# 2. Environmental Compliance

It is DOE-ORO and NNSA policy to conduct operations in compliance with federal, state, and local environmental protection laws, regulations, compliance agreements and decrees, settlement agreements, executive orders, DOE orders (as incorporated into the operating contracts), and best management practices. DOE and its contractors make every effort to conduct operations in compliance with the letter and intent of applicable environmental statutes. The protection of the public, personnel, and the environment is of paramount importance.

Except for the few instances of noncompliance discussed in this chapter, all ORR sites were in compliance with applicable environmental regulations in 2006. Each site achieved a National Pollutant Discharge Elimination System permit compliance rate greater than 99.9% in 2006.

In 2006, all three ORR facilities operated in compliance with the regulatory dose limits of Tennessee Rule 1200-3-11-.08 (Emission Standards for Hazardous Air Pollutants for Radionuclides) and met its emission and test procedures.

No releases of reportable quantities of hazardous chemicals or asbestos were reported under the Comprehensive Environmental Response, Compensation, and Liability Act by any of the sites.

Several private businesses operate under leasing arrangements at the ETTP under the DOE Reindustrialization Program. Lessees are accountable for complying with all applicable standards and regulations and for obtaining permits and licenses with local, state, and federal agencies as appropriate. Unless specified, lessee operations are not discussed in this report.

## 2.1 Introduction

DOE's operations on the reservation are required to be in conformance with environmental standards established by a number of federal and state statutes and regulations, executive orders, DOE orders, contract-based standards, and compliance and settlement agreements. However, numerous facilities at the ETTP site have been leased to private entities over the past several years through the DOE Reindustrialization Program. Their level of compliance is not addressed in this report.

Principal among the regulating agencies are the Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC). These agencies issue permits, review compliance reports, participate in joint monitoring programs, inspect facilities and operations, and oversee compliance with applicable regulations.

When environmental issues are identified during routine operations or during ongoing self-assessments of compliance status, the issues are typically discussed with the regulatory agencies. In the following sections, major environmental statutes are summarized for the ORR sites. More detailed information can be found in the appendixes. See Appendix D for reference standards data for water, Appendix E for National Pollutant Discharge Elimination (NPDES) noncompliances, and Appendix F for a listing of permits.

## 2.2 Compliance Activities

### 2.2.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) was passed in 1976 to address management of the country's huge volume of solid waste. The law requires that EPA regulate the management of hazardous waste, which includes waste solvents, waste chemicals, and many other substances deemed potentially harmful to human health and to the environment. RCRA also regulates underground storage tanks (USTs) used to store petroleum and hazardous substances; recyclable used oil; and universal waste such as batteries, mercury-containing equipment, pesticides, and fluorescent lamps.

Subtitle C of RCRA controls all aspects of the management of hazardous waste, from the point of generation to its ultimate disposal. Hazardous waste generators must follow specific requirements for handling these wastes. In addition, owners and operators of hazardous waste treatment, storage, and disposal facilities

are required to obtain a permit that includes a plan for long-term, postclosure care of the facility.

The Y-12 Complex, ORNL, and ETTP are considered RCRA large-quantity generators of hazardous waste because each facility individually generates more than 1,000 kg of hazardous waste per month. This number includes the amount of hazardous waste that is managed under permitted activities. Each site is also regulated as a handler of universal waste (e.g., fluorescent lamps, batteries, and other items regulated under *Code of Federal Regulations* (CFR) Title 40, Sect. 273; however, the types of universal wastes managed as such at each site may vary. Some of the hazardous waste contains or is contaminated with radionuclides (this is referred to as "mixed waste"). The hazardous and/or mixed wastes are accumulated at various locations within each site or project location and are eventually transported to a permitted treatment, storage, or disposal facility. A significant quantity is shipped directly off site for treatment, storage, disposal or recycle. At the end of 2006, the Y-12 Complex had 102 generator accumulation areas for hazardous or mixed waste, ORNL had 339 generator accumulation areas, and ETTP maintained 11.

