3. Environmental Management and Reservation Activities

Much of the work accomplished by the DOE Oak Ridge Operations Office of Environmental Management (EM) on the ORR is performed as a result of the requirements of the Federal Facility Compliance Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The 1992 Federal Facility Compliance Agreement requires that all DOE facilities manage and dispose of mixed waste in accordance with their respective site treatment plans. Bechtel Jacobs Company LLC has established programs to address the storage, transportation, treatment, disposal, and recycling of legacy and newly generated waste from the ORR. Bechtel Jacobs LLC manages the Toxic Substances Control Act Incinerator, wastewater treatment facilities, landfill operations, and certain other treatment and recycle facilities that also contribute to meeting the requirements of the Federal Facility Compliance Agreement and other EM milestones.

Another large portion of the EM work conducted at ORR is performed according to the requirements of CERCLA, which is implemented by the 1991 Federal Facility Agreement. The Federal Facility Agreement, signed by DOE, TDEC, and EPA, addresses contamination resulting from past activities of DOE operations that remain in structures, buildings, facilities, soil, groundwater, surface water, or other environmental media.

3.1 INTRODUCTION

For over half a century, one of the primary missions of DOE and its predecessor agencies was the production of nuclear weapons for the nation's defense. Production of materials for nuclear weapons, which began in 1943, produced hazardous and radioactive waste and resulted in contamination of facilities, structures, and environmental media. Two laws passed by Congress included requirements to address these problems. These two laws are the Federal Facility Compliance Act and CERCLA. The Federal Facility Compliance Agreement, made in accordance with the Federal Facility Compliance Act, requires that all DOE facilities manage and dispose of waste in accordance with their respective site treatment plans. The Waste Disposition and Waste Operations projects address waste stored, treated, disposed of, or recycled on the ORR in accordance with the Site Treatment Plan. The DOE Environmental Management program also operates and maintains waste treatment, storage, disposal, and recycling facilities at each of the three Oak Ridge sites (ETTP, ORNL, and Y-12). These activities are included in the Waste Operations Project.

CERCLA addresses any environmental contamination resulting from past industrial operations, not just those performed at federal facilities. CERCLA requires that sites requiring cleanup actions be placed on the National Priorities List. Once on the list, the responsible entities are required to investigate and remedy abandoned or uncontrolled hazardous waste sites where a release has occurred or may occur. The ORR was placed on the National Priorities List in 1989. In 1990, DOE Headquarters (DOE-HQ) established the Office of Environmental Management (EM), making DOE-ORO responsible for cleanup of the reservation. CERCLA also requires public involvement to ensure that citizens will be informed of cleanup decisions that may affect them or the area in which they live.

The following sections highlight some of the EM activities for 2003 and some related activities carried out to ensure good stewardship of the reservation.

3.2 EAST TENNESSEE TECHNOLOGY PARK

3.2.1 Decontamination and Decommissioning

3.2.1.1 ETTP Three-Building Decontamination and Decommissioning Project Nearing Completion

The ETTP Three-Building Decontamination and Decommissioning Project is nearing completion, with 90% of the work accomplished as of the end of CY 2003. The contractor, under a fixed-price contract with DOE awarded in August 1997, is dismantling, removing, and dispositioning the materials and equipment within the K-33, K-31, and K-29 gaseous diffusion buildings at ETTP. The three buildings cover more than 4.89 million ft^2 of floor space and housed more than 140,000 tons of contaminated or potentially contaminated material.

The purpose of the project is to dismantle, remove, and disposition all of the material from the three buildings and to decontaminate two of the three buildings to certain specifications, making them available for reuse without radiological or other safety concerns.

A total of 144,000 tons of material has been dismantled, removed, and dispositioned as waste or recyclable material for the entire project. During CY 2003, more than 20% of the overall project was completed, including dismantlement, disassembly, removal, and dispositioning of all of the process equipment and material from the last four remaining cascade units in Building K-31 and two of the three remaining cascade units in Building K-29. More than 54,000 tons of metal have also been processed as low-level waste to the Envirocare Disposal Facility and the Nevada Test Site Disposal Facility. In addition, 8260 yd^3 of concrete pedestal material have been disposed of in the Environmental Management Waste Management Facility (EMWMF), which is located near the Y-12 National Security Complex.

The dismantlement, disassembly, and disposal of the remaining cascade unit in Building K-29 and decontamination of the interiors of Bldgs. K-33 and K-31 are expected to be completed in 2004. The interior of Building K-29 will not be decontaminated as part of this project. The decision not to decontaminate the interior of Building K-29 was made in 2003, and the contract modification is being put into place. The project is currently scheduled to be completed by August 2004.

3.2.1.2 ETTP K-25/K-27 Facilities Decontamination and Decommissioning Project

The K-25 building, built during the Manhattan Project, is the largest building on the ORR. The U-shaped building covers 1,637,170 ft^2 and contains 3,018 stages of gaseous diffusion process equipment and associated auxiliary systems, which will be removed and disposed of. Each stage consists of a converter, two compressors, two compressor motors, and associated piping. The K-27 building covers 383,000 ft^2 and contains 540 stages of gaseous diffusion equipment and associated auxiliary equipment.

A public information session was held in 2001 to solicit comments from the public on the engineering evaluation/cost analysis developed for this project. An action memorandum for the decontamination and decommissioning of the K-25 and K-27 buildings was signed in February 2002. Phase 1, hazardous materials removal, started in spring 2002 and was just over 50% complete by the end of 2003. Phase 1 activities primarily include the removal of asbestos-containing building materials from the inside of the K-25 and K-27 facilities. At the close of 2003, hazardous material abatement had been completed in 28 units (280 cells), and more than 283,000 ft^3 of waste from the K-25 building had been disposed of at the EMWMF.

Phase 2, process equipment removal activities in 2003, included detailed meetings with the decontamination and decommissioning core team to resolve comments on the process-equipment-removal waste-handling and characterization plans. The Phase 2 process equipment removal request for proposal was issued during 2003, and the proposal was under review at year end. Additionally, the work on removal of excess materials from the K-25 and K-27 buildings was awarded in December 2003. The corresponding draft versions of the waste-handling plan, waste

characterization plan, and removal action work plan were also prepared. Excess material removal and the process equipment removal work are planned to begin in 2004.

On September 30, 2003, DOE signed an action memorandum for the remaining facilities (approximately 500) to undergo decontamination and decommissioning under the engineering evaluation/cost analysis for the K-25 Auxiliary Facilities Demolition Project, Group II. The Remaining Facilities Demolition Standard Operating Protocol and the Waste Handling Plan Part I were prepared and submitted to the regulators for approval on September 18, 2003. The standard operating protocol was approved in October 2003; Part I of the Waste Handling Plan was approved in November 2003.

