

East Tennessee Technology Park



Background

The Oak Ridge Gaseous Diffusion Plant began operations in World War II as part of the Manhattan Project. Its original mission was to produce uranium enriched in the uranium-235 isotope for use in atomic weapons. The plant produced enriched uranium for the commercial nuclear power industry from 1945 to 1985 and was permanently shut down in 1987.

Restoration of the environment, decontamination and decommissioning (D&D) of the facilities, and management of the legacy wastes have since been major activities. Reindustrialization of the site began in 1996, and the site was renamed East Tennessee Technology Park (ETTP) in 1997.

Accelerated Cleanup

The U.S. Department of Energy's (DOE's) long-term goal for ETTP is to convert the site into a private industrial park. The site is undergoing environmental cleanup, which is now expected to be completed on an accelerated schedule. The new accelerated closure plan will achieve cleanup several years ahead of the original plan and, therefore, will reduce environmental and safety risks more quickly and will save in long-term maintenance costs. The reuse of key site facilities through title transfer is part of the closure plan for the site.

The accelerated cleanup approach offers uncontaminated buildings, suitable for immediate private industrial use, for title transfer to the Community Reuse Organization of East Tennessee (CROET). CROET then leases this property to private industry. It also recruits business to the area. Any buildings at ETTP that remain unused will be demolished.

Remedial Action Progress

DOE has signed a Record of Decision (ROD) with the State of Tennessee and Environmental Protection Agency (EPA) authorizing environmental restoration of an area of land known as Zone 2 at ETTP. The area encompasses approximately 800 acres inside the main security fence. The objective of the decision is to protect future industrial workers and the underlying groundwater from contamination in soil, slabs, and subsurface structures.

Development of a sitewide ROD for groundwater, surface water, sediment, and ecological soil risk is in progress. Additional

field data were collected in 2004 and 2005 to supplement the existing data and to support the ongoing technical evaluations required for ROD or action memorandum development.

Characterization of the available acreage was completed in Fiscal Year (FY) 2005, and a Phased Construction Completion Report documenting no further action on more than 500 acres and 9 Federal Facility release sites is in development. Zone 2 characterization completed during FY 2005 includes the slabs and soils of K-25, K-27, and K-29 as well as the K-1070-B burial grounds.

The ETTP Scrap Removal Project fieldwork is expected to be completed in December 2006. As of July 2006, approximately 33,748 tons of scrap have been removed from the K-770 and K-1064 scrap yards, K-1131 Area, K-1300 Pole Yard, and K-1066-G and K-1070-C Maintenance Yards. Demolition and disposal of the K-1004-A, B, C, D, P, and L Laboratory concrete slabs began in July 2006.

ETTP is located in the Roane County portion of Oak Ridge, Tennessee, approximately 13 miles west of downtown Oak Ridge.

Completed D&D Projects

Group 1 Buildings, Auxiliary Facilities

DOE has completed the demolition of five buildings at ETTP, known collectively as the Group 1 Buildings.

The Group 1 Buildings included the K-725 Beryllium Building and the nearby K-724 Storage Building, the K-1131 Feed and Tails Building, the K-1410 Plating Facility, and the adjacent K-1031 Warehouse.

These auxiliary facilities were selected for dismantlement because of their poor physical condition, proximity to surface water or other structures, expense of surveillance and maintenance activities, or a combination of these. Demolition was completed in June 1999.



East Tennessee Technology Park (continued)

Group 2 Buildings, Main Plant Demolition

DOE has completed the demolition of 10 facilities, known collectively as the Group II Buildings Phase I project. The facilities include the K-1045-A Waste Oil Burning Pit, K-1408 Tire and Battery Shop, K-1300 Stack, K-1301 Fluorine Production Facility, K-1302 Fluorine Storage Building, K-1303 Fluorine Facility, K-1404 Acid Storage, K-1405 High Temperature Laboratory, K-1407 Laboratory and Storage Facility, and K-1413 Engineering Laboratory. Demolition was completed in January 2003.

DOE has also completed the demolition of 18 facilities located near the K-1064 Peninsula. The facilities consisted of pump houses, a cooling tower (K-801-H), old storage facilities (K-1025 A-E), and miscellaneous maintenance areas.



Removal of transite panels from the K-25 Building

Ongoing D&D Projects

K-25/K-27 Demolition

The footprint of the U-shaped K-25 Building, which contains 1.64 million square feet of floor space, occupies about 40 acres near the center of ETTP. The K-27 Building is a rectangular building that occupies approximately 374,000 square feet. Except for shape and size, the two buildings are similar with respect to materials and construction techniques. Both buildings have radioactive contamination and hazardous materials that are contained by the building structures. Both buildings are planned for demolition. The demolition process will leave the basement slabs, retaining walls, and the north wing in place in a structurally sound condition. The slab and underground soil and utilities will be addressed in a future ROD for ETTP.

