3. Environmental Management and Reservation Activities

Setting

Much of the work done under the Oak Ridge Operations (ORO) Office of Environmental Management (EM) on the ORR is performed as a result of the requirements of the Federal Facility Compliance Act and CERCLA. The 1992 Federal Facility Compliance Agreement (FFCA) (see Sect. 2.2.4) requires that all DOE facilities manage and dispose of mixed waste in accordance with their respective site treatment plans (STPs). The Waste Disposition Project was established in part to address the storage, transportation, treatment, disposal, and recycling of legacy and newly generated waste from the ORR. The Waste Operations Project manages the Toxic Substances Control Act Incinerator (TSCAI), wastewater treatment facilities, landfill operations, and certain other treatment and recycle facilities that also contribute to meeting the requirements of the FFCA and other EM milestones.

Another large part of the EM work conducted at Oak Ridge is done according to the requirements of CERCLA, which is implemented by the 1991 Federal Facilities Agreement (FFA) in Oak Ridge. The FFA is an agreement signed by DOE, TDEC, and EPA to address contamination resulting from past activities of DOE operations that remain in structures, buildings, facilities, soil, groundwater, surface water, or other environmental media.

Update

This section will discuss the EM program accomplishments during 2000 at each of the three Oak Ridge sites and throughout the reservation.

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 the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Federal Facility Compliance Agreement (FFCA) made in accordance with the Federal Facility Compliance Act (see Sect. 2.2.4), requires that all DOE facilities manage and dispose of waste in accordance with their respective site treatment plans (STPs). The Waste Disposition and Waste Operations projects address waste stored, treated, disposed of, or recycled on the ORR in accordance with the STP. The EM 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 program.

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 (NPL). 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 Oak Ridge Reservation (ORR) was placed on the NPL in 1989. In 1990, DOE Headquarters (DOE-HQ) established the Office of EM, making Oak Ridge Operations (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 2000 and some related activities carried out to ensure good stewardship of the reservation.

3.2 FEDERAL FACILITY COMPLIANCE ACT

The STP, prepared under the 1992 FFCA, in accordance with the Federal Facility Compliance Act, includes schedules, milestones, and target dates for appropriately dispositioning any low-level or mixed low-level waste (MLLW) stored at any of the three Oak Ridge facilities. The STP is updated annually according to the ongoing needs of ORO and the character and nature of waste remaining to be dispositioned. Another waste type, transuranic (TRU) waste, is currently being addressed as an additional effort of the Legacy Waste program. TRU waste is waste contaminated with radioactive isotopes that have atomic numbers higher than 92.

3.3 WASTE DISPOSITION PROJECT

The objective of the Waste Disposition Project (WDP) is to dispose of the inventory of waste stored on the ORR and to manage and disposition newly generated waste from other DOE programs. This will be accomplished when waste generation on the ORR is in "steady state" condition; that is, the only waste present on the site will be the inventory required to accumulate volumes sufficient for their economic disposition.

Accomplishments of the WDP in 2000 include the following:

- reducing the inventory of MLLW by 7532 m^3,
- reducing the inventory of low-level radioactive waste (LLW) by 4864 m^3,
- making the first shipment of LLW to the Nevada Test Site (NTS) and transporting 60 monoliths to NTS, and
- reducing the amount of floor space used for storage of legacy waste by over 200,000 ft^2.

In 2001, all of the waste stored in the K-25 Building will be removed and the storage areas closed. The WDP consists of six subprojects, described briefly below.

3.3.1 Hazardous Waste Subproject

The Hazardous Waste subproject manages nonradioactive waste. The nonradioactive status of the waste is based on criteria of the facilities designated to receive the waste, and the rules and regulations of the states where those facilities are located. Hazardous waste can be regulated by RCRA or the TSCA; it can also be industrial chemical waste that cannot be managed at ORR facilities.

The objective of the Hazardous Waste subproject is to manage hazardous waste so that at least 80% of it is moved directly from the point of generation to an off-site commercial treatment, storage, disposal, or recycle facility. A related objective is that no more than 20% of the waste is moved into storage on the ORR. The overlying goal of this objective is to minimize the amount of storage space and waste volume stored on the ORR.

The activities conducted by the Hazardous Waste subproject include the following:

- review and verification of generator waste documentation against acceptance criteria;
- transportation of hazardous waste to commercial treatment, recycle, and disposal facilities;
- collection and short-term storage of waste that can be shipped off site immediately; and
- maintenance and operation of the Chemical Detonation Facility (CDF).

3.3.2 Mixed Low-Level Waste Subproject

The MLLW subproject comprises three activities described below.

3.3.2.1 Legacy MLLW Disposition

The objective of the Legacy MLLW Disposition activity is to facilitate the disposal of MLLW

at approved commercial facilities. If any savings are realized from selecting a facility that has lower costs than those planned, the extra money is applied to additional waste characterization and/or disposition activities.

3.3.2.2 Unstabilized Pond Waste

This activity consists of staging, transporting, treating, and disposing of the approximately 1627 m^3 of unstabilized pond waste that remains stored in 21st Century™ containers, poly-overpacks, and various metal containers. The waste inventory includes soft-centered "reject" drums previously processed at the decommissioned K-1419 Batch Plant that failed certification as "stabilized." The activity also includes repackaging 449 metal containers of raw, unstabilized pond waste into 21st Century™ containers; transporting, treating, and disposing of the material; and the compliant disposition of the containers.

3.3.2.3 Newly Generated MLLW Disposition

The objective of the Newly Generated MLLW Disposition activity is to maintain compliance with RCRA Land Disposal Restrictions (LDRs) and TSCA storage restrictions. This is accomplished by maintaining "steady-state" conditions for the newly generated MLLW streams. Newly generated waste is waste that was received from generators after September 30, 2000, and placed in storage only to accumulate enough so that it can be cost-effectively dispositioned by either treatment, disposal, or recycling in accordance with RCRA LDR and TSCA requirements.

3.3.3 Low-Level/Industrial Waste Subproject

The objective of the Low-Level/Industrial Waste (LL/IW) subproject is to support elimination of the current inventory of LL/IW on the reservation that was put into storage before September 30, 2000. The goal is to reach a point when only newly generated LL/IW is available and is placed in storage for the sole purpose of accumulating sufficient quantities to cost-effectively treat or dispose of it.

This subproject includes the following activities:

- Solid LLW disposition,
- LLW process residues disposition,
- LLW special case waste disposition,
- Newly generated LLW disposition, and
- Legacy industrial waste disposition.

The LLW special case waste disposition activity includes establishing agreements with disposal facilities for waste that has technical disposal difficulties, performance assessment or administrative limitations at disposition facilities, as low as reasonably achievable (ALARA) considerations, repackaging constraints, contemporary program scope limitations, or other challenges.