3.2.1.3 Group II, Main Plant Area Demolition Project

All buildings at the ETTP are scheduled for demolition as part of DOE's accelerated cleanup plan. However, up to 26 facilities have been targeted for potential transfer of title under the reindustrialization program. Property transfer is a key component of the accelerated cleanup plan and will result in savings to DOE by avoiding building demolition costs. Additionally, transfer of these properties will contribute to the reduction of DOE mortgage costs at ETTP, making that money available for other cleanup projects.

Buildings and facilities have been divided into two groups: (1) K-25/27 facilities decontamination and demolition and (2) decontamination and demolition of remaining facilities, which is organized into several subprojects. Because these subprojects will be managed as interim removal actions, future CERCLA decisions will determine the final remedy for the contaminated slabs, soils, and below-grade structures.

The Main Plant Demolition Project involves (1) characterization, sampling, hazardous material abatement, radiological decontamination, demolition, and disposal of the fluorine and UF_6 process vent lines located on the overhead pipe rack between facilities and (2) demolition to grade the following CERCLA facilities: K-1300 Brick Vent Stack, K-1301 Nitrogen Production Facility, K-1302 Fluorine Storage, K-1303 Air Model Test Facility, K-1405 High Temperature Laboratory, K-1407 Laboratory and Storage (which also included the K-1407-D Calcium Hydroxide Tank and K-1407-L Sulfuric Acid Tank), K-1413 Laboratory, and their related appurtenances. Three additional buildings (K1045-A, K-1404, and K-1408-A) were not within the scope of the CERCLA removal action and were demolished in accordance with the National Environmental Policy Act of 1969 (NEPA).

This project began in 2001 and was completed in late 2003. During 2003, the K-1300 UF_6 vent lines were demolished, and all remaining waste from the facilities was disposed of, with the exception of the low-level classified waste from K-1413. The uncontaminated waste was disposed of at the ORR Industrial Landfill; the bulk of the low-level waste was disposed at the EMWMF. The K-1300 vent line waste was disposed of at the Nevada Test Site.

Classified waste from K-1413 was disposed of at the Nevada Test Site in CY 2003. A removal action report that documents the completed project will be submitted to the regulators.

CY 2004 decontamination and demolition activities at ETTP began on July 31, 2002, when DOE approved the action memorandum for the decontamination and demolition of 17 ETTP facilities and for the removal of contaminated scrap material. These facilities and the scrap material are included in the Group II Buildings, Phase II Demolition Project, and are primarily located in the K-1064 peninsula area of ETTP. During 2003, the regulators approved the removal action work plan and waste-handling plan.

3.2.1.4 Remedial Action Completed at K-1070-A Burial Ground

Organic compounds and radioactively contaminated wastes from 62 pits and 26 trenches at the K-1070-A Burial Ground at ETTP were excavated and disposed of at the EMWMF. The primary waste type disposed of was soil; however, there was some construction debris commingled with the soil. Excavation began in June 2002 and was completed in March 2003; 28,509 tons were excavated and shipped in 1,586 shipments to the EMWMF for disposal.

Included in the 21,651 yd^3 of waste were 344 intact gas cylinders and various-size containers

that were unearthed and underwent nondestructive assay analyses to determine uranium-235 enrichment. Three hundred thirty-four of these cylinders were breached and disposed of at the EMWMF; the remaining ten cylinders, including two 10-ton cylinders that had the potential to contain UF_6, were transferred to and dispositioned by the UF_6 Project. The site has been regraded to its original contours and restored. More than 70,600 hours were worked without incident or injury. The remedial action report for the burial ground was submitted to the regulatory agencies in September 2003, three months ahead of the Federal Facility Agreement milestone.

3.2.1.5 Zone 1 Record of Decision Approved

The record of decision for the ETTP Zone 1 remediation was approved by DOE, EPA, and TDEC in November 2003. Zone 1 encompasses an area of approximately 1400 acres located outside the ETTP main fence and surrounding the former main plant production area. The record of decision specifically addresses known areas of contaminated soil, Blair Quarry, scrap metal and debris in the K-770 Area, and the K-710 Sludge Beds and Imhoff Tanks. In addition, it establishes remediation levels for soil and burial areas and a methodology, referred to as the "dynamic verification strategy," for making action/no action determinations that will be used throughout Zone 1.

The remedial action core team, composed of representatives from DOE, EPA, TDEC, and their contractors, was established. The core team finalized its team charter in February, and through a series of team meetings and workshops, has made progress reaching agreement on a number of issues. A waste-handling plan, set of standard operating protocols, land-use control implementation plan, and dynamic verification strategy protocol have been developed by the remedial action core team to guide implementation of the remedy outlined in the record of decision for Zone 1. Additionally, five site summaries have been developed and issued to the regulatory agencies. A request for proposals for remediation of the K-770 scrap metal has been prepared and issued for bid, and a pilot demonstration of dynamic verification strategy implementation has been planned for Blair Quarry in Zone 1.

The focused feasibility study is being developed for Zone 2 soils for submittal to EPA and TDEC for approval. The study includes soil remediation levels for groundwater protection. The proposed plan for Zone 2 soils was initiated concurrently with development of the focused feasibility study.

3.2.1.6 K-1070-C/D G-Pit and Waste Disposition Completed

Portions of the K-1070-C/D Burial Ground were remediated in a two-phase project. Phase I (completed in 1999) consisted of excavation, segregation, characterization, and packaging of buried material in G-Pit, located in the K-1070-C/D Burial Ground, and covering of the K-1071 concrete pad, also located at the burial ground. Phase II of the remedial action consisted of the treatment and disposal of the excavated material from G-Pit. This waste was disposed of at the ORR Industrial Landfill at the Y-12 Complex. Approximately 40 yd^3 of secondary construction waste were accepted for disposal and were incinerated at the TSCA Incinerator in September 2003. The remedial action report was submitted to EPA and TDEC in December 2002, meeting the Federal Facility Agreement milestone, followed by a letter notification of the completion of incineration of the secondary waste stream in September.

3.3 OAK RIDGE NATIONAL LABORATORY

3.3.1 Melton Valley Remedial Actions

Continued well plugging and abandonment, decontamination and decommissioning of the New Hydrofracture Facility, and hydraulic isolation at SWSA 4 were among the remediation activities in Melton Valley in 2003.

The Federal Facility Agreement parties signed the Melton Valley record of decision in September 2000. The Melton Valley record of decision presents the selected remedy for environmental remediation of various burial

grounds and other contaminated waste units within the ORNL Melton Valley area. Remediation will be accomplished through a combination of responses that includes containment, stabilization, removal, treatment, monitoring, and interim land-use controls.

Regulators approved a remedial design work plan in May 2001, with the approval of the land use control implementation plan still outstanding. The plan specifies what actions must be taken to implement and maintain the required land use controls. Remediation work mandated by the Melton Valley Record of Decision has been ongoing and will continue through 2006. Individual actions completed before 2003 included remediation of both the Process Waste Sludge Basin and the Old Hydrofracture Facility as well as demolition of various surface structures in Melton Valley.