Activities within the K-25 Building to date include clean-out and disposal of a large quantity of loose stored material and equipment, installation of a temporary power system, and other

preparations for removal of the process system and equipment. Successful completion of an Operational Readiness Review by DOE in early FY 2006 has allowed startup of the process equipment removal and disposal work.

Radioactive wastes that meet the acceptance criteria will be sent to the Environmental Management Waste Management Facility (EMWMF), located near the Y-12 National Security Complex in Oak Ridge. Other radioactive wastes are planned for disposal at the Nevada Test Site. D&D activities that will be implemented under the preferred alternative include characterization, hazardous material removal, high-mass equipment removal, building demolition using heavy equipment (shears and grappling equipment), waste and material disposition, and site stabilization. In FY 2006, the technical approach to execute the K-25/K-27 D&D scope was revised to substitute large quantities of manual labor with heavy demolition equipment.

DOE recognizes that the K-25 Building played an important part in the history of the Manhattan Project and desires to preserve its history. Following the National Historic Preservation Act, DOE has entered into several Memorandums of Agreement with state, federal, and local historic preservation officials and has identified several activities to appropriately commemorate the K-25 Building's place in history.



K-25 Building

Buildings K-29, K-31, and K-33

Buildings K-29, K-31, and K-33 were previously used for uranium enrichment processes. Contaminated structures and equipment remained. BNFL Inc. was awarded a fixed-price contract in 1997 to decontaminate and decommission the facilities. The company, now known as BNG America, has dismantled, removed, and dispositioned more than 156,000 tons of materials and equipment from the three buildings, which comprise more than 4.8 million square feet of floor space. All three buildings were originally to be cleaned up and converted to usable facilities

East Tennessee Technology Park (continued)



Demolition of K-29

for private industrial tenants. However, DOE later decided that K-29 was not suitable for reindustrialization. It was transferred to Bechtel Jacobs Company LLC (BJC), DOE's Environmental Management cleanup contractor, in July 2005. BJC began demolishing K-29 in January 2006 and completed it in August 2006.

Centrifuge Facilities

Equipment removal continues from the 17 facilities at ETTP that supported the development and pilot testing of the gas centrifuge process for enriching uranium. These 17 facilities are slated for demolition and approximately half of the centrifuge machines from the development facility have been disposed while the remainder has been processed for burial.

Removal of Remaining Facilities

Approximately 500 above-ground facilities are being demolished by groupings. These facilities include buildings, tanks, sheds, and other structures. Most of these facilities have actual or potential elevated concentrations of radiological and/or other hazardous substances. Demolition will include characterization, decontamination (if required), and segregation of demolition waste streams and disposal in appropriate Oak Ridge Reservation or other disposal facilities, as required. Recent demolition activities largely focused on the Balance of Site laboratory and K-1008/K-1020 areas, the K-1417 yards, and demolition preparation in K-1401 and K-1420.

Completed Remediation Projects

K-1070-C/D G Pit, Concrete Pad

Activities at ETTP generated many types of waste, including hazardous, radioactive, and classified wastes that were disposed

of at the K-1070-C/D site from 1975 to 1989. G-Pit was originally designed as an organic solvent disposal pit. The G-Pit and the Concrete Pad area were grouped together for remedial action, which included a source removal at G-Pit (where the majority of the contaminant release is attributed) and putting a soil cover over the concrete pad at K-1071. The concrete pad was covered with a soil cover in April 1999, and the G-Pit removal was completed in January 2000. Thermal treatment of the contaminated soil was completed in April 2001, and the treated waste was disposed of in the EMWMF in April 2002. Wastes were disposed of at the Oak Ridge Reservation Industrial Landfill at the Y-12 Complex. Approximately 40 cubic yards of secondary construction waste was accepted for incineration at ETTP's Toxic Substances Control Act (TSCA) Incinerator in September 2003.

K-1070-A Burial Ground

The K-1070-A Burial Ground was opened just west of the K-25 Site in the 1950s to receive wastes from the gaseous diffusion plant. The one-acre site was used for underground burials of unclassified, contaminated materials. Burials consisted largely of uranium-contaminated materials. DOE, with public input, selected waste removal and disposal as the cleanup alternative. Remediation work began in June 2002 and was completed in March 2003 with 28,509 tons of waste excavated and disposed of at EMWMF. The site has been regraded to its original contour and restored.

