Y12 Site Modernization EIA

APPENDIX A: Y-12 PLANNING, PROCESS AND FACILITY INFORMATION

This appendix to the Y-12 Site-Wide Environmental Impact Statement (SWEIS) presents information on the principal planning, processes, and facilities associated with the Y-12 Plant. This includes a description of the facility planning and transition process; a summary of major Y-12 Plant configurations and infrastructure; a description of the Y-12 Plant production processes; a description of Defense Programs (DP) major facilities (designated by building complex or specific buildings); a summary of principal Waste Management activities (designated by unit names since these are usually located in larger buildings); and information dealing with traffic and transportation. Tables and figures related to these discussions are included in order to conveniently summarize selected facility information.

A.1 FACILITY PLANNING PROCESS AND FACILITY TRANSITION PROGRAM

This section summarizes information dealing with facility planning processes at Y-12. In addition, information on facility transition programs and the decontamination and decommissioning (D&D) of facilities is also summarized.

A.1.1 Y-12 Facility Planning

The Y-12 Weapons Programs Organization, in which the Required Technical Base and Facilities Program resides, has the overall responsibility for formulating the DP capital investment and workforce strategy for the Y-12 Site. The Weapons Program is integrally linked with the Modernization Program and the Utilities and Infrastructure Management Program. Together, this triad works to accomplish the following objectives:

- Convey program requirements to the Site organizations to ensure that Y-12 plans for the capacity and capability commensurate with directive schedules and funding (Weapons Programs/Required Technical Base and Facilities Program)
- Migration (planning, project development, and execution) of current state to future state with respect to facilities and infrastructure (Modernization Program)
- Maintenance of all utilities and distribution systems, development of their requirements, and prioritization of resources (Utilities and Infrastructure Management Program)
- Development and prioritization of maintenance, upgrades, and replacement of site-wide infrastructure buildings, roads, parking lots, etc. (Utilities and Infrastructure Management Program/Modernization Program)

Planning at the Y-12 Plant begins with an understanding of current and proposed missions, coupled with a vision of the future role of the facility in meeting overall DP requirements. A strategic plan is prepared for the Y-12 Plant that provides guidance on its objectives and long-range plans, including site and facilities considerations relating to the manufacturing footprint. The site and facilities planning process uses the strategic plan as a starting point for developing long-range alternatives, prioritizing proposed projects, and generally setting the direction for infrastructure investment.

At a detailed level, the site and facilities planning process at the Y-12 Plant involves three major steps: (1) identification of needs, (2) packaging of proposed solutions into projects or activities, and (3) prioritization of those projects and activities to meet budget constraints. These steps are iterative and ongoing, as needs and budget projections change.

In the past, Y-12 has used the Condition Assessment Survey tools and procedures developed by the U.S. Department of Energy (DOE) Headquarters to systematically assess and document the physical condition of its facilities. Condition Assessment Survey data have provided information to identify maintenance needs. Other needs, particularly for operational improvements, acquisition, and disposition, have been identified by program managers and facility managers in response to facility conditions, workload requirements, and programmatic guidance from DOE.

These needs and proposed solutions are then formalized into requests for funding of capital projects, expense-funded projects, or work authorization packages. Processes for setting priorities differ, depending on the proposed funding source, but generally involve formal or informal committees of middle managers passing initial recommendations to senior management for modification and approval.

A.1.2 Y-12 Facility Transition Program

Facility Transition, which is part of the Modernization and Facilities Transition Program, involves preparing surplus facilities for disposition with their safe, compliant, and cost-effective management until disposition. Disposition could include reuse by another entity, transfer to the DOE Office of Nuclear Material and Facility Stabilization (EM-60), or demolition by DP. Any of these disposition alternatives may be preceded by an extended period of surveillance and maintenance (S&M): the program has developed a systematic approach for placing surplus facilities in a safe and compliant condition and minimizing S&M costs in a framework that protects workers, the public, and the environment.

Figure A.1.2S1 is a top-level flow diagram of the decision and planning process. While the flow diagram represents a linear sequence of events, many of the steps in the process can be done in parallel. S&M is not final disposition, and facilities in long-term S&M will be periodically reevaluated to determine if the time is right for a more permanent disposition. The level of activity required at each step in the process will depend on the size and complexity of the facilities.

A.1.2.1 *Surplus Facilities Identification*

Identification of surplus facilities is obtained through the Y-12 Ten-Year Plan and the downsizing activities described in the Activity Implementation Plan. The surplus facilities identified in these documents constitute the baseline for surplus facilities to be managed by the program.

A.1.2.2 *Disposition Strategy*

The disposition options for surplus facilities are to reuse the facility, transfer it to EM-60, demolish it, or place it in long-term S&M. The preferred option is to find a reuse (new owner) for the facility. If reuse is not feasible, transfer to EM-60 or demolition by DP are the next preferences. For process-contaminated facilities, Environmental Management (EM) is the departmental organization designated to deactivate and decontaminate as necessary and take the facility to its final disposition.

The final disposition could be demolition or a reuse option that was not available in its former contaminated state. The uncontaminated facilities that EM will take will be demolished with DP funding whenever justified on the basis of cost savings or other programmatic imperatives, such as need for the land. Demolition is subject to funding constraints. Long-term S&M is not a final disposition alternative, although it may be used while waiting for a reuse opportunity, demolition funding, or EM's readiness to accept a contaminated facility. The final selection of a disposition option for a facility will involve the approval of Y-12 Site management and DOE.

FIGURE A.1.2–1.—*Facility Disposition Approach.*

A.1.2.3 *Scheduling and Budgeting*

After the disposition strategy for a facility is selected, a baseline schedule and cost estimate for the disposition of the facility would be developed and incorporated into the budget planning process. Developing the budget submission requires a team effort involving numerous Y-12 organizations: Weapons Programs Management; Operations; Engineering; Environment, Safety and Health; Maintenance; Waste Management; Facility Safety; Fire Protection; and others as required.

A.1.2.4 *Walkdown Assessments*

Walkdown assessments identify actions required to place facilities in a safe and compliant condition, taking into account the status of the facility and a necessary and sufficient approach to requirements. The assessment process is used to determine what actions need to be performed in a facility prior to reuse, transfer to EM, demolition, or long-term S&M. Figure A.1.2–2 shows the process flow for the stabilization actions required to place a surplus facility in a safe and compliant condition.

A.1.2.5 *Reuse*

The stabilization approach is tailored to the disposition strategy for the facility. If the facility is a candidate for reuse, then it is anticipated that some actions will need to be completed prior to transfer to a new owner. These actions typically will address removal of potential *Resource Conservation and Recovery Act* (RCRA) wastes, equipment, materials, etc., that are not needed by the new owner.

A.1.3 Transfer to EM

If reuse is not an option, process-contaminated facilities are candidates for transfer to EM-60. Process contamination is defined as contamination of systems or structural components by radioactivity or hazardous chemicals. The definition excludes contamination from conventional building materials, such as asbestos and lead-based paint, and from polychlorinated biphenyl (PCB) oils. It also excludes facilities in which bulk or containerized hazardous materials have been used or managed if no residual contamination remains after the hazardous materials are removed.

Transfer to EM will be done as prescribed by DOE O 430.1A, *Life Cycle Asset Management.* Because a facility's budget for S&M is transferred along with the facility, notification of intent to transfer is required two budget-years in advance of the proposed transfer. This time will allow EM-60 to incorporate the S&M costs into its budget planning and to complete a pre-transfer agreement. The pre-transfer agreement documents the actions that will be required by Y-12 prior to EM's accepting the facility.

A.1.4 Demolition

If a facility is targeted for demolition, a demolition plan is prepared. Consideration will be given to options that could range from having a subcontractor remove the facility and salvage the materials with no cost to DOE, destruction of the facility by fire with fire protection personnel using this fire as a training exercise, a low-bid subcontractor award contract, or other options. The intent is to minimize the costs to DOE while maintaining a safe and compliant process.

FIGURE A.1.2–2.—*Stabilization Action Process.*

A.1.4.1 *Long-Term S&M*

If near-term disposition by reuse, transfer, or demolition is not feasible, the facility will be placed into long-term S&M. The basic difference in the process at this time is the implementation of an S&M plan. The facility will be stabilized to a safe and compliant condition as determined by analysis of the walkdown assessments (based on necessary and sufficient principles). After stabilization, personnel access to the facility will be limited, and an S&M plan will be implemented. The objective is to minimize the S&M costs, consistent with risk management concepts. Reduction of S&M costs will potentially involve things such as shutting off utility services (e.g., electrical, water, steam), decontaminating radiation-contaminated areas, removing materials, and eliminating inspections on equipment no longer in service. Systems such as the Criticality Accident Alarm System, Fire Protection, Emergency Notification System, and Emergency Lighting/Egress will remain in service as necessary to ensure the health and safety of workers, the public, and the environment.

A.1.5 Y-12 Decontamination and Decommissioning of Facilities

It is important to recognize that the decisions to conduct near-term cleanup and D&D activities at Y-12 do not depend on whether the proposals for the Y-12 SWEIS alternatives are implemented. Regardless of proposed actions, substantial cleanup of both soil and groundwater contamination and substantial D&D of buildings already determined to be necessary for future operations are either occurring or planned. When specific proposals are completed for the D&D of facilities that would be phased out as a result of the implementation of the proposed Y-12 SWEIS actions, the appropriate *National Environmental Policy Act* (NEPA) process would be followed.