The Union Valley Facility is considered a small-quantity generator of hazardous waste (< 1,000 kg/month). At the end of 2006, it was managing a total of eight accumulation areas.

ORISE, the Central Training Facility on Bear Creek Road, the Office of Secure Transportation Vehicle Maintenance Facility, the ORNL 0800 Area, the National Transportation Research Center (NTRC), and the Freel's Bend area are all classified as conditionally exempt small-quantity generators for calendar year (CY) 2006, meaning that they generate less than 100 kg of hazardous waste per month.

The Y-12 Complex is registered as a large-quantity generator under EPA identification (ID) Number TN3890090001 and is permitted to perform hazardous waste treatment and storage. During 2006, nine units operated as permitted units. The RCRA units at the Y-12 Complex operate under two permits: TNHW-122 and TNHW-127. The permits are modified whenever necessary.

ORNL is registered as a large-quantity generator under EPA ID Number TN1890090003 and is permitted to perform hazardous waste treatment and storage. During 2006, 26 units operated as interim-status or permitted units; another 4 units were proposed (new construction). Five of the interim status units completed the steps for RCRA closure by the end of the calendar year (Table 2.1).

ORNL's RCRA units operate under three permits: TNHW-097, TNHW-010A, and TNHW-121 (formerly TNHW-010). TNHW-121 is the existing RCRA Hazardous and Solid Waste Amendments permit for the ORR (see Table 2.2). The permits are modified when necessary. The process for adding the Foster-Wheeler TRU facility to the TNHW-097 permit that was started at the end of CY 2005 continued in CY 2006. This included both a Part A permit modification and a Part B Permit (TNHW-097) modification. Those Foster-Wheeler units operated under an interim approval during 2006. The renewal application for the TNHW-010A permit submitted in late 2004 is still pending.

In late 2005, ORNL requested permit-by-rule status for extended storage of recyclable lead. In late 2006, TDEC determined that the ORNL lead waste operations are not subject to permitting under TN Rule 1200-1-7-.02.

At ETTP, the RCRA closure of K-1025C was completed in CY 2004, while K-1036A and K-711 were closed in CY 2005. The remaining

**Table 2.1 Closed RCRA[a] units for ORR, CY 2006**

| Site | Unit | Permit No. | Certified Closed Date |
|---|---|---|---|
| ORNL | SWSA-6 (includes Hillcut Test Facility and Former Chemical Detonation Facility) | NA | November 6, 2006 |
| ORNL | Chemical Detonation Facility | NA | November 15, 2006 |
| ORNL | Trench 27 | NA | November 6, 2006 |
| Y-12 | East Chestnut Ridge Waste Pile | NA | January 5, 2006 |

[a]Resource Conservation and Recovery Act.

**Table 2.2. RCRA[a] operating permits, 2006**

| Permit number | Building/description |
|---|---|
| | **Y-12 Complex** |
| TNHW-122 | Building 9720-9 Container Storage Unit |
| | Building 9720-25 Container Storage Unit |
| | Building 9720-31 Container Storage Unit |
| TNHW-127 | Building 9206 |
| | Building 9212 |
| | Building 9720-12 |
| | Organic Handling Unit |
| | Building 9812 Container Storage Area |
| | Building 9811-9 Container Storage Area |
| | **ORNL** |
| TNHW-10A | Building 7507W Container Storage Unit |
| | Building 7651 Container Storage Unit |
| | Building 7652 Container Storage Unit |
| | Building 7653 Container Storage Unit |
| | Building 7654 Container Storage Unit |
| | Building 7669 Container Storage Unit |
| | Portable Buildings 1 & 2 Container Storage Unit |
| TNHW-097 | Building 7572 Container Storage Unit |
| | Building 7574 Container Storage Unit |
| | Building 7576 Container Storage Unit |
| | Building 7577 Container Storage Unit |
| | Building 7580 Container Storage Unit |
| | Building 7823 Container Storage Unit |
| | Building 7824 Container Storage Unit |
| | Building 7842 Container Storage Unit |
| | Building 7855 Container Storage Unit |
| | Building 7878 Container Storage Unit |
| | Building 7879 Container Storage Unit |
| | Building 7883 Container Storage Unit |
| | Building 7884 Container Storage Unit |
| | Building 7880 Waste Processing Facility 2 |
| | Building 7880 Waste Processing Facility 4 |
| | Building CHSA Waste Processing Facility 1 |
| | Building DAC Waste Processing Facility 3 |
| | Building CSA Waste Processing Facility 5 |
| | **ORR** |
| TNHW-121 | Hazardous Waste Corrective Action Permit |