Newly generated LLW must be characterized and packaged by the generator to meet the waste acceptance criteria of the identified treatment or disposal facility to which it will be shipped. The subproject includes verifying the characterization of 10% of all newly generated waste.

The Legacy industrial waste disposition activity includes identification, characterization, and treatment and disposal for the nonregulated industrial chemicals.

3.3.4 TRU Waste Subproject

Disposition of TRU waste on the ORR includes treatment and disposal of solids and sludges. Solid TRU waste disposition includes transporting the stored legacy contact-handled (CH) and remote-handled (RH) TRU solid waste containers in inventory and a portion of the Solid-Waste Storage Area (SWSA) 5N RH-TRU casks to the TRU Waste Remediation Facility (TWRF) for processing. TRU Sludge Disposition includes mixing and transferring RH-TRU sludge from Tank W-35 at ORNL to the Melton Valley Storage Tanks (MVSTs) to facilitate treatment and packaging at the TWRF in the Melton Valley area of the ORNL.

3.3.5 Waste Disposition Storage Project

The Waste Disposition Storage Project includes storing LLW, MLLW, hazardous wastes, and TRU wastes. It provides safe, compliant, and

cost-effective storage of these wastes in facilities located at the ETTP, the Y-12 Complex, and ORNL. These wastes are contaminated with radiological constituents as a result of past weapons development or research operations at these sites and have been accumulated for treatment and disposal pending development of appropriate technologies, availability of disposal sites, and/or availability of funding. The scope of this subproject also includes closure of storage facilities and waste inventory tracking activities. Storage of TRU waste will be moved to the TRU subproject in FY 2002.

3.3.6 Reindustrialization

The WDP provides support to the reindustrialization activities at the ETTP being undertaken by Decontamination and Recovery Services (DRS) at K-1420 and Material & Energy Corporation (M&EC) at K-1200. These activities generate LLW, MLLW, hazardous wastes, and sanitary/industrial wastes. The project team provides guidance on characterizing, packaging, and certifying wastes in accordance with the ORR Waste Certification Program.

3.4 WASTE OPERATIONS PROJECT

The Waste Operations Project (WOP) consists of operating and maintaining several facilities throughout the ORR that treat, store, dispose of, or recycle waste generated from any of the ongoing DOE facility operations. The project also addresses some of the waste from past operations in accordance with the STP. In addition to optimizing each facility's operating capability, a large part of this work entails ensuring that all applicable permit requirements and other environmental requirements are met for each facility.

3.4.1 Y-12 Waste Operations

Facilities operated and maintained at Y-12 by the WOP include the following:

- West End Treatment Facility (WETF), including the West Tank Farm and Environmental Support Facility;
- Groundwater Treatment Facility including the Liquid Storage facility;
- the Uranium Chip Oxidation Facility;
- the Central Pollution Control Facility (CPCF), including the Central Mercury Treatment System;
- two industrial landfills (see Sect. 2.2.1.3); and
- four construction and demolition landfills (see Sect. 2.2.1.3).

In 2000, Y-12 Waste Treatment Operations has accomplished the following project highlights:

- processed over 8 million gal of water,
- removed the RCRA designation from the WETF Polishing System, and
- shipped over 1.2 million kg of sludge from the WETF to Envirocare of Utah.

All of these were completed with no National Pollutant Discharge Elimination System (NPDES) permit violations. The 2001 work is expected to include the following:

- treatment of 1.5 million gal of water at the WETF,
- treatment of 2.3 million gal of water at the Groundwater Treatment Facility/Liquid Storage Facility, and
- treatment of 9 million gal of water at the CPCF.

Landfill operations at Y-12 include Sanitary Landfills IV and V, a Spoil Area, Construction Demolition Landfill VI, preoperations activities for Landfill VII, and closure of Landfill II. All of these operations were conducted in 2000 with no environmental permit noncompliances or accidents. All waste brought to any of these facilities must meet applicable treatment standards and each facility's waste acceptance criteria.

3.4.2 ORNL Waste Operations

The Waste Operations facilities at ORNL include the Process Wastewater Treatment Facility (PWTF), the Low-Level Liquid Waste Evaporation Facilities, and the Off-Gas Collection and Treatment Facility. In addition to operating these facilities, Waste Operations supports EM projects by providing waste management and disposition services to cleanup projects. Among the services provided is the transfer of Liquid-Low-Level

Waste (LLLW) from the Gunite and Associated Tanks Project to the MVSTs.

The PWTF treats approximately 75 million gal of process waste water from ORNL each year. The Gaseous Waste Project supports gaseous waste collection and treatment generated from ongoing research and development programs at ORNL. The Interim Waste Management Facility (IWMF) operations are located on the southwest border of the SWSA 6 and are designed to dispose of low volumes of high-activity, short-half–life LLW. The IWMF began operations in 1991 and has disposed of approximately 3,600 m^3 of waste to date.

3.4.3 ETTP Waste Operations

Waste Operations facilities at ETTP include the following:

- the Toxic Substances Control Act Incinerator (TSCAI),
- the Central Neutralization Facility (CNF), and
- the Transportable Compressed Gas Recontainerization System (TCGRS).

The TSCAI treated approximately 1.35 million lb of wastes in 2000 that included meeting milestones of the FFCA. In 2001, the TSCAI will be upgraded to meet new EPA requirements for hazardous waste incinerators, and a trial burn for continuation of the RCRA permit will be conducted. The CNF is a hazardous wastewater treatment facility that treats approximately 35–40 million gal of wastewater each year. The secondary waste sludge generated as a result of the wastewater treatment operations at the CNF and the TSCAI is shipped to Envirocare of Utah for final disposal. Waste carbon from the carbon adsorption columns at the CNF is treated at the TSCAI. The TCGRS analyzes and treats the contents of gas cylinders located throughout the ORR. Treatment operations may include neutralization or flaring. Cylinders with inert or nonhazardous gases are vented. In 2000, approximately 525 cylinders were dispositioned at the TCGRS.

3.5 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT

The sequential steps in a CERCLA project are assessment, investigation, feasibility studies, and remedial actions. To implement CERCLA requirements in Oak Ridge, the EM Program adopted a watershed approach for assessing and investigating areas to determine the best methods for protecting and restoring ecosystems and protecting human health. The basic concept of the watershed approach is that environmental problems in industrial areas are best solved at the watershed level rather than at individual contamination sites. The watershed approach requires consideration of all environmental concerns, including needs to protect public health as well as critical habitats (such as wetlands), biological integrity, and surface and ground waters. The watershed approach allows better management strategies for investigations and remediation, thereby maximizing the use of scarce resources. In addition to the information presented here, DOE has published an annual report, *Cleanup Progress* (DOE 2000), which details the progress of CERCLA actions in the ORR.