The required level of effort to complete the D&D of Y-12 facilities would be a function of the types of chemical and radiological materials used when the facility was operational, and the extent to which radioactive and hazardous/toxic materials have been deposited on the internal and external surfaces of components, systems, and structures.

Because the specific number and types of Y-12 facilities that may be proposed for transition to EM have not been identified for the future schedule of D&D, it is not possible to quantitatively analyze potential impacts at this time. However, radiological impacts from D&D activities to the general population are expected to remain below the negligible level for a maximally exposed individual (1 mrem/yr) based on the off-site releases reported in previous annual environmental reports for the ORR published by DOE. All D&D activities are regulated by DOE Orders, and exposure limits to the general population would be similar to exposure limits for facility operations.

A.2 Y-12 SITE CONFIGURATION AND INFRASTRUCTURE

This section summarizes information dealing with the Y-12 Site configuration and infrastructure.

A.2.1 Site Configuration

The Y-12 Area of Responsibility in the Oak Ridge Reservation (ORR) covers a total of 2,136 ha (5,279 acres). The main area of Y-12 is largely developed and encompasses 328 ha (811 acres), with 255 ha (630 acres) fenced (4 by 2 km [3 by 1 mi]). Approximately 580 buildings, trailers, and other structures house about 714,317 m² (7.6 million ft²) of laboratory, machining, dismantlement, storage, and research and development (R&D) areas. Because of the Site's defense support manufacturing and storage facilities, the land in the Y-12 area is classified in DOE's industrial category.

Many of the buildings used for Y-12 production processes were built during the 1940s for the Plant's original mission of electromagnetically separating isotopes of uranium. These buildings have been modified over the years to accommodate changing missions. The separation of lithium isotopes using column exchange technology was performed at one time in some of the buildings, but that process was discontinued in the 1960s.

The Building 9212 Complex was built in the early 1940s with several buildings added in the 1950s. The most recent production facility additions were made in the late 1960s and early 1970s as part of the Production Facilities Modifications Program. The major facilities added at that time were Buildings 9204-2E, 9201-5W, and 9201-5N. The current beryllium operations are located in Buildings 9202, 9201-5, 9201-5N, and 9995; these buildings range from 27 to more than 50 years old.

Generally speaking, the Y-12 Plant can be divided into three areas: (1) the East End mission support area; (2) the West End manufacturing areas; and (3) the West End environmental area. East End facilities are generally technical, administrative, and Y-12 Plant support functions. The West End manufacturing area is generally considered an area inside the Perimeter Intrusion Detection and Assessment System (PIDAS) fence. The area inside the PIDAS boundaries contains manufacturing and nuclear material storage facilities as well as technical and Y-12 Plant support operations and program management, product certification, quality control, product engineering and scheduling, maintenance, and utilities. The West End environmental area is managed by EM and contains tank farms, waste management treatment facilities, and storage areas; included are such facilities or areas as the Bear Creek Road Debris Burial Area, Rust Spoil Area, Liquid Organic Waste Storage Facility, Hazardous Chemical Disposal Area, Oil Landfarm, Oil Landfarm Contaminant Area, and Sanitary Landfill 1.

A.2.2 Site Infrastructure

An extensive network of existing infrastructure provides services to Y-12 activities and facilities. The Y-12 area contains 104 km (65 mi) of roads ranging from well-maintained paved roads to remote, seldom-used roads that provide occasional access.

Electric power is supplied by the Tennessee Valley Authority (TVA) and is distributed throughout the Y-12 Site via three 161-kV overhead radial feeders. In addition, there is one 161-kV interconnecting overhead feeder. Some sections of the three lines are supported from suspension insulators on self-supporting steel towers; most sections, however, are supported on wooden-pole H-frame structures. Thirteen 13.8-kV distribution systems ranging in size from 20 MVA to 50 MVA are located within such buildings as 9201-1, 9201-2, 9201-3, 9204-4, 9201-4, 9201-5, 9204-1, and 9204-3. Each system consists of a high-voltage outdoor transformer with indoor switchgear, 15-kV feeder cables, power distribution transformers, and auxiliary substation equipment.

The electrical distribution loads outside major buildings are carried out through 13.8-kV overhead circuits, primarily radial-feed type. Two 13.8-kV tie lines are capable of transferring large blocks of power between the distribution substations. These tie lines are used as alternate power feeds to sections of the Plant when part of the 161-kV transmission system is out of service. The total installed transformer capacity is approximately 400 MVA. According to the draft report, *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999), the Y-12 Plant load during the 1990s averaged approximately 44 MVA.

Natural gas is used for furnaces, the Steam Plant, and laboratories and is supplied via a pipeline from the East Tennessee Natural Gas Company at "C" Station located south of Bethel Valley Road near the eastern end of the Y-12 Plant. A 36-cm (14-in) 125-psig line is routed from "C" Station to the southwest corner of the

Y-12 Plant perimeter fence. From this point, a 20-cm (8-in) line feeds the Steam Plant and a 15-cm (6-in) branch line serves the process buildings and laboratories in the east end of the Plant. The western end of the Y-12 Plant, other than the Steam Plant, is served by 10-cm (4-in) and 5-cm (2-in) headers that are fed from the Steam Plant line. Two other pressure reducing stations, one at the Steam Plant and the other at Building 9202, reduce the gas pressure from 125 psig to 25 psig and 35 psig, respectively. The gas pressure is further reduced and the flow metered at each use point.

Steam used in heating and processing is supplied from a central Y-12 Steam Plant which was originally built in 1955 and upgraded and modernized several times to date. The Plant operates 24 hr/day, 365 days/year. It includes four coal-fired boilers, each of which is rated at 200,000 lb/hr at 500• F and 235 psig. Each boiler is capable of firing on either pulverized coal or natural gas, and includes two coal pulverizers and four burners. Coal for the Steam Plant is purchased regionally, delivered by truck, and stored in a bermed area near the Steam Plant. Runoff from the coal pile is collected and treated in the Steam Plant Wastewater Treatment Facility prior to discharge to the sanitary sewer system. Natural gas is supplied from the Y-12 Plant system through an 8-in-diameter, and a 125-psig underground main; a pressure reducing station reduces the pressure to 25 psig for use in the burners.

Steam is distributed throughout the Y-12 Plant at 235 psig through main headers ranging in size from 5 cm (2 in) to 46 cm (18 in) in diameter. Condensate is collected and returned to the Steam Plant using a similar network of pipes; a majority of the returned condensate is used as feed to the demineralized water system.

The source of raw water for the Y-12 Plant and a city of Oak Ridge filtration plant is the Melton Hill Reservoir section of the Clinch River. Raw water is pumped approximately 9,000 ft from the reservoir to a 1.5 million gal storage tank and pumping station east of the Plant. From the pumping station, raw water is pumped to a 91 MLD (24 MGD) filtration plant water system that also serves Oak Ridge National Laboratory (ORNL) and the city of Oak Ridge. Separate underground piping systems provide distribution of raw and treated water within the Y-12 Plant. Raw water is routed to the Y-12 Plant by two lines: a 41-cm (16-in) main from the booster station, installed in 1943; and a 46-cm (18-in) main from the 61-cm (24-in) filtration plant feed line. The raw water system has approximately 8 km (5 mi) of pipes with diameters ranging from 10-cm (4-in) to 46-cm (18-in). The primary use of the raw water is to maintain a monthly average minimum flow of 7 MGD in the East Fork Poplar Creek (EFPC).

Treated water is routed from the city of Oak Ridge filtration plant to Y-12 facilities by three lines: one 61 cm (24 in) main and two 41 cm (16 in) mains; the total treated water system contains approximately 31 km (19 mi) of pipe ranging in size from 3 cm (1 in) to 61 cm (24 in) in diameter. The treated water system supplies water for fire protection, process operations, sanitary sewage requirements, and boiler feed at the Steam Plant. Treated water usage at the Y-12 Plant averages 5 to 6 MGD, or 160 to 200 million gal/month. The ownership and operation of the treated water system were transferred from DOE to the city of Oak Ridge in May 2000.

Demineralized water is used to support various processes at the Y-12 Plant that require high-purity water. A central system located in and adjacent to Building 9404-18 serves the entire Y-12 Plant through a distribution piping system. This system consists of feedwater storage, carbon filters, demineralizers, a deaerator, and demineralized water storage tanks. The primary source of feedwater is condensate return which is cooled and stored in two storage tanks (13,000 gal and 30,000 gal). The secondary source of feedwater is softened water from the Steam Plant; feedwater from the storage tanks is filtered, demineralized, deaerated, and stored until needed.

The demineralization system includes four mixed-bed-type demineralizer units, each capable of delivering 100 gpm of water. These units, which use commercial resins, operate alternately—one unit is online while the other three are on standby. The system also includes three storage tanks: one with a 30,000-gal capacity and two with a 20,000-gal capacity each. Demineralized water is distributed in 8m cm (3 in) and 15-cm (6 in) mains constructed mostly of stainless steel. The mains run above and below the ground in approximately equal proportions. The *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report indicates that the existing system is in good mechanical condition.

The Y-12 Site's sanitary sewer system was first installed in 1943 and expanded as the Y-12 Plant grew. Sanitary sewage from the Y-12 Plant flows by gravity to a 46-cm (18-in) sewer main that leaves the west end of the Plant near Lake Realty and connects to the city main near the intersection of Bear Creek and Scarboro roads. The current system capacity is approximately 1.5 MGD.