**Table 2.2 (continued)**

| Permit number | Building/description |
|---|---|
| | **ETTP** |
| TNHW-015 | K-1435 Toxic Substances Control Act Incinerator |
| TNHW-015A | K-1425 and K-1435 Container and Tank Storage Units |
| TNHW-117 | Building K-25 Vault K-309-2A |
| | Building K-1065-A Container Storage Unit |
| | Building K-1065-B Container Storage Unit |
| | Building K-1065-C Container Storage Unit |
| | Building K-1065-D Container Storage Unit |
| | Building K-1065-E Container Storage Unit |
| | Building K-1065-F Container Storage Unit |
| | Building K-1065-G Container Storage Unit |
| | Building K-1065-H Container Storage Unit |
| | Building K-1423 Container Storage Unit |
| | Building K-1423 Repackaging Area |
| | Portable Buildings 1 & 2 Container Storage Units |

[a]Resource Conservation and Recovery Act

RCRA-permitted units at the ETTP Site include K-1065 A through H, K-1423, vault K-309-2A (located in the K-25 Building), and K-1425/K-1435 TSCA Incinerator units. All other cleanup actions at ETTP are being conducted under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

ETTP is registered as a large-quantity generator under EPA ID Number TN0890090004 and is permitted to perform hazardous waste treatment and storage. ETTP has received three RCRA permits (see Table 2.2). The K-1435 TSCA Incinerator is a hazardous waste treatment unit operating under a RCRA permit (TNHW-015) issued by TDEC on September 28, 1987. A revised RCRA permit based on trial-burn results was received in December 1995. A reapplication of the permit was submitted to TDEC in March 1997. A trial burn was conducted in 2001, and the results were submitted to TDEC. A second permit (TNHW-015A) is for storage of waste at the incinerator. Permit TNHW-117 (formerly TNHW-056) covers container storage at various locations throughout the plant. Permit TNHW-117 was issued September 30, 2004. The historical USTs will be addressed through the CERCLA process.

#### 2.2.1.1 RCRA Assessments, Closures, and Corrective Measures

The Hazardous and Solid Waste Amendments to RCRA, passed in 1984, require any facility seeking a RCRA permit to identify, investigate, and (if necessary) clean up all former and current solid waste management units (SWMUs). The Hazardous and Solid Waste Amendments permit requires DOE to address past, present, and future releases of hazardous constituents to the environment. The Hazardous and Solid Waste Amendments permit requirement for corrective action has been integrated into the ORR Federal Facility Agreement (see Sect. 2.2.2 for details). The current Hazardous Waste Corrective Action permit (TNHW-121) was issued in September 2004.

The renewed permit addresses contaminant releases from SWMUs and from RCRA areas of concern, but also integrates RCRA requirements with cleanups conducted under the Federal Facility Agreement and CERCLA programs (see Sect. 2.2.3).

"Areas of concern" are areas contaminated by a release of hazardous constituents that originated from something other than an SWMU. Under the new Hazardous and Solid Waste Amendments permit, DOE must notify TDEC within 30 days of identification of a new SWMU or new potential areas of concern. DOE has provided to EPA the *2006 Annual Update of the*

*Solid Waste Management Units and Area of Concern for the Oak Ridge Reservation* (DOE 2005a) (see Table 2.3).