Two other projects under the Melton Valley record of decision completed subcontractor procurement and remedial design activities in 2003 in preparation for 2004 construction. These projects are hydrologic isolation for the SWSA 5 burial grounds and for the Seepage Pits and Trenches Area.

3.3.1.1 Hydrofracture Wells Plugging and Abandonment

Between the 1960s and mid-1980s, the process of deep waste injection was used at ORNL to dispose of radioactive liquids and sludge in mixtures of waste with cement-based grout and various additives. Two test injection wells were constructed, along with boreholes and wells, so that the behavior of the injected grout in the injection zone bedrock could be observed. At these two test sites, small quantities of radionuclides were added to the injected grout to make the grout sheets detectable by gamma detectors. The third and fourth injection wells, located within the Old Hydrofracture Facility and New Hydrofracture Facility, respectively, were constructed for large-scale waste disposal. More than 5 million gal of liquid waste-grout mix, containing approximately 1.4 million Ci of activity, were injected into artificially induced fractures in a shale formation at depths of 300 to 1000 ft. All large-scale disposals were at depths greater than 780 ft. Contamination levels in hydrofracture monitoring wells have been reported as high as 97 million pCi/L gross beta.

These surplus wells are potential pathways for the migration of contaminated fluids from the grout sheets and from deep groundwater to shallower groundwater zones. To prevent this migration, a remedial action was initiated in 2001 to plug and abandon 111 wells consisting of 4 injection and 107 monitoring wells. As of the end of CY 2003, 110 of the 111 wells had been plugged and abandoned. Plugging and abandonment of the remaining well (injection well 1968), which is located within the New Hydrofracture Facility, is scheduled for completion in early CY 2004.

3.3.1.2 New Hydrofracture Facility Decontamination and Decommissioning

The New Hydrofracture Facility was built at ORNL between 1979 and 1982 and operated from 1982 to 1984. It replaced the Old Hydrofracture Facility, which operated between the late 1950s to the mid-1970s. The New Hydrofracture Facility was designed to facilitate the injection of a mixture of radioactive waste solutions and grout into an impermeable shale formation at depths between 700 and 1000 feet below grade. The hydrofracture process is essentially a batch process in which the waste/grout mixture is pumped down a tubing string in the injection well and out into the shale formation. The high injection pressure of approximately 3000 psi fractures the subsurface shale and forces the waste/grout mixture into the fractures, where it hardens into “grout sheets.”

The objective of the decontamination and decommissioning of the New Hydrofracture Facility is the removal and disposition of the main and ancillary facilities, including some subsurface structures. As of the end of 2003, all New Hydrofracture Facility ancillary facilities, including dry storage tanks, the weighing station, and transfer piping, had been removed and dispositioned and demolition of the main building was under way. Process piping and equipment had been removed from two of the three hot cells. The control room and office/support structure had been demolished.

3.3.1.3 SWSA 4 Hydrologic Isolation

Work on the SWSA 4 project includes the hydrologic isolation of the SWSA 4 burial ground, Liquid Waste Disposal Pit 1, the Pilot Pits Area, and the 7819 Decontamination Area, as well as the excavation of the Intermediate Holding Pond. Hydrologic isolation includes the installation of a multilayer cap, upgradient storm-flow diversion trenches, and downgradient collection trenches. To facilitate cap installation, this project also includes plugging and abandonment of unneeded, shallow, non-hydrofracture wells within the cap boundary; developing a borrow area and associated haul roads; and relocating Lagoon Road.

From 1951 to 1959, DOE used SWSA 4 for disposing various liquid and solid radioactively contaminated wastes in unlined trenches and auger holes. SWSA 4 contains approximately 20,000 Ci of radioactive wastes and contributes approximately 27% of the total risk in surface water to a hypothetical resident at White Oak Dam.

Pit 1 was constructed in 1951 to test the feasibility of disposing liquid waste in pits excavated in the natural clays in Melton Valley. Pit 1 received liquid waste from August to October 1951. In 1981 Pit 1 was backfilled and covered with an asphalt cap. In 1991 a portion of the wastes disposed of in Pit 1 was stabilized as part of an in situ vitrification technology demonstration. In situ vitrification is a process that uses electrical power to heat and melt contaminated soil, fusing the soil and waste into a glass-like solid.

The remedial design report/remedial action work plan for this project was approved in May 2002. Bridge and haul road upgrades, borrow area development, and the plugging and abandonment of 167 shallow wells have been completed. Approximately 24,300 tons (17,200 yd^3) of contaminated soil from the Intermediate Holding Pond were excavated and disposed of in the EMWMF. A portion of the Intermediate Holding Pond is being used as a holding pond for the SWSA 4 cap remediation; the remainder has been backfilled and reseeded. An approximately half-mile section of Lagoon Road has been relocated to a position farther to the north of the SWSA 4 cap. A downgradient trench has been constructed for collection of leachate from SWSA 4. As of the end of CY 2003, contour fill placement for the cap construction was approximately 85% complete, and a landfill liner had been installed over approximately one-fourth of SWSA 4. A wastewater treatment plant, which will treat the collected leachate from SWSA 4, was nearing completion. Hydrologic isolation of SWSA 4 will be completed in CY 2004.

3.3.1.4 Spent Nuclear Fuel

Research and development programs related to nuclear reactor fuel have historically been a part of ORNL's mission. Many of these programs involved the post-irradiation examination and testing of spent nuclear fuel from various types of reactors. After these programs were completed, the remaining spent fuel was collected and placed into on-site storage facilities, primarily during the 1970s. Spent fuel was stored in below-grade storage positions in facilities 7823A, 7827, and 7829, which are located in SWSA 5 North. In addition, one package of spent fuel was placed in SWSA 6 in Melton Valley.

With the issuance of the programmatic environmental impact statement record of decision for spent fuel in 1995, smaller sites, like Oak Ridge, were directed to ship aluminum-clad spent fuel to the Savannah River Site and non-aluminum-clad spent fuel to the Idaho National Engineering and Environmental Laboratory (INEEL). Following the issuance of the record of decision for the programmatic environmental impact statement, an environmental assessment was prepared for the Oak Ridge spent fuel activities, and a finding of no significant impact was issued.

DOE approved the safety basis for loading spent fuel in the shipping cask in March 2003 and then approved readiness to load spent fuel in the shipping cask in June 2003. Immediately following that approval, the first shipment of spent fuel was loaded and prepared for shipment to INEEL. The shipping of spent fuel stored at ORNL began in 2003. The material is being consolidated with other spent fuel in storage at the INEEL.

By the end of CY 2003, all five planned shipments to INEEL had been completed. The five shipments completed the removal of more than

100,000 Ci of radionuclides from the ORR. These shipments also transferred 62 spent-fuel canisters and 9 intact Peach Bottom Reactor fuel assemblies with a total of 0.22 metric ton of heavy metal from Oak Ridge to INEEL.