K-1085 Old Firehouse Drum Site

Six potential drum burial areas at the K-1085 Old Firehouse Drum Site, located outside the ETTP perimeter fence near State Highway 58, were excavated to remove contaminated material. This project was initiated after a state highway construction contractor accidentally uncovered drum fragments. The excavated material from two of the six areas was contaminated. Fifty-five cubic meters of material were placed into waste containers and disposed of at EMWMF in December 2002. Approximately 22 cubic meters of waste transported to the TSCA Incinerator were unable to be incinerated because of slagging problems in the kiln. Sampling of the remaining soils showed that they now meet the waste acceptance criteria for disposal at the EMWMF. Final disposal will take place by the end of calendar year 2006.

Blair Quarry Remediation Project

Blair Quarry, located just east of the K-25 Site, was an operating rock quarry from 1942 to 1945. Material disposal within the quarry and open burning of trash and debris began in 1945. Pits were dug into the floor of the quarry and subsequently filled with debris. Buried waste was primarily contaminated with polycyclic aromatic hydrocarbons and polychlorinated biphenyls. The major component of the selected remedy was removal and

East Tennessee Technology Park (continued)

disposal of the contaminated soil and debris. Remediation work began in November 2004 and was completed in January 2005 with 15,069 tons of waste excavated and disposed of at EMWMF. The site has been re-contoured and revegetated.

Ongoing Remediation Projects

Depleted Uranium Hexafluoride Disposition

Natural uranium hexafluoride (UF₆) was used as feed material during the gaseous diffusion process to enrich uranium at the former K-25 site. A percentage of uranium-235 from the original feed material was removed in the process and the remaining material is called depleted UF₆. It is stored as a white, crystalline solid that is slightly less radioactive than natural uranium.

The cylinders at ETTP in which the UF₆ is stored are being transported to Portsmouth, Ohio. These steel cylinders hold up to approximately 10 to 14 tons of UF₆. They are stored in storage yards in aisles and were stacked two high. About 5,400 cylinders have been shipped and shipments are expected to be completed in December 2006. Empty and near empty cylinders containing residual uranium compounds other than UF₆ have been disposed of at the Nevada Test Site.



UF₆ cylinder being loaded for transport

K-1401/K-1420 Sumps Project

During past operations, Building K-1401 served as a maintenance facility to clean equipment needed in the gaseous diffusion process, and Building K-1420 was used for equipment decontamination, uranium recovery, and metal finishing. Sumps were installed during construction of these buildings to remove groundwater that would seep into the basements in order to keep them dry. Since the groundwater in the area was contaminated as a result of equipment cleaning operation,

a CERCLA removal action was implemented in August 1998 to pump the groundwater from the K-1401/K-1420 basement sumps and treat it at the ETTP Central Neutralization Facility. Recently, as part of the site-wide groundwater evaluation, the value of continued pumping from the sumps for the protection of groundwater was evaluated by DOE, EPA and TDEC. All parties agreed continued pumping provided limited value, and concurred with shutting down the sump pumps and amending the Action Memorandum to reflect this decision. To date, the sump in K-1401 is still operational to keep the basement dry, while the sump in K-1420 has been shut down and filled with grout.

K-1070-C/D and Mitchell Branch Plumes

ETTP has two areas—K-1070-C/D and Mitchell Branch—where previous DOE operations resulted in groundwater contamination. These defined areas of groundwater containing contamination, or “plumes,” have been investigated and identified. A groundwater collection system was installed at Mitchell Branch.

The Federal Facility Agreement parties evaluated the groundwater collection system remedy in 2005. The evaluation resulted in a decision to shut down the groundwater collection and treatment system. The system was not producing the desired results. The ETTP site-wide ROD is evaluating the need for future remedial actions.

TSCA Incinerator

ETTP is home to DOE’s TSCA Incinerator, the only U.S. facility permitted to incinerate certain radioactive and/or hazardous wastes. The facility, located on the eastern edge of the site, has operated since 1991. It plays a key role in the treatment of radioactive polychlorinated biphenyl and hazardous wastes from the Oak Ridge Reservation and other out-of-state DOE facilities.

The incinerator operates under rules and regulations issued by DOE, the Environmental Protection Agency, and the State of Tennessee, as well as Occupational Safety and Health Act regulations. The operator develops and follows detailed procedures to ensure safety and compliance with requirements. DOE, as well as the Environmental Protection Agency and the State of Tennessee, provide oversight of the operation. Periodic tests and evaluations are conducted to ensure performance meets requirements.

An annual TSCA Incinerator burn plan identifies the waste planned for treatment at the incinerator. The burn plan is provided to the State of Tennessee and made available to the public at the DOE Information Center as required by the “Waste Receipt and Study Protocol” executed by the State of Tennessee and DOE in 1997. Throughout the year, as waste is generated and characterized, the burn plan may be modified to add or delete waste streams or to reflect waste stream quantity changes.