According to the *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report, the sanitary sewer system has been upgraded over the past couple of years and is judged to be in good shape. The storm drainage system, however, is judged to be in need of repair; some lines are collapsed, most lines have sediment buildup, and some mains are undersized because of changes in the Y-12 Plant layout over the years.

The chilled water systems were renovated and upgraded during the mid-1990s. Most chillers that were more than 20 years old were replaced, and the new chillers were inspected and renovated to eliminate the use of chlorofluorocarbons and to restore the chillers to optimal mechanical condition.

Industrial gases include compressed air, liquid nitrogen, liquid oxygen, liquid argon, helium, and hydrogen. Compressed air is supplied by three different systems that use compressors and associated air-drying equipment located throughout the Y-12 Plant. The high-pressure (110 psig) instrument air system serves specific production buildings in the west end of the Y-12 Plant. The low-pressure (100 psig) system also serves the production facilities in addition to serving the production support buildings and ORNL facilities located at Y-12. The Plant air system (90 psig) serves those areas where air quality is not a concern. All three systems are supplied from the same set of compressors and are different only in the operating pressure and the cleanliness of the piping systems (i.e., the Plant air piping system contains legacy oil and moisture from previous operations).

Both the high- and low-pressure instrument air systems provide dry, clean, oil-free air for air operated valves, instruments, gages, air-spindle bearings, and breathing air (for both respirators and suits). The Y-12 Plant air system is supplied from the low-pressure system; however, since the piping system is not the same quality as the parent system, the Y-12 Plant air system is operated at a lower pressure to prevent backflow and cross contamination of the low-pressure system. Air compressors and dryer systems have been installed throughout the Y-12 Plant. Twelve compressors are located in Buildings 9976, 9767-1, 9767-13, 9401-3, 9727-4, 9404-2, 9767-5, and 9767-10.

Liquid nitrogen is normally delivered to the Y-12 Plant by trailer truck. The Y-12 nitrogen supply system consists of five liquid-nitrogen storage tanks, a bank of atmospheric vaporizers, a steam-to-nitrogen vaporizer, and hot-water vaporizers. Nitrogen is delivered to all production facilities and laboratories at 90 psig through a network of 5-cm (2 in), 8 cm (3 in) and 10 cm (4 in) pipes. The five storage tanks have a combined capacity of 241,084 L (63,688 gal), or approximately 5.9 Mscf. A bank of 12 atmospheric vaporizers, each with a capacity of 4500 scf/hr at 0• F, is capable of producing 38.8 Mscf/month. In Building 9727-3, four standby hot water vaporizers with a combined capacity of approximately 300,000 scf/hr can provide an additional 100 Mscf/month. The *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report indicates that usage in 1998 at the Y-12 Plant was 192 Mscf.

Liquid oxygen is delivered to the Y-12 Plant by truck. The oxygen supply system consists of one 914,460 scf vacuum-insulated storage tank for liquid oxygen. Oxygen is generated by passing the liquid oxygen through two banks of atmospheric vaporizers that have a capacity of 5800 scf/hr, or 4.1 MScf/month. The gas pressure is reduced to 90 psig, metered, and distributed to production facilities through a 5-cm (2 in) overhead pipeline. According to the *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report, oxygen consumption between 1994 and 1998 ranged from 3 to 4 Mscf per year.

Liquid argon is delivered to the Y-12 Plant by trailer truck. The Plant's argon system consists of five vacuum-insulated liquid storage tanks and 12 atmospheric fin-type vaporizers. The storage tanks have a combined capacity of 116,351 L (30,737 gal) equivalent to approximately 3.4 Mscf of gas. The argon distribution system operates at 75 psig and includes a system of filters, dryers, regulators and meters. Gas is distributed to production areas and laboratories through a network of 5-cm (2 in) and 8 cm (3 in) pipes. Argon is also piped to the cylinder-filling station at Building 9977.

The Y-12 Plant receives and stores high-purity helium at 3,000 psig in a jumbo tube trailer. The helium facility at Building 9977-1 includes a jumbo tube trailer with a capacity of 160,000 scf. In addition, 36,000 scf of helium at 1800 psig is stored in a tube trailer and serves as emergency standby. The Building 9977-1 cylinder filing facility also houses the high pressure reducing station. Helium gas is distributed throughout the Y-12 Plant at 90 psig through a 5 cm (2 in) overhead pipeline. The *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report indicates that the condition of the current system is adequate to serve the long-term needs of the Y-12 Plant.

The hydrogen supply at the Y-12 Plant is stored in Building 9977-2 in multi-cylinder tube trailers in open concrete block stalls. Four trailers are used on a rotating basis: one is in service, one is in ready standby, one is in emergency standby, and one is being refilled. Each trailer has a capacity of approximately 30,000 scf, providing a total capacity of 90,000 scf. Stored gas is pressurized at 2,000 psig. A two-stage pressure-reducing station delivers 50 psig gas through a meter. The gas is then distributed through a 5-cm (2 in) overhead pipeline to Plant and laboratory facilities. The draft report, *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999), indicates that current usage is approximately 1,000 scfd.

According to the *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report, systems supplying industrial gases are generally oversized and do not operate at optimum efficiency. For example, the nitrogen system has an installed capacity of over 140 Mscf/min while current usage is averaging approximately 14 Mscf/min. The oxygen system has a capacity of over 4 Mscf/min compared to an average consumption in FY 1998 of approximately 300,000 scf/min. These oversized conditions results in excessive losses and increase the cost to users.

The four basic telecommunications systems within the Y-12 Plant are the Oak Ridge Federal Integrated Communications Network (ORFICN), the Cable Television (CATV) Network, the unclassified Y-12 Intrasite Network, and the Y-12 Defense Programs Network (Y-12DPNet). ORFICN consists of copper cable distributed throughout the Y-12 Plant and within all its buildings. This network is used for telephone, fax, and special data and alarm circuits and is operated by U.S. West.

The CATV Network consists of coaxial cable that is run to selected sites within the Y-12 Plant. This network has the ability to send and/or receive video among the Oak Ridge Plant's buildings at a given site and some off-site locations. Broadcasts originating at one plant can be seen at the other two as well as off-site locations and the DOE Federal Building. The CATV Network is managed and operated by ORNL's Computing, Information, and Networking Division (CIND).

The unclassified Y-12 Intrasite Network consists of a fiber-optic backbone network with fiber-optic connectivity to most buildings within the Y-12 Plant. The unclassified network uses a 100-Mbps fiber-distributed data interface (FDDI) Ring for the backbone network. This network uses a routed Ethernet service to separate Internet protocol (IP) sub-nets for each building. Within these buildings, desktop connectivity consists of mostly Category V data wiring. Most desktops presently have shared 10 Mbps connectivity, although some locations have switched 10 and 100 Mbps connectivity. External connections to the Internet are made through the ORNL Network that is managed and operated by CIND.

The Y-12DPNet is the Classified Services Network (CSN) and presently consists of a coaxial broadband network and a fiber-optic backbone network with fiber-optic connectivity to most buildings within the protected areas of the Y-12 Plant. The coaxial broadband network is still used for terminal-to-host connectivity and some Ethernet service in areas not connected by fiber optics. A fiber-optic backbone network, consisting of a 100 Mbps FDDI Ring, is used for 100 Mbps Ethernet service to buildings with fiber-optic connectivity. Within these buildings, desktop connectivity consists mostly of old, nonstandard cabling with shared 10 Mbps service. This network is connected to other nuclear weapons complex sites through DOE's SecureNet.

As part of the ORR system, telephone services for the Y-12 Plant are provided by U.S. West; approximately 7,000 voice and data lines are provided. In addition, a Plant-wide public address and emergency notification system is provided. Finally, a classified computer network supports the DP mission.

A.3 Major Y-12 Production Processes

The Y-12 mission activities required to support the production and maintenance of the secondaries and case components of the nuclear weapons physics package include:

- Providing secondary materials
- Processing materials
- Fabricating parts and components
- Assembling and disassembling secondary components
- Performing quality evaluations of secondary assemblies
- Providing safe, secure storage of secondary material and products
- Packaging and shipping materials, components, and assemblies

Functional capabilities required to perform these activities include operations to physically and chemically process, machine, inspect, assemble, certify, disassemble, and store secondary materials. Management of wastes generated from these operations is also required. The fabrication of secondaries and cases can be subdivided into the following major material production processes: uranium, lithium, and nonnuclear/special materials. The following typical process descriptions are provided to illustrate the functional activities and operations associated with each of the major production processes. These processes are based on traditional secondary and case fabrication methods and represent upper bounds to the types and number of processes that would be continued in the downsized and modernized Y-12.

A.3.1 Process Descriptions

Processes described in this section include those dealing with uranium, lithium, special materials, and nonnuclear.

A.3.1.1 *Uranium*

The uranium process provides finished enriched and depleted uranium parts and products. The operations are capable of all uranium handling and processing functions, from raw materials handling to finished parts manufacturing. In addition, uranium storage areas are provided for storage of in-process uranium materials and for the highly enriched uranium (HEU) strategic reserve.