3.3.1.5 Molten Salt Reactor Experiment Fuel and Flush Salts Removal

The Molten Salt Reactor Experiment (MSRE) facility operated from 1965 to 1969 to test the molten salt concept. Unlike most current commercial reactors that have fuel confined to fuel rods, MSRE was fueled by molten salt that flowed through the reactor chamber, where the nuclear chain reaction produced heat.

A CERCLA action to remove the fuel and flush the salt is under way. Testing of fuel salt removal equipment and a cold trap system was successfully completed in 2003. Operating procedures were developed based on results of the testing, and training of operators was conducted. Fuel and flush-salt removal will occur in 2004 and 2005.

3.3.1.6 TRU Waste Processing Facility

The mission of the Oak Ridge Transuranic (TRU) Program is to provide cost-effective, safe, and environmentally compliant treatment and disposal of all TRU waste stored at ORNL. In CY 2003, the TRU Program continued the construction of the Waste Processing Facility. The scope of the facility is to treat and dispose of 900 m^3 of remote-handled TRU sludge, 550 m^3 of remote-handled TRU/alpha low-level radioactive waste (LLW) solids, 1600 m^3 of remote-handled-LLW supernate, and 1000 m^3 of contact-handled TRU/alpha LLW solids currently stored in Melton Valley.

Construction for the Supernate Processing System of the Waste Processing Facility is complete, and the operational readiness reviews are under way. Supernate processing is to begin in early in CY 2004. Construction and testing of the contact-handled waste system is scheduled to resume shortly after supernate operations begin. Contact-handled waste operations are expected to start in August 2005. Construction and testing of the remote-handled solids and sludge systems will resume early in CY 2006, depending on the status of the remote-handled waste permit for the WIPP, which is currently expected to be approved and in place by July 31, 2006.

3.3.1.7 22-Trench Area TRU Waste Retrieval

During the 1970s, packages of TRU waste were retrievably stored in the 22-Trench. Since the 1980s, packages of newly generated TRU waste have been stored in constructed facilities. Radionuclides in the TRU waste containers represent some of the most toxic and longest-lived radioisotopes stored on the ORR. In a consent agreement signed in September 2000, DOE committed to the state of Tennessee to retrieve the TRU waste from the 22-Trench Area under DOE's Atomic Energy Act authority.

A request for proposals for the 22-Trench Area retrieval project was issued for bid early in 2003. The proposals were evaluated, and a subcontract was awarded. The scope of work consists of retrieving the TRU waste packages, placing the waste packages in overpacks, and staging the waste in appropriate areas pending transport to the TRU Waste Processing Facility when directed by DOE. There the wastes will be repackaged to meet the acceptance criteria for off-site disposal facilities and then shipped off site for disposal. Soil exceeding remediation levels in the Melton Valley Record of Decision and debris waste associated with the excavation will be disposed at the EMWMF or other appropriate facility. Design documents were submitted to and approved by the regulators. Field activities will begin in 2004 and will be completed in 2006.

3.3.1.8 Melton Valley Hydrologic Isolation

In addition to the SWSA 4 cap, the Melton Valley Record of Decision calls for construction of caps on several other waste disposal areas—SWSA 5, SWSA 6, and selected pits and trenches. Approximately 100 acres of multilayer caps, several groundwater interception trenches, and a groundwater treatment unit will be constructed. Design documents were submitted to the regulators in 2003, and upgrading of a haul

road from the Copper Ridge Borrow Area to the solid waste storage areas began in August 2003. In addition, areas to be capped were prepared by cutting trees within the cap footprint. Cap construction will begin in early CY 2004.

3.3.1.9 T-1, T-2, and HFIR Tanks Remediation

The T-1, T-2, and HFIR tanks are the last inactive liquid low-level waste tanks at ORNL to be remediated. The HFIR Tank will be stabilized by being filled with grout. The residual sludge in Tanks T-1 and T-2 will be treated to destroy organic resins. The treated sludge will be transferred to the active LLLW system. Tanks T-1 and T-2 will then be stabilized with grout.

The requirements decision record/remedial action work plan for this work was approved by the regulators in 2003. As of the end of CY 2003, the chemical treatment unit for the sludge was being constructed. Treatment will begin in 2004.

3.3.2 Activities Managed under the ORNL Balance of Program Project

Activities performed under the ORNL Balance of Program Project included remediation activities under CERCLA, environmental monitoring and investigation to support the Bethel Valley and Melton Valley Record of Decision, and surveillance and maintenance activities at facilities that are slated for remediation or decontamination and decommissioning in future years.

The Bethel Valley Record of Decision, signed by the Federal Facility Agreement parties in May 2002, presents the selected remedy for environmental remediation of various contaminated areas with Bethel Valley at ORNL and waste system components that reach into Melton Valley. Remediation under the Bethel Valley Record of Decision will be conducted at higher-risk sites first and will continue through 2014.

The first two projects to be performed that are mandated by the Bethel Valley Record of Decision are the Bethel Valley Groundwater Engineering Study (in Bethel Valley) and the remediation of the T-1, T-2, and HFIR tanks (located in Melton Valley). The remediation of the T-1, T-2, and HFIR tanks is being implemented under the Melton Valley Completion Project (see Section 3.3.1.9).

3.3.3 Bethel Valley Groundwater Engineering Study

The Bethel Valley Record of Decision specified that a groundwater engineering study be conducted to satisfy data needs for the design of several remedial actions related to groundwater, including (1) deep groundwater extraction at the Corehole 8 Plume, (2) in situ biodegradation at the East Bethel Valley volatile organic compound plume, (3) groundwater monitoring in West Bethel Valley, and (4) soil excavation at known leak sites to minimize impacts to groundwater. Planning for the groundwater engineering study was summarized in the *Engineering Study Work Plan for Groundwater Actions in Bethel Valley* (DOE 2003b), issued as a final document in 2003. The work plan includes an evaluation of relevant data from previous characterization activities and defines the scope of work to be performed to design groundwater and soil remedial actions under the record of decision. Once the engineering study data have been collected, a report summarizing the results will be issued in 2005.

3.3.4 Surface Impoundment Waste Removed

Waste from four surface impoundments at ORNL was disposed of in 2003. The four impoundments (3513, 3524, 3539, and 3540), known as the "Main Plant Surface Impoundments," were located in the south-central portion of the ORNL main plant in Bethel Valley. They served as intermediate collection, storage, and mixing basins for liquid process wastes. EPA, DOE, and the state of Tennessee signed a record of decision in August 1997 specifying that the impoundment sediment to be removed, stabilized, and disposed of.