3.6 OAK RIDGE Y-12 COMPLEX

EM projects involving the Y-12 Complex are located in one of three hydrogeologic regimes: Bear Creek Valley (BCV), Upper East Fork Poplar Creek (UEFPC), and the Chestnut Ridge hydrogeologic regimes. BCV extends from the west end of the Y-12 Complex approximately 10.2 miles to the Clinch River. A 2-mile section of BCV immediately west of the Y-12 Complex contains numerous waste disposal sites that have been used since 1943. Of these, the three main disposal areas are as follows: (1) the S-3 Ponds, (2) the Oil Landfarm (OLF)/Bone Yard/Burn Yard (BY/BY) area, and (3) the Bear Creek Burial Grounds (BCBG). Several auxiliary areas were used for the disposal of various liquid and solid wastes contaminated with both radionuclides and chemicals. The major contaminants to surface

water and groundwater in the BCV are uranium and nitrate with lower concentrations of cadmium and technetium-99.

The Environmental Management Waste Management Facility (EMWMF) will be constructed in BCV. This facility will enable disposition of waste generated as a result of CERCLA activities on the ORR.

The UEFPC begins in the western portion of the Y-12 Complex as an underground storm drain system that collects groundwater and stormwater. The UEFPC encompasses the developed Y-12 Complex industrial area, including certain solid waste management units included in the RCRA Hazardous and Solid Waste Amendments permit and other dispersed areas of contamination resulting from past operations. Water in the storm drain system surfaces in the south-central area of the complex, initially flowing northeast along the southern boundary of the complex, then turning to the northwest as it passes through a gap in Pine Ridge, exiting UEFPC as Lower East Fork Poplar Creek (LEFPC). The UEFPC is bounded by the base of Pine Ridge to the north, the base of Chestnut Ridge to the south, and BCV to the west. To the east, the UEFPC extends to the ORO boundary at Scarboro Road and includes a contaminated groundwater plume, the East End Volatile Organic Compound (VOC) Plume, which extends eastward past the boundary to a spring at the intersection of Union Valley Road and Illinois Avenue. The creek drains portions of the ORR and privately held lands to the northeast.

Chestnut Ridge Hydrogeologic Regime extends from the UEFPC southward to Bethel Valley Road and includes soil waste piles, closed disposal units, and abandoned quarries.

3.6.1 Bear Creek Valley Remedial Actions

3.6.1.1 Bear Creek Valley Phase 1 Record of Decision

This subproject captures actions that crosscut the watershed including the BY/BY, the S-3 Ponds (both of which are discussed below), the OLF Soils Containment Pad, and the BCV Disposal Area Remedial Action (DARA) Solid Storage Facility (SSF).

Following signing of the BCV Phase 1 Watershed and EMWMF Records of Decision (RODs), remedial activities began. Construction activities at a number of sites throughout the watershed will impact streams; the impacted streams will be mitigated via the BCV Wetlands Mitigation Project.

3.6.1.2 Bear Creek Valley S-3 Ponds Remediation

The S-3 Ponds have been closed with a RCRA cap and are now under RCRA post-closure care and monitoring. Capping of the old ponds has lessened the impacts of contamination. However, the remedial investigation (RI) Report for the BCV Characterization Area estimates that approximately 5740 acre-ft of groundwater downgradient of the S-3 Ponds have been contaminated as a result of the waste leachate production prior to closure of the ponds. The contaminated groundwater acts as a secondary source of contamination as it discharges into Bear Creek and its associated tributaries. The primary contaminants in the surface water are uranium, nitrate, and cadmium. The S-3 site currently contributes approximately 26% of the risk at the BCV Watershed Integration Point through releases of uranium. In addition, discharges of contaminated groundwater to surface water at the S-3 Site are the primary causes of current impacts on the aquatic ecology of Bear Creek.

Because the S-3 Ponds were located on a shallow groundwater and surface water divide, contaminated groundwater plumes emanate from the site and extend to the east and west. This project addresses the western plume and includes the design and implementation of treatment systems for contaminated shallow groundwater discharging to Bear Creek and its tributaries. The western plume consists of three primary pathways of groundwater flow. Two of the pathways (Pathways 1 and 2) are shallow-flow regimes that discharge to the main stem of Bear Creek. Both pathways are contaminated primarily with uranium. Pathway 3 is deeper and travels through the bedrock along strike, discharging nitrate- and cadmium-contaminated groundwater to two tributaries of Bear Creek (NT-1 and NT-2). The objective of this subproject is to capture and treat contaminated groundwater so that risk to human

health and the environment can be reduced to levels consistent with the goals of the BCV Phase I ROD.

Reactive barriers were installed at Pathways 1 and 2 as part of the technology demonstration program. In 1998 these barriers were adopted as a CERCLA removal action. Both the Pathway 1 and Pathway 2 systems experienced operational problems, and in 2000, modifications were made to improve the operation of the systems. The modifications consisted of constructing a force main to convey groundwater from Pathway 1 to the well at Pathway 2 and installing a pump at Pathway 2 to allow the system to operate continuously. The modified system has been operational since December 20, 2000. Initial data demonstrate that contaminated groundwater is being captured by the systems and that uranium is being removed.

The remedial objective for Pathway 3 is to install a groundwater interception trench containing reactive media. During 2000, a pilot-scale system was installed in the Pathway 3 area to collect predesign data on various media to determine the optimal media to be used in the trench. Design of the trench will be performed in 2001.

3.6.1.3 Bear Creek Valley Boneyard/ Burnyard Remedial Actions

There are three release sites associated with the BY/BY RA: (1) Hazardous Chemical Disposal Area (HCDA); (2) BY/BY, including Bear Creek Tributary 3 Floodplain Soils; and (3) OLF Soils Containment Pad. These sites are located north of Bear Creek Road, approximately 1 mile west of the main Y-12 Complex.

At the BY/BY, combustible wastes, including uranium turnings, were placed either on the surface or in trenches and burned. The area was also used for abandoned equipment laydown, which resulted in surface contamination. This waste is now leaching to shallow groundwater that discharges to surface water. The site is the major contributor to risk levels in the valley.

The HCDA was historically used to dispose of chemicals that were deemed hazardous to plant workers, such as acids, bases, and miscellaneous liquids. The area was capped with a RCRA-like cap in the 1980s.

The OLF Soils Containment Pad was a below-grade storage pad covered with a Rubb™ temporary structure. The pad contained 570 yd^3 of soils contaminated with polychorinated byphenyls (PCBs) excavated during the RCRA closure of the OLF as well as soils excavated from the banks of NT-7 during road construction in the late 1980s.