The production of uranium parts and products involves casting or wrought processing; metal-working; machining, inspection, and certification; chemical recovery; assembly/disassembly/quality evaluation; and in-process storage. The products from casting or wrought processing are billets and cast parts that feed directly to machining and metal-working. Billets are cropped and cast parts are deluged before they are sent to the next operation. The input to casting consists of retired weapons parts, metal buttons from storage, and recycled scrap metal from metal-working and machining. A casting charge is made up and processed in a criticality-safe configuration in a vacuum induction furnace. Scrap metal and machine turnings are degreased, cleaned, and briquetted before direct recycle.

Metal-working prepares a wrought product as feed for machining. Cropped billets from casting are preheated in a salt bath, rolled into a sheet, annealed in a salt bath, blanked, and pressed. The blanking operations are a major source of recycled metal for casting. Formed parts are cleaned, debrimmed, and machined.

Both formed and cast blanks are machined to finished dimensions and inspected. Scrap metal and machine turnings are returned to casting for cleanup and reuse. Miscellaneous solids are sent to the chemical recovery systems for treatment to recycle the material back to metal buttons. Product inspections and certification are accomplished with coordinate measuring machines, optical gauging, high-energy x-ray radiography, ultrasonic and dye penetrant flaw-inspection methodology, plating thickness gaging, and mechanical properties testing.

Enriched uranium chemical recovery receives feed from virtually all areas in the process. The major feeds are residuals from casting, impure metal chips from machining, and a miscellaneous array of combustibles from all areas. The feeds are incinerated and processed in a head-end treatment consisting of acid dissolution, leaching, and feed preparation for solvent extraction. The feed solution is processed through primary extraction by which it is purified, concentrated by evaporation, and purified further by secondary extraction. The resulting solution is converted to oxide, then to UF_4, and then to uranium metal buttons. Secondary residues are returned to the head-end treatment. Finished metal is returned to casting for reuse.

Assembly operations assemble parts into subassemblies using joining techniques such as welding, adhesive bonding, and mechanical joining. Disassembly takes retired weapons apart and recycles all materials of value. The quality evaluation function receives weapons from the stockpile for disassembly, evaluation, and life cycle testing. Shipping containers for weapons parts and subassemblies are certified and refurbished as part of the assembly and disassembly process.

Uranium storage includes storage vaults for in-process uranium materials, which include buttons and other scrap materials directly recycled, as well as semifinished and finished components. The vaults at Y-12 are also used for the strategic reserve, which includes assembled secondaries and HEU metal castings and surplus HEU awaiting final disposition.

A.3.1.2 *Lithium*

The lithium process provides finished lithium hydride and lithium deuteride parts. Primary functional elements of this process include powder production and forming, finishing and inspection, and deuterium production. These systems are briefly described below.

The lithium hydride and lithium deuteride from storage, recycled weapons parts, and manufacturing scrap are broken, crushed, and ground to produce powder. The powder is loaded into molds and cold isostatically pressed to form solid blanks.

The blanks are unloaded from the molds and placed into vacuum furnaces where they are outgassed by heating under vacuum. After cooling, the outgassed blanks are loaded into form-fitting bags, heated, and then warm pressed. After being warm pressed, the blanks are cooled to room temperature and removed from the bags. The fully dense machining blanks that result from forming operations are radiographed to detect any high-density inclusions. Powder production, mold loading, and radiography are all performed in dry gloveboxes to minimize reaction of the lithium hydride and lithium deuteride with moisture in the atmosphere. Mold unloading, furnace loading and unloading, and bag loading and unloading are all conducted in an inert glovebox. The lithium hydride or lithium deuteride is handled outside inert-atmosphere gloveboxes only when it is sealed in a mold or bag.

The blanks from forming operations are machined to final shapes and dimensions on lathes using single-point machining methods in finishing operations. Most machine dust is collected for direct recycle salvage operations. The finished part weight and dimensions are inspected using certified balances and contour measuring machines. All machining and inspection activities are conducted in dry gloveboxes to minimize any reaction with moisture in the atmosphere. Certified parts receive a final vacuum outgassing treatment before final assembly.

Deuterium is required for many of the products and is stored for future use. Deuterium oxide, or heavy water, is electrolytically reduced. The resulting deuterium is compressed and stored for use. If necessary, the compressed deuterium gas is used to reconvert the lithium metal to deuteride in the final step of wet chemistry.

Lithium wet chemistry can be used to pre-produce lithium hydride and lithium deuteride to meet production requirements for many decades. The principal function of wet chemistry is to purify lithium hydride and lithium deuteride by removing oxygen and other trace elements. The principal feeds to this system are retired weapons components from the disassembly operation, machine dust, powder, and killed parts from other operations. Purification is accomplished by transforming the lithium hydride and lithium deuteride through a chemical dissolution process, then the solution is evaporated and crystallized. The crystals are then reduced to lithium metal and impurities are removed. The lithium metal is reconverted to lithium hydride and lithium deuteride by combining it with hydrogen or deuterium gas. The resulting lithium hydride and lithium deuteride billet, sealed in a thin stainless-steel can, is transferred to lithium storage.

The production of lithium hydride and lithium deuteride components creates a considerable amount of scrap that must be recycled to recover the lithium and deuterium. Much of the machine dust, unacceptable formed parts, machined parts that fail inspection, and stockpile returned parts are directly recycled. Salvage operations typically process material that is too impure to be recycled. Salvage operations primarily involve washing and chemical recovery. Items that require washing include machining tools and fixtures, filters used throughout the processes, and sample bottles. Oil-soaked lithium hydride and lithium deuteride blanks from the powder-forming operations are also prepared for storage. Solutions from the purification and wash operations, including mop and dike water streams, are neutralized, filtered, crystallized, and sent to storage or waste disposal.

Long-term storage is required for chemicals and pre-produced lithium hydride and lithium deuteride billets. Interim storage is provided for lithium hydride and deuteride components from disassembly or retired weapons and rejected components from forming and finishing operations.

A.3.1.3 *Special Materials*

Special materials such as diallyl-phthalate are required to support DP. Diallyl-phthalate based molding compound is formed into near-net-shape blanks that are later machined to finished parts. The primary forming operation is compression or transfer molding, which is followed by a drying and final curing step. Current beryllium operations are located in Buildings 9202, 9201-5, 9201-5N, and 9995. Beryllium machining, final dimensional inspection, and beryllium part certification currently provide worker protection through the use of vent hoods and personal protective equipment. All of these operations rely heavily on administrative controls for worker protection. The existing buildings in which beryllium operations are located range from 27 to more than 50 years old.

A.3.1.4 *Nonnuclear*

The nonnuclear process is responsible for producing certain weapons components composed of nonnuclear materials and for providing the uranium and lithium processes with specialized material and support services. Many types of materials are processed to provide a diverse product line consisting of both nonnuclear metal components and tooling and a variety of polymer-based items. The principal manufacturing technologies employed are hydroforming, hydrostatic forming, rolling, forging, heat treating, welding, machining, cold/hot isostatic pressing, grinding, winding, casting, plating, molding, and coating.

The nonnuclear process handles several product streams, which are described briefly in the following paragraphs.

Several types of urethane foams are required to be produced. The urethane components and blowing agents are pumped into molds and allowed to expand to fill the mold. After curing, the foam moldings are ejected and trimmed to final shape.

Steel and aluminum are construction materials for both components and support tooling, making this a relatively high throughput product line. The usual fabrication route for both materials is rough machining, heat treatment, and finish machining.

Operations to produce stainless-steel cans consist of blanking, followed by hydroforming and hydrostatic forming with subsequent machining and heat treatment. Ultrasonic cleaning is required before heat treatment to ensure cleanliness for welding, which completes the assembly.

Ceramic finished parts are finished from blanks or procured. Procured parts are inspected and certified prior to final assembly.

Polyvinyl chloride is formed into bags and castings and is also applied as a coating. Items to be coated are dipped into a tank of curable, plasticized polyvinyl chloride formulation, whereas castings are produced by transferring the polyvinyl chloride liquid into a mold. All items are heat cured.

Figures A.3.1–1 through A.3.1–3 depict the waste management system associated with the Y-12 production missions. Waste management facilities for treatment and storage are described in Section A.5.

FIGURE A.3.1–1.—*Waste Management Process - Solid Waste Treatment.*

FIGURE A.3.1–2.—*Waste Management Process - Declassification*.

FIGURE A.3.1–3.—*Waste Management Process - Process Wastewater Treatment and Waste Thermal Treatment.*

A.4 Y-12 DEFENSE PROGRAMS MAJOR FACILITIES DESCRIPTION

Of the approximately 714,317 m^2 (7.6 million ft^2) of total floor space at the Y-12 Plant, DP occupies roughly 427,350 m^2 (4.6 million ft^2); approximately 223,000 m^2 (2.4 million ft^2) are in major manufacturing facilities, and approximately 195,100 m^2 (2.1 million ft^2) are in support facilities (LMER 1999, SPAS 1999, DOE 1999). According to the *Oak Ridge Y-12 Plant Site Facility Plan, FY 1999-FY 2008* (SPAS 1999), 49 DP buildings are in surplus; most of these are small support structures that are not process-contaminated. The long-term objective is to plan for the removal of these facilities when it becomes cost-effective or a compliance requirement mandates action. Another 11 facilities are planned to be surplus within 10 years, assuming the availability of funding for downsizing. The remainder of the DP buildings are anticipated to have a continuing mission.