Sediment was transferred from impoundments 3539 and 3540 to 3513 in 1998. Sediment was transferred from impoundment 3524 to 3513 in 2000. Following sediment transfer, impoundments

3524, 3539, and 3540 were backfilled with rock, and grout was added to the rock to fill empty spaces. Gravel pads were installed over the backfilled impoundments to provide space for the construction and operation of a sediment treatment system and to create a staging area for treated waste forms before shipment for disposal. The treatment system became operational in late 2001. Since then, all the sediment (approximately 6350 yd^3) has been removed, treated, and converted to 981 concrete final waste forms. As of the end of 2003, the disposal of waste generated from the dismantling of the treatment plant was wrapping up. The final demobilization is scheduled to be completed in 2004.

3.3.5 Melton Valley Picket Well Installation

In October 2003, the Melton Valley Picket Well Installation Project initiated work in the field to construct six wells that are up to 500 ft deep to support environmental monitoring required by the Melton Valley Record of Decision. The project included construction of access roads and drill pads and installation of corrugated steel drainage pipes across two unnamed streams. By the end of December 2003, the surface casings had been installed down to bedrock for all locations.

Each borehole will be continuously cored, and the borings will be geophysically logged and straddle-packer tested. A West Bay MP38 multiple-zone monitoring system will be installed in each well. Completion of the project is scheduled for spring 2004.

3.3.6 Tower Shielding Facility Defueling

The defueling of the Tower Shielding Reactor facility in the Melton Valley area was initiated during 2003 and was completed on December 12, 2003. The Tower Shielding Facility was built in 1953 for the Aircraft Nuclear Propulsion Project. The main feature of the project was a reactor with a 55-ton shield that could be lifted 200 feet into the air, where it was used to measure the shielding properties of various materials and radiation that might reach aircrews.

With the fuel removed, the facility can be downgraded to a radiological facility. The downgrade will yield an estimated $1.95 million in savings between 2004 and 2009, the original fuel removal date. The reactor fuel was shipped to the Savannah River Site on December 16, 2003. The remainder of the facility will be left in safe shutdown until decontamination and decommissioning of the buildings begins in 2009.

3.4 Y-12 NATIONAL SECURITY COMPLEX

3.4.1 Remediation of Boneyard/ Burnyard Completed

The remediation of the Boneyard/Burnyard, a 20-acre disposal area in Bear Creek, was completed in 2003. A total of 80,422 yd^3 of waste was excavated, of which 63,676 yd^3 were disposed of at the EMWMF and 16,746 yd^3 of lower levels of contaminated waste were consolidated and capped on site. The excavation of waste will permanently remove and/or isolate uranium-contaminated material from surface water and groundwater, thereby reducing the migration of contamination to Bear Creek.

Some of the first wastes disposed of in Oak Ridge were placed in the Boneyard/Burnyard, beginning in 1943. Both radiological and nonradiological wastes were disposed of at this site, which continued receiving wastes until 1970.

Three release sites are associated with the Boneyard/Burnyard remediation project: (1) the Oil Landfarm Soils Containment Pad, (2) the Hazardous Chemical Disposal Area, and (3) the Boneyard/Burnyard, including Bear Creek Tributary 3 floodplain soils. The Oil Landfarm Soils Containment Pad structure was a below-grade storage pad that contained approximately 570 yd^3 of PCB-contaminated soils excavated during closure of the Oil Landfarm. The Hazardous Chemical Disposal Area was historically used to dispose of chemicals that were deemed to be hazardous to plant workers, including acids, bases, and miscellaneous liquids. The area was covered in the late 1980s with an engineered cap, similar to the type required under RCRA. The Boneyard/Burnyard was used for the disposal of combustible wastes, including uranium

turnings, which were placed either on the surface or in unlined trenches and set on fire. The area was also used for storing abandoned equipment, which resulted in surface contamination. The wastes were leaching from the Boneyard/Burnyard to shallow groundwater, which then discharged to surface water.

Remedial actions were divided into three phases. Phase I consisted of the remedial design. Phase II included the hydraulic isolation at the Boneyard/Burnyard to reduce the contaminant flux entering Bear Creek, to dry the site in preparation for the Phase III work, and to remove the Oil Landfarm Soils Containment Pad structure and disposal of the soils at an off-site facility. Phase III consisted of excavation and disposal of Boneyard/Burnyard wastes.

3.4.2 Upper East Fork Poplar Creek Remediation Being Conducted in Phases

Remediation of the Upper East Fork Poplar Creek Watershed is being conducted in stages using a phased approach. Phase 1 addresses interim actions for remediation of mercury-contaminated soil, sediment, and groundwater discharges that contribute contamination to surface water. The focus of the second phase is remediation of the balance of contaminated soil, scrap, and buried materials within the Y-12 Complex, the major contaminated area in the Upper East Fork Poplar Creek Watershed. Decisions regarding final land use and final goals for surface water, groundwater, and soils will be addressed in future decision documents.

During 2003, a focused feasibility study for remediation of Upper East Fork Poplar Creek contaminated soils, scrap, and buried materials was conducted. Alternatives were developed and evaluated to protect workers in the industrial plant area and to minimize further contamination of groundwater and surface water by remediating accessible soil, buried waste, or subsurface structures that contribute significantly to contamination above acceptable risk levels. Once regulatory comments are received and incorporated, a proposed plan and record of decision will be developed and public input will be incorporated.

3.4.3 Building 9201-2 Water Treatment System to Be Constructed

To mitigate the mercury being released into Upper East Fork Poplar Creek, the Building 9201-2 Water Treatment System was designed and will be constructed as the first action of the approved record of decision for Phase 1 Interim Source Control Actions in the Upper East Fork Poplar Creek Characterization Area.

The design of the Building 9201-2 Water Treatment System was completed in September 2003. Results of a predesign study completed in the spring and summer of 2002 to evaluate potential methods for removing mercury to the ambient water quality criterion of 51 ppt and to determine design and operational parameters for the water treatment system were incorporated into the design.

A 300-gal/min water treatment system will be constructed near Building 9201-2. The system will use a series of granular activated-carbon beds to reduce the mercury concentration in the system effluent to levels of 200 ppt or less. The system influent will include Outfall 51 discharge and 9201-2 sump water. The existing East End Mercury Treatment System will be removed. Construction of the new water treatment system and demolition of the old plant are scheduled to be completed in 2004.

3.5 Oak Ridge Reservation Operations

3.5.1 Witherspoon Site Being Prepared for Cleanup

The David Witherspoon, Inc., 901 Site, located on Maryville Pike in Knoxville, Tennessee, consists of a 9.5-acre parcel formerly owned and operated as the David Witherspoon, Inc., Recycling Center and a 0.5-acre parcel owned by CBX Transportation, Inc. A 1993 court order forced cessation of operations at the Witherspoon site, and the property was seized by the Tennessee Division of Superfund.

The objective of this off-site project is to perform interim actions and to complete the

supporting documentation resulting in a record of decision at the site.

The scope of this project is to decontaminate and demolish the main building, metal office building, incinerator, magnet house, compactor house, control house, scale house/scale, bailer house, and breaker house. Contaminated soils will be excavated and disposed of as radioactive PCB mixed waste in the EMWMF. The contaminated soils will be excavated and treated to meet land disposal restrictions.