The objective for the BY/BY remedial action (RA) is to implement a series of hydraulic isolation measures designed to substantially reduce the uranium flux entering Bear Creek from the BY/BY and to "dry" the site out in preparation for excavation of the waste in FY 2002.

Additionally, the objective for the OLF Soil Containment Pad involves final disposition of the soils stored at the facility and demolition of the temporary storage building and concrete pad. The soils in the OLF Soil Containment Pad carry RCRA-listed waste codes.

Activities for FY 2000 included completing the BCV BY/BY OLF RA, which included clearing and grubbing, hydraulic control, OLF Soils Containment Pad closure, off-site disposal, borrow area operation and maintenance, and site restoration.

3.6.2 Upper East Fork Poplar Creek Remedial Actions

3.6.2.1 Upper East Fork Poplar Creek Record of Decision—Phase 1 and Phase 2

The objective of this project is to select a cleanup remedy for the UEFPC Characterization Area and document it. The Phase 1 ROD focuses on mercury source control actions. The Phase 2 and final ROD will address soil RAs for worker protection; surface water actions including monitoring and other mercury source actions, as necessary; additional UEFPC sediment removal; building decontamination and decommissioning (D&D); and additional groundwater actions. In 1999, agreement was reached among TDEC, EPA, and DOE on the UEFPC Watershed ROD proposed interim goals for groundwater and surface water and the long-term goal for soil.

3.6.2.2 East End Volatile Organic Compound Plumes

A removal action to mitigate off-site migration of the Y-12 East End VOC Plume by installing a pump-and-treat system was implemented in 2000. The system installation and testing period was completed in September 2000 with operations beginning in October 2000. The system consists of a duplex filter and air stripper unit and operates continuously at a flow rate of 25 gpm. In 2001, field testing of in situ biostimulation will be conducted.

3.6.2.3 Upper East Fork Poplar Creek Firing Range

The scope of the UEFPC Firing Range Soil Remediation was to excavate lead-contaminated soils from the Y-12 Complex Firing Ranges outside the Y-12 Complex fence line at the eastern end of the complex. In 1998, soil was excavated from two target berms, transported off site, and disposed of at a RCRA-permitted facility. The removal action report was published in 1999.

3.6.2.4 Basin 9822 Clean Out

The Basin 9822 Clean Out Project removed and disposed of liquid and sediment waste to prevent recontamination of Basin 9822 and the Building 81-10 Sump. This project was completed in 1999.

3.6.2.5 Reduction of Mercury in Plant Effluents

The historical purpose of the Reduction of Mercury in Plant Effluents (RMPE) project was to comply with limits for mercury concentrations in UEFPC as required by the Y-12 National Pollutant Discharge Elimination System (NPDES) permit by eliminating, mitigating, or capturing for treatment mercury-contaminated effluent. In September 1999, a Consent Order was issued that resolved the appeal of the Y-12 NPDES permit limit for mercury. The Consent Order documents the appropriate areas of responsibility for the NPDES program and the CERCLA program as they address mercury in UEFPC. Permit numeric limits remain for the mercury treatment systems outfalls. However, NPDES mercury limits at Station 17 have been eliminated. Station 17 will continue to be a monitoring point under CERCLA with an interim remediation goal of 200 parts per trillion (ppt).

With the responsibility for future mercury remediation transferred to CERCLA, RMPE is being phased out. Beginning in October 2000, monitoring and reporting became the responsibility of the Y-12 Water Quality Program. Future actions will be considered under the appropriate CERCLA document.

In 2000, RMPE had responsibility for several treatability studies being conducted to support the CERCLA process. The bank stabilization study was implemented to determine the effectiveness of erosion-protection measures in reducing or eliminating contributions from stream sediments and/or bank soils to the overall mercury flux. Sand tubes were installed along a 300-ft section of UEFPC and rip rap along an adjoining ~400-ft section. The stabilization effort has been successful at protecting highly contaminated deposits along the UEFPC banks from contact with flowing water. Average mercury flux added to UEFPC in the reach affected by the action decreased by 3.7 g/d. Monitoring of the study will continue in 2001.

Additional studies are planned for 2001, including the evaluation of the hydraulic connection between the 9201-2 and 81-10 sites and UEFPC; in-situ grouting of the 81-10 area; and alternatives to low-temperature thermal desorption.

3.6.3 Environmental Management Waste Management Facility

The purpose of the EMWMF project is to build a CERCLA mixed-waste disposal facility for the ORR. More specifically, the objective of the project encompasses the design, construction, operation, and closure of two 400,000-yd^3 capacity cells as well as the preparation of associated CERCLA documentation. Waste generated from the CERCLA cleanup of former waste sites and buildings that have been impacted by past operations (both on the ORR and at nearby sites off the ORR within the state of Tennessee) will be dis-

posed of in the EMWMF pending compliance with the facility's waste acceptance criteria. The EMWMF, a RCRA-compliant, on-site, above-ground earthen disposal facility, will safely isolate waste from the environment and protect human health. The decision for on-site waste disposal from the CERCLA cleanup of ORR is documented in the ROD for this project, which was approved by EPA, TDEC, and DOE on November 2, 1999. The Remedial Design Report and Remedial Action Work Plan detailing the design and operation of the facility were subsequently prepared and reviewed at several stages by the regulators. Additionally, the EMWMF Waste Acceptance Criteria Attainment Plan, to be used to make disposal decisions on a waste stream basis, was begun and is currently still under development. This plan, once approved by the regulators, will serve as the guide for the acceptance of all CERCLA waste in the EMWMF. An evaluation of including classified waste in the scope of the EMWMF was completed, with required changes to the design and operations pending.

A contract to design, construct, and operate the first phase of the facility has been awarded; initial construction activities began in 2000 and will continue through 2001. Facility operation is scheduled to begin in early 2002.

3.7 EAST TENNESSEE TECHNOLOGY PARK

The CERCLA projects at ETTP can be divided into two broad categories: RA and D&D projects. RA projects address contaminant releases to the environment by cleaning or treating contaminated soil, water, sediment, or biota. D&D projects address contamination in facilities and structures. Both kinds of projects address hazardous and radioactive contamination and compliance issues resulting from implementation of the projects.

3.7.1 Remedial Actions

3.7.1.1 ETTP Site-Wide Record of Decision Project

The purpose of the ETTP Site-Wide ROD Project is to define the remedial strategy for ETTP. This entails evaluating data from all potential contaminant sources at ETTP to determine where RAs are required and which are the most effective RAs at specific sites. This project is also expected to identify areas where contaminants are not present above action levels or where existing conditions do not pose risks sufficient to justify RAs.