All Y-12 facilities used in processing and storage of HEU are located in the protected area of Y-12 surrounded by the PIDAS (except Buildings 9983 and 9710-3, which house only calibration sources managed by Radiological Control and the Protective Services Organization). Figure A.4–1 shows the locations of major DP facilities. Table A.4-1 provides an overview of the DP facilities. Table A.4–2 (located at the end of this appendix) lists all facilities at the Y-12 Plant. The following provides information on the major DP facilities located at the Y-12 Plant.

A.4.1 Building 9212 Complex

The Building 9212 Complex includes Buildings 9212, 9818, 9815, and 9980. Over 100 operations or processes have been or are capable of being performed within the Building 9212 Complex. The primary missions performed in this Complex include the following:

- Casting of HEU metal (for weapons, reactor fuels, storage, and other purposes)
- Accountability of HEU from Y-12 Plant activities (quality evaluations, casting, storage)
- Recovery and processing of HEU to a form suitable for storage and/or future designation (from Y-12 Plant activities and commercial scrap)
- International Atomic Energy Agency (IAEA) sampling of surplus enriched uranium
- Packaging HEU for off-site shipment
- Preparation of special uranium compounds and metal for research reactor fuel

The largest building, Building 9212, is a multistory facility constructed in the early 1940s of structural steel frame infilled at the perimeter with thick hollow clay tiles. It was built in stages over a period of years. The substructure basement is constructed of reinforced concrete. The original structure consisted of a headhouse 22 by 94 m (72 by 308 ft) (N–S direction) and four wings projecting from the east side of the headhouse, each 11 by 80 m (36 by 264 ft) (A, B, C, and D Wings).

In 1948, new structures were added in the space between the A, B, and C Wings (A-1, B-1, and C-1 Wings) and adjoining D-Wing (D-1 Wing). Finally, a single-story 34 by 122 m (113 by 400 ft) long steel frame structure was added in 1951 (E-Wing). Other less extensive modifications or additions have been added subsequently.

TABLE A.4–1.—*Y-12 Defense Program Major Facility Overview* [Page 1 of 2]

Facility Designation	Function	Mission	Current Status
Building 9212 *Includes Buildings 9818, 9815, 9980, 9981*	• Uranium Recovery Operations • Metallurgical Operations • In-Process Storage • X-ray density	• Recovery of HEU to a form suitable for storage • Casting HEU metal (for weapons, storage, reactors, or other uses) • HEU down-blending • Accountability of HEU from Y-12 Plant activities • Nondestructive evaluation of parts	Not Operating except for limited special operations. Operations expected to resume after stand-down
Building 9206 *Includes Building 9720-17*	• Chemical recovery of intermediate enrichments of HEU (20% to 85% ^{235}U) • In-Process Storage	• Recovery of HEU to a form suitable for storage	Not Operating-HEU materials will be transferred to Building 9212 for processing or to a storage location. Operations in Building 9206 will not resume
Building 9720-12 *Includes a small storage area in Building 9201-5*	• Storage of combustibles, residues and other solid waste material contaminated by HEU	• Storage of combustibles, residues, and other solid wastes awaiting chemical recovery of HEU	In use as a storage facility
Building 9215 *Includes Building 9998*	• Storage • Dismantling • Fabrication (rolling, heat treating, forming, shearing, machining, inspection, etc.) of parts	• Storage and handling of HEU • Dismantling of weapons • Fabrication and inspection of metal parts • HEU down-blending	Partial operations. Full operations expected to resume after stand-down
Building 9720-5 *Includes bonded storage area in 9204-4*	• Storage of HEU • Receiving • Shipping • SNM vehicle material transfers	• Warehouse for shipping and receiving HEU from other sites • Transient, interim, and long-term storage of HEU • In-Plant material transfers in SNM vehicle	Operating
Buildings 9204-2 and 9204-2E	• Assembly • Product Certification • Disassembly • Storage	• Assembly of new or replacement weapons • Quality operations for certification • Disassembly of retired weapons • Storage of retired weapons assemblies, subassemblies, and components • LiH/LiO production	Operating

TABLE A.4–1.—*Y-12 Defense Program Major Facility Overview* [Page 2 of 2]

Facility Designation	Function	Mission	Current Status
Building 9204-4	• Quality Evaluation/Disassembly • Metalworking • Testing • Plating	• Currently, only Quality Evaluation/Disassembly is conducted	Operating
Building 9995	• Analytical Chemistry Organization	• Provides analytical support services for Y-12 and LMES regulatory compliance	Operating
Building 9201-5W	• Metal machining	• Machining of metal parts	Not operating. In standby awaiting refurbishment
Building 9201-5N	• Machining • Dimensional Inspection • Electroplating • X-ray density	• Depleted uranium and stainless-steel machining • Dimensional inspection of parts • Electroplating of parts • Nondestructive evaluation of parts	Operating
Buildings 9202 and 9203	• Process Development • Beryllium Operations	• Development and refinement of manufacturing processes employed at Y-12 • Technology transfer support	Operating
Building 9996	• Storage	• Tooling and material storage	Active
Building 9201-1	• Metal and graphite machining	• General machine shop • Machining and tooling • Work for others • Technology transfer	Operating
Building 9201-5	• Machining • Dimensional Inspection • Nondestructive Evaluation (x-ray density)	• Machining of beryllium • Dimensional inspection of parts • Nondestructive evaluation of parts	Operating

Note: SNM - special nuclear material.
Source: DOE 1996.

FIGURE A.4.-1.—*Major Defense Program Facilities at Y-12.*

The Building 9212 Complex houses two major process areas: (1) the Building 9212 Uranium Recovery Operations (also called Chemical Recovery Operations), which occur primarily in the Headhouse, Wings B-1, C, and C-1, and Buildings 9818 and 9815; and (2) the Metallurgical Operations which occur in the E-Wing. Buildings 9818, 9815, 9880, and 9981 are small structures adjacent to Building 9212, which contain services for operations in Building 9212.

The HEU materials located in the Building 9212 Complex are in various chemical forms, both liquids and solids, and are in more than 6,000 separate containers. All this material is considered "in process." Material awaiting processing, including solid process residues, fluorides, low-equity residues, and aqueous and organic solutions of many kinds, is stored throughout the building. Solids are typically stored in cans made from ordinary carbon steel or stainless steel, depending on the material. Liquids are stored in plastic criticality-safe bottles.

There are no floor areas where solutions may collect to greater than 4 inches in depth. Nearly all vessels in the solvent extractions operation are of safe geometry. Solid oxides and residues are stored in cans of limited volume and controlled mass. The foundry operation, which involves the use of large amounts of uranium metal, is closely controlled, and each operation is subjected to criticality safety analysis and control.

Large quantities of combustible organics can be in-process in the B-1 Wing. In the past, there have been some minor explosions in the chemical recovery operations involving Nitric Acid Dissolvers, Muffle Furnaces, and Destructive Distillation Unit Operations. The *Highly Enriched Uranium Vulnerability*

Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant (LMES 1997) report identifies interim corrections associated with Building 9212. These include manual fire fighting capability that is provided on-site 24 hours/day; the three active extraction systems are segregated from each other; and the dissolution processes are performed in well-ventilated chemical fume hoods or dissolvers. The E-Wing baghouse is equipped with flame-resistant bag filters that reduce the predicted likelihood of a major fire with significant release of HEU to very low (i.e., not expected to occur in the life of the facility). Finally, every inventory period the E-Wing bag filter is shaken down and the residue is collected; the material is removed to minimize the accumulation of HEU.

The Building 9212 Complex is currently not operating except for limited special operations. It is expected that operations will resume after stand-down.

The following summarizes Building 9212 Uranium Recovery Operations and Metallurgical Operations.

A.4.1.1 Uranium Recovery Operations

Uranium recovery operations include recovery/purification of HEU-bearing scrap into forms suitable for reuse and accountability of the HEU contained therein. The majority of this scrap and waste was generated by Y-12's weapon production or disassembly operations and by the recovery processes themselves. Some scrap and waste were generated through nuclear materials production; additional scrap is received from other sites for recovery or for accountability of the HEU it contains. The nature of these HEU-bearing materials varies from combustible and noncombustible solids to aqueous and organic solutions. Concentrations of HEU vary in these materials from pure uranium compounds and alloys to trace quantities (parts per million levels) in combustibles and solutions.

The recovery and purification process can be divided into the following general groupings:

- Headend Operations (Headhouse, B-1, C, and C-1 Wings)
  - Bulk reduction of scrap (mostly burning)
  - Dissolution of scrap into uranyl nitrate solution
  - Separation of uranyl nitrate from nonuranium materials
  - Continuous Recovery and Purification Operations (B-1 and C-1 Wings)
  - Organic solvent extraction
  - Evaporation
  - Conversion of uranyl nitrate to UO_3
  - Conversion of UO_3 to UF_4

- Reduction
  - Blending of UF_4
  - Calcium reduction of UF_4 powder to uranium metal

- Special Processing
  - Special materials production
  - Accountability of scrap
  - Scrap dissolution
  - Packaging of materials for shipment

- Waste Streams and Materials Recovery (Buildings 9818 and 9815)
  - Nitrate recycle
  - Biodenitrification
  - Materials storage and handling
  - Chemical makeup

The Biodenitrification Unit, located in Building 9818, utilizes such treatment methods as neutralization, pH adjustment, and nitrate removal to treat liquid mixed low-level waste (LLW) (e.g., nitrate solutions from enriched uranium recovery). The Phaseout/Deactivation Program Management Plan has been approved by DOE for Building 9206 (see Section A.4.2); waste that was generated and transported to Building 9818 will no longer be generated.

