Data: No releases have been reported (ORNL 1990)

Site Status: No applicable regulation (ORNL 1990)

Media of Concern:

Comments: Soil monitoring results (Appendix E-1) for ORNL's Chemical Detonation Facility (7667) were included in the information given to Jerry Kuhaida, ER Project Manager, from Linda Kaiser, ORNL Program Planning Manager. However, no reference for this information could be found and it is not clear whether this is the same site as identified for this SDDS.

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_19.JPG



UNIT NAME: Reactive Chemicals Disposal Area (7659B)

Unit Number: 19.06

Project Status: No activity planned.

Unit Location: The site is located to the southeast of the ORNL main plant area in Melton Valley. It is located south of Ramsey Drive and east of Melton Valley Access Road. (Kuhaida 1996) ORNL grid coordinates are N 17,950 ft and E 39,830 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The Reactive Bottle Smasher is a box 18 in (46 cm) deep, 30 in (76 cm) wide, and 48 in (122 cm) long. It is located in a fenced area measuring 75 ft by 150 ft (23 by 46 m). (ORNL 1990)

Dates Operated: Site installed: 1983. Site is no longer in service as of 1988. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: This facility, also known as the Reactive Chemicals Bottle Smasher, is used to crush glass and metal containers and release their contents to the atmosphere. It is a 0.5-in. plate steel box with a hinged lid. Containers to be smashed are placed in the box, and the lid is released remotely from approximately 75 ft (23 m) away. The lid swings into the box, smashing the glass and metal containers. (ORNL 1990)

Waste Characteristics: Contents of containers are highly volatile liquids (e.g., hydrazine, ethers, alcohol-ether mixtures, etc.). (ORNL 1990)

Release Data: No releases have been reported. Crushed glass and metal containers are disposed of in the Contractors' Landfill. No monitoring of the site is conducted. (ORNL 1990)

Site Status: RCRA (ORNL 1990)

Media of Concern:

Comments: No additional information was obtained.

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, (CSSS), Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Soil Injection of Radioactive Gas (7659C)

Unit Number:

Project Status: No activity planned.

Unit Location: The site is located south of Ramsey Drive in Melton Valley in the same general area the Leaking Gas Cylinder and Reactive Chemical Disposal Areas. ORNL grid coordinates are N 17,850 ft and E 39,750 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The area is fenced and measures about 75 ft by 150 ft (23 by 46 m). (ORNL 1990)

Dates Operated: The site was constructed and operated during the period 1976-1977. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The original description of this unit was based on verbal information and is incorrect. More detailed investigation indicates that this site (known as the "Sandia Site") was used to perform heater tests in the shale to obtain thermal information for use in the high-level waste repository program. No radioactivity or chemical wastes were involved at the site. No records exist to suggest any gas injections at this site. (ORNL 1990)

Waste Characteristics: No wastes (radioactive or hazardous chemical) were involved in the studies at this site. (ORNL 1990)

Release Data: No releases have occurred. Equipment has been removed from the site. Site is currently used for SWMUs X19-05 and X19-06. (ORNL 1990)

Site Status: No applicable regulation (ORNL 1990)

Media of Concern:

Comments: No additional information was obtained.

References:

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Municipal Sewage Sludge Application Site (XF1226)

Unit Number: 20.01

Project Status: No Further Investigation (NFI) approved (FFA 1996)

Unit Location: The site is located on the southeast side of Chestnut Ridge and north of Bethel Valley Road ~ 5 miles east of the main ORNL plant area. (ORNL 1987)

Approximate Dimensions and Capacity: Approximately 65 acres (26 ha) has been used to date. (ORNL 1990)

Dates Operated: Sludge disposal began in 1983. Sludge disposal was moved to another site in 1986. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The unit functioned as a land disposal operation for digested sewage sludge from the city of Oak Ridge's sewage treatment plant. (ORNL 1990)

Waste Characteristics: The waste is digested sewage sludge. Due to water discharged into the Oak Ridge sewer system by certain industries, radionuclides have been detected in the sewage sludge. Inventory of radionuclides at this site is 0.074 Ci from Co-60, 0.013 Ci from Sr-90, 0.044 Ci from Cs-137, 0.010 Ci from Pu-239, 180.0 kg (397 lb) of Cd, 110.0 kg (242.5 lb) of Ni, and 4,600.0 kg (10,141 lb) of Pb. Volume of sludge applied was about 6.0×10^6 gal (2.3×10^7) L). (ORNL 1987 and ORNL 1990)

Release Data: Limited sampling of soil and surface water on the site does not indicate that there are potential public health problems due to exposure to the radionuclides. Groundwater sampling at the site has been initiated. (ORNL 1990)

Site Status: RCRA/CERCLA; Clean Water Act (ORNL 1990)

Media of Concern:

Comments:

References:

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation,* DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1987. *RCRA Facilities Assessment (RFA) - Oak Ridge National Laboratory*, ORNL/RAP-12/V1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

5. ORNL SITE DESCRIPTION DATA SHEETS FOR REMOVAL SITE EVALUATION AREAS

UNIT NAME: High Radiation Level Analytical Facility (3019B)

Unit Number: 1A.15

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Buildings 3019A, 3019B, and 3135 are part of the Radiochemical Development Facility (RDF), otherwise referred to as the Building 3019 Complex. All three buildings are located inside the ORNL main complex near the intersection of Third Street and Hillside Avenue. (ORNL 1996)

Approximate Dimensions and Capacity: The High Radiation Level Analytical Facility (HRLAF) (3019B) is a 3,000ft^3 concrete and masonry block building containing a hot cell bank with seven cells equipped with master-slave manipulators, and a central storage cell from and to which materials were transferred for storage. (ORNL 1996)

Dates Operated: Constructed in 1952. Operation ended in 1984. (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: The HRLAF was used for separating, processing, and analyzing highly radioactive samples from many ORNL programs. Including all those operated in Building 3019A. (ORNL 1996) On the west end of the building is a loading dock that appears as a small appendage with red doors to the outside. This dock was used to load and unload carriers to and from the charging area. The dock was cleaned out in 1990, and has been used within the last 5 years to transport materials from the building. The cells are also serviced by a rear access area providing entry to the back of the cells. (ORNL 1996)

Waste Characteristics: The samples handled in Building 3019B included fission products, activation products, uranium, plutonium, and other transuranic materials. (ORNL 1996)

Release Data: The area within the cells is highly contaminated with both beta-gamma and alpha-emitting radioisotopes but the exact amount is not known. (ORNL 1996)

Site Status: CERCLA

Media of Concern:

Comments: The Contaminated Site Summary Sheets (ORNL 1990) lists date operation ended as 1980.

References:

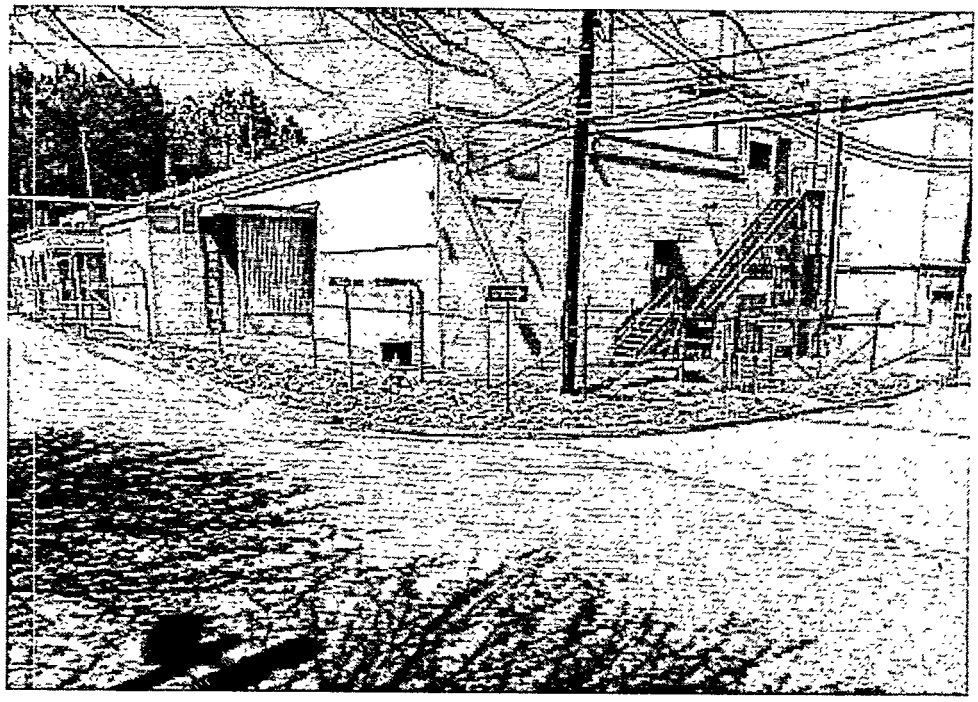
Advanced Sciences, Inc., August 1996. *Removal Site Evaluation Report on 3019B at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1514 &D1,* prepared for the U.S. Department of Energy, Office of Environmental Management.

Oak Ridge National Laboratory, March 1996. *Work Plan for High Ranking Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-322, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 3656_91.JPG



UNIT NAME: Alpha Handling Facility (3038 AHF)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The Alpha Handling Facility is located in the ORNL main plant area north of Central Avenue in the west end of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3038 consists of 5 hot cells shielded by water-filled steel tanks. It is a single-story metal frame building. The operating face of each cell has 3 ft of shielding, is 6 ft wide by 8 ft high, and contains a viewing window and manipulator ports. Each cell is 10 ft deep. The building has approximately 7,250 ft^2 of floor space. (ORNL 1995)

Dates Operated: 1949-1990

Present Function: Not in operation. (ORNL 1995)

Life Cycle Operation: Building 3038 Alpha Handling Facility housed the packaging, inspection and shipping activities for radioistopes. The building wall, consisting of 1 ft of concrete, forms the back of the cells. These cells can be used as glove boxes by replacing the front shielding tank and manipulators with an approved window equipped with glove ports and loadout station. The alpha cells drain to the WC-2 tank system. (ORNL 1995)

As the volume of radioisotopes being shipped decreased in the 1960s, the shipping area was reduced. In 1968, the west portion was converted into the Alpha Handling Facility by adding water-shielded hot cells and glove boxes for fabrication of targets. (ORNL 1995)

Waste Characteristics: Unknown.

Release Data: Low levels of residual fixed and transferrable radioactive surface contamination exist in areas of the facility resulting from historical operations. The contamination exists primarily in the hot cells, barricade area, glove boxes, hoods, and related process equipment. Total radiation levels in the facility was < 12 mrem/hr @ 30 cm (gamma/neutron). (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Alpha Powder Facility (3028)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The Alpha Powder Facility is located in the ORNL main plant area in the northwest area of Isotope Circle, directly west of Building 3047. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3028 is a steel-frame structure covered by metal siding. The total volume of free space is 80,000 ft^3. The building has a four-story central section with one-story cell operating areas on the east and west sides. (ORNL 1995)

Dates Operated: Constructed in 1950. Operation discontinued in 1985.