The first phase of the ROD is the RI. The RI is designed to define the nature and extent of contamination in the soils and sediments and to identify the areas that pose a risk to human health and the environment at ETTP. The information obtained from the RI will be used to develop, screen, and evaluate potential RA alternatives.

Both EPA and TDEC have expressed concerns on whether sufficient data exist in some geographic areas to make RA decisions based on the information in the RI Report. Consequently, the approach and strategy are being reviewed to redefine the ETTP Site-Wide ROD Project.

3.7.1.2 K-1070-A Burial Ground

The K-1070-A Burial Ground, located in the northwest corner of ETTP, was used for the disposal of several types of waste from the 1950s through the mid-1980s. The burial ground mostly contains uranium-contaminated waste from ETTP and other operations buried in unlined trenches and pits. Thorium-contaminated and pyrophoric waste and UF_6 cylinders are also included in records of burials at the site. Investigations have concluded that groundwater underlying the burial ground is contaminated with dense nonaqueous-phase liquids and that the plume is migrating southward toward the K-901-A Holding Pond. This project includes the excavation of waste deposited in the trenches and pits. Groundwater and adjacent soils will be addressed in the site-wide ROD. The subcontract for this project was awarded in 2002.

3.7.1.3 K-1070-C/D G-Pit and Concrete Pad

The K-1070-C/D Classified Burial Ground is located on a hill at the eastern edge of ETTP. The burial ground is composed of several disposal areas: large trenches, small pits, three earthen dike areas, a land farm, and a concrete pad. Both low-level radioactive and nonradioactive nonhazardous waste materials and equipment were buried in the large trenches. The small pits were used for the disposal of segregated liquid and glass wastes, including some hazardous and radioactive wastes. One of the pits, G-Pit, was considered to be a continuing source of contamination to groundwater. The K-1071 Concrete Pad was used for the compaction of metal drums before burial and has been identified as a source of radiological contamination. Contaminants of concern (COCs) at the burial ground are volatile and semivolatile organics, uranium-contaminated scrap metal, uranium compounds, lead, and other metals. The remedial decision for the K-1070-C/D operable unit (OU) mandated the excavation of wastes from the G-Pit and temporary storage of those wastes at ETTP. In 2001, the excavated soil was treated by using low-temperature thermal desorption. The treated soil will either be disposed of at the Y-12 landfill or will be spread over the ground within the K-1070 C/D Burial Ground fence.

3.7.1.4 K-1085 Old Firehouse Burn Area Drum Burial Site

The Drum Burial Site is located outside the ETTP perimeter fence within an area bounded by State Highway 58, Bear Creek Road, and Powerhouse Road. The Drum Burial Site was identified when a Tennessee Department of Transportation excavation contractor uncovered and accidentally punctured two buried drums of unknown contents. The Drum Burial Site was identified in the action memorandum to consist of five locations within an overall area of approximately 12,000 ft^2 that was determined from geophysical investigation results. These five locations will be excavated to unearth any buried drums, associated drum contents that have escaped from ruptured or deteriorated drums, and discolored soil. In addition, another area of approximately 200 ft^2 was added to the removal action scope after the action memorandum was signed. The sixth area that is planned for excavation was added to the removal action scope because a Tennessee Department of Transportation excavation contractor working in the immediate area encountered a small seam of black-colored soil. Although no buried drums were encountered in the sixth area, radiological screening and sampling information identified elevated levels (i.e., above background) of radiological contamination associated with the black-colored soils.

3.7.2 Decontamination and Decommissioning

3.7.2.1 K-1001 Administrative Building Demolished

The K-1001 Building was the original administrative office building at the K-25 Site. It was a two story wood frame structure built in 1944. A structural engineering analysis of the building determined that it was no longer structurally sound to use as an office building, and the decision was made that it was more cost-effective to demolish the building than to try and renovate it to bring it up to modern standards. Safety and Ecology Corporation of Knoxville was awarded the contract to perform the work. Although the building was surveyed and found to be radiologically clean, it contained asbestos materials and small amounts of lead and PCBs. These contaminants were removed and disposed of at a permitted disposal facility. The remainder of the construction debris was disposed of at the Y-12 Construction Debris Landfill.

In a related action, Safety and Ecology Corporation also demolished seven trailers near the K-1001 Building. These trailers had been used as auxiliary office buildings. They had been determined to be surplus the ETTP needs and would have required significant resources for upkeep and continued use.

3.7.2.2 Process Equipment Decontamination and Decommissioning (Buildings K-29/K-31/K-33)

This RA addresses the decontamination and removal of process equipment and the decontamination of Buildings K-29, K-31, and K-33. These buildings were originally designed and built to house the low-enrichment operations of the gaseous diffusion plant. The process buildings were constructed in the early 1950s, placed in stand-by in 1985, and placed in permanent shutdown status in 1987. The condition of the buildings (three of the largest process buildings at ETTP) presents a threat of potential release of contaminants to the environment. The three buildings combined contain more than 4.8 million square feet of floor space. The equipment in these three buildings totals over 136,000 tons of material. British Nuclear Fuels, Inc (BNFL) is under contract to DOE to recycle or dispose of surplus materials and equipment, decontaminate the buildings, and make them available for reuse. In 2000, BNFL dispositioned 17,881 tons of metal from Building K-33, with another 16,530 tons of materials dismantled and awaiting disposition. In addition to the buildings themselves, the electrical switchyard equipment that used to service the buildings has also been demolished and dispositioned. 4,615 tons of metal have been removed and dispositioned from the K-31 and K-33 switchyards.

3.7.2.3 K-1200 Equipment Removal and Cleanup Project

The scope of the K-1200 project is to remove existing gas centrifuge process equipment and support structures and classified residuals from the buildings. The center bay work was completed in 2000.

3.8 OAK RIDGE NATIONAL LABORATORY

As at Y-12, CERCLA activities can be grouped into RA and D&D projects with similar definitions to those at ETTP. Additionally, ORNL hosts a Nuclear Material Facility Stabilization program that is addressing radioactive contamination in abandoned reactors before they become candidates for D&D.

3.8.1 Remedial Actions

Remedial actions at ORNL are being addressed in one of two watersheds, Bethel Valley, the main area of ORNL, and Melton Valley, also referred to as White Oak Creek Watershed, which is south of the ORNL main plant area, where most of the historic waste disposal operations took place.