Since the mid-1980s, 45 RCRA units at ETTP have been closed. The RCRA closure of

**Table 2.3. Summary of 2006 annual update of ORR solid waste management units**

| Revision[a] | Number of sites/revisions |
|---|---|
| Addition of solid waste management units (SWMUs) or area of concern (AOC) to A-2 list | 2 |
| Revision made to SWMU/AOC Names, Notes, and Operation end dates on A-1 list | 5 |
| Revision made to SWMU/AOC Names, Notes, and Operation end dates on A-2 list | 8 |
| Additions to Table A-1 | 2 |
| Deleted from Table A-2 | 2 |
| Moved from Table A-1 to A-2 | 46 |

[a]Department of Energy. 2005a. *Annual Update of the Solid Waste Management Units and Areas of Concern for the Oak Ridge Reservation*. Submitted to the Environmental Protection Agency.

At the Y-12 Complex, 37 RCRA units have been closed since the mid-1980s. TDEC accepted the certification of final closure to the East Chestnut Ridge Waste Pile on January 5, 2006. See Table 2.1 for RCRA units closed in 2006.

Since the mid-1980s, ORNL has closed a total of 21 hazardous waste management units. ORNL's solid waste storage area (SWSA) 6 was an interim-status disposal site (landfill) that underwent partial closure beginning in late 1988; the final steps for RCRA closure were completed in 2006. Although a revised closure plan for SWSA 6 (which included the eight interim-measure caps, the Hillcut Test Facility, and the Former Explosives Detonation Trench) was submitted in July 1995, actual final remediation of SWSA 6 was deferred to CERCLA. The Melton Valley Record of Decision, which includes the selected remedy under CERCLA for SWSA 6, was signed in September 2000. The Interim Record of Decision for ORNL's Bethel Valley was issued in May 2002; its goal is to maintain the ORNL main plant as a controlled industrial-use facility. A postclosure permit application for SWSA 6 was submitted to TDEC in September 2002; issuance of the postclosure permit is pending. Phased construction completion reports were submitted to TDEC in 2006 for both SWSA 6 and Trench 27 (in SWSA 5). The RCRA closure of the Chemical Detonation Facility was also completed in 2006.

K-1025C was completed in CY 2004, while K-1036A and K-711 were closed in CY 2005. The remaining RCRA-permitted units at the ETTP Site include K-1065 A through H, K-1423, vault K-309-2A (located in the K-25 Building), and K-1425/K-1435 TSCA Incinerator units. All other cleanup actions at ETTP are being conducted under CERCLA.

RCRA inspections conducted by TDEC at the facilities resulted in four notices of violations (NOVs) issued in 2006, one each at the Y-12 Complex, ORNL, NTRC, and ETTP. Details of the violations are presented in Sect. 2.5.

### 2.2.1.2 RCRA Subtitle D Solid Waste

Located within the boundary of the Y-12 Complex are two Class II operating industrial solid waste disposal landfills and one operating Class IV construction demolition landfill. These facilities are permitted by TDEC and accept solid waste from DOE operations on the ORR. A second Class IV construction demolition landfill (Landfill VI) has been certified closed, and the permit terminated March 15, 2007. In addition, one Class IV facility (Spoil Area 1) is overfilled by 11,700 $yd^3$ and has been the subject of a CERCLA remedial investigation/feasibility study. A CERCLA record of decision for Spoil Area 1 was signed in 1997. One Class II facility (Landfill II) has been closed and is subject to postclosure care and maintenance. Associated

TDEC permit numbers are noted in Appendix F, Table F.1.