Site brush and vegetation removal, sampling activities, and radiation scoping surveys were completed in 2003. The decontamination and decommissioning debris removal interim action work plan was completed and issued for regulator review. An interim action work plan will also be prepared for soil removal. The interim action will begin in 2004, and the soil removal interim action is scheduled to be completed in 2007.

3.5.2 Tons of Wastes Placed in the EMWMF

Despite record rainfalls in 2003, the EMWMF, located near the Y-12 Complex, was able to provide almost uninterrupted disposal services for ongoing cleanup work.

EMWMF operations collected, analyzed, and dispositioned more than 8.5 million gal of leachate and contact water. The operations also effectively controlled site erosion and sediments, resulting in an 80% reduction in total suspended solids measured in surface waters during the year.

By the end of 2003, 69,486 tons of soil and debris waste had been disposed of at the facility. The following projects have made use of the EMWMF:

- Boneyard/Burnyard Remedial Action Project near •the Y-12 Complex,
- Intermediate Holding Pond Remedial Action Project at ORNL,
- K-1070-A Remedial Action Project at ETTP,
- ETTP Main Plant Facilities,
- ETTP K-31 Building Decontamination and Decommissioning,
- Melton Valley Old Hydrofracture Facility Decontamination and Decommissioning at ORNL,
- New Hydrofracture Facility Decontamination and Decommissioning Projects at ORNL, and
- Surface Impoundment Operable Unit Project at ORNL.

The EMWMF, located in East Bear Creek Valley near the Y-12 Complex, is an on-site waste facility that is being used to contain the waste generated during cleanup of ORR and associated sites in Tennessee. The EMWMF and ORR Landfills are serving the disposal needs of the ORR cleanup program as well as the active missions of the Y-12 Complex and ORNL. The EMWMF accepted its first waste shipment in May 2002.

DOE also operates solid waste disposal facilities at the Y-12 Complex, called the ORR Landfills. In 2003 more than 108,000 yd^3 of industrial, construction/demolition, classified, and spoil material waste were disposed of—40% above the forecast as the result of acceleration of cleanup activities across the ORR.

A major challenge to operations in 2003 was the unusually high rainfall, which resulted in the generation of exceedingly large volumes of contact water that necessitated collection and transport for treatment. This was accomplished while appropriately containing all water resulting from the heavy rain events. Another effect of the high rainfall is the unexpected increase in shallow groundwater levels beneath the facility. DOE is actively engaged with the regulators to implement a remedial action to lower the site-wide shallow groundwater table. An underground rock-core drain is being constructed 25 ft below the liner of the EMWMF to permanently suppress and drain groundwater. The successful implementation of this action will result in continued preparations for expanding the EMWMF starting in late 2004.

3.5.3 Millions of Gallons of Wastewater Treated in 2003

During 2003, the Environmental Management Program treated 25.4 million gal of liquid waste at the Groundwater Treatment Facility, East End Mercury Treatment System, Central Mercury Treatment System, and East End Volatile Organic Compound System.

The West End Treatment Facility and the Central Pollution Control Facility at the Y-12 Complex processed about 640,000 gal of wastewater, primarily in support of National Nuclear Security Administration operation activities. This wastewater included hazardous materials such as PCBs, cyanide, mercury, cadmium, chromium, and uranium. The hazardous materials end up in the sludge that results from wastewater treatment. A total of 900,000 kg of sludge was treated and shipped for off-site disposal in compliance with site treatment plan milestones. The total quantity of mixed-waste sludge disposed of since the project began in 1997 is 8,300,000 kg (about 9,200 tons). The remaining sludge inventory will be treated and disposed of by the end of 2004.

At ETTP, the Central Neutralization Facility treated more than 35 million gal of wastewater in 2003. The facility is ETTP's primary wastewater treatment facility and processes both hazardous and nonhazardous waste streams arising from multiple waste treatment facilities and remediation projects. The facility removes heavy metals and suspended solids from the wastewater, adjusts pH, and discharges the treated effluent into the Clinch River. Sludge from the treatment facility is treated, packaged, and disposed of off site.

At ORNL, approximately 167,000,000 gal of wastewater were treated and released at the Process Waste Treatment Complex. In addition, the LLLW evaporator at ORNL treated 227,500 gal of waste. Finally, 2.3 billion m^3 of gaseous waste were treated at the ORNL 3039 Stack Facility. These important waste treatment activities supported both Environmental Management and Office of Science mission activities in a safe and compliant manner.

3.5.4 Waste Stockpile Continues to Diminish

Operations at the ORR produce wastes that frequently contain radionuclides. Such wastes are characterized as either LLW or TRU wastes. Mixed LLWs are those that contain materials deemed hazardous and are regulated under RCRA.

TRU wastes from throughout the DOE complex are to be disposed of at the WIPP near Carlsbad, New Mexico. Before being shipped to the WIPP, however, TRU waste must be treated, packaged, and certified to meet the waste acceptance criteria of the WIPP.

DOE awarded a contract to Foster Wheeler Environmental Corporation in 1998 to build and operate a TRU waste treatment facility on the ORR. In 2001, an approximately 1000-ft extension to the access road from White Wing Road (State Route 95) and fencing of the approximately 20-acre site were completed. Waste processing at the TRU waste treatment facility is poised to begin in early 2004.

The ORR has the largest inventory of legacy LLW in the DOE complex. In addition, active DOE missions at the Y-12 Complex and ORNL produce newly generated LLW that must be managed and disposed of safely and efficiently. In 2003, DOE shipped 112 legacy LLW monoliths (2161 yd^3) to the Nevada Test Site for disposal, leaving fewer than 40 of the large legacy LLW containers. Characterization and planning activities are nearly complete for ensuring that the entire inventory of legacy LLW will be disposed of by the end of 2005. Almost 9000 yd^3 of newly generated LLW was also shipped for disposal in 2003.

The ORR also has a large inventory of mixed LLW, but most mixed waste has been dispositioned since the site treatment plan agreement was signed in 1995. In 2003, 323,069 kg of waste identified in the site treatment plan were dispositioned. Only 600,000 kg of such waste remain from an original inventory of more than 4,200,000 kg. In addition, DOE also shipped and disposed of 900,000 kg of sludge in 2003, bringing the total quantity of mixed waste sludge disposed of since the project began in 1997 to 8.3 million kg. Approximately 440,000 kg of sludge remain. By the end of 2005, the entire inventory of mixed waste regulated by the site treatment plan will be safely disposed of, closing an important chapter in the cleanup of the ORR.

Also in 2003, DOE and its contractors completed a 2-year effort to identify and safely disposition more than 1000 potentially shock-sensitive chemical items. Rigorous planning and careful execution brought about a successful outcome to ridding the ORR of these items in a safe and compliant manner.