Present Function: Not in operation. (ORNL 1995)

Life Cycle Operation: This facility originally housed the I-131 processing facility (now the Short-Lived Fission Product Cells) and the separation facility (a four-story ion-exchange column) for Pm-147. The I-131 facility was converted to manipulator cells in the early 1960s and expanded to the Short-Lived Fission Product Facility. The Xe-131 facility was added at about that time. Products and processes developed for sale included Xe-133, I-131, and Mo-99. The Xe-133 operation continued through 1980, and the Short-Lived Fission Product Program was discontinued in 1985. Water-shielded cells were installed on the first floor in 1964 for the curium source fabrication program of Space Nuclear Systems. The curium cells were partially decontaminated in the mid-1980s and the facility was redesigned as the Alpha Powder Facility, which brought it back into a full-cost-recovery isotopes program. In the late 1970s, the target facility moved to Building 3038 and the upper floors were occupied by Nuclear Medicine Research (NMR), which was funded by Energy Research in the Health Science Research Division (HSRD). NMR turned the laboratory facilities over to the Office of Risk Assessment, HSRD in 1988. (ORNL 1995)

Waste Characteristics: The major contamination in this building is left from curium processing, the source fabrication work, and the Pm-147 processing. The contamination exists primarily on the hot cells and process equipment (vessels, hood, piping, ventilation ducts, etc.). (ORNL 1995)

Contamination levels are reportedly 10 µCi of alpha in the facility and approximately 150 mCi alpha in the hot cells, 25 µCi of beta/gamma contamination in the facility and approximately 0.45 Ci beta/gamma in the hot cells. (Haff et al 1994)

Release Data: Cell 6 is highly contaminated with Pm-147. Cell 5 is contaminated with alpha and beta/gamma (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

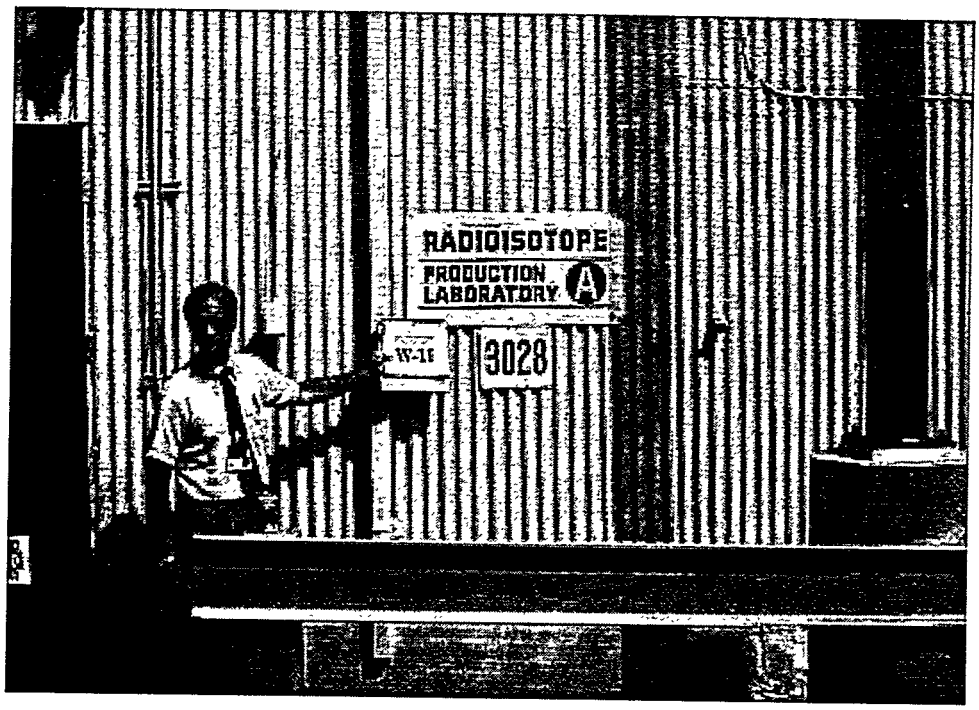
Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Haff, K.W., R.S. Owens, and W. J. Armento, December 20, 1994. *Phase I Safety Documentation, The Source Development Laboratory, Building 3029, Hazard Screening*, HS/3029/F/RT-6, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 18_24.JPG



UNIT NAME: Bulk Shielding Reactor (Building 3010)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996).

Unit Location: The Bulk Shielding Facility (BSF), which houses the Bulk Shielding Reactor (BSR) and the Pool Critical Assembly (PCA), is in the north-central area of the main ORNL site north of Hillside Avenue. (ORNL 1996)

Approximate Dimensions and Capacity: The facility is a two-story steel framed building with corrugated metal siding. Building 3010 covers an overall area of 77 ft x 51 ft. The portion of the facility containing the pool and the 35 ft high reactor bay occupies an area 32 ft wide and 74 ft long. The remainder of the building contains offices, instruments rooms, experiment rooms, and a small shop. The three experiment rooms are located on the main level, on the west, northwest, and northeast sides of the facility. The pool has internal dimensions of 40 ft long x 20 ft wide and varies in depth from 21.5 ft to 27 ft. The pool holds approximately 130,000 gallons of water. (ORNL 1996)

Dates Operated: 1951-1984 (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: Throughout its history, the BSF was used by ORNL and other domestic, international, government, academic, and commercial personnel and organizations for isotope production, materials irradiation, radiation shielding experiments, and training for reactor operators and nuclear engineering students. (ORNL 1996)

Waste Characteristics: The radiological materials stored at the BSF include spent fuel, radioactive source material, and heavy water containing tritium. (ORNL 1996)

There are radioactive sources stored in the reactor bay pool which are stored in two locked aluminum cans. These sources include 2000 Ci of Co-60, 10 Ci of radium, and 1.5E-4 Ci of Sb-124. Also, there are 10 fission chambers used for calibration stored in a locked storage cabinet at the BSF. The reactor bay holds three aluminum tanks containing 907 kg of heavy water contaminated with tritium. (ORNL 1996)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., August 1996. *Removal Site Evaluation Report for the Bulk Shielding Facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1516&D1,* prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory,* DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory National Laboratory, March 1996. *Work Plan for the High Ranking Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-322, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Fission Product Development Laboratory (FPDL) (3517)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The FPDL is located in the ORNL main plant area in Building 3517. ORNL coordinates are N 21,730 ft and E 31,000 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building 3517 is a three-story, braced steel framework structure with metal deck roofs and 12 in non-reinforced concrete masonry walls in the lower two stories. The building is about 120 ft long (east - west), and the first two stories are about 60 ft wide (north - south) and 27 ft high. A third story, about 27 ft wide by 16 ft high, runs the length of the building east - west. This third story, referred to as the crane bay, supports a 20 ton bridge crane and services the top access plugs to Cells 1 through 15. The crane bay has aluminum siding. (ORNL 1995)

Dates Operated: Site commissioned: 1958. Site placed in standby condition: 1989. (ORNL 1995)

Present Function: No radioactive operations are being conducted in Building 3517. Decontamination activities are continuing with the removal and disposal of some solid and liquid radioactive waste. (ORNL 1995) Activities involving the processing of radioactive source material have ceased in Building 3517. Current operations are limited to surveillance, maintenance, and deactivation activities and storage of most of ORNL's inventory of Sr-90 and Cs-137. (ASI 1996)

Life Cycle Operation: The Fission Product Development Laboratory (Building 3517), was constructed (1) to recover long-lived fission products (e.g., Sr-90, Cs-138, and Ce-144) from aqueous wastes generated in reprocessing irradiated reactor fuel elements, (2) to purify feed materials from other DOE sites, and (3) to prepare radioactive sources. Radioisotopes processing continued in the manipulator cells after 1975 as a reduced level of operation until April 1989, when the building was placed on standby. The principal operations during this period involved the production of Sr-90 and Cs-137 sources from separated product from Hanford. (ORNL 1995)

Other special operations (various short-term periods) include (1) processing of Co-60, Ir-192, and U-235; (2) Am-241 target preparation; (3) Eu-152-154 purification; and (4) separation of Tc-99 from crude concentrate received from the Paducah Gaseous Diffusion Plant. (ORNL 1995)

Waste Characteristics: Primary wastes are Sr-90 and Cs-137. (ORNL 1990)

Release Data: The inactive process cells contain an array of contaminated tanks, piping, samplers, services, and instrumentation with background radiation levels ranging 1-100 rad/h, with isolated hot spots of 100-1,000 rad/h. (ORNL 1990) The following represents the known quantities if substances currently existing in the facility that have been released and that could be released. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.
(ASI 1996)
90,000 Ci Sr-90
350,000 Ci Cs-137
= 3,500 CI Eu-154
= 2,500 Ci Eu-152
= 16,000 Ci uCo-60
= 36,000 Ci C,-244
Quantity of PCB's unknown (assumed to be less than 1 gallon)
= 1,686 pounds total miscellaneous HAZMATs

Site Status: Surplus Facility (SF) (ORNL 1990)

Media of Concern:

Comments: Burwinkle (1987) indicates the facility was put on standby in 1975. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-249/R2 Prepared by the Isotopes Facilities Deactivation Project, Environmental Restoration Division, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

UNIT NAME: Integrated Process Demonstration Facility (7602)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Building 7602 is located in Melton Valley at the east end of Ramsey Drive. It is attached to Building 7603, the Remote Operations and Maintenance Demonstration Facility, which is active. (ORNL 1996)

Approximate Dimensions and Capacity: Building 7602 is a 15,841 ft^2 concrete block and steel frame building. The building has three floors. Three pits that could collect any liquids coming from leaks are included as part of Building 7602. Those pits are the F14 pit, the solvent extraction pit, and the dissolver pit. (ORNL 1996)

Dates Operated: Constructed in 1963. Declared surplus in 1994. (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: Originally built as a reactor fueling building for the Experimental Gas-Cooled Reactor, which was never fueled or operated. From 1974-1981, the building was used for the Liquid Metal Program which developed technology and equipment to reprocess fuel in connection with the Clinch River Breeder Reactor. From 1981-1983, modifications were made for a collaborative program with Japan involving separating process development and testing, which was conducted from 1984-1994. (ORNL 1996)

Waste Characteristics: Since Building 7602 was declared surplus, process chemicals and uranium have been removed from the process systems, and all have been disposed of except 2,774 gallons of concentrated uranyl nitrate solution. (ORNL 1996)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: The High Ranking Facilities Deactivation Project Work Plan (ORNL 1996) indicates that "no fuel was ever handled in Building 7602"; however, according to Terri Nelson (Nelson 1996), radioactive materials were handled in this facility. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., August 1996. *Removal Site Evaluation Report for the Integrated Process Demonstration Facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1515& D1*, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Nelson, Terri, April 29, 1996. Operations Deactivation Manager, High Ranking Facilities Deactivation Project for Environmental Restoration (ORNL Sites), LMES, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, March 1996. *Work Plan for the High Ranking Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-322, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Isotope Material Laboratory (3038-E)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Located in the ORNL main plant area. The Isotopes Material Laboratory is located on the east end of Building 3038 on the southwest corner of the Isotopes Circle. (ORNL 1995b)

