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WEAPONS OF MASS DESTRUCTION (WMD)

Y-12 PLANT

Date Established: 1942

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Sources

- [Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management DOE/EIS-0236](#)
- [Plating Shop Replacement Y-12, Plant Oak Ridge, Tennessee DOE Environmental Assessment DOE/EA-0502](#)
- [Environmental Assessment O-Wing Renovation, Y-12 Plant, Oak Ridge, Tennessee DOE/EA-0503](#)
- [Proposed Replacement and Operation of the Anhydrous Hydrogen Fluoride Supply and Fluidized-Bed Chemical Processing Systems at Building 9212, Y-12 Plant DOE Environmental Assessment DOE/EA-1049 \(September 1995\)](#)
- [DOE Office of Oversight Validated Site Profile](#)

Present Mission: Weapon component dismantlement; special nuclear material (SNM) [storage](#); maintenance of technical capability for weapons development and production, stockpile maintenance and evaluation, and nonproliferation and arms control; technology transfer.

Size: 811 acres

Employees: 4000 as of July 29, 1996, representing a reduction from 6,388 as of September 30, 1994.

Annual Budget: The total fiscal year (FY) 1998 estimated site budget is: \$469.8M for FY 1996, \$482.1M for FY 1997, \$612.8M for FY 1998.

Cognizant Secretarial Officer: Assistant Secretary for Defense Programs (DP); principal DP offices include DP-20, Deputy Assistant Secretary for Military Application and Stockpile Management, and DP-24, Office of Site Operations.

Responsible Operations/Area Office: Department of Energy (DOE) Oak Ridge Operations Office (OR)/Y-12 Site

Office (YSO).

Management and Operating Contractor: Lockheed Martin Energy Systems (LMES).

Fissile Material: 171.9 metric tons of enriched uranium; other SNM (December 1993)

The Oak Ridge Y-12 Plant is situated at the eastern end of the Oak Ridge Reservation, adjacent to the city of Oak Ridge, in Anderson County, Tennessee. The plant, consisting of 531 buildings containing over 7,000,000 square feet of space, occupies an area approximately 0.67 mile wide and 3.2 miles long.

Y-12 was originally constructed in 1943 as part of the Manhattan Project. Its initial mission was the separation of fissionable isotopes of uranium (U-235) by the electromagnetic process. Built in a rural section of East Tennessee, the Y-12 National Security Complex, previously known as the Oak Ridge Y-12 Plant, was part of the Manhattan Project. Its job was to process uranium for the first atomic bomb. Construction of Y-12 started in February 1943; enriched uranium production started in November of the same year. Construction, however, was not entirely finished until 1945. At its peak during the war, Y-12 employed 22,000 workers. The first site mission was the separation of uranium-235 from natural uranium by the electromagnetic separation process. The magnetic separators were taken out of commission at the end of 1946 when gaseous diffusion became the accepted process for enriching uranium.

Since World War II, the number of buildings at Y-12 has doubled. Today, the Department of Energy's Y-12 National Security Complex is a manufacturing facility that stretches over 811 acres. Its 250 buildings contain about 7 million square feet of floor space (the square footage of 150 football fields). Its mission and capabilities have changed as well. Over the ensuing years, Y-12 has become a highly sophisticated nuclear weapons component manufacturing and development engineering organization.

The mission at Y-12 changed at the end of the Cold War from producing nuclear weapon components to maintaining the capability to produce secondaries and cases (capability assurance). Current Y-12 missions include receipt, storage, and protection of uranium and lithium materials and parts; directive work (process technology and development support); stockpile surveillance (quality evaluation); material recycle/recovery; and dismantlement capability and facility transition.

Y-12 core stockpile management (CSM) missions support the maintenance and evaluation of the stockpile through manufacturing, process technology, and development assistance. The site continues to move to a consolidated and downsized Defense Programs reduction footprint.