A.4.1.2 *E-Wing Metallurgical Operations*

Casting of enriched uranium metal and alloys occurs in vacuum induction furnaces located in E-Wing. Cast components are shipped to M-Wing in Building 9215 via the intrasite Special Nuclear Materials (SNM) Vehicle for machining. Machine turnings are washed in water and freon to remove machine coolant and boron, dried, and pressed into briquettes for reuse in the casting operation. A number of presses and shears are used to condition recycled weapons components and other metal parts for casting. Recycled metal may be washed with nitric acid to remove surface oxide prior to casting. Waste from the casting operations is sent to the chemical recovery operations for accountability and recovery.

Metallurgical Operations can be described in the following general groupings of activities:

- E-Wing Casting
  - Preparation of metal feed
  - Casting metal into parts or cylinders
  - Packaging of materials for shipment
  - Machine turning recycle

A.4.2 Building 9206 Complex

The Building 9206 Complex includes the primary Building 9206 and an immediately adjacent Building 9720-17. The Complex is centrally located in Y-12 near the east end of the protected area. Building 9720-17, adjacent to the south side of Building 9206, is constructed of prefabricated metal and occupies approximately 297 m^2 (3,200 ft^2). Building 9720-17 was constructed in the 1950s. This metal-frame building has transit siding and a concrete slab on grade.

Building 9206 is a multi-story facility constructed in the early 1940s of structural steel infilled at the perimeter with thick, hollow clay tile. It is approximately 50 by 79 m (165 by 260 ft). The building consists of a second floor in its center portion and two sections elevated to two stories. The two one-story sections are approximately 18 by 50 m (60 by 165 ft) and 24 m (80 ft) in plan with a height of 6 m (18 ft). The center section measures approximately 37 by 50 m (120 by 165 ft) with a height of 10 m (32 ft). Also contained in Building 9206 is an incinerator, which is currently permitted for burning combustible waste containing uranium.

Building 9206 has generally been reserved for intermediate enrichments (20 to 85 percent) of HEU. Its original design mission was to recover HEU from the electromagnetic separation process. After World War II, Building 9206 received intermediate enrichments of uranium from the gaseous diffusion plants as uranium hexafluoride. An ammonia gas reduction and hydrofluorination was used to convert the uranium hexafluoride (UF_6) to uranium tetrafluoride (UF_4). In the mid-1950s, a UF_6 to UF_4 conversion facility using fluorine and hydrogen gas was installed to perform the same function. In either case, the UF_4 was reduced with calcium metal to purified uranium metal. Supporting the conversion processes, recovery processes were installed to recover and purify uranium contained in the increasing waste processes. Many of these processes were patterned after the recovery process equipment that was installed in Building 9212.

In the late 1960s, Building 9206 underwent modifications to install denitration and fluid bed systems for the conversion of uranyl nitrate to UF_4. The mission of converting recovered uranyl nitrate from the Savannah River back into metal was transferred to Building 9206 in 1973. The machining-turning-cleaning process was installed in the mid-1980s for recycling intermediate enrichments of uranium turnings. In 1988, shipments of uranyl nitrate from the Savannah River were stopped. A year later the weapon production rate was severely decreased. In 1993, decommissioning of Building 9206 began. Since that time, most of the processes have been shut down and some processes have been removed from the facility.

The *Building 9206 Complex Phaseout/Deactivation Program Management Plan* (LMES 1999) describes the activities to transition the existing chemical recovery capabilities from Building 9206 to Building 9212 and deactivation of the 9206 Complex. The project is expected to last 6 to 10 years. The phaseout and deactivation will reduce the risk of existing hazards and place the building in a positive, safe, and environmentally secure configuration. Some in-process holdup still remains in the facility tanks and process lines.

There are no plans to resume operations in Building 9206. At the present time, Building 9206 is designated as an in-process HEU storage area; this will be its function until the stored material can be transferred to Building 9212 for processing, or to another storage location. Building 9206 has five permitted RCRA waste storage locations. The locations are used for storage of both hazardous waste, as defined by RCRA, and nonhazardous waste mixed with HEU awaiting recovery or disposal. The hazardous wastes include characteristic and listed wastes. Hazardous materials include a number of strong and weak acids as well as various organic materials.

Material transfers occurring within the Building 9206 Complex are performed by a number of different methods. Dollies designed to provide safe spacing of fissile material containers are used to perform the majority of the container transfers. Personnel are also permitted to transfer single fissile material containers by carrying them. Process material transfers are accomplished with pumps and airlifts.

The *Highly Enriched Uranium Working Group Report* (DOE 1996a) identified that the storage of pyrophoric material and flammable gases for the furnaces in Building 9206 under certain conditions can result in explosions. The report also noted that Building 9720-17 is not protected by an automatic sprinkler system to detect and suppress a fire; however, sprinklers are not necessary if the combustible level is kept low.

The *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report identified interim corrections associated with Building 9206: manual fire fighting capability is provided on-site 24 hours/day; materials are stored in taped cans; much of the uranium is in the form of oxides that do not burn; reactor vessels are inspected daily as a part of the operator's round; and natural gas supply to the building has been shut off and tagged outside the building.

A.4.3 Building 9720-12

Building 9720-12 is a warehouse facility located in the western portion of Y-12. The building is a single-story, steel structure with sheet metal exterior walls. It is 15 by 91 m (50 by 300 ft) with a pitched roof 5 m (15 ft) high at the eaves. The mission of Building 9720-12 is to provide storage for items and materials that have been removed from the Material Access Areas. The western portion of the facility is used for storage of combustibles that contain recoverable amounts of enriched uranium. The storage area is also used for other hazardous materials including RCRA storage, PCBs, and drums of beryllium. Combustible material storage containers include cans, plastic bags, and carbon-steel (208-L) 55-gal drums. Drums containing combustible materials are stored on wooden pallets and are collocated with other combustible materials that are also in drums on wooden pallets.

The *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report identified interim corrections associated with Building 9720-12: sprinkler systems are provided in storage areas; a manual fire fighting capability is provided on-site 24 hours/day; and materials are stored in sealed drums.

A.4.4 Building 9201-5

Building 9201-5 is a multi-story, steel frame and concrete structure that was constructed in the early 1940s. The building is a large production/processing facility previously used for depleted uranium and nonuranium processing. Three small storage areas for enriched uranium combustibles have been established on the third floor of the building. The building has several collocated operations, including lithium hydride storage and arc melt operations. The third floor storage area also includes miscellaneous parts, combustibles, and depleted uranium. Combustible materials storage containers include cans, plastic bags, and carbon-steel 208-L (55-gal) drums.

The *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report, identified interim corrections associated with Building 9201-5: sprinkler systems are provided in storage areas; a manual fire fighting capability is provided on-site 24 hours/day; and materials are stored in sealed drums.

A.4.5 Building 9215 Complex

The Building 9215 Complex consists of Buildings 9215 and 9998. Building 9998 is physically attached to the northeast corner of Building 9215. Both are multi-story steel buildings with hollow clay tile walls. Building 9215 was constructed in the early 1940s, and Building 9998 was added shortly thereafter. Both buildings have been expanded and modified over the years. Included in Building 9215 is a Blister Area in the northwest corner of the building where HEU parts and scraps are packaged and shipped. The Blister Area was constructed in the 1970s and is configured as an "L" shaped steel-frame structure with cement block shear walls.

The mission of the Building 9215 Complex is to provide for storage and handling of HEU inventories, to aid in the dismantlement of nuclear weapons, to provide fabricated metal shapes as needed for the nuclear weapons stockpile maintenance, and to support nuclear programs at other U.S. and foreign facilities. Materials stored in Building 9215 are considered to be part of the backlog awaiting processing. Not all of the materials will be processed in Building 9215.

Operations performed in the Building 9215 Complex are rolling and forming in O-Wing and machining of HEU parts in M-Wing. Additionally, the basement contains an HEU storage vault. Third Mill operations include salt-bath heat treating, rolling, shearing, and plate cutting of depleted uranium, depleted uranium alloys, and nonradiological materials. Arc melt operations include sawing, skull casting, and vacuum arc remelting of depleted uranium and depleted uranium alloys. P-Wing operations include forming, heat treating, and rolling of depleted uranium, depleted uranium alloys, and nonradiological materials.

Building 9998 contains H-2 inspection, machining, and storage areas, H-1 foundry (casting of depleted uranium, depleted uranium alloys, and nonradiological materials using induced melting and arc melting processes), and an R&D area. Operations in both areas include the handling, packaging, and transporting of HEU materials and parts. The Blister Area allows collection, packaging, receipt, and shipment of outgoing HEU metal parts, chips, metal scrap, and contaminated combustibles. F-Area/A-Wing operations include metal forming, heat treating, and arc melting of depleted uranium, depleted uranium alloys, and nonradiological materials.

The *Highly Enriched Uranium Working Group Report* (DOE 1996a) noted that there have been 16 reportable occurrences for the Building 9215 Complex partition area. These occurrences include 15 off-normal occurrences and 1 unusual occurrence. The off-normal occurrences include person/clothing contamination (11 cases), inventory difference (1 case), loss of ventilation (1 case), injury (1 case), and loss of facility power (1 case). The unusual occurrence occurred on April 30, 1996, and involved an operator safety requirement violation.