Approximate Dimensions and Capacity: Building 3038 is divided by concrete block interior walls into three separate facilities: 3038E, 3038M, and 3038AHF. The Isotope Material Laboratory (3038-E) consists of the process cell area which has one manipulator cell (Cell 3), hoods, and a shielded counting room. The cell is constructed of 4-in steel plate on all sides with a mineral oil-filled, leaded-glass viewing window and a 10-in^2 access port. It is supported on concrete pillars. This cell was used for separating Y-90 from Sr-90 and is highly contaminated. There is no provision for wash down since the hot drain was sealed. An empty shielded counting room is adjacent. There is single-stage roughing filtration in the cell. Exhaust from the cell, hoods, and room is routed to a filter house on the roof (double-stage HEPA filtration) and discharged to the 3039 stack. (ORNL 1995b)

Dates Operated: 1949-Unknown. (ORNL 1995b)

Present Function: Packaging, shipping, and receiving of radioisotopes are ongoing activities in Building 3038. There are no operations in the east-end laboratories. However, the plan is to relocate these activities to other ORNL facilities. (ORNL 1995b)

Life Cycle Operation: Building 3038 was constructed to house all the radioisotopes shipping activities for ORNL. The building has been in operation since 1949. Originally, the entire facility was dedicated to radioisotopes shipping as follows: the east portion (3038E) contained the analytical chemistry laboratory to perform analyses of short-lived radioisotopes prior to shipment; the middle section (3038M) housed the radioisotopes handling and transfer barricade; and the west section housed the packaging, inspection, and shipping activities. (ORNL 1995b)

The analytical chemistry laboratories supporting isotopes sales were located in the east end until 1976. When the analytical function was transferred to other ORNL facilities, the east end was converted into an isotopes production and development facility. In the late 1970s and early 1980s, a research program on plutonium alloys and compounds was conducted in the area which was funded by the DOE Office of Basic Energy Sciences. The same glove boxes were used in the mid 1980s to perform research with the Solid State Division on Pm-147-doped crystals and glasses for laser development studies funded by Lawrence Livermore National Laboratory. With these two exceptions, all work in this end of the facility has been dedicated to isotopes efforts. (ORNL 1995b)

Waste Characteristics: Y-90, Sr-90. (ORNL 1995b). The principal materials used in the Isotope Material Laboratory were uranium, transuranic materials, and Pm-147. (ORNL 1995a)

Release Data: The process cell was used to separate Y-90 from Sr-90 and is highly contaminated. Although all inventory is gone, some old containers leaked in the lazy-susan-type storage holders. The contamination is contained and decontamination efforts reduced the background radiation levels and remaining quantities of residual radioactive material. The following were identified as possible contributors to the residual surface contamination and are part of the remaining inventory: Sr-90 (~ 10 Ci), Np-237 (0.0064 Ci), Pu-238 (3800 Ci), Pu-239 (3.7 Ci), Pu-240 (1.8 Ci), Pu-241 (19 Ci), and Am-214 (0.59 Ci). (ORNL 1995a).

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, January 23, 1995a. *Phase I Safety Documentation, The Isotope Development Laboratory, Building 3038, Hazard and Screening*, Doc. No. HS/3038/F/RT-15.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Isotope Technology Building (3047)

Unit Number:

Project Status: No planned activities.

Unit Location: Located in the ORNL main plant area at Hillside Avenue and Fifth Street. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3047A is a three-story steel-frame building with concrete block exterior and interior walls. Building 3047A is joined to the Radioisotopes Development Laboratory Building 3047. Because they have individual ventilation systems and are separated by at least two sets of double doors, they are considered two separate buildings. (ORNL 1995)

Dates Operated: Approximate date of construction is 1963. (Phillips 1996)

Present Function: Currently used for office space. (ORNL 1995)

Life Cycle Operation: Used as an office building for personnel in the Isotope Production Program. (ORNL 1995)

Waste Characteristics: No wastes were handled in this facility. (Phillips 1996)

Release Data: Not Applicable.

Site Status: CERCLA

Media of Concern:

Comments: According to the Isotopes Facilities Deactivation Project (IFDP) Work Plan, the Isotopes Technology Building is an administrative office building adjoining the Radioisotopes Building 3047 and is not in the deactivation program. According to Bob Eversole, IFDP manager, the only building designated as 3047 in the IFDP is the Radioisotope Development Laboratory. The Isotopes Technology Building is an administrative office annex designated 3047A. (Eversole 1996) The FFA lists both the Isotope Technology Building (3047) and the Radioisotopes Development Laboratory (3047) separately, under the NMFS Program and the RmSE Phase with no "A" designation for the Isotope Technology Building. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Eversole, Robert, April 30, 1996. Project Manager for IFDP, LMES. Personal communications with Anita F. Parker, Advanced Sciences, Inc.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, Personal communication with Anita F. Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 15_14.JPG



UNIT NAME: Krypton Storage Cubicle (3093)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Located in the ORNL main complex northwest of and adjacent to Building 3033. (ORNL 1995)

Approximate Dimensions and Capacity: The cubicle is a roofless reinforced, concrete enclosure, containing four charcoal-filled storage tanks. It consists of a non-ventilated 2 ft-thick reinforced-concrete enclosure. (ORNL 1995).

Dates Operated: Unknown.

Present Function: Not in Service.

Life Cycle Operation: Building 3093 was used to store radioactive materials used in processes conducted in Building 3033. (ASI 1996) Building 3033 was used to process Cr-14, Kr-85, and H-3. Processing of C-14 was discontinued in 1975. Krypton operations included the purification of Kr-85 (from the Idaho National Engineering Laboratory) in preparation for direct sale or as feed to the thermal diffusion columns in Building 3026C. The last Kr-85 campaign was conducted in September 1989. (ORNL 1995)

Waste Characteristics: Much less than 1 Ci of krypton remains in the storage tanks. (ORNL 1996)

Release Data: There is some residual krypton irretrievably absorbed on the charcoal in the storage tanks in Building 3093. This poses no threat of exposure to personnel or the environment. The krypton gas cannot be removed from the charcoal even by extended heat treatment. (ORNL 1996)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities in the Isotope Facilities Deactivation project were used in the late 1940s to the late 1980s. (Phillips 1996) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, February 26, 1996. *Safety Documentation, The Krypton and Tritium Facility, Buildings 3033/3093*, Draft, Doc. No. HS/3033/3093/E/RT-10/Rev 1, prepared by Chemical Technology/ORNL Environmental Restoration Program, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ONRL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Krypton-85 Enrichment Facility (3026C)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3026C located in the ORNL main plant area on Central Avenue between Third and Fifth Streets. (Kuhaida 1996)

Approximate Dimensions and Capacity: The two-story structure (i.e., high bay area) of Building 3026C houses two banks of four hot cells each. These cells are constructed of reinforced concrete 2 ft thick (top, sides, and partitions) with a 4- by 6-foot space for each cell. (ORNL 1995)

Dates Operated: The building was constructed in 1943. The krypton system was installed in the mid-1960s. (ORNL 1995)

Present Function: Krypton loading equipment in Building 3026C is still functional and will be used in the final disposal of all residual Kr-85 as part of the Isotopes Facilities Deactivation Project (IFDP) planned activity. The Health Sciences Research Division (HSRD) now uses only Cell 4 in Bank 1 (west), the Laboratory 11 complex, and the counting room for nuclear medicine research. The Instrument and Control (I&C) Division operates a shop in the southwest corner of the building in which they repair and maintain monitoring equipment. I&C presently occupies offices in Room 5. (ORNL 1995)

Life Cycle Operation: Building 3026C was used for about 5 years (1943-1948) primarily to develop methods of isolating fission products. After World War II, the effort shifted to processing radioisotopes for research and medical purposes. The waste from processing irradiated reactor fuel elements for uranium and plutonium recovery in Building 3019 was piped directly to Building 3026C. At Building 3026C, it was processed to isolate short-lived isotopes. The commercial isotopes program started in Building 3026C. The krypton system was installed in the east cell bank (Cell Bank 2) in the mid 1960s and is still functional but has not operated in over 2 years. By the early to mid 1960s the two front cells of the west cell bank (Bank 1) were being used by the Metals and Ceramics (M&C) Division. It is thought that irradiated reactor fuel elements were segmented in these cells. Cells were also originally used for source safety testing and, more recently, have been used for hot metallographic work. They have now been shut down. Since 1974, Cells 3 and 4 of Bank 1 have been used exclusively for nuclear medicine research. The krypton sales program operations in Building 3026C were discontinued in 1991. (ORNL 1995)

Waste Characteristics: Fission products such as Cs-137 and Sr-90, alpha-emitting actinides, and isotopes recovered during early operations including I-129, I-131, Se-79, Pd-107, Co-60, H-3, Kr-85, W-188, Os-191, and Pm-147. (ORNL 1995)

Release Data: Because of the long operational period, the system is highly contaminated with krypton, which is embedded in the organic gasketing material of the equipment. (ORNL 1995) Contaminants present in the facility include < 1 μCi alpha (no isotope identified), < 10 μCi fission products, including Sc-137, Kr-85, and Co-60, and < 100 μCi H-3. (Ramey and Armento 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996, LMES Project Manager, Review Comments.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Ramey, D.W. and W.J. Armento, March 31, 1992. *Phase I Safety Documentation, The Krypton-85 Enrichment Facility, Building 3026-C, Hazard Screening,* HS/3026-C/F/RT-4, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Metal Segmenting Facility (3026D)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3026D is located in the ORNL main plant area on the north side of Central Avenue. It is east of and adjacent to 3026C. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3026D is a three-story wooden structure. The principal structure within the building is a two-story, 5 ft-thick concrete cell block which is divided into two connecting radioactive material handling cells (hot cells) located in a north-south direction. The west face of the cell block is equipped with manipulators and Zn-Br_2-filled viewing windows. To the west of the cell block, located at floor level is a high-level radioactivity storage facility. This is connected to the south hot cell via a tunnel below the floor for transfer purposes. (ORNL 1995)

Dates Operated: The facility dates back to the 1940s. It was removed from service in 1990. (ORNL 1992)

Present Function: There are no ongoing operations in Building 3026D other than the storage of irradiated metal specimens. (ORNL 1995)

Life Cycle Operation: The Segmenting Hot Cells Facility was originally used to isolate large quantities of fission-produced Ba-140 for criticality testing purposes. The cells in the Segmenting Hot Cells Facility have been greatly modified since the discontinuance of the earlier Ba-140 process. Subsequently they provided facilities for the segmenting, examination, and assembly of irradiated metallurgical specimens. (ORNL 1995)

The building also houses a Chemical Separation Laboratory in addition to the Segmenting Hot Cells Facility. (ORNL 1995)