The President and the Congress have directed the Department of Energy (DOE) to maintain the safety and reliability of the nation's nuclear deterrent without underground nuclear testing. In order to do that, DOE has established a program of science-based stockpile stewardship. Y-12 is an integral part of that mission. Stockpile stewardship refers to the activities associated with research, design, development and testing of nuclear weapons and the assessment and certification of their safety and reliability. Stockpile management refers to the activities associated with production, maintenance, surveillance, refurbishment and dismantlement of the nuclear weapons stockpile.

Nuclear manufacturing includes the manufacture or remanufacture of unique nuclear weapon components for the nation's long-term defense capabilities. Precision fabrication services are supported by mature management and safeguards systems. Nuclear manufacturing includes Depleted and Enriched Uranium Operations; Special Materials Operations; and the Assembly, Disassembly, and Storage Operations, all in support of the nation's nuclear stockpile.

Weapon dismantlement, storage and evaluation includes primarily the disassembly of returned weapons components and quality evaluation for the existing weapons stockpile with surveillance of weapons through disassembly inspection and documentation of findings. Minimum processing is used to reach a state of safe, secure, legally compliant, and economical storage of the materials.

Y-12's focus on national security ensures safe operation and management of Y-12, the nation's "Fort Knox" of highly enriched uranium, the leader in uranium and lithium materials research, development and processing and the country's assembly and disassembly plant for nuclear weapon secondary components. This national security focus ensures comprehensive support for Y-12 non-proliferation and international nuclear materials safeguard programs. This office provides support to DOE in the development and monitoring of arms control and nonproliferation. The group also provides support for implementation and operates the Nuclear Materials Management and Safeguards System.

Enriched uranium material warehousing and management oversees the secure management and storage of special nuclear materials as weapons are retired from the national stockpile or returned for dismantlement under strategic arms reduction treaties. This function also includes the management and storage of nuclear materials that are returned to Y-12 from other DOE sites, including DOE-owned nuclear material from universities and other research facilities, both domestically and internationally. This work also includes the processing of enriched uranium for various applications, including enriched uranium processing and storage for DOE's Central Scrap Management Office.

Y-12 supports DOE's stockpile management program by maintaining the reliability and safety of weapons in lieu of underground testing and providing resources to address safety, programmatic and operational considerations, including maintaining the required technology, critical skills and physical assets for weapon production. As with all

other missions, protecting the public, workers and the environment is a priority when Y-12 activities are performed.

The Oak Ridge Operations Office (OR) is responsible for managing and overseeing operations of all facilities under its jurisdiction. The three largest sites are located in Oak Ridge, Tennessee: the Oak Ridge National Laboratory (ORNL), Y-12, and K-25. OR continues to maintain a presence at Paducah and Portsmouth Gaseous Diffusion Plants primarily for environmental remediation and waste management.

OR has delegated all day-to-day operational functions of ORNL, Y-12, and K-25 to the Department of Energy (DOE) site offices, headed by a site office manager and associated support staff, except for day-to-day environment, safety, and health (ES&H) functions at ORNL and K-25. These are performed by the OR matrix organization. The staff at the site offices are considered a line function, and report through the site office manager to the appropriate OR assistant manager (Defense Programs, Energy Research, Environmental Management, or Uranium Enrichment Operations).

The OR Manager is the Contracting Officer for all OR projects. The site office managers are designated as Contracting Officer's Representatives for most of the projects at their sites, except those administered directly by OR or another line function. For example, the DOE Y-12 Site Manager is responsible for all day-to-day production/operation related activities at Y-12 but is not responsible for environmental restoration and waste management activities, which are managed by the Assistant Manager for Environmental Management. Neither are the site office managers responsible for contracts managed by other elements of OR, such as the Oak Ridge Federal/Integrated Communications Network (ORF/ICN), which is managed by OR's Information Resources Management Division.