According to the *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report, interim corrections associated with Building 9215 include the packing of machine turnings in coolant to prevent dry out and spontaneous combustion, and the use of vented ship dollies to prevent pressurization due to hydrogen generation.

Except for limited special operations, the Building 9215 Complex is currently not operating. It is expected that operations will resume after stand-down.

A.4.6 Building 9720-5

Building 9720-5 historically has been used as a warehouse for weapons-related materials and reactor fuel. The facility was built in 1944 and has since been renovated. The current mission is an operating warehouse used for short- and long-term storage of materials, including high-equity uranium, weapons assemblies, reactor fuel, and low-equity materials awaiting recycle.

The facility is a single-story building with a concrete floor elevated about 1 m (4 ft) above local grade; air is exhausted unfiltered through roof-mounted fans. The main warehouse dimensions are approximately 46 by 91 m (150 by 300 ft). Five dock areas serve the transfer of SNM and non-SNM materials to and from approved transport vehicles.

The *Highly Enriched Uranium Working Group Report* (DOE 1996a) raised several concerns about Building 9720-5. These included concerns about potential flooding by a 5,000- or 10,000-year flood, and collapse of the Brookhaven fuel storage vault walls and storage racks during an earthquake. While the potential for fires of sufficient intensity to threaten materials in the vaults is low, the potential for a wide-scale facility fire that would then involve the drums storage in cages was judged to be higher. Differences in construction, operating practices, amount of combustibles, design of the specific storage arrays, and specific locations of the arrays within the buildings means that fire risks are expected to vary among the Building 9720-5 storage arrays.

The *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report identified interim corrections associated with Building 9720-5. The partitioned area is covered by wet-pipe sprinkler systems, portable fire extinguishers, and fire alarms; forklift trucks are required to be electrically operated; all wooden surfaces comprising the building frame are periodically painted with fire retardant paint; and all hot work operations (i.e., cutting, welding, etc.) are controlled by special permit. Use of combustible/flammable liquids in the facility is very limited.

A.4.7 Buildings 9204-2 and 9204-2E

Building 9204-2 was built in 1943 and has been used to support nuclear weapons production since that time. The main structure of the building is structural steel and concrete with freestanding hollow clay tile exterior and interior walls. As a result of a major upgrade program, Lithium Process replacement, some of the major processes and equipment were upgraded in the early 1990s. In addition, a portion of Building 9204-2 is being modified for storage of HEU materials.

Building 9204-2E, which comprises the major portion of the building partition, is a multi-story facility, reinforced concrete slab structure built in 1971 to house weapon assemblies. Exterior walls on the first floor are reinforced concrete, but are clay tile and concrete block with brick veneer on the second and third floors. Interior walls are also clay tile and concrete block. Major assembly and disassembly facilities are located in Building 9204-2E. According to the *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) report, the building is generally in good condition except for a structural problem with the west wall and deterioration of the third floor from Kathene leakage.

Four current HEU activities at 9204-2E include:

- Assembly of new or replacement weapons

- Quality certification of components and assemblies
- Disassembly of retired weapons assemblies
- Storage of retired assemblies, subassemblies, and components

Assembly and disassembly operations areas, five vault-type rooms, and one vault are located in Building 9204-2E. Most of the HEU is composed of metal pieces or weapons components. According to the *Highly Enriched Uranium Working Group Report* (DOE 1996a), significant quantities of various hazardous materials are collocated with HEU in the operations areas.

Barriers to exposure of workers or the public to radiation or chemical hazards or to releases of radioactive materials to the environment include packages and containers, and vault and/or room walls; and for some operations, gloveboxes, hoods, and ventilation systems with high-efficiency particulate air (HEPA) filters. Both Buildings 9204-2 and 9204-2E are protected by smoke and heat detectors, sprinklers, and alarm systems. Operations and storage activities are conducted by procedure in accordance with criticality safety approvals that incorporate double contingency. At least two independent criticality alarm systems cover each HEU area to annunciate a criticality accident.

According to the*Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report, interim corrections associated with these buildings includes fixed fire suppression systems and smoke alarms; ventilation, both for recirculating and exhausting, is HEPA filtered; the ventilation system includes a smoke removal system; uranium chips are packed in coolant to prevent dry out and spontaneous combustion; machining and work with lithium hydride, lithium deuteride, and uranium are conducted in controlled atmospheres to prevent ignition; and machining is conducted under exhaust hoods in conjunction with respirator use to prevent internal contamination.

A.4.8 Building 9204-4

Building 9204-4 was built in 1943 and is a three-story structure (including the basement level) 73 by 112 by 27 m (240 by 368 by 87 ft). The main structure is steel and concrete. The roof is constructed with precast concrete roof planks over structural steel beams. The exterior and original interior walls are constructed of 30 cm (12 in) of hollow clay tile with no attachment between the walls and structural slabs or beams. Building 9204-4 has complete fire detection and fire suppression coverage.

Areas within Building 9204-4 can be functionally classified as follows: (1) quality evaluation of current weapons production programs and disassembly of obsolete weapons; (2) metal-working operations (forging, forming, heat treating) and grit blast cleaning of depleted uranium, depleted uranium alloys, and metals such as steel and aluminum; (3) a Bonded Storage Area (occupying approximately 929 m^2 [10,000 ft^2]) and vault-type room for storage of SNM (occupying approximately 557 m^2 [6,000 ft^2]); (4) radiography, ultrasonic, and other nondestructive testing (NDT); and (5) a plating area. The only active operational areas involving HEU within Building 9204-4 are quality evaluation, assembly, and storage in the vault-type room and the Bonded Storage Area. The plating area, while shut down, contains residual materials. The Bonded Storage Area and the vault-type room are set aside for storage of HEU in drums.

Key safety features of Building 9204-4 include a criticality alarm system and detectors. Two criticality detectors are located in Building 9204-4: one in the quality evaluation area (on the second floor) and the other adjacent to the Bonded Storage Area (on the first floor). The building is equipped with a fire detection and fire suppression system consisting of wet-pipe sprinklers. The ventilation exhaust system is HEPA-filtered. Additionally, the quality evaluation and disassembly areas are equipped with HEPA-filtered gloveboxes for use in performing a limited number of operations.

HEU is normally stored within specially designed packages and containers except when quality evaluations or disassembly operations are being performed. A variety of packaging configurations for HEU-bearing materials is used. For relatively pure metal and weapons components, packaging configurations include (1) 114 208-L (30 55-gal) drums and overpacks designed to U.S. Department of Transportation (DOT) requirements with weapons components or canned subassemblies, (2) metal stored in cans with birdcages, (3) metal components or canned subassemblies with special metal vessels designed for use in quality evaluation operations, and (4) metal in slip-lid cans. Sealed and unsealed polypropylene bottles are used for low concentration HEU solutions or mop water, respectively. Polyethylene bags contain paper, plastic, mop heads, and other miscellaneous combustible materials used in the process areas. The total number of HEU storage containers within the quality evaluation and disassembly partition is approximately 100, with the majority (>60 percent) being 208-L (55-gal) drums and polyethylene bags of combustibles. Storage of HEU in the process areas is minimal due to criticality safety approval limitations.

Storage configurations range from drum arrays in vaults to cans and bottles stored on transport carts and dollies within vault-type cages. Polyethylene bags are stored within the process areas or consolidated into 208-L (55-gal) drums prior to shipment from the facility.

Building 9204-4 press operations include the forming of depleted uranium, depleted uranium alloys, and non-radiological materials using 7,500-ton, 1,500-ton, and 1,000-ton presses.

The *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report identified interim corrections associated with this building to include fixed fire suppression systems and smoke alarms which alarm locally and to remote continuously monitored locations; ventilation, both recirculating and exhausting, is HEPA filtered; uranium chips are packed in coolant to prevent dry out and spontaneous combustion; machining and work with lithium hydride, lithium deuteride, and uranium are conducted in controlled atmospheres to prevent ignition; and machining is conducted under exhaust hoods in conjunction with respirator use to prevent internal contamination.

A.4.9 Building 9995

Building 9995, the Analytical Chemistry Organization (ACO), is a multistory 37 by 10 m (123 by 361 ft) facility that was constructed in 1952. It is a steel frame structure with hollow clay tile and concrete block walls on reinforced concrete foundation. A 2-inch-thick gypsum roof deck covers the majority of the building with concrete on the remainder. The building is within the Y-12 PIDAS area. Building 9995 has had two major expansions since it was originally constructed. A south addition was added in 1969 that is currently used for analytical development. An annex office area was added in 1981. The roof on the main structure was replaced in the early 1970s. The primary operations area is divided between first-floor and basement levels. Two service elevators connect the various floors of the building; the elevators are original equipment and according to the draft report, *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999), they are not code compliant.

Building 9995 is equipped with approximately 150 chemical fuming hoods with supporting heating, ventilation, and air conditioning (HVAC) systems that form the primary engineered safety feature. Most chemical fume hoods in the building are original equipment; limited hood upgrades have been performed and approximately 20 hoods were replaced in the mid-1980s with additional units having been added or replaced at various times during laboratory alteration projects. There are 52 separate supply and exhaust systems; however, most air is supplied by seven major air handling units that provide conditioned, filtered air to the various rooms in Building 9995. Five major exhaust fans support hoods, and each hood is fitted with a continuous flow monitor to allow convenient confirmation of hood flow before use. The ventilation system in Building 9995 is a zoned, once-through system that provides more than six air exchanges per hour.