Waste Characteristics: Historically, the Chemical Separations Laboratory has served as a facility for the production of P-32 and I-131; separation of numerous fission products; isolation of T-99, Pm-147, Np-237; and the isolation of Xn-135 for neutron cross-section determination. (ORNL 1995)

Release Data: Handling cells are contaminated with Co-60 and Cs-137. Several are also highly contaminated with krypton. (ORNL 1995) Hazardous substances consist mainly of residual radioactive surface contamination (alpha, beta, and gamma), irradiated metal specimens, zinc-bromide, and PCB's. The known quantities of substances found in the facility are 150 Ci of Co-60, 2,000 gal of zinc bromide, and < 5 gal of PCBs. (ORNL 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

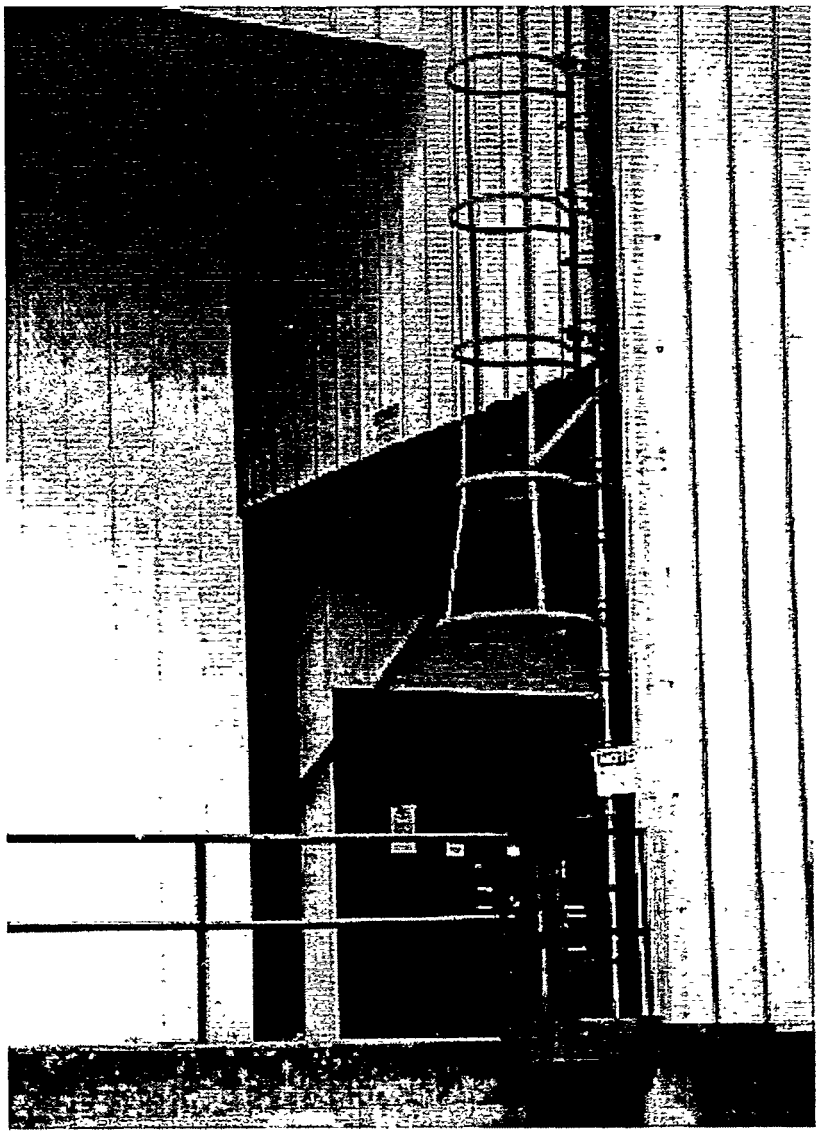
Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, October 20, 1992. *Hazard Screening, Segmenting Hot Cell Facility, Building 3026D, Phase 1 Safety Analysis Report*, Document No. HS/3026D/F/92/Rev 0, prepared by the ORNL Metals and Ceramics Division.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_16.JPG



UNIT NAME: Radioactive Gas Processing Facility (3033)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The radioactive gas processing facility is housed in Building 3033, which is located in the ORNL main plant area. It is in the central area of the Isotopes Circle, northeast of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: The building is a single-story steel-frame structure covered with aluminum siding. The floor space is about 1200 ft^2 with a total volume of about 20,000 ft^3. The outer surface of the building has been sealed by a cocooning process to make it as airtight as possible. Personnel and equipment entrances are gasketed. The building is maintained at a pressure of -0.3 in w.g. or more relative to the outside atmosphere. (ORNL 1995)

Dates Operated: Unknown to 1990 (ORNL 1995)

Present Function: Not in operation.

Life Cycle Operation: Building 3033 was used to process C-14, Kr-85, and H-3. Processing of C-14 was discontinued in 1975. The last operations in Building 3033 consisted of two separate radioactive gas processing systems. Tritium operations involved the receiving of bulk tritium shipments from the Savannah River Plant, followed by purification, loading of shipping containers, and shipment. Krypton operations included the purification of Kr-85 (as received from the Idaho National Engineering Laboratory) in preparation for direct sale or as feed to the thermal diffusion columns in Building 3026C. The processing of H-3 for sale to private industry was discontinued in 1990. The last Kr-85 campaign was conducted in September 1989. (ORNL 1995)

Waste Characteristics: Tritium radiation consists of a relatively soft beta emission, which produces essentially no penetrating radiation hazard. Tritium is handled in a hood inside the tritium room. (ORNL 1995)

Release Data: There is presence of tritium in three traps and associated equipment. There are also some small, fixed hot spots of residual radioactive surface contamination, but most of these areas have been decontaminated. (ORNL 1996)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, February 26, 1996. *Safety Documentation, the Krypton and Tritium Facility, Building 3033/3093, Hazard Identification and Facility Classification*, Draft Document No. HS/3033/3093/F/RT-10/Rev. 1, prepared by the Chemical Technology/ORNL Environmental Restoration Program, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 29_04.JPG



UNIT NAME: Radioactive Packaging and Shipping Facility (3038-M)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area on the southwest corner of Isotopes Circle. The radioactive packaging and shipping facility is located in the middle section of Building 3038. (ORNL 1995b)

Approximate Dimensions and Capacity: Building 3038 is divided by concrete block interior walls into three separate facilities: 3038E, 3038M, and 3038AHF. The radioactive materials shipping and packaging facility (RAMSPAC) consists of a now-empty concrete barricade for storage of isotopes products, a remote pipefitting station, a canning and packaging station, an area for health physics inspection, and an area for labeling of packages. The barricade consists of a concrete wall with lead brick shielding stacked 2 ft high, two lazy-susan-type storage holders behind the shielded wall, a remote manipulator, and an overhead viewing mirror. The products were stored as liquids in glass bottles. (ORNL 1995b)

Dates Operated: 1949 - Unknown. (ORNL 1995b)

Present Function: Packaging, shipping, and receiving of radioisotopes are ongoing activities in Building 3038. However, the plan is to relocate these activities to other ORNL facilities. Barricade operations are discontinued, and all existing inventory has been removed. (ORNL 1995b)

Life Cycle Operation: Building 3038 was constructed to house all the radioisotopes shipping activities for ORNL. The building has been in operation since 1949. Originally, the entire facility was dedicated to radioisotopes shipping as follows: the east portion (3038E) contained the analytical chemistry laboratory to perform analyses of short-lived radioisotopes prior to shipment; the middle section (3038M) housed the radioisotopes handling and transfer barricade; and the west section housed the packaging, inspection, and shipping activities. (ORNL 1995b)

The section of the building called 3038M has always been the radioactive shipping operation for ORNL. Most of the shipments were for the isotopes sales program, but shipments of radioactive materials from other ORNL groups were also handled here. The glove boxes in the Alpha Handling Facility annex were used for loading out of isotopes for sales. (ORNL 1995b)

Waste Characteristics: Some discrete items of inventory remain in transient storage within the facility. Some residual surface radioactive contamination remains. There are some areas of transferrable contamination within the facility but they have been secured. (ORNL 1995a)

Release Data: Although all inventory is gone, some old containers leaked in the lazy-susan-type storage holders. The contamination was contained and decontamination efforts reduced the background radiation levels and remaining quantities of residual radioactive material. The following were identified as possible contributors to the residual surface contamination and are part of the remaining inventory (for the total facility - 3038AHF, 3038E, and 3038M): Sr-90 (~ 10 Ci), Np-237 (0.0064 Ci), Pu-238 (3800 Ci), Pu-239 (3.7 Ci), Pu-240 (1.8 Ci), Pu-241 (19 Ci), and Am-214 (0.59 Ci). (ORNL 1995a)

Site Status: CERCLA

Media of Concern:

Comments: The date of inactivation is not known but is thought to be late 1980s. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge*

National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, January 23, 1995a. *Phase I Safety Documentation, The Isotope Development Laboratory, Building 3038, Hazard and Screening*, Doc. No. HS/3038/F/RT-15.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioactive Production Laboratory Annex (3033A)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3033A is located in the ORNL main plant area in the central portion of the Isotopes Circle, south of Building 3047. (ORNL 1995a)

Approximate Dimensions and Capacity: It is a single-story metal structure erected by bridging the space between Buildings 3033 and 3034 and using their walls for support. Floor space is about 242 ft^2, with a free-space volume of about 718 ft^3. Personnel access is through gasketed, air-lock entries. The exterior has been sealed by a polyurethane cocooning process and the building is maintained under negative pressure. (ORNL 1995a)

Dates Operated: 1960 - 1990 (ORNL 1995a)

Present Function: Not in Operation. (ORNL 1995a)

Life Cycle Operation: Building 3033A (Annex) was used to house and contain the facilities for the production, loading, welding, and decontamination of neutron dosimeter materials as well as the weighing and packaging of milligram to gram quantities of actinide materials for research applications. The building does not contain a hot cell and was used only for low-level radioactive operations in glove boxes and one hood. Special nuclear materials were, at one time, stored in the building. (ORNL 1995a)

Waste Characteristics: Actinide isotopes and C-14. (ORNL 1995a)

Release Data: There is presence of small, fixed hot spots of residual alpha-emitting and C-14 radioactive surface contamination, but these areas have been decontaminated as much as practical. Building 3033A is maintained using good radiological surveillance practice. These is no potential for significant radiation exposure to personnel working within Building 3033A. Current quantities of radioactivity existing in the building are 1.1 mCi of alpha, 2.2 mCi of beta/gamma and 72 μCi of C-14. (ORNL 1995b)

Site Status: CERCLA

Media of Concern:

Comments: This site is also referred to as the Actinide Fabrication Facility. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995a. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 13, 1995b. *Phase I Safety Documentation, The Actinide Fabrication Facility, Building 3033A, Hazard Screening*, Document No. HS/3033-A/F/RT-11/Rev 1, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioisotope Production Laboratory -- C (3030)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the west-central area of the Isotopes Circle, north of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3030 is a single-story steel-frame structure covered by corrugated aluminum siding. The single-story facility has a floor area of 825 ft^2. A manipulator-type hot cell is located on the middle of the east wall. (ORNL 1995)

Dates Operated: Unknown.