Y-12 and K-25 sites are operated by Lockheed Martin Energy Systems (LMES). LMES has created a structure similar to OR and assigned day-to-day plant-level operations to each site's management chain. LMES has retained certain functions at its corporate office, such as administering large subcontracts that operate at more than one site. For example, the M. K. Ferguson-Oak Ridge Company, managed by LMES, is the Construction Manager for all major OR sites.

OR also administers other contracts for the Oak Ridge Reservation, including the contract with Johnson Control, Inc. for management of the Oak Ridge Water Treatment Plant and maintenance of roads and grounds; U.S. West for ORF/ICN; Bechtel National Corporation for environmental remediation and demonstration projects; and Jacob Engineering and Lockwood Greene for architect/engineering services. OR has recently begun a contracting process whereby specialized services are contracted and managed by LMES or others. These projects are also considered outside the normal scope of the DOE site offices responsibilities.

Recent staff realignments within OR have resulted in the matrixing of most support staff functions to the three OR sites. For example, most of the technical staff within the OR Safety and Health Division have either been reassigned to one of the three OR sites or transferred to support organization within OR's Environmental Protection Division. It is unclear at this time how OR will discharge responsibilities for conducting multifunctional appraisals, special reviews, and other processes previously assigned to the Safety and Health Division.

OR manages the activities at Y-12 and established the Y-12 Site Office (YSO) to oversee contractor activities at the Plant. YSO has about 35 employees who report to the YSO Manager, who reports to the OR Manager through the Assistant Manager for Defense Programs.

OR has 660 full time equivalent (FTE) staff. With strategic realignment of DOE, OR will lose 55 FTEs in the next two years and 100 FTEs over the next five years. It is not clear how many FTEs will be lost at YSO.

LMES announced the next phase of workforce downsizing on August 26, 1996. The total downsizing announced by OR in May 1995 is estimated to total 900 LMES jobs by the end of fiscal year (FY) 1996. These reductions are in anticipation of lower budgets in FY 1997 as well as completion of previously funded projects, restructuring, and reorganization.

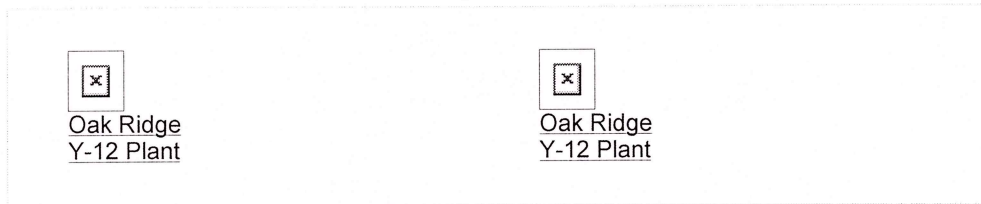
LMES is the integrating contractor. LMES (or its predecessor organization) has operated Y-12 since 1984. The LMES contract was due to expire in March 1996; however, an extension through March 1998 was authorized in 1995. (This contract extension required that ORNL be placed under a separate contract, which was negotiated with a new entity, Lockheed Martin Energy Research Corp., effective January 1996 and extending through March 1998.) A new performance-based management contract was negotiated and signed with LMES in August 1995, effective October 1995 through March 1998. This new contract incorporated all of the major elements of the Department's contract reform initiative: providing objective vs. subjective performance measures, establishing performance incentives through multiple fee arrangements, emphasizing and providing incentive for cost reduction, shifting of risk and liability to the contractor. On August 6, 1996, the Department announced its decision to extend the contract with LMES for the operation of the Y-12 Plant for two years, through March 2000. The primary reason for this decision is to avoid any disruption of some critical Department of Defense requirements.

Production activities at Y-12 were placed in a stand down mode on September 22, 1994, due to procedural and criticality safety concerns identified by the Defense Nuclear Safety Board. Since then, Y-12 has made progress improving its operations throughout the plant. Selected crucial operations were performed in these areas under control of a special operations package. Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-4, "Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant," provides a detailed background of these conduct of

operations problems.