3.5.5. TSCA Incinerator Continues Hazardous Waste Treatment

The Toxic Substances Control Act (TSCA) Incinerator, located at ETTP, plays a key role in the treatment of radioactive PCB and hazardous wastes (mixed wastes) from cleanup projects on the ORR as well as from projects at numerous out-of-state DOE sites. The incinerator operates at temperatures of 1500 to 2200° F. Some 99.99% of the hazardous organics and 99.9999% of the PCBs are destroyed during incineration. Plans are in place to increase the throughput at the incinerator to ensure cost-effective operations in support of the DOE complex's cleanup mission.

The TSCA Incinerator operates under rules and regulations issued by DOE, EPA, and the state of Tennessee. It began full operation in 1991 and since then has treated more than 28 million lb of waste. In 2003, it treated 567,289 lb of liquid waste and 162,664 lb of solid waste. About 900,000 pounds of combined liquid and solid waste are scheduled for treatment at the incinerator in 2004. A comprehensive performance test is also scheduled for 2004, to demonstrate compliance with new emission standards. The TSCA Incinerator is expected to be closed at the end of 2006.

3.5.6 Improved Technologies Being Used for Cleanup

The mission of the DOE-ORO Environmental Technology Program is to provide the scientific foundation, new approaches, and new technologies to bring about significant reductions in risk, cost, and schedule for completion of the environmental management accelerated cleanup mission. The need for real-time technology solutions has been made even more urgent with the renewed emphasis on site closure. In 2003, the program focused on several key problem areas at DOE-ORO sites. Also in 2003, development and field testing of a microcantilever sensor for the detection of mercury in water at the parts-per-trillion level were advanced.

The Y-12 Complex has had historical releases of mercury from four main process buildings. The loss of an estimated 2 million lb of mercury to soil and surface waters has created a mercury-management problem involving contamination of numerous sumps and outfalls. The Environmental Technology Program is working with academia and the private sector to investigate phytoremediation for the stabilization of mercury; mercury speciation in water, sediments, and fish in the lower reaches of East Fork Poplar Creek; and use of a specialized grout for stabilization of mercury in soils.

Several projects were initiated in 2003 to address ecological risk assessment. At ETTP, a demonstration of the Spatial Analysis and Decision Assistance (SADA) software was conducted to determine the ecological risk assessment capability of SADA as applied to a large, complex site. SADA documents all models and parameters used in an assessment in a form that can be accessed by all members of the decision-making team. Use of SADA facilitates agreement because of its documented quality assurance/quality control process and the fact that the ecological risk assessment modules were developed under guidance from EPA's Ecological Risk Assessment Forum and have been reviewed by EPA. Additionally, the Biological Monitoring and Abatement Program was used to assess environmental impacts and trends and to track compliance and environmental health updates.

The DOE-ORO complex has numerous scrap yards covering a total of 50 acres and containing more than 90,000 tons of scrap metal and debris. Most of the waste is radiologically contaminated. In addition to the existing scrap inventory, a large volume of scrap metal will be generated by decontamination and decommissioning activities at DOE-ORO and around the DOE complex. A more cost-effective, nondestructive characterization technology was needed to characterize waste in a wide variety of configurations and containers. The technology also had to be capable of isotopic discrimination and sensitive enough to certify that the waste meets the waste acceptance criteria of the receiving disposal facility. In 2003, in situ gamma spectrometry was successfully demonstrated to characterize the scrap metal piles at K-770. The process proved to be efficient, cost-effective, and accurate in characterizing the scrap metal for disposition.

The reliability and maintainability of reactive barrier systems are important considerations in the long-term treatment of contaminated groundwater. In 2003 the Environmental Technology Program funded the study of a number of operating barriers, including those at the Y-12 Complex S-3 ponds. The purpose of the study was to understand how the barriers function over time. Additionally, new reactive media were developed and tested in 2003, including biogenic apatite (Apatite II™) sorbent for removal of metals from Y-12 Complex groundwater.

Bioremediation continued to be evaluated as a viable treatment process for groundwater contaminated with volatile organic compounds. Bioremediation studies continued for the Y-12 Complex Upper East Fork Poplar Creek carbon tetrachloride plume with a treatability study planned for 2004.

ORNL has a mixture of TRU organic ion-exchange resin and sludge stored in two inactive underground storage tanks (the T-1 and T-2 tanks) and radioactive sludge and resin with TRU constituents in the HFIR tank. This waste must be retrieved and treated before disposal to meet the Federal Facility Agreement and achieve accelerated closure of the site by 2006; however, the waste does not meet the waste acceptance criteria for any existing treatment/storage facility. The waste must be pretreated to destroy the organic resins before solidification at the Oak Ridge TRU Waste Treatment Facility and disposal at the WIPP.

In 2003, the Environmental Technology Program focused its efforts on finalizing a process to chemically destroy the ion-exchange resin using Fenton's Reagent (hydrogen peroxide and a ferrous iron catalyst), which oxidizes the resin to carbon dioxide and ammonium sulfate. A specialized treatment tank and mixing system were designed and tested, and the process was successfully tested using both simulated and actual waste. After completion of final safety reviews, the system should be ready for full implementation in 2004.

3.6 PUBLIC PARTICIPATION

3.6.1 Oak Ridge Site Specific Advisory Board Posts Accomplishments in Public Involvement, Providing Recommendations to DOE

3.6.1.1 Public Involvement Continues to Be Key Aspect of Cleanup

Although many cleanup projects have moved from the decision-making phase to actual field work, public involvement remained a key component of the 2003 Environmental Management efforts in Oak Ridge.

DOE sought public input on the following key documents and decisions:

- Accelerated Cleanup Lifecycle Baseline,
- proposed 2005 budget request for Oak Ridge's Environmental Management Program,
- public health assessment for Y-12 Complex uranium releases,
- action memorandum for demolition of remaining facilities at ETTP,
- Spallation Neutron Source discharge permit, and
- disposal of outdoor LLW at ETTP.

On September 15, 2003, members of the public and more than 700 current and former Oak Ridge K-25 Site workers attended the sixtieth anniversary celebration for the K-25 Site. DOE and local government leaders also participated. The event, held outside the fenced area of ETTP, featured displays, music, and presentations. Participants heard about plans for accelerated cleanup of the site and saw the open spaces where buildings once stood.

Other notable 2003 public involvement initiatives included the following:

- A new DOE Information Center Web site was established to make information more accessible to the public (www.oakridge.doe.gov/info_cntr/). It

provides a centralized electronic source of new documents produced by DOE and an overview of the services offered to the public at the Information Center.
- A readership survey for *Public Involvement News*, the monthly stakeholder newsletter, was conducted to allow DOE to better mold its content to the type of information the public is seeking. A mailing list update card was also sent to all newsletter recipients to ensure that only those wishing to receive the newsletter would remain on its mailing list.
- The *TSCA Incinerator Burn Plan for 2004 to 2006* was made available. The incinerator is tentatively scheduled to be closed in 2006.
- An information session was held to discuss the title transfer of facilities and land at ETTP. This transfer supports the accelerated environmental cleanup of the site.
- The Oak Ridge Public Tour Program, featuring visits to all three DOE facilities in Oak Ridge, resumed in 2003.