Present Function: Not in Operation.

Life Cycle Operation: Building 3030 was constructed to perform limited production and development work with radioisotopes used for industrial, medical, and research applications. The hot cell in Building 3030 has been used to process irradiated cyclotron and reactor targets to produce numerous unique radioisotopes such as (1) Co-56 recovery from an iron target, (2) Co-57 recovery from a nickel cyclotron target, (3) preparation of a purified Au-198 solution, (4) purification of Fe-55, (5) separation of Np-234 from a uranium target, (6) processing of Se-75, (7) preparation of purified Sr-90 nitrate, (8) processing of Sn-11, (9) purification of U-237, (10) processing of P-33, and (11) processing of Ir-192. (ORNL 1995)

Waste Characteristics: Small quantities of Ni-63 and Pd-103 are present in the facility (laboratory). (ORNL 1995)

Release Data: Some areas of the building are contaminated. (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities now in the Isotope Facilities Deactivation Project were used from the late 1940s to the late 1980s. (Phillips 1996). The IFDP Work Plan indicates small quantities of Ni-63 and Pd-103 are present but the Hazard Screening (ORNL, no date) does not mention this. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, no date. *Phase I Safety Documentation, Radioisotope Production Laboratories C, D, and H, Buildings 3030, 3031, and 3118, Hazard Screening, Draft*, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioisotope Production Laboratory -- D (3031)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Located in the ORNL main plant area in the west-central area of the Isotopes Circle and north of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: The building is a single-story, steel-frame structure covered by corrugated metal siding with a floor area of 825 ft^2. It has one manipulator cell located in the middle of the west wall and hoods in the corners. The hot cell has 1 ft barytes concrete walls with 5-in steel armor plate on the operating (east) face of the cell wall starting 2 ft 10 in above the floor and an unshielded top cover. (ORNL 1995)

Dates Operated: Unknown.

Present Function: Not in operation.

Life Cycle Operation: Building 3031 was constructed to perform limited production and development work with radioisotopes used for industrial, medical, and research applications. The hot cell in Building 3031 was used in the final separation stage of gadolinium from europium targets. The Gd-153 processed here is used in nuclear medicine research to determine bone density for osteoporosis research and treatment evaluation. (ORNL 1995)

Waste Characteristics: Residual and trace levels of beta/gamma and alpha contamination, respectively. (ORNL, date unknown)

Release Data: Some areas within the building (cell and hoods) are contaminated. (ORNL 1995) Quantities of contamination are residual for miscellaneous beta/gamma and traces (very low) for miscellaneous alpha. (ORNL, date unknown)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities now in the Isotope Facilities Deactivation Project were used from the late 1940s to the late 1980s. (Phillips 1996) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, date unknown. *Phase I Safety Documentation, Radioisotope Production Laboratories C, D, and H, Buildings 3030, 3031, and 3118, Hazard Screening, Draft*, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioisotope Production Laboratory -- E (3032)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the central area of the Isotopes Circle, east of Building 3031. (ORNL 1995b)

Approximate Dimensions and Capacity: The building is a single-story steel-frame structure covered with aluminum siding. The floor space is about 1200 ft^2 with a total volume of about 20,000 ft^3. The facility has a laboratory containing 5 hoods on the north side of the building and an office area on the south side of the building. An open passage connects the two areas. (ORNL 1995b)

Dates Operated: Constructed in the 1950s. (ORNL 1995a) Removed from service: unknown.

Present Function: Not in operation.

Life Cycle Operation: Originally it housed the analytical facility for radiochemical support of the isotopes production activities. (ORNL 1995a)

Waste Characteristics: Am-241 and several shorter half-lived materials. (ORNL 1995b)

Release Data: The five hoods are contaminated with a variety of materials from old radioisotope processing and development work (including Am-241 and several shorter half-lived materials). Smears up to the 100K beta/gamma and 10-20K alpha range have been obtained in these hoods. Radiation levels are very low, with hot spots being in the 10-100 mrad/hr range. (ORNL 1995b)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities now in the Isotope Facilities Deactivation Project were used from the late 1940s to the late 1980s. (Phillips 1996) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

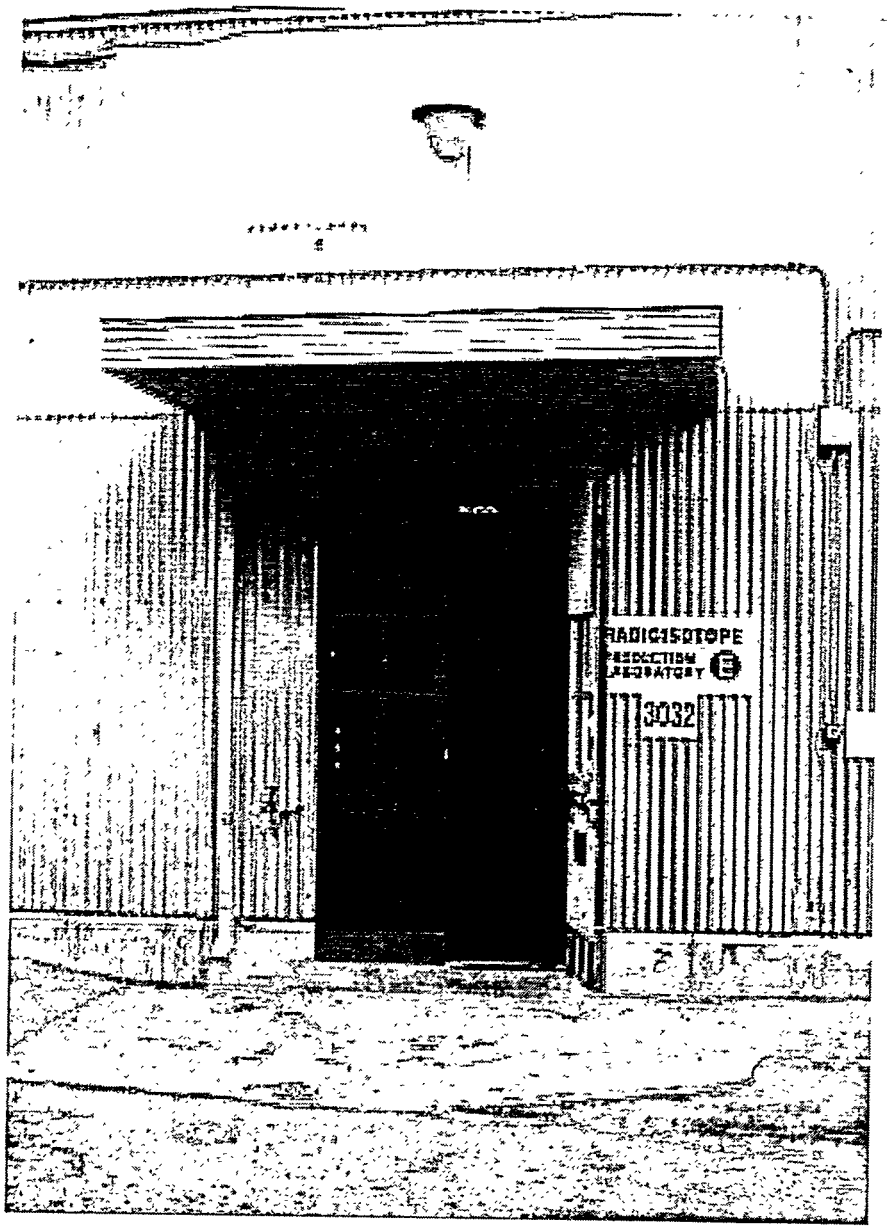
Oak Ridge National Laboratory, June 12, 1995a. *SARUP Hazard Screening Document, Radioisotope Production Laboratory E, Building 3032*, Document No. HS/3032/F/RT-9/Rev 0, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker , Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 29_02.JPG


RADIOISOTOPE
3032

UNIT NAME: Radioisotope Production Laboratory -- H (3118)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the west-central area of the Isotopes Circle, north of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3118 is a single-story, steel-frame structure covered with corrugated aluminum siding that was erected by roofing and enclosing the space between Buildings 3030 and 3031. The floor consists of a concrete pad. It covers the access doors to the cells in these buildings. (ORNL 1995)

Dates Operated: Early 1960s to unknown. (ORNL 1995)

Present Function: Not in operation. (Phillips 1996)

Life Cycle Operation: It provides access to the rear entry doors for the hot cells in Buildings 3030 and 3031, cask storage of some old radioactive sources, and temporary holding of contaminated waste. (ORNL 1995)

Waste Characteristics: Unknown.

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioisotopes Services Building (3034)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the east end of the Isotopes Circle, adjacent to Building 3033-H. (ORNL 1995b)

Approximate Dimensions and Capacity: Unknown.

Dates Operated: Constructed in the 1950s. (ORNL 1995a)

Present Function: Building 3034 houses the central electrical distribution station for the Isotopes Circle area. (ORNL 1995b)

Life Cycle Operation: This facility was used as a field shop for the Plant and Equipment Division in supporting past isotope production operations in other facilities. No handling of radioactive materials has occurred in this building. (ORNL 1995b)

Waste Characteristics: No handling of radioactive waste occurred in this building. (ORNL 1995b)

Release Data: Although no radioactive materials were ever handled in this facility (ORNL 1995b), the Hazard Screening Report (ORNL 1995a) for the facility indicates that some small, fixed hot spots of residual radioactive surface contamination remain in inaccessible areas. The quantity of contamination detected is <1.7 mCi beta/gamma activity. (ORNL 1995a)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities in the Isotopes Facilities Deactivation Project (IFDP) were used from the late 1940s to the late 1980s. (Phillips 1996) The Hazard Screening Report conflicts with the IFDP Work Plan that says no radioactive materials were handled in Building 3034. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