Briefly, a DNFSB staff member identified a nuclear criticality safety infraction at Y-12 in September 1994. Because of improper management response to the infraction, Y-12 operations were placed in stand-down. In the days following the stand-down, hundreds of similar nuclear criticality safety deficiencies were identified at the Plant and at the other DOE sites in Oak Ridge. As a result, the stand-down was continued for most of the plant nuclear operations. Operations in Y-12 facilities have been resumed in phases. Some have already begun, such as the warehousing and shipping, and the assembly and disassembly operations.

Since the stand down, Y-12 personnel have worked to restart operations in the following mission areas: Receipt and Shipment, Disassembly and Storage Operations, Depleted Uranium Operations, and Stockpile Surveillance, while continuing to meet defense mission requirements. On June 8, 1998 Y-12 resumed the last of its production missions, Enriched Uranium Operations, when it cast its first enriched uranium part since September, 1994. Y-12 is currently involved in the life extension program for the Peacekeeper Missile warhead, called the W87. Initial delivery of key components of this weapon are due at the end of 1998, and manufacturing will continue for several years.



KEY FACILITIES

The Y-12 National Security Complex has been making nuclear components for the U.S. Department of Energy (DOE) since 1944. Facilities have become increasingly more expensive to maintain as the aging structures become outdated and require extensive repairs. In comparing the current method of repeated repair and maintenance with the option of constructing new, state-of-the-art facilities, it has been determined that the mission of National Security will be best supported through the development of new, technologically superior facilities.

In 1998, DOE Oak Ridge Operations (ORO) officials announced that a uranium storage building, called the Highly Enriched Uranium (HEU) Materials Facility, would be built as the first segment of a project to upgrade and modernize Y-12's aging equipment and structures. DOE-ORO's plans are to include money to begin construction on the HEU facility in the federal budget in fiscal year 2001. The plan is to build the rest of the new uranium process facilities in phases which could extend to the year 2015. After the initial facility is built, construction work would begin on a new uranium manufacturing center.

Additional work will include process buildings along with infrastructure and utility improvements. A site-wide Environmental Impact Statement is under way in preparation for the construction and demolition that will take place with the modernization effort.

Building 9201-4, Alpha 4

This nuclear facility, constructed in 1945, was originally used for electromagnetic separation of uranium. It was later used for separation of lithium isotopes. It occupies 562,000 square feet of space, is shut down, and is assigned to EM. However, all major Y-12 plant utilities run through this facility, and it is the hub of the entire electrical system of Y-12.

The building contains large quantities of mercury and other hazardous materials, such as asbestos, lithium, lithium hydroxide, and mixed wastes. Although this facility is deteriorating, it is still in good condition. About 50 to 70 workers occupy this building, and extensive precautions are taken to protect the workers from the risk of exposure to the hazardous materials.

Building 9201-5, Alpha 5

This building was constructed in 1945 and occupies 591,500 square feet of space. The primary mission of this facility is to process and manufacture depleted uranium and non-uranium materials parts. In addition, beryllium, lithium, and depleted uranium in various forms are stored in this facility. Combustibles contaminated with enriched uranium are also stored in 9201-5. There are plans to relocate the arc melting operation to the 9998 H-1 foundry.

Building 9201-5N/5W, Alpha 5N/5W

This nuclear facility, constructed in 1972 and occupying approximately 80,500 square feet of space, is used to machine depleted uranium. There is some risk of depleted uranium exposure or uptake to workers in this facility.

Building 9204-2, Beta 2

This building was constructed in 1954 and occupies 270,000 square feet of space. The primary mission of this facility is to manufacture non-nuclear components for weapon production. This mission includes salvage and recycle

of weapon components made from lithium hydride and lithium deuteride and storage of these and other lithium-based materials for possible reuse. Today's lithium operations are generally industrial types: non-nuclear, non-radiological, chemical, foundry, and metal working processes. Much of the original equipment has been replaced or upgraded by the lithium process replacement project and other projects since the late 1980s with significant improvements in safety, waste minimization, and process control.