### 2.2.1.3 RCRA Underground Storage Tanks

The USTs containing petroleum and hazardous substances are regulated under Subtitle I of RCRA (40 CFR 280). TDEC has been granted authority by EPA to regulate USTs containing petroleum under TDEC Rule 1200-1-15; however, hazardous-substance USTs are still regulated by EPA. Table 2.4 summarizes the status of USTs on the ORR.

ORNL has responsibility for 54 USTs registered with TDEC under Facility ID Number 0-730089. These 54 USTs can be classified as follows:

- 49 USTs closed to meet the RCRA Subtitle I requirements;
- 3 USTs in service that meet the 1998 standards for new UST installations; and
- 2 USTs still in service that are deferred or exempt from Subtitle I because they are regulated by other statutes (one UST under the RCRA Subtitle C and one UST under the Clean Water Act [CWA]).

Of the 49 closed USTs, 24 were replaced by double-walled, concrete-encased aboveground storage tanks; 3 were replaced by the new, state-of-the-art USTs; and 22 were not replaced because they were no longer needed. Closure approval letters have been received for all USTs closed between 1988 and 1998.

The Y-12 UST Program includes four active petroleum USTs that meet all current regulatory compliance requirements. Two of these are located at the Office of Secure Transportation Vehicle Maintenance Facility. The UST registration certificates for these tanks are current, and certificates are posted at the UST locations, enabling fuel delivery until March 31, 2007.

All legacy petroleum UST sites at the Y-12 Complex have either been granted final closure by TDEC or have been deferred to the CERCLA process for further investigation and remediation.

The ETTP UST Program includes two active petroleum USTs that meet all current regulatory compliance requirements. The UST registration certificates are updated annually and are conspicuously posted in accordance with TDEC

**Table 2.4. ORR underground storage tank (UST) status, 2006**

| | Y-12 Complex | ORNL | ETTP |
|---|---|---|---|
| Active/in-service | 4[a] | 3 | 2 |
| Closed, deferred or excluded | 43[b] | 51[c] | 14 |
| Hazardous substance | 0 | 0[d] | 6[e] |
| Known or suspected sites | 0 | 0 | 16 |
| Total | 47 | 54 | 38 |

[a]Two are located off the Y-12 Complex at the Office of Secure Transportation Vehicle Maintenance Facility.

[b]Includes two USTs that are deferred because they are regulated by the Atomic Energy Act of 1954, and one that is a permanently closed methanol UST.

[c]The 51 "closed" USTs include deferred or excluded tanks of various categories, as detailed in the text.

[d]Closed tanks include two hazardous substance tanks, both of which were excavated, removed, and dismantled.

[e]Four USTs were permanently closed that had been used to store natural gas odorant and that are regulated under the Pipeline Safety Act. A fifth UST, designed as a spill-overflow tank, has never permanently been placed into service. A sixth UST, which stored a methanol-gasoline mixture, was permanently closed.

rules. Fourteen other petroleum USTs have been removed or closed in place with TDEC regulators' recommendation of "case closed" status. During the construction of the haul road, a previously undocumented UST was discovered near Portal 5. The tank was removed and closed out.

Five hazardous substance USTs at ETTP have been removed since 1996. One other hazardous substance UST, designed as a spill overflow tank, is present at ETTP but has never been activated.

Sixteen known and/or suspected historical USTs that were out of service before January 1, 1974, are also included in the ETTP UST Program as a best management practice. These historical UST sites could be subject to closure requirements if directed by UST regulators. Magnetic and electromagnetic geophysical techniques are being used for detection and characterization of these historical UST sites and other underground structures to provide property database information for reindustrialization of ETTP.