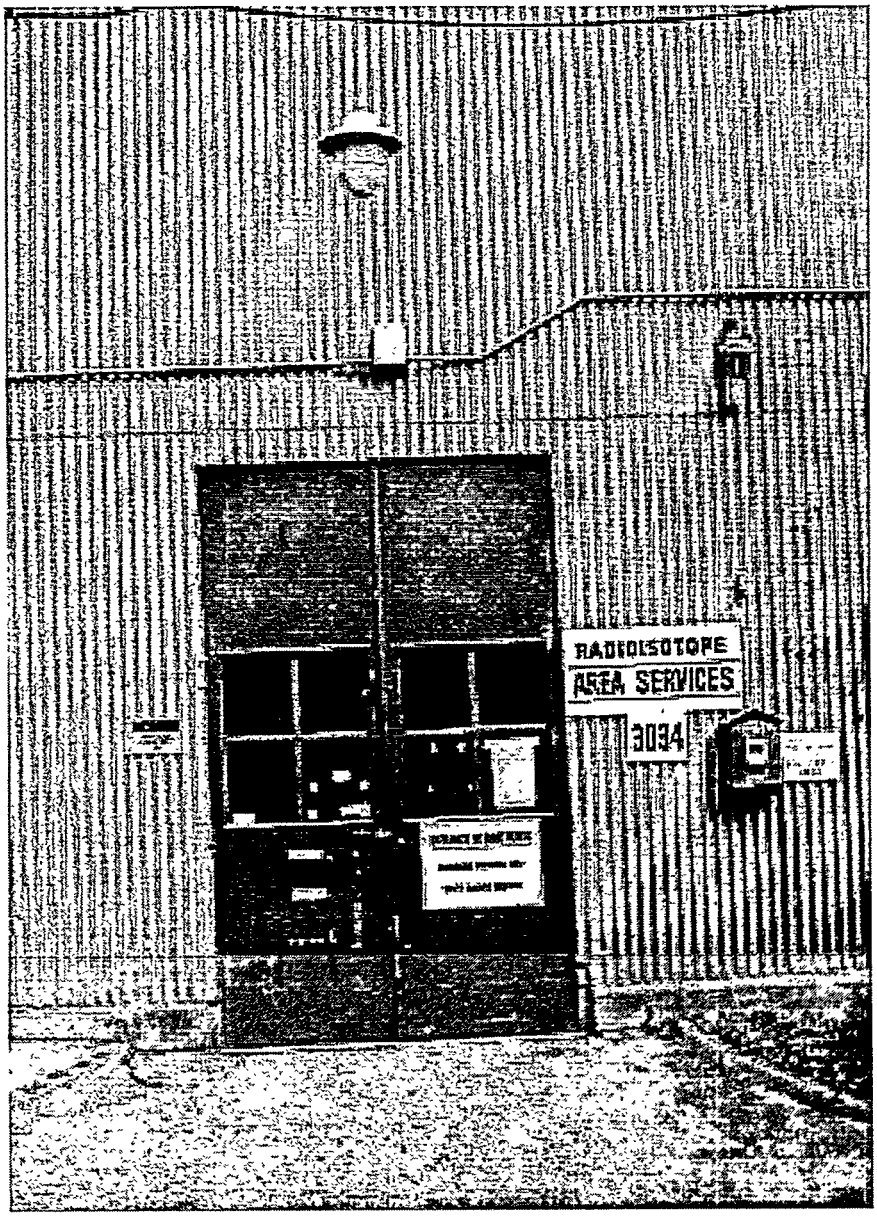
Oak Ridge National Laboratory, June 12, 1995a. *SARUP Hazard Screening Document, Radioisotopes Area Services Building, Building 3034*, Document No. HS/3034/F/RT-12/Rev 0, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 29_01.JPG


RADIOISOTOPE
AREA SERVICES
3034

UNIT NAME: Radioisotopes Development Lab (3047)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the north-central area of Isotopes Circle. (ORNL 1995b)

Approximate Dimensions and Capacity: Building 3047 is a three-story steel-frame building with concrete block exterior and interior walls. The Radioisotopes Development Laboratory houses four high-level beta-gamma cells, one alpha hot cell, seven laboratories for handling low-level materials, a decontamination room, offices, and service areas. (ORNL 1995b)

Dates Operated: Constructed in 1962; still in operation. (ORNL 1995b)

Present Function: Isotope activities are shut down except for waste removal and transloading of radioactive materials in the beta-gamma hot cells. (ORNL 1995b) Presently used for processing, temporary storage, packaging and disposal of radioactive materials. Radioisotopes and radiopharmaceutical research is conducted in parts of the facility. (ORNL 1995a)

Life Cycle Operation: Used to conduct research and development, and production of radioisotopes. (ORNL 1995b)

Waste Characteristics: Radioactive materials normally handled at the facility are Sr-90 (up to 100,000 Ci). Single sealed sources of material handled could be equivalent to 350,000 Ci of Sr-90. Other isotopes handled include Cs-137 and Eu-152/154. Stored items include Pu-238 materials. Between 20–100 Ci of short-lived radioisotopes are studied periodically including Sn-177m, Dy-166/Ho-166, Re-186, and W-188/Re-188. (ORNL 1995a)

Release Data: Past programs and processes previously conducted have resulted in remaining inventory. (ORNL 1995a) Low levels of residual fixed and transferrable radiologic surface contamination exist in areas of the facility as a result of historical operations. Residual radiologic surface contamination consists of < 1 mCi beta activity as Sr-90 and < 5 mCi of alpha activity as Pu-239. The remaining radioisotope inventory consists of 3,000 Ci of bulk Pu-238 (alpha activity) and 500,000 Ci of Sr-90 (beta/gamma activity). Approximately 1 gal of PCBs is also present (ORNL 1995a)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

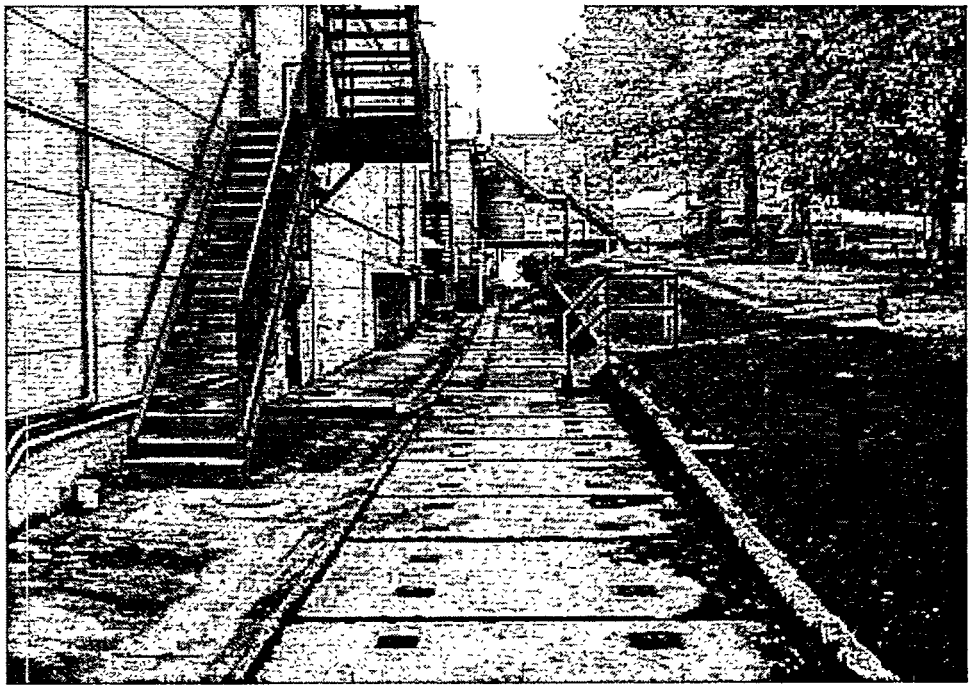
Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, June 12, 1995a. *Phase I Safety Documentation, The Radioisotope Development Laboratory Building 3047, Hazard Screening*, Document No. HS/3047/F/RT-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_15.JPG



UNIT NAME: Source Development Laboratory (3029)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3029 is located in the western area of Isotopes Circle, southwest of Building 3047. (ORNL 1995)

Approximate Dimensions and Capacity: The building is a single-story, steel frame structure covered by corrugated metal siding. The floor area is 3,000 ft^2, and the total free-space volume of 33,000 ft^3. The operating area contains four manipulator-type hot cells. Cells 1, 2, and 3 were used to process high-level beta/gamma sources; Cell 4 was used for short-lived materials and Ir-190 monitoring. The cell access area contains a Co-60 storage and irradiation area known as the Co-60 garden. The Co-60 garden has been emptied and is part of the isotopes facilities deactivation. Two laboratory hoods located in the southwest corner of the operating area are used for preparing both elemental I_2-131 and CH_3 I-131. Those hoods are equipped for use as gloveboxes. There are two small gloveboxes in the northwest corner of the cell access area. The exterior of the building is cocooned with polyurethane foam for containment. (ORNL 1995)

Dates Operated: Constructed in 1952 (ORNL 1995) and removed from service: unknown.

Present Function: Not in operation. The outer surface of the building is sealed for air tightness by cocooning with polyurethane foam. All normal entries have air locks for lift trucks and personnel access and have gasketed doors to minimize leakage. Building ventilation is provided by a roof-mounted exhaust fan with HEPA filters. In conjunction with dampered inlet and exhaust vents, it is operated to maintain a slight negative pressure in the building and to automatically place the system in a "contained" state when air monitors detect radioactivity. (ORNL 1995)

Life Cycle Operation: Building 3029 was constructed in 1952 and originally contained a system of remotely- operated barricades and a small manipulator cell (now called Cell 4). The facility was built as part of, and has always been used in, the Isotopes Program. Isotopes originally handled in the facility were Ir-192 (source fabrication) and small Co-60 sources. Cell 1 was built in 1955 - 1956 to handle large quantities of Co-60. Very little Co-60 source fabrication has been done since the late 1950s. Cell 3 was built in 1960-1962 for Cs-137 source fabrication. Cell 2 was built by enclosing the space between Cells 1 and 3 and is used for waste handling and pass-through between the cells. Major building operation included Co-60, Cs-137, Sr-90, and Ir-192 source fabrication. (ORNL 1995)

Waste Characteristics: Major building operation included Co-60, Cs-137, Sr-90, and Ir-192 source fabrication. The contamination exists primarily in the hot cells, Co-60 garden and related process equipment (vessels, hoods, piping, ventilation ducts, etc). (ORNL 1995)

Total facility contamination is reported to be <700 μCi as Sr-90 and 2 Ci as Co-60. (Haff et al 1994) Although the hazard screening indicates no alpha contamination is present, the work plan for the IFDP (ORNL 1995) and findings during the removal site evaluation (ASI 1996) indicate that the area under the Glove Box B is alpha contaminated and sealed.

Release Data: A number of areas within the building are highly contaminated (alpha-Pu, Cm, and beta/gamma). (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities in the isotope production deactivation project were used from the late 1940s to the late 1980s. (Phillips 1996) The hazard screening (Haff et al 1994) indicates "no alpha contamination is present". This site was included in a CERCLA remedial investigation (Bechtel et al 1992)

and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., June 1996. *Phase I Removal Site Evaluation (RmSE) Report (Isotopes Facilities),* prepared for Lockheed Martin Energy Systems, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Haff, K.W., R.S. Owens, and W. J. Armento, December 20, 1994. *Phase I Safety Documentation, The Source Development Laboratory, Building 3029, Hazard Screening*, HS/3029/F/RT-6, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995 *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996, Assistant Facilities Manager, ORNL Special Projects, LMES, Personal communications with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Storage Pad (3099)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area adjacent to the east side of Building 3032. (ORNL 1995b)

Approximate Dimensions and Capacity: Concrete pad approximately 30 ft x 40 ft (Conant 1996)

Dates Operated: 1950s—Present (ORNL 1995a)

Present Function: Used as a temporary storage area for the Isotopes facilities. (ORNL 1995a)

Life Cycle Operation:

Waste Characteristics: DOT-approved prepackaged shipments, (ashes and other materials) were stored on the pad. All radioactive material stored on the pad were in accordance with DOE/DOT regulations. (ORNL 1995a)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Conant, Todd, April 23, 1996. Removal Site Evaluation Task Manager, Advanced Sciences, Inc., personal observation communicated to Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, June 12, 1995a. *Phase I Safety Documentation, The Radioisotope Development Laboratory Building 3047, Hazard Screening*, Document No. HS/3047/F/RT-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: November 1996

Photo: No photo available.