Building 9204-2E, Beta 2E

This facility occupies approximately 151,200 square feet of space and was constructed in 1969. It is currently used for: (1) processing cleaning, assembling, welding, and preparing nuclear components for shipment; (2) disassembling, storing, and preparing non-nuclear components for shipment; (3) dismantlement; and (4) quality evaluation and component certification. Operations resumed in March 1996. A major hazard is the significant quantities of special nuclear material (SNM). While the risks are relatively low, the workers are exposed to radiological and industrial hazard and to possible nuclear criticality. Significant events include failure to comply with fire protection system surveillance requirements and operational safety requirements (OSRs).

Building 9204-4, Beta 4

This nuclear facility, constructed in 1949, occupies approximately 273,000 square feet. It is used for disassembly, testing, and storage of warhead components produced at Y-12. Portions of this facility have become active as part of receipt, storage, and shipping (RSS) operations. Other activities, such as quality evaluation (QE), are being performed under special operation packages. The mission of this facility is being moved to Building 9204-2E; the move is scheduled to be completed by 2002. In addition, depleted uranium and non-uranium metals are processed in this facility. Plans are to relocate this activity to Buildings 9212, 9996, and 9998. A major hazard is the presence of significant quantities of SNM and hazardous substances; while the risks are relatively low, workers are exposed to hazardous substances and to possible nuclear criticality. A past significant event includes violation of OSRs.

Building 9206

This nuclear facility, constructed in 1946, occupies approximately 67,294 square feet. It was used to recover enriched uranium from scrap and trash. However, it is in stand-down with limited operations, due to conduct of operations concerns identified by the DNFSB. A major hazard is the presence of significant quantities of SNM and hazardous substances. While the risks are relatively low, the workers are exposed to hazardous substances and to possible nuclear criticality. A past significant event was failure to conduct monthly inspection required by criticality safety approval, which constitutes a violation of OSRs.

Building 9212 Complex

This facility was built in 1949 and occupies approximately 311,325 sq. ft. and is used for recovery, purification, and processing of enriched uranium into usable products or forms suitable for storage. The major hazards are nuclear, radiological, and hazardous chemicals present in the facility, and standard industrial hazards. Significant events are: 1) the required annual test of the baghouse Halon system did not test all required components; 2) CSA requirements were not strictly enforced; and 3) there was uptake of radiological material by workers. An internal investigation by the contractor resulted in a detailed report that identified the causes of the uptake and the recommendations to prevent a recurrence. The uptake resulted in a committed effective dose equivalent of # 5 mrem for all of the attested workers. The Price-Anderson Amendment Act audit conducted in October 1996 focused on this event. The results of the audit are pending. The facility is in stand-down with limited operations due to conduct of operations concerns.

Building 9215 Complex

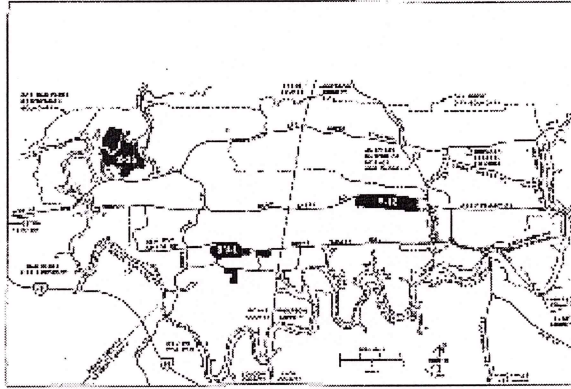
This nuclear facility was constructed in 1950 and occupies approximately 157,000 square feet of space. It was used to manufacture parts for depleted and enriched uranium. Portions of this facility has become active as part of RSS operations. The remainder will be reactivated as part of the enriched uranium operations restart. The major hazard is the presence of significant quantities of enriched and depleted uranium.