3.8.1.1 Melton Valley Remedial Actions

Melton Valley Watershed Record of Decision Project

The purpose of the Melton Valley Watershed ROD Project is to define the remedial strategy for Melton Valley Watershed. This entails evaluating data from all potential contaminant sources to determine where RAs are required and which are the most effective RAs at specific sites. Several CERCLA areas located in the Melton Valley portion of the WOC Watershed at ORNL will be addressed under this project. The project used existing data, supplemented by a small amount of new data, to develop a remedial strategy. Groundwater, surface water, floodplain soils, and source units in the watershed were evaluated as a single entity (i.e., watershed) to ensure that (1) a consistent approach to remediation was implemented across the valley and (2) RAs at specific sites were prioritized to achieve the greatest risk reduction. The ROD was signed in September 2000. Final groundwater decisions are being deferred to a future ROD, after the effect of the remedial actions in the watershed ROD are known.

Solid Waste Storage Area 4 Capping/ Intermediate Holding Pond Remediation Project

The first major remedial action resulting from the Melton Valley Watershed ROD is remediation of the Intermediate Holding Pond (IHP) and installation of approximately 30 acres of multilayer engineered cap over SWSA 4, along with

upgradient and downgradient groundwater interception trenches to isolate the SWSA 4 buried wastes from groundwater. IHP sediments will be excavated and disposed of in the EMWMF. Engineering design began in 2000; approval of the Remedial Design Report/Remedial Action Work Plan and start of field activities are scheduled for 2001.

Old Hydrofracture Facility Tanks and Impoundment

Between 1964 and 1980, waste liquid and suspended solids from the ORNL main plant LLLW system were decanted and pumped to five tanks at the Old Hydrofracture Facility (OHF), from which the radioactive liquid was mixed with grout and injected deep in to shale bedrock. The OHF Impoundment is a riprap-lined pond used between 1965 and 1979 to receive various types of wastes from the OHF operations.

In 1998 residual sludge from the five tanks was removed. In 2000 water in the OHF Impoundment was removed and the remaining radioactively contaminated sludge was stabilized in place. Contaminated sludge in another small impoundment near OHF was also stabilized and placed in the OHF Impoundment, which was then covered with a soil cap.

3.8.1.2 Bethel Valley Remedial Actions

Bethel Valley Watershed Record of Decision

Like Melton Valley, a ROD is being developed for the Bethel Valley Watershed. The remedial investigation/feasibility report in support of the ROD was approved by the regulators in August 1999. In 2000, the proposed plan was approved and a draft ROD was submitted to the regulators.

Gunite and Associated Tanks Project

The Gunite and Associated Tanks (GAAT) project consists of the eight underground gunite tanks associated with two tank farms located in the center of the ORNL main plant area. Tanks W-3 and W-4 are in the North Tank Farm; W-5, W-6, W-7, W-8, W-9, and W-10 are located in the South Tank Farm. These inactive tanks, installed in 1943 to store liquid wastes, were used as the main holding tanks for the LLLW system at ORNL. The GAAT project is separated into three components: (1) removal of residual sludge in the tanks as part of an interim action ROD, (2) stabilization of the tanks under an action memorandum, and (3) final site closure under the Bethel Valley ROD.

Removal of tank contents began in June 1997 and was completed in September 2000. During this time, approximately 425,000 gal of slurry, which contained approximately 100,000 gal of sludge from the tanks, were transferred to the active LLLW system for future treatment.

ORNL Main Plant Surface Impoundments

The Main Plant Surface Impoundments, originally consisting of four surface impoundments (two small and two larger) located in the south-central portion of the ORNL main plant area, were used to collect, mix, or store untreated wastewaters. Transfer of the sediment and subimpoundment soil from the two smaller impoundments, C & D (3539 and 3540), to Impoundment B (3524) was completed in 1998. Transfer of the sediment and subimpoundment soil from Impoundment A to B was completed in 2000. Construction of a treatment facility for the consolidated sludge and subimpoundment soil from Impoundment B began in 2000.

During the remediation activities, the seeps from the surface impoundments are being controlled and monitored to verify effectiveness of the control methods.

Inactive Tanks Remediation Project

ORNL has a comprehensive program under way to upgrade the LLLW system to meet the FFA requirements. Tank systems that do not meet the FFA requirements have been removed from service, have been characterized, and are being remediated. As of the end of 1998, all LLLW tanks that did not meet the FFA requirements for active service had been removed from service. The inactive tanks are remediated within the CERCLA framework. Tanks with little associated risk have been remediated as maintenance actions

with regulatory concurrence. Tanks with more associated risk are remediated upon approval of an approved engineering evaluation/cost analysis and action memorandum (AM). Final decisions on the tanks will be documented in the Bethel Valley ROD.

An AM was approved in 1999 for removal of waste from 11 inactive LLLW tanks and was subsequently modified to include the remaining 16 inactive tanks. In 2000 removal of residual sludge and filling with grout was completed for nine tanks.

Core Hole 8 (Tank W-1A) Plume Source Removal

The liquid radioactive waste collection/ storage Tank W-1A was commissioned in 1951 and remained in service for 35 years, until 1986. Tank W-1A was used as a storage tank for wastes from the high- radiation analytical facilities (Bldgs. 2026, 3019, and 3019B). During rock-coring activities in 1991, high concentrations of radiological contamination were detected in groundwater in the central main plant area of ORNL at a location designated as Core Hole 8. Subsequent groundwater sampling in 1995 indicated significant gross beta and alpha contamination in the vicinity of Tank W-1A in the North Tank Farm. Actions have been taken to intercept and treat the contaminated groundwater.

The plume source removal project is focused on the removal of Tank W-1A and the surrounding soils suspected of being a primary source of contamination to groundwater. A Removal Action Work Plan (RAWP) was approved by the regulators in March 1999, and field work began in August 1999. Additional soil analyses performed in 1999 indicated higher-than-expected levels of some radionuclides, requiring modification of plans for excavation and disposal of the soil. The soil with the highest radionuclide concentrations will be selectively excavated and disposed of at the Nevada Test Site; the remaining soil will be disposed of at Envirocare of Utah. Tank and soil removal are expected to be completed in 2001.

3.8.2 Decontamination and Decommissioning

3.8.2.1 Molten Salt Reactor Experiment

The Molten Salt Reactor Experiment (MSRE) facility was an experimental reactor fueled by molten uranium tetrafluoride salt and cooled by molten salts of lithium and beryllium. It operated from 1965 to 1969. After being shut down, the reactor was mothballed. The fuel was solidified in tanks for long-term storage, and surveillance and maintenance programs were initiated.

In subsequent years, a number of potential problems were found in the facility. Samples of off-gas revealed that fluorine and uranium hexafluoride gas were being emitted, leading to the discovery of a 7-lb deposit of uranium in a charcoal-bed off-gas filter. Because the charcoal bed was within a water-filled chamber, it raised a concern that a nuclear criticality was possible. In addition, the fluorine had reacted with the charcoal to form chemically unstable compounds. These discoveries led to the initiation of remedial actions, which began in 1994, to reduce or eliminate three potential risks: a nuclear criticality accident, an explosive release of radioactive material, and a release of reactive and/or radioactive gases.