UNIT NAME: Tower Shielding Facility (7700)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: The TSF is located 2.35 miles south-southeast of the main ORNL complex on Copper Ridge. The facility is situated on a hill with an elevation of 1069 ft. Access to the site is from Highway 95 near Clinch River. (Kuhaida 1996)

Approximate Dimensions and Capacity: The tower structure is a braced and guyed steel frame forming a 100 ft by 200 ft rectangle, with a leg placed at each of the four corners. Each leg is 9 ft square and 315 ft high, and terminates at the lower end in an inverted truncated pyramid. The objective of the design was to minimize the scattering of radiation by structural material. The unit weight of the steel in the tower structure was kept below 400 lb/ft. The towers were equipped with hoists capable of lifting loads of up to 55 tons to heights of 200 feet. (ORNL 1996)

Dates Operated: Built in 1953. Operation began in 1954. The reactor was shutdown in 1992. (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: Built to study asymmetric shield configurations for the Aircraft Nuclear Propulsion Project. (ORNL 1996)

This research required that the reactor radiation source be located in a region free from ground or structure scattering. Four reactors have been used at the TSF. These include the TSR-I, TSR-II, Aircraft Shield Test Reactor (ASTR), and the Space Nuclear Auxiliary Power (SNAP) reactor. (ORNL 1996)

By lifting the reactor and shield materials to heights of 200 ft the shielding characteristics of the materials could be measured without interference from radiation reflected off the ground. (ORNL 1996)

Waste Characteristics: Radioactive materials stored at the TSF include spent fuel, radioactive source material and depleted uranium. Fuel at the TSF remains loaded in the TSR-II reactor core. The fuel is composed of a uranium/aluminum alloy clad in aluminum. The spent fuel has a mass of 8.4 kg which is 93% U-235. Four lune plates containing 233 grams of U-235 are stored in a concrete silo next to the Big Beam Shield. Nine grams of mainly Am-241 and Pu-239 are stored in 2-in diameter SS pipes buried 5 ft below the surface in area 7700B-055A. Large sodium and lithium hydride shielding blocks are also stored at the TSF. Other hazardous substances stored at the TSF include asbestos, copper slabs, lead, hevimet, bismuth, boron carbide, boral, zirconium, lithium, therium oxide, and cadmium. (ORNL 1996)

Release Data:

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

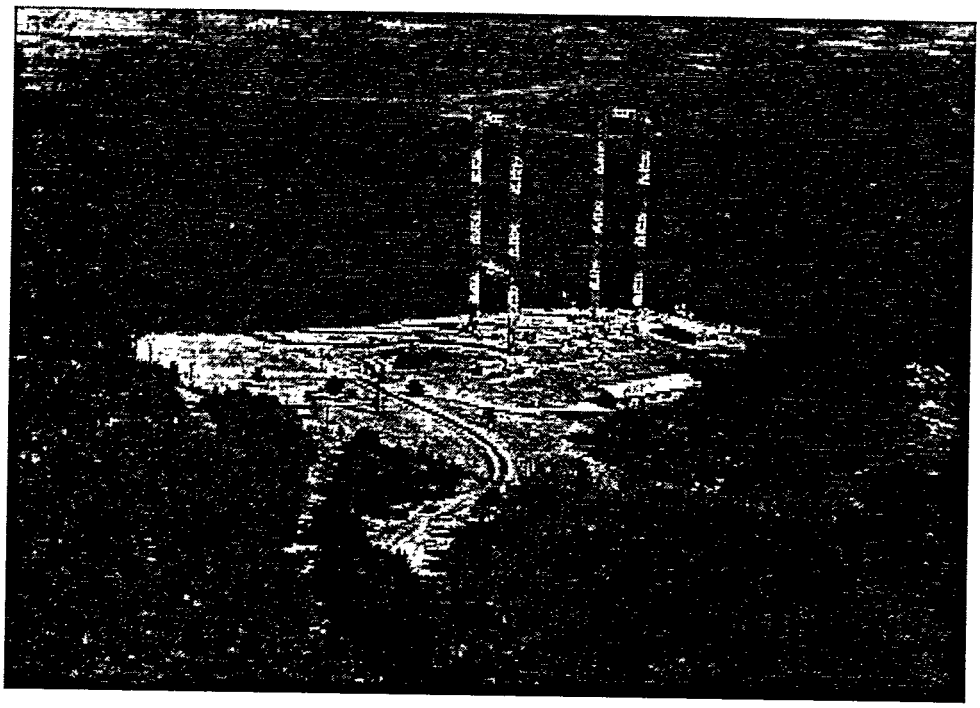
Advanced Sciences, Inc., August 1996. *Removal Site Evaluation Report for the Tower Shielding Facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1517 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996. LMES Project Manager, Review Comments.
Oak Ridge National Laboratory National Laboratory, March 1996. *Work Plan for the High Ranking Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-322, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 1468_90.JPG



UNIT NAME: Tritium Target Preparation Facility (7025)

Unit Number:

Project Status:

Unit Location: This facility is located east of WAG 17 (ORNL Services Area). Approximate ORNL grid coordinates are N 21,370 ft and E 38,285 ft.(ORNL 1990)

Approximate Dimensions and Capacity: Floor area of building is 55 m2. The tritium equipment for target fabrication is housed in a 26 by 5 ft stainless-steel hood.(ORNL 1990) The structure is a prefabricated, metal-sided building with a total free space volume of approximately 6000 ft^3. (ORNL 1995)

Dates Operated: The building was installed in 1968. Operations involving tritium were halted in October of 1989; bulk tritium and uranium storage traps have been removed. Operation of the ThO_2/UO_2 high vacuum system ended in January of 1990. (ORNL 1995)

Present Function: Not in operation.

Life Cycle Operation: The building is designed primarily for the purpose of producing tritium-containing accelerator targets as well as loading tritium by absorption into other types of metal specimens. The accelerator targets are used by other laboratories to produce neutrons for experimental purposes. Other operations included preparing metallurgical samples for helium embrittlement studies by diffusing tritium into the samples and allowing it to decay to helium, and for preparing thin films of ThO_2/UO_2 by vacuum evaporation. No aqueous wastes were generated by these processes. (ORNL 1995)

Waste Characteristics: Major constituent is tritium. The ThO_2/UO_2 system is being disassembled and disposed of as waste. (ORNL 1995)

Release Data: Tritium off-gas is exhausted by a 0.94 m3/s fan through a 4 m stainless steel stack. (ORNL 1990) The background well for the WAG 1 remedial investigation is located downgradient from Building 7025 and showed elevated tritium levels. (Bechtel 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: Building 7025 is a Tennessee Valley Authority Surplus building. (ORNL 1995) The FFA Appendix C (1996) refers to the facility as the Tritium Target Preparation Facility, but the ORNL 1995 Work Plan for The Isotopes Facility Deactivation Project (IFDP) lists it as a Fabrication Facility.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

6. ORNL SITE DESCRIPTION DATA SHEETS FOR D&D PROGRAM, NON-FFA, ANCILLARY FACILITIES

UNIT NAME: Pool-Water Cooling Tower (3086)

Unit Number:

Project Status: D&D facility

Unit Location: North of ORRR 3042. (Childs 1996)

Approximate Dimensions and Capacity: Approximately 25 ft high, 20 ft square. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: The pool secondary coolant is cooled by a United model no. 1818-AM16-10-15 induced-draft-double-flow cooling tower. The cooling tower dissipates the heat to the atmosphere. Adjacent to the tower is the secondary system pumphouse, which houses the electrical switch gear and chemical treatment equipment. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORRR Pumphouse (3085)

Unit Number:

Project Status: D&D facility

Unit Location: Located approximately 300 ft northeast of the reactor building. (Hamrick et al 1968)

Approximate Dimensions and Capacity: The overall size of the building is 68 ft by 42 ft. It is divided into five pump cells and an electrical equipment room. The 3 main pump cells are 30 ft 8 in by 14 ft 8 in The shutdown pump cell is 11 ft 8 in by 22 ft 8 in. The cell for the emergency gasoline-operated pump is 11 ft by 22 ft, and the electrical equipment room is 23 ft 8 in by 19 ft 4 in.

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: The pumphouse contains pumps used to circulate the cooling water through the system. (Hamrick 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORRR Cooling Tower #3 (Building 3103)

Unit Number:

Project Status: D&D facility

Unit Location: Located approximately 900 yds north of Building 3042. (Childs 1996)

Approximate Dimensions and Capacity: The cooling tower has ~ 50 MW capacity, is 3 stories tall (50-60 ft), and 150 ft long x 75 ft wide. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Part of the reactor secondary cooling system. The cooling water enters the top of the tower. As the hot water falls through the cooling tower, the cooling tower fans draw air past it, evaporating some of the water and cooling the remainder. The cool water is then retained in the cooling tower basin, which serves is a reservoir for the system. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORRR Heat Exchanger Pit (3102)

Unit Number:

Project Status: D&D facility

Unit Location: Located in an open pit in the ground. Approximately 300 ft from the secondary cooling tower which is approximately 900 yds north of Building 3042. (Childs 1996)

Approximate Dimensions and Capacity: The pit consists of four stainless steel shell-and-tube heat exchangers connected in parallel. (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Used to transfer heat generated in the core from the primary system to the secondary system. The reactor cooling water passes from east to west through the shell side of the exchangers. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Two 20,000 gal Above-Ground Demineralized-Water Holding Tanks

Unit Number:

Project Status: D&D facilities

Unit Location: Just south to east of the pump house (Building 3085). (Childs 1996)

Approximate Dimensions and Capacity: 20,000 gal each (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function:

Life Cycle Operation: The holding tanks were used to hold pool water while the reactor was being serviced. (Childs 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR Experimental Facilities in 3042 (GCR A9-B9 Experimental Loop)

Unit Number:

Project Status: D&D facilities

Unit Location: Located in the northeast corner of the basement in Building 3042. (Childs 1996) ORNL grid coordinates are N 22,536 ft and E 31,381 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Approximately 50 ft x 30 ft. (Childs 1996) Each of the experimental facilities at the ORR are separate, identifiable units with a variety of designs, structural materials, and flow patterns. All of the facilities included an in-reactor section, with associated piping, instrumentation and controls leading to away-from-reactor processing or experimental areas. The out-of-reactor portions of the facilities were normally contained in shielded cells, either lead, concrete block, or concrete and steel, with separate instrument and control panels. The complexity of the systems range from a simple lead-shielded stainless steel pneumatic tube to a large pressurized water loop consisting of pumps, heat exchangers, heaters, surge tanks, water purification systems, sampling stations, emergency electric supply, and a continuously-manned control room. (Burwinkle 1987)

Dates Operated: 1960-1969 (Burwinkle 1987)

Present Function: N/A

Life Cycle Operation: The GCR Aq-Bq was an experiment for measurement of fission-product gases from ceramic fuels. This was one of six experimental facilities designated as surplus in Building 3042. Following completion of the respective experiments, the in-reactor portions of the facilities were removed and the remaining systems placed in standby. Most of the facilities remain as left at the time, with only limited equipment or instrumentation removal conducted to provide room for active experiments, or for reactor maintenance activities. The abandoned experiments are in various states of disrepair and deterioration. (Burwinkle 1987)

Waste Characteristics: All of the experimental facilities involved transfers of irradiated solids, liquids, or gases, during normal operations. (Burwinkle 1987)

Release Data: As a result of the use of irradiated items, the transfer piping became contaminated with long-lived corrosion or fission products to varying degrees depending upon the experiment. In addition, for those experiments were significant chemical processing or irradiated product handling and analysis was conducted, much of the process equipment is contaminated. Preliminary characterization efforts have been conducted to determine the radiation/contamination levels and estimate the residual radionuclide inventory present in these facilities. No significant hazards to operating personnel were identified. (Burwinkle 1987)

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Burwinkle, T.W. March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16.