### 2.2.2 CERCLA

CERCLA, also known as Superfund, was passed in 1980 and was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). Under CERCLA, a site is investigated and remediated if it poses significant risk to health or the environment. The EPA National Priorities List is a comprehensive list of sites and facilities that have been found to pose a sufficient threat to human health and/or the environment to warrant cleanup under CERCLA. The ORR was placed on the National Priorities List on November 21, 1989, ensuring that the environmental impacts associated with past activities at the ORR are thoroughly investigated and that appropriate remedial actions or interim measures are taken as necessary to protect human health and the environment. An interagency agreement under Sect. 120(c) of CERCLA, known as the ORR Federal Facility Agreement, was effective in 1992 among EPA, TDEC, and DOE. The agreement establishes the procedural framework and schedule for developing, implementing, and monitoring remedial actions on the ORR in accordance with CERCLA. Appendix C of the Federal Facility Agreement lists all of the sites/areas that will be investigated, and possibly remediated, under CERCLA. Milestones for submittal of CERCLA documents are available in Appendix E of the agreement.

The progress toward achieving these goals is described in the *2006 Remediation Effectiveness Report for the U.S. Department of Energy Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE 2007a). This report describes the individual remedial actions and provides an overview of some of the monitoring conducted to evaluate the efficacy of those actions.

Staff from NNSA and BWXT Y-12 have provided periodic updates of proposed construction and demolition activities at the Y-12 Complex (including alternative financing projects) to managers and project personnel from the TDEC DOE Oversight Division, EPA Region 4, and DOE-ORO. A CERCLA screening process is used to identify proposed construction and demolition projects that warrant CERCLA oversight. The goal is to ensure that modernization efforts do not impact the effectiveness of previously completed CERCLA environmental remedial actions and that they do not adversely impact future CERCLA environmental remedial actions. A similar CERCLA screening process is being utilized by ORNL (UT-Battelle, LLC) for its revitalization/modernization efforts.

### 2.2.3 RCRA-CERCLA Coordination

The CERCLA response action and RCRA corrective action processes are similar and include four steps with similar purposes (Table 2.5). The ORR Federal Facility Agreement is intended to coordinate the corrective action processes of RCRA required under the Hazardous and Solid Waste Amendments permit with CERCLA response actions.

As a further example, three RCRA postclosure permits, one for each of the three hydrogeologic regimes at Y-12, have been issued to address the eight major closed waste disposal areas at Y-12. Because it falls under the jurisdiction of two postclosure permits, the S-3 Pond Site is described as having two parts (eastern and former S-3) (see Table 2.6). Postclosure care and monitoring of East Chestnut Ridge Waste Pile was incorporated into permit TNHW-088 in 2006. Groundwater corrective actions required under the postclosure permits have been deferred to CERCLA. RCRA groundwater

**Table 2.5. RCRA corrective action processes and CERCLA response actions[a]**

| RCRA | CERCLA | Purpose |
|---|---|---|
| RCRA facility assessment | Preliminary assessment/site investigation | Identify releases needing further investigation |
| RCRA facility investigation | Remedial investigation | Characterize nature, extent, and rate of contaminant releases |
| Corrective measures study | Feasibility study | Evaluate and select remedy |
| Corrective measures implementation | Remedial design/remedial action | Design and implement chosen remedy |

[a]Abbreviations
RCRA Resource Conservation and Recovery Act
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

monitoring data will be reported yearly to TDEC and EPA in the Annual CERCLA *Remediation Effectiveness Report* for the ORR.

### 2.2.4 Federal Facility Compliance Act

The Federal Facility Compliance Act was passed by Congress to bring federal facilities (including those under DOE) into full compliance with RCRA. The Federal Facility Compliance Act waives the government's sovereign immunity and allows fines and penalties to be imposed for RCRA violations at DOE facilities. In addition, the act requires that DOE facilities provide comprehensive data to EPA and state regulatory agencies on mixed waste inventories, treatment capacities, and development of site treatment plans. It ensures that the public will be informed of waste treatment options and encourages active public participation in the decisions affecting federal facilities. TDEC is the authorized regulatory agency under the act for the DOE facilities in the state of Tennessee.