Removal of reactive uranium hexafluoride gas began in 1996 and was completed in 1999, resulting in the removal of approximately 22.6 kg of uranium.

In 1996, an AM for removal of uranium deposits from the charcoal bed was issued. A RAWP was approved in 1999, but examination of the charcoal revealed that it is nongranular rather than granular, as had been assumed. Consequently, a revised approach and RAWP were submitted to the regulators and were approved in 2000. Installation of equipment began in 2000.

A ROD for removal of fuel and flush salts was signed in 1998. The remedial design report/RAWP was approved by the regulators in 1999. Engineering design was completed and equipment purchase began in 2000.

3.8.2.2 Metal Recovery Facility

The Metal Recovery Facility (MRF) is a one-story, metal-sided building that was used as a pilot and small-scale nuclear fuel reprocessing plant between 1952 and 1960. Associated with the MRF are an exterior concrete canal, a small storage facility, and, interior to the facility, a dissolver pit and seven hot cells. The MRF was used primarily to recover fuel and other nuclear materials. The fuel reprocessing occurred in the hot cells; fission products were also separated out. The scope of this project is to remove the surface structure of the facility to the finished floor elevation. The walls of the dissolver pit, small storage building, and canal will also be removed to the finished floor elevation of the facility. The dissolver pit will be drained and decontaminated. The remaining subsurface structures of the canal and dissolver pit will be filled with a low-strength cement and gravel mixture. The waste generated by this project will be disposed at an approved facility.

The RAWP for this project was approved, and facility decontamination and dismantlement began in 2000.

3.8.2.3 Old Hydrofracture Facility

The OHF is described in Sect. 3.8.1.1. This CERCLA RA, which is part of the Melton Valley ROD, addresses the D&D of the OHF structures and equipment, which must be completed before installation of a cap on SWSA 5. Inactive buildings, surplus aboveground structures, and equipment items at the OHF site will be removed to ground level. Subsurface structures will be filled with concrete or other inert and stable material. Structures and equipment to be addressed include the OHF Building, pumphouse and valve pits, the above-grade portion of Waste Pit T-4, abandoned tank remediation equipment and miscellaneous debris.

The RAWP for this project was submitted to the regulators in August 2000. Approval of this document and initiation of field activities will occur in 2001.

3.8.2.4 SWSA 4 Small Facilities

Prior to installation of the SWSA 4 cap, described in Sect. 3.8.1.1, existing facilities and equipment within the cap footprint must be demolished to slab. The facilities and equipment to be demolished as part of this project include the Alpha Greenhouse Facility, Decontamination Facility, Pilot Pits Building, Solid Waste Leaching Lysimeters, and five shielded transfer tanks adjacent to the Decontamination Facility.

The RAWP for this project was submitted to the regulators in August 2000. Approval of this document and initiation of field activities will occur in 2001.

3.8.2.5 Hydrofracture Wells Plugging and Abandonment

Between the 1960s and mid-1980s, the process of deep injection of waste was used at ORNL to dispose of radioactive liquids and sludges in mixtures of waste with portland-cement-based grout and various additives. Two experimental injection wells, called New Hydrofracture Facility (NHF), were constructed, along with boreholes and wells, to observe the behavior of the injected grout in the bedrock. Small quantities of radionuclides were added to the injected grout to make the grout sheet detectable with instrumentation. The third and fourth injection wells, called OHF (see Sect. 3.8.2.3), and NHF, along with numerous observation and monitoring wells and boreholes, were constructed for large-scale radioactive waste disposal. The waste disposals were generally at depths greater than 780 ft. The injection and monitoring wells and boreholes provided potential pathways for migration of radionuclide contamination. To prevent this migration, the four injection wells and about 100 associated monitoring wells and boreholes will be plugged and abandoned, as specified in the Melton Valley ROD.

The RAWP for this project was submitted to the regulators in September 2000. Approval of this document and initiation of field activities is expected to occur in 2001.

3.8.2.6 Cooling Towers Maintenance Action

Five cooling-tower structures at ORNL were dismantled in 2000 as a maintenance action. The deteriorated condition of these towers posed a safety risk to the ORNL workforce and ongoing operations. The remaining basins were cleaned and covered. This action is compatible with the remedies proposed in the Bethel Valley ROD.

3.8.2.7 Spent Nuclear Fuel Program

The purpose of the Spent Nuclear Fuel Program is to place spent nuclear fuel (SNF) at ORNL in a safe and stable condition as quickly as possible. SNF at ORNL is being retrieved from underground storage wells, repackaged, certified, and placed in interim storage until it can be shipped to the Idaho National Engineering and Environmental Laboratory (INEEL). This work began in 1996 and continued through 2000.

3.9 TECHNOLOGY DEVELOPMENT

3.9.1 ORNL Technology Deployments, Demonstrations, and Treatability Evaluations

3.9.1.1 Modular Evaporator and Ion Exchange Systems for Waste Reduction in Tanks and Waste Tanks Pretreatment

State-of-the-art evaporators remove excess water from liquid waste before solidification by processing sluice water generated during the retrieval of sludges and/or treatment of secondary wastes generated during treatment operations. Removal of cesium and strontium is being implemented to minimize the volume of high-activity waste, thus reducing costs for construction and operation waste treatment facilities, waste form transportation, and disposal. A solid/liquid separation system is used to manage the excess liquids generated during sluicing of sludges between tank farms and/or to maintain desired feed composition for subsequent treatment operations. Technologies deployed for processing wastes from the MVST tanks W-29 and W-30 include a single-stage, subatmospheric evaporator, a highly selective crystalline silicotitanate ion-exchange system, and a cross-flow filtration system.

3.9.2 ETTP Technology Demonstrations and Treatability Evaluations

3.9.2.1 Toxic Substances Control Act Incinerator Test Bed for Continuous Emissions Monitors

A national test bed has been established at the TSCAI in Oak Ridge to evaluate promising continuous emissions-monitoring technologies. The TSCAI—a continuously operated, full-scale, mixed-waste treatment facility—is being used to conduct field tests of emerging continuous emissions-monitors in a real-world operating environment. This test bed facilitates passing continuous emissions monitoring technology from the engineering development phase to the demonstration phase. Testing of continuous emissions monitors is also enhancing public and regulatory acceptance of thermal treatment technologies for treatment of DOE mixed wastes. Accomplishments in 2000 included awarding a contract for the trial burn and completing a pre-trial burn. The trial burn, a rigorous test to make sure the TSCAI is meeting its permit requirements, is scheduled for April 2001.