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR NOG Filter Pit (Charcoal Filter) (3126)

Unit Number:

Project Status: D&D facility

Unit Location: Located south of 3042 along Hill Street. (Childs 1996)

Approximate Dimensions and Capacity: The NOG consists of a piping system embedded in the concrete of the pool wall and building floor with numerous access ports, two water catch tanks to prevent accumulated liquids from blocking the flow channels, and an 8 in diameter steel line from the ORR building to the 3039 stack. (Hamrick et al 1968)

Dates Operated: With some modifications, has been in operation since the initial operation of the building. (Hamrick et al 1968)

Present Function: N/A

Life Cycle Operation: The off-gas systems were designed to handle routine high-concentration radioactive gaseous releases and are connected to the components which are capable of releasing these effluents. The normal off-gas (NOG) system collects gaseous wastes only from components which are not subject to becoming pressurized. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR Neutron Spectrometer Station (Neuton Flight Tube) (Bldg 3083)

Unit Number:

Project Status: D&D facility

Unit Location: The last of three stations located along the neutron flight tube, approximately 300 yds from the cooling tower (Childs 1996).

Approximate Dimensions and Capacity: Building 3083 is a 2 story block structure approximately 25 ft^2. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Used to contain neutrons at a given energy level state. (Childs 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR Cell Vent Filters (3139)

Unit Number:

Project Status: D&D facility

Unit Location: The filters are located in the cell ventilation filter pit, south of the reactor building (3042). (Hamrick et al 1968)

Approximate Dimensions and Capacity: The filter pit is an underground waterproofed concrete structure designed to withstand pressures in the range -57 in H_2O to +15 psig. The top shield of the filter pit is 1.5 ft thick and removable concrete plugs allow access to the filters. Five separate banks of filters are in the pit. They are, in order, a 3 x 3 array of 2 ft square fiberglass prefilters, a 3 x 3 array of 2 ft square fiberglass absolute filter, two 3 x 3 arrays of 2 ft square 0.75 in thick activated charcoal filters, and another 3 x 3 array of 2 ft square absolute filters. The filter frames are of corrosion-protected carbon steel. (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: The cell vent filters are part of the cell-ventilation system which is a maximum reliability system that provides for the removal, decontamination, and disposal of possibly contaminated air from the reactor building. The filters remove particles and radioiodine from the air. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR 25-meter Target House (Flight Tube Building) (3107)

Unit Number:

Project Status: D&D facility

Unit Location: The time of flight tube extends approximately 600 ft from the northeast corner of Building 3042 to a location south of the reactor secondary cooling towers. (Hamrick et al 1968) Located 25 in from the reactor. (Childs 1996)

Approximate Dimensions and Capacity: Building 3107 is approximately 8 ft x 8 ft. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Used to contain neutrons at a given energy level state. (Childs 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description,* Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR A/C Cooling Tower (3089)

Unit Number:

Project Status: D&D facility

Unit Location: Located on the north side of the pool cooling tower (3086). (Childs 1996)

Approximate Dimensions and Capacity: 20 ft x 10 ft x 15 ft. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Chilled water is supplied to the various air-conditioning units in the ORR building by a single large unit that has a capacity of 2.15×10^6 Btu/hr (180 tons). Heat collected at the chiller is dissipated by the ORR coding tower, which is used by that system only. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR POG Filter Pit (Off-Gas Filter) (3109)

Unit Number:

Project Status: D&D facility

Unit Location: The POG filter pit is located just east of Building 3089. (Hamrick et al 1968)

Approximate Dimensions and Capacity: The filter pit consists of 2 banks of filtering systems (north and south). Each filter bank is composed of four compartments. Within the first compartment, the inlet, there is a pair of valves for interconnecting the two banks and a roughing filter for removal of any particulate matter. The second compartment contains an activated-charcoal filter assembly for the removal of gaseous fission products, primarily iodine. The third compartment contains and absolute filter. The last compartment contains the exit line and another pair of bank interconnection valves. The first, second, and fourth compartments have floor drains, with float traps, which discharge the condensate or water collected from the system to a hot drain line connected to waste tank WC-19. (Hamrick et al 1968)

Dates Operated: This system was shutdown and isolated in 1968. (Hill 1993)

Present Function: N/A

Life Cycle Operation: The off-gas systems were designed to handle routine high-concentration radioactive gaseous releases and are connected to the components which are capable of releasing these effluents. The pressurizable off-gas system is connected to components which may become pressurized. (Hamrich et al 1968).

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc.

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description,* Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Hill, W.E., August 1993. *Oak Ridge Research Reactor Hazard Screening, Phase I, SAR Update Program,* Research Reactors Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, HS/3042/F/ORR/RI.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR 10,000 gal Decay Tank

Unit Number:

Project Status: D&D facility

Unit Location: Tank is below ground south of the pumphouse (Building 3085). (Childs 1996)

Approximate Dimensions and Capacity: The tank has a capacity of 10,000 gal. (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Part of the reactor cooling system, the decay tank receives water from the reactor core via a 24in line. The purpose of the tank was to delay transport of the water to allow any N-16 that may be present to decay to a safe radiation level. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Molten Salt Reactor Experiment Fuel Salt

Unit Number:

Project Status: Interim Remedial Action.

Unit Location: The fuel salt is located in two drain tanks within the MSRE Building 3042. (Peretz 1996)

Approximate Dimensions and Capacity: NA

Dates Operated: The MSRE was operated from 1965 -1969. (Peretz 1996)

Present Function: NA

Life Cycle Operation: The MSRE is an 8 MW reactor that was operated as a demonstration of the technology needed to develop a commercial Molten Salt Breeder Reactor. The reactor used a unique liquid fuel, formed by dissolving UF_4 in a carrier salt composed of a mixture of LiF, BeF_2, and ZrF_4. In December 1969, reactor operation terminated and fuel, flush, and coolant salts were drained into their respective tanks. The fuel salt was divided between the two fuel salt drain tanks. As the fuel salt was drained, activity was observed in the drain tank cell atmosphere. This activity was traced to a minor leak in one of the freeze valves (105) leading to fuel drain tank 2. All of the salts were allowed to freeze, but the fuel salt was held at an elevated temperature for about a year to control effects of radiolysis in the salt. This is the only time the salts were allowed to freeze in the MSRE drain tanks, and they have not been melted since. Throughout the operation of MSRE, a detailed record of the chemical behavior of the salts was maintained, and a summary of the chemical aspects of MSRE operation was prepared following the postoperation examination period. (Peretz 1996)

Waste Characteristics: The carrier salt for the fuel was initially prepared as 65 mol % ^{7}LiF, 30 mol % BeF_2, and 5 mol % Zrf_4. Zirconium fluoride was added to the fuel salt so that if the salt became contaminated with oxygen- containing contaminants (e.g., water or oxygen) zirconium oxides would precipitate ahead of uranium oxides. Enough zirconium was added so that the precipitate would be observed before precipitation of uranium began. Fuel was added to the carrier salt as a 73 % ^{7}LiF -27 mol % UF_4 low-melting eutectic enriching salt. The bulk of the fuel was added directly into the molten carrier salt in one of the drain tanks. Final approach to criticality was made by adding small batches of enriching salt to the fuel and carrier salt using the sampler-enricher, while the salt was circulating through the reactor. The initial U-235 fuel was diluted with about 70 % U-238 to increase the amount of uranium in the salt until experience was gained with maintaining chemical control of the system, especially with respect to maintaining the desired UF_3/UF_4 ratio. The total mass of uranium in the initial charge was about 220 kg.

The composition of the fuel salt did not remain constant. The quantity of uranium changed as fuel was burned and additional enriching salt was added. Enriching salt also added small amounts of LiF to the system. Plutonium was produced by transmutation of U-238. Each time the system was opened for maintenance, flush salt was circulated through the reactor circuit before the fuel salt was returned. It was estimated that about 20 kg of salt remained in the reactor circuit following the drain; this amount of fuel salt was lost to the flush salt and the same amount of flush salt was added to the fuel salt each time the system was opened.

The following table lists the half-life and inventory of those fission and activation products that are present in quantities greater than 0.1 Ci, as of 30 years after reactor shutdown (about the beginning of the year 2000). It is seen that the inventory is dominated by Sr-90, Cs-137, and their daughter isotopes. There will be a total of 24,400 Ci of fission and activation product isotopes at the start of the year 2000. (Peretz 1996)

Inventory of fission and activation product isotopes

Isotope	Half life	Curies	Inventory of fuel salt (98.3%)	Inventory in flush salt (1.7%)
^{90}Sr	28.5 y	6,670	6,557	113
^{90}Y	2.7 d	6,670	6,557	113
^{137}Cs	30 y	5,600	5,505	95
^{137m}Ba	2.6 m	5,290	5,200	90
^{151}Sm	90 y	117	115	2
^{147}Pm	2.62 y	13.4	13.2	0.2
^{155}Eu	4.96 y	4.4	4.3	0.1
^{154}Eu	8.8 y	3.1	3.0	0.1
^{152}Eu	13.3 y	1.1	1.1	0.0
^{99}Tc	2.1×10^5 y	0.5	0.5	0.0
^{125}Sb	2.73 y	0.3	0.3	0.0
^{93}Zr	1.5×10^6 y	0.3	0.3	0.0
Total		24,400	23,985	415

Release Data: No records of releases have occurred.

Site Status: CERCLA

Media of Concern:

Comments:

References:

Peretz, F. J., August 1996. *Identification and Evaluation of Alternatives for the Disposition of Fluoride Fuel and Flush Salts from the Molten Salt Reactor Experiment at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, prepared for the U.S. Department of Energy, Office of Environmental Management, Oak Ridge, Tennessee, ORNL/ER-380.

Date Prepared: December 1996

Photo: No photo available.

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