The facility was designed for, and is currently used as, an analytical chemistry laboratory, providing analytical support for DP, Work-for-Others, and operation and maintenance (O&M) contractor, regulatory compliance programs. The total facility is restricted to a maximum of 5 kg (11 lb) of HEU for criticality safety. Analyses associated with HEU include impurities by emission spectroscopy, x-ray fluorescence spectrometry or Davies-Gray titration, carbon analysis by LECO carbon analyzer, and isotopic analysis by thermal oxidation mass spectrometry. Control of enriched uranium is facilitated by bar coding of samples and by a computer system for recording the location of materials within the facility. Most work is done in hoods. The area is provided with sprinklers in the event of a fire.

The *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report indicates that special facilities located in Building 9995 include the Lithium Preparation Room, Argon-purged gloveboxes, and a gas-mixing laboratory. The Lithium Preparation Room has its own roof-mounted HVAC system, independent of the rest of the building; the room atmosphere is humidity controlled at 10 percent relative humidity in the winter and 15 percent in the summer to limit hydrolysis of reactive lithium or lithium compounds. Agron-purged gloveboxes are provided in several laboratories for handling materials that require dry inert atmospheres; these are self-contained systems, and mostly include filters and desiccant systems to maintain and dry the recirculating argon while others are once-through argon-purge types. A gas-mixing laboratory is located in the room off Dock 11 in Building 9995; ACO personnel mix gases in cylinders for use by various Y-12 Plant operations.

Fire protection for Building 9995 is provided by the Y-12 Plant Fire Department. The building is also protected by a sprinkler system, an alarm system, and by departmental procedures. An alarm system located on the first floor of Building 9995 responds to the sprinkler trip alarm, glovebox heat detectors, pull boxes, and other heat detectors located in the building. In the event of a fire, it is expected to be restricted to a limited area and, because of the small amount of enriched uranium present, is not expected to have large radiological consequences. Chemical reactions resulting from the mixing of incompatible chemicals are expected to be minimal because the sample sizes are limited and operations are performed according to procedures. Safety showers are readily available throughout the laboratory.

The *Highly Enriched Uranium Vulnerability Assessment Corrective Action Plan for the Oak Ridge Y-12 Plant* (LMES 1997) report identified interim corrections associated with Building 9995 to include the location of sprinkler systems throughout the process and storage areas; flammable liquids are stored in approved flammable storage cabinets; limited quantities of gases and solvents are maintained in inventory; and portable fire extinguishers are found throughout the areas, as are cans of fire suppressant carbon in areas where chip fires are possible.

A.4.10 Buildings 9119, 9983, and 9710-3

The HEU calibration standards and test facilities are in Buildings 9119, 9983, and 9710-3. Building 9119 is an office building built of noncombustible materials and located in the western end of Y-12. The current mission of the building supports a variety of DP-related organizations. HEU sources are stored in this building in a Nuclear Materials Control and Accountability Vault. The sources are used for the calibration of nondestructive assay (NDA) equipment. Building 9983 is a small wooden frame storage building located next to Building 9711-1 in the eastern half of Y-12. Radiological control instrument calibrations are performed in Building 9983. Y-12 personnel use these sources for calibration purposes and to store sources awaiting disposal. Building 9710-3 is an office building constructed of noncombustible materials and is located in the eastern section of Y-12. This building houses the Protective Services Force which uses these sources to test the portal monitors at the Plant.

According to the *Highly Enriched Uranium Working Group Report* (DOE 1996a), HEU sources in Building 9119 are stored in fireproof safes with combination locks. The Y-12 personnel store the sources in a cabinet in Building 9983. Both buildings are protected with automatic sprinkler systems. Protective Service personnel lock the sources in Building 9710-3 in a file cabinet; the building is also protected by an automatic sprinkler.

A.4.11 Building 9201-5W

Building 9201-5W is a single-story structure 79 by 80 m (258 by 263 ft) built in 1967. The main structure is steel and concrete with brick veneer. The major portion of Building 9201-5W is a large machine shop area containing machining equipment and controls with nominal storage for in-process parts and materials. Offices for shop supervision are provided on a mezzanine. The building is used as a machine shop and performs machining, plating, and support operations (including NDT and dimensional inspections) of depleted uranium, depleted uranium alloys, and nonradiological materials. Currently, the facility is on standby awaiting refurbishment.

A.4.12 Building 9201-5N

Building 9201-5N is a one-story steel and concrete building 55 by 101 m (182 by 331 ft) with a basement that was built in 1972. It is connected to Building 9201-5W via an underground tunnel for transport of materials and parts. The building is protected by smoke and heat detectors, sprinklers, and an alarm system.

Activities conducted in Building 9201-5N include:

- Electroplating of parts
- Machining of depleted uranium and stainless steel parts
- Dimensional inspection of parts
- Nondestructive evaluation (x-ray and density) of parts
- Beryllium machining

Barriers to exposure of workers or the public to radiation or chemical hazards or to releases of radioactive or toxic materials to the environment include gloveboxes, hoods, and ventilation systems with HEPA filters. Ventilation exhaust stacks are monitored for radiological and hazardous materials as appropriate.

A.4.13 Buildings 9202 and 9203

Building 9202 was built in 1954 and is a two-story building 55 by 110 m (182 by 360 ft) with a basement and a four-story laboratory wing. The structure is steel and concrete with a brick veneer over the office at the front of the building. An addition, which houses a welding laboratory, was added in 1972. According to the *Y-12 Site Integrated Modernization Deployment Study* (Y-12 1999) draft report, a small beryllium blank forming area is operated in Building 9202. Activities conducted in Building 9202 include development of material and metallurgical synthesis, forming, and evaluation techniques and processes.

Building 9203 was built in 1944 and is a two-story building 166 ft wide by 176 ft long with a basement. The structure is steel and concrete with a brick veneer over the office at the front of the building. Activities conducted in Building 9203 include development of processes for material characterization as well as measurements, and instrumentation and control.

A.4.14 Building 9996

Building 9996 is a three-story structure 25 by 78 m (82 by 256 ft) that was built in 1955. The main structure is steel and concrete with brick veneer. Building 9996 is used as a tooling and material storage facility to support operations in immediately adjacent portions of Building 9212.

A.4.15 Building 9201-1

Building 9201-1 is a two-story structure 84 by 162 m (276 by 530 ft) built in 1955. The main structure is steel and concrete with brick veneer. Building 9201-1 is a large, general machine shop with several areas containing machining equipment and controls. Nominal storage for in-process parts and materials and offices for supervision are also provided. The building is used as a general machine shop for nonuranium metal and graphite parts.

A.5 WASTE MANAGEMENT ACTIVITIES

This section summarizes information for facilities used to manage the various waste streams generated at the Y-12 Plant; including LLW, mixed LLW, RCRA-hazardous waste, TSCA-regulated waste, and nonhazardous waste. Some inactive facilities that were closed recently and facilities that are expected to operate in the near future (within 3 years) are included here as well.

The majority of waste management facilities at Y-12 are operated under the EM Program, but some are managed by DP. Waste management facilities are located in buildings, or on sites, dedicated to their individual functions, or are collocated with other waste management facilities or operations. Many of the facilities are used for more than one waste stream (see Figure A.5–1).

DOE is authorized to manage radioactive waste that it generates under the *Atomic Energy Act of 1954*. LLW is generated during many plant operations including, machining operations that use stock materials such as steel, stainless steel, aluminum, depleted uranium, and other materials. DOE stores, treats, and repackages, but does not dispose of, LLW at Y-12. The majority of the LLW generated at Y-12 is otherwise uncontaminated scrap metal and machine turnings and fines. Waste treatment provides controlled conversion of waste streams generated from operations to an environmentally acceptable, or to a more efficiently handled or stored, form. This activity includes continuing O&M of facilities that treat wastewater and solid waste generated from production and production support activities. LLW at Y-12 is managed in accordance with DOE Orders (e.g., DOE O 435.1), policy, and guidance related to management of radioactive waste. Management of this waste is not directly regulated by EPA or TDEC. Waste minimization and planned treatment facilities are expected to continue reducing the magnitude of these wastes.

The TDEC Division of Solid Waste Management (DSWM) regulates management of both hazardous and non-hazardous waste streams under RCRA. The major sources of hazardous waste are plating rinsewaters, waste oil, and solvents from machining and cleaning operations; contaminated soil, soil solutions, and soil materials from RCRA closure activities; and waste contaminated with hazardous constituents from construction/demolition activities. Facilities used to store or treat RCRA-hazardous waste at Y-12 are regulated by the DSWM as authorized by the EPA. These facilities may also be used to manage mixed waste (waste that is RCRA-hazardous and radioactive). Mixed waste is generated from site development, sampling, metal preparation, fabrication, enriched and depleted uranium operations, assembly, and industrial engineering functions at Y-12. Mixed waste is put in storage awaiting treatment or disposal, treated at Y-12, or sent to another ORR facility for treatment and disposal. There are no facilities for the disposal of RCRA-hazardous or mixed waste currently in operation at Y-12. Some disposal of RCRA-hazardous and mixed wastes is done at a permitted off-site commercial facility.