3.9.3 Y-12 Site Technology Deployments, Demonstrations, and Treatability Evaluations

In October 2000, a CERCLA treatability study was initiated to evaluate in situ stabilization of a mercury-contaminated source area (Building 81-10 area) to limit releases of mercury to UEFPC.

This innovative approach is potentially an order of magnitude less expensive than the baseline cost of excavation, treatment, and disposal. This study will be followed by a CERCLA-focused feasibility study and amendment of the UEFPC Phase 1 ROD so that the action can be performed as planned within the Y-12 Lifecycle baseline. DOE and regulators could not agree on the action due to data limitations and decided to eliminate it from the ROD; this approach allows a remedial decision per the baseline.

In October 2000, a CERCLA treatability study was initiated to evaluate alternative treatments for characteristic RCRA mercury-contaminated soils at Y-12. The current life-cycle baseline estimates that up to 50,000 yd^3 of contaminated soils will require thermal treatment costing more than $50 M to meet EMWMF waste-acceptance criteria (WAC). The treatability study is evaluating alternatives to thermal treatment with the potential to lower costs by an order of magnitude. Results from the study will be evaluated in a focused feasibility study, and the UEFPC Phase 1 ROD will be amended. Results will also be used in other RODs and evaluation of centralized treatment facilities for the EMWMF.

3.9.3.1 Reactive Barriers Performance Monitoring and Verification

Technologies are needed to evaluate and maximize the effectiveness of permeable reactive barriers. The colloidal borescope is an instrument capable of directly observing the movement of colloidal-size particles within boreholes to quantify groundwater flow rate and direction. The instrument was used at the two reactive barriers installed at the Y-12 BCV S-3 Pond area to monitor the performance of the treatment system.

3.10 POLLUTION PREVENTION

During FY 2000, Oak Ridge Operations (ORO) continued to implement a substantial number of pollution prevention projects. Specifically, ORO reported to DOE a total of 92 projects (excluding wastewater and ongoing source reduction and segregation projects) during FY 2000. These 92 projects reduced approximately 50,600 m^3 of waste and saved or avoided spending approximately $49.1 million.

The ORO and ORR Sites' Pollution Prevention Programs are regulatorily driven by federal and state laws and regulations, executive orders (EOs), and DOE policies, notices, and orders. During FY 2000, additional drivers were established. In November 1999, DOE issued a memorandum that established DOE's current pollution prevention and energy efficiency goals, the majority of which are to be met by the end of FY 2005. These goals are also designed to address the goal requirements of the April 2000 EO 13148, *Greening the Government Through Leadership in Environmental Management*. EO 13148 is designed to demonstrate environmental leadership and specifically references pollution prevention as an avenue to be pursued and lists pollution prevention requirements and reduction goals. DOE N 450.4 flows down the requirements of this EO to each of the ORR sites. The *Annual Report on Waste Generation and Pollution Prevention Progress as Required by DOE Order 5400.1*, the annual affirmative procurement report, and pollution prevention project reporting completed by each site are designed to provide data used to measure progress toward DOE's goals. Each site's data are included in DOE's annual report. Elements of DOE's annual report are extracted and included in the Natural Resources Defense Council, Inc., (NRDC) Internet database, as required by the December 1998 settlement agreement between DOE and NRDC.

To support future pollution prevention implementation and goal achievement, the ORR sites' Pollution Prevention Programs continue to pursue site projects where possible and complete required reporting. To support the achievement of these goals, each site also responded to DOE's November 2000 memorandum that requested goal-specific funding needs information.

3.11 EM-SUPPORTED ENVIRONMENTAL MONITORING ON THE ORR

The Water Resources Restoration Program (WRRP) was established by the EM to implement a comprehensive and integrated environmental-

monitoring and assessment program for the ORR and to minimize duplication of field, analytical, and reporting efforts. The WRRP and associated site-specific water quality programs are successors to the Integrated Water Quality Program that was established in 1996. The DOE is under a regulatory requirement from the FFA to conduct postremedial action monitoring. The FFA requires the evaluation and annual reporting on the effectiveness of completed remedial actions. Specific monitoring requirements are typically included in documents supporting CERCLA RODs, AMs, or remediation/removal action reports. Additional monitoring includes baseline water quality, pre-ROD monitoring to support watershed management decisions.

There are water quality projects (WQPs) for each of the three sites on the ORR: the XWQP is responsible for monitoring activities within the BV and MV administrative watersheds at ORNL, the EWQP is responsible for monitoring at ETTP, and the YWQP is responsible for monitoring within the BCV and UEFPC administrative watersheds at Y-12 and at selected non-ORR localities. The WRRP provides a central administrative and reporting function that integrates and coordinates the activities of the watershed-specific projects. The WRRP also provides coordination and integration among the respective WQPs for the development and implementation of long-term monitoring strategies and plans to support future groundwater remediation decisions.

The annual *Remedial Effectiveness Report* (RER) (BJC 2000a), an FFA primary document, provides analytical results and evaluations of performance assessment monitoring, as required by CERCLA decision documents and/or the project-specific RA work plans or RA reports. The RER will provide any recommendations for changes to the facility WQP monitoring plan for the subsequent year. Additionally, the RER includes a summary of stewardship activities for completed CERCLA RAs that, together with the performance assessment monitoring data, support the completion of a CERCLA 5-year review. A CERCLA 5-year review will be performed as part of the RER starting with FY 2001, and subsequent RERs will contain all required information to support future reviews.

3.12 SITE-SPECIFIC ADVISORY BOARD

The Oak Ridge Site-Specific Advisory Board (SSAB) is a volunteer citizens' panel that provides advice and recommendations to the EM Program. The group was chartered under the Federal Advisory Committee Act in 1995. The SSAB is composed of up to 20 voting members, chosen through an independent screening process to reflect the diversity of gender, race, occupation, and interests of persons living near the ORR. Board membership also includes two nonvoting student representatives selected from local high schools.

The SSAB is a primary source of stakeholder input to DOE on EM matters and also functions as a major communication link between DOE and the public. In 2000, the SSAB continued to advise DOE on EM issues, such as long-term stewardship, environmental restoration, and waste management. Throughout 2000, the SSAB held regular meetings of the Board and its committees, all of which were open to the public. SSAB information, including meeting schedules and minutes, membership, publications, and full-text recommendations, are available on the Web at www.oakridge.doe.gov/em/ssab. Major highlights and accomplishments are also available to the public in the *Oak Ridge Site Specific Advisory Board FY 2000 Annual Report*, which was published in October 2000. The various SSAB committees are described along with their primary missions. Abridged text of each recommendation submitted to DOE is given along with DOE's response and relevant background information.