3.6.1.2 Oak Ridge Site Specific Advisory Board Provides Public Input to Environmental Management Program Activities

The Oak Ridge Site Specific Advisory Board posted several accomplishments this year. The board is an independent, volunteer, federally appointed citizens' panel formed in 1995. Its mission is to provide informed advice and recommendations to DOE on its Oak Ridge Environmental Management Program and to involve the public in environmental decision making.

The board generated 17 recommendations this year on a variety of environmental management topics, including the following:
- recommendation to accelerate removal of remote-handled transuranic TRU waste from the ORR,
- recommendation concerning the Depleted Uranium Hexafluoride Disposition Program,
- recommendation concerning the DOE action memorandum for the Corehole 8 plume source,
- comments on the environmental assessment for proposed changes to the Sanitary Biosolids Land Application Program, and
- recommendation concerning the RCRA Part B permit renewal for the TSCA Incinerator.

Other significant 2003 accomplishments are described in the following sections.

3.6.1.3 TRU Waste Issues

The ORR is home to the largest quantity of remote-handled TRU waste in the DOE complex. This year the Oak Ridge Site Specific Advisory Board worked on several fronts to expedite its movement to more secure storage, where the risk to workers, the public, and the environment can be reduced. In October 2002 the advisory board wrote to the state of New Mexico to endorse DOE's remote-handled TRU waste permit modification request to allow shipment of this waste to the WIPP as part of DOE's effort to accelerate the disposition of legacy waste. In January 2003, Oak Ridge board members attended the Site-Specific Advisory Board Workshop on TRU Waste Management at the WIPP and subsequently endorsed the workshop's recommendations. The board followed up on these recommendations with a set of site-specific recommendations, transmitted to DOE Assistant Secretary Jessie Roberson in July 2003.

3.6.1.4 Environmental Management Waste Management Facility

A rising groundwater problem was identified beneath the EMWMF in spring 2003. DOE proposed several alternatives to the facility design to remedy the problem, and they were presented to EPA and the state of Tennessee. Because building of the CERCLA waste facility had significant public support, the regulators sought the public's input on the alternatives before making a decision. The Oak Ridge Site Specific Advisory Board provided the forum. Presentations were made to the board, and public notices were placed before the board's meetings, resulting in excellent public attendance.

In July 2003, the board endorsed DOE's preferred method for placement of an underdrain to address the high groundwater. Without a quick

decision on the design issue, the scheduled completion of additional waste cells would have significantly affected waste disposition in 2005, forcing off-site disposition, cost increases, and/or slowed remediation activities.

3.6.1.5 Long-Term Stewardship

In 2003, the Oak Ridge Site Specific Advisory Board provided six recommendations and comments to DOE on various aspects of long-term stewardship. The board's Stewardship Committee established an Education Subcommittee, which prepared the *Oak Ridge Reservation Educational Resource Guide* (ORSSAB 2003) and began work on a Stewardship Resource Kit to help educators develop curricula on stewardship and environmental issues. As in past years, these recommendations, comments, and educational efforts reflected the board's commitment to providing DOE with informed stakeholder involvement on long-term stewardship issues—not just at the ORR, but also at the national level.

3.6.2 Educational Resource Guide

In June 2003, Oak Ridge Site Specific Advisory Board issued the *Oak Ridge Reservation Educational Resource Guide* (ORSSAB 2003), to introduce the concepts of radiological and chemical contamination, environmental management, and stewardship to middle and high school students. The guide is the first part of a planned series of educational efforts by the board. The guide was initially distributed to area educators but is also being provided to the community at large through the board's web site (www.oakridge.doe.gov/em/ssab/pubs.htm), the DOE Information Center, and various public outreach events.

In July 2003, Oak Ridge Site Specific Advisory Board launched its video lending library at the DOE Information Center, providing the community with a valuable educational resource regarding environmental management program issues. The library contains more than 30 titles related to waste management, radiation, risk, environmental justice, environmental laws and regulations, history, and environmental management. The library also includes videotapes of the board's monthly meetings from January 1999 through the present. The videos are available at no charge to educators, students, board members, and the public.

All board meetings are open to the public and are announced in newspaper advertisements, in the *Federal Register*, through the board's 24-hour information line [(865) 576-4750], and on its web site (www.oakridge.doe.gov/em/ssab). Information is also available by calling the board's support office at (865) 576-1590 or (800) 382-6938.

3.7 Land-Use Planning

DOE programs in Oak Ridge depend not only on the facilities at ORNL, ETTP, and the Y-12 Complex, but also on the land base of the ORR. UT-Battelle, LLC, has the management and planning responsibility for most of the ORR's undeveloped land area. This responsibility includes planning for approximately 18,000 acres of undeveloped and developed land. The *2002 Oak Ridge National Laboratory Land and Facilities Plan* (ORNL 2002) has been prepared to assist DOE and contractor personnel in implementing ORNL's land and facility responsibilities for management and planning. The plan is available at http://www.ornl.gov/~dmsi/landUse/.

The ORR includes multiple, overlapping reservation land uses. Details on the various uses are discussed in Sect. 2 of the *2002 Oak Ridge National Laboratory Land and Facilities Plan* (ORNL 2002). With major changes in mission at ETTP and at the Y-12 National Security Complex, demonstrating current land use and planning for future land use needs by DOE and ORNL are critical. Decisions on how to use the land area have an effect at the local and regional levels as well as on the national and international levels.

The ORR is a unique and irreplaceable resource for DOE to use for its national science and technology missions. The DOE ORR vision, as stated in the *ORR Comprehensive Integrated Plan* (ORNL 1999), emphasizes that the ORR serves as an integrated science, education, industrial, and technology complex managed by DOE in partnership with the private sector—supporting a dynamic regional and

national economy. Future use is to include a mixture of activities that are compatible with and contribute to ongoing and anticipated DOE missions. According to current plans, the reservation will be used to support many of the same programs it currently supports while adapting to changing national goals and interests and reduced federal budgets. Portions of the reservation will be used to promote the development of private-sector enterprises in ways that are consistent with and complementary to DOE missions. DOE's environmental management and reindustrialization initiative is highlighted at the ETTP; defense support, manufacturing, and storage is highlighted at the Y-12 National Security Complex; R&D is highlighted at ORNL.

In December 2002, DOE and the state of Tennessee signed an agreement in principle to set aside approximately 3000 acres of the ORR for conservation purposes. The agreement was in response to natural-resource damages resulting from past U.S. government nuclear weapons production and research activities on the ORR. The agreement was developed through a joint effort by the state, DOE, the U.S. Fish and Wildlife Service, and the Tennessee Valley Authority. The 3000-acre area to be protected is part of the area included in the Land Use Planning Process for the northwest portion of the ORR.