Building 9720-5

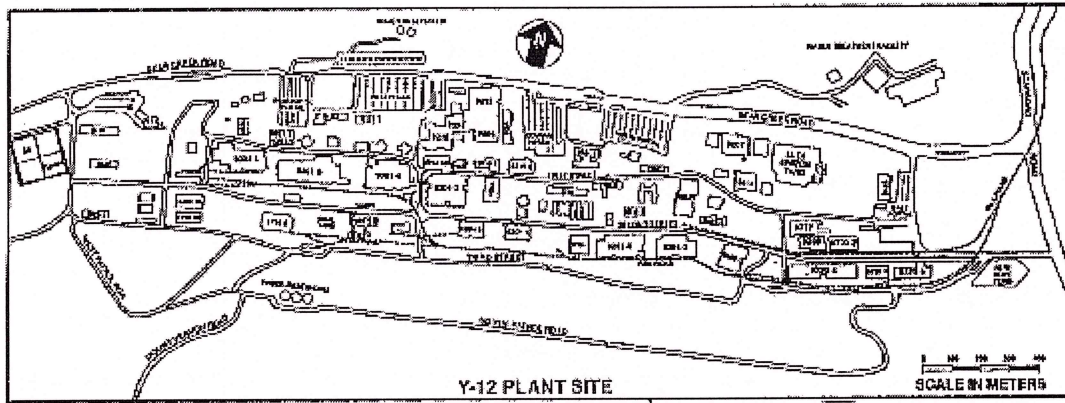
This nuclear facility was constructed in 1945 and occupies approximately 53,949 square feet of space. It is used for storing enriched uranium weapons parts, assemblies, and other SNM for Y-12. The major hazard is a significant quantity of SNM. A significant event is failure to comply with fire protection system surveillance requirements, which is a violation of OSRs.

Building 9995

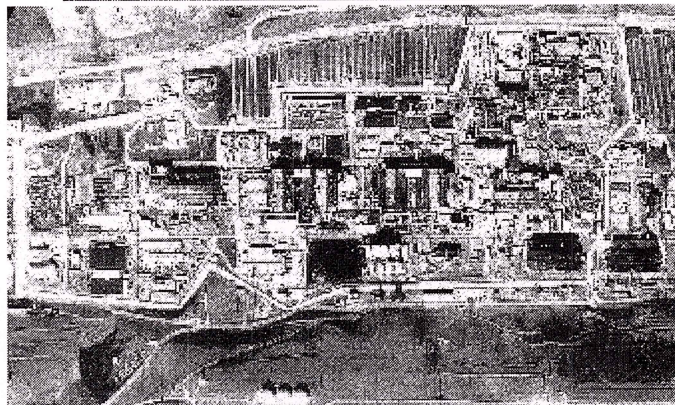
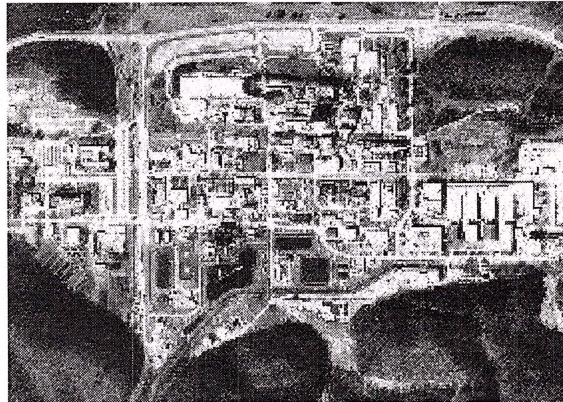
This nuclear facility was constructed in 1952 and occupies approximately 84,000 square feet of space. It is an analytical laboratory used, among other tasks, to assay nuclear components. This facility was maintained as a continuing operation.



Site Map



Y-12 PLANT SITE



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