The ORR Site Treatment Plan calls for mixed waste on the ORR to be treated by a combination of commercial treatment capabilities and existing and modified on-site treatment facilities. Mixed TRU waste streams on the ORR, composed of both contact- and remote-handled wastes, will be treated in the Transuranic Waste Processing Facility as necessary to meet the waste acceptance criteria for disposal at the WIPP.

The ORR Site Treatment Plan provides overall schedules, milestones, and target dates for achieving compliance with land disposal restrictions, a general framework for the establishment and review of milestones, and other provisions for implementing the plan that are enforceable under an order from the TDEC commissioner. Semiannual progress reports document the quantity of land-disposal-restricted mixed waste in storage at the end of the previous 6-month period and the estimated quantity to be placed in storage for the next 5 fiscal years. The annual update of the ORR Site Treatment Plan has been issued for CY 2006.

The Site Treatment Plan will terminate in accordance with Sect. 2.7.2 of the Federal Facility Compliance Act, when there is no longer any land-disposal-restriction mixed waste, regardless of when generated, being stored on the ORR; to do so in the absence of a site treatment plan would be in violation of RCRA Section 3004(j).

### 2.2.5 National Environmental Policy Act

The National Environmental Policy Act (NEPA) provides a means to evaluate the potential environmental impact of proposed federal activities and to examine alternatives to those actions. The NEPA review process results in the preparation of NEPA documents in which federal, state, and local environmental regulations and DOE orders applicable to the environmental resource areas must be considered. These environmental resource areas include air, surface water, groundwater, terrestrial, and aquatic ecology; threatened and/or endangered species; land use; and environmentally sensitive areas.

**Table 2.6. RCRA postclosure status for former treatment, storage, and disposal units on the ORR[a, b]**

| Unit | Major components of closure | Major postclosure requirements |
|---|---|---|
| **Upper East Fork Poplar Creek Hydrogeologic Regime (RCRA Postclosure Permit No. TNHW-113)** | | |
| New Hope Pond | Engineered cap, Upper East Fork Poplar Creek distribution channel | Cap inspection and maintenance. No current groundwater monitoring requirements in lieu of ongoing CERCLA actions in the eastern portion of Y-12 |
| Eastern S-3 Ponds Groundwater Plume | None for groundwater plume, see former S-3 Ponds (S-3 Site) for source area closure | Postclosure corrective action monitoring. Inspection and maintenance of monitoring network |
| **Chestnut Ridge Hydrogeologic Regime (RCRA Postclosure Permit No. TNHW-088)** | | |
| Chestnut Ridge Security Pits | Engineered cap | Cap inspection and maintenance. Postclosure corrective action monitoring. Inspection and maintenance of monitoring network and survey benchmarks |
| Kerr Hollow Quarry | Waste removal, access controls | Access controls inspection and maintenance. Postclosure detection monitoring. Inspection and maintenance of monitoring network and survey benchmarks |
| Chestnut Ridge Sediment Disposal Basin | Engineered cap | Cap inspection and maintenance. Postclosure detection monitoring. Inspection and maintenance of monitoring network and survey benchmarks |
| **Bear Creek Hydrogeologic Regime (RCRA Postclosure Permit No. TNHW-116)** | | |
| Former S-3 Ponds (S-3 Site) | Neutralization and stabilization of wastes, engineered cap, asphalt cover | Cap inspection and maintenance. Postclosure corrective action monitoring. Inspection and maintenance of monitoring network and survey benchmarks |
| Oil Landfarm | Engineered cap | Cap inspection and maintenance. Postclosure corrective action monitoring. Inspection and maintenance of monitoring network and survey benchmarks |
| Bear Creek Burial Grounds A, B, and Walk-In Pits | Engineered cap, leachate collection system specific to the burial grounds | Cap inspection and maintenance. Post-closure corrective action monitoring. Inspection and maintenance of monitoring network and survey benchmarks |

[a]There were no closures of treatment, storage, and disposal units at East Tennessee Technology Park during CY 2006.

[b]Abbreviations

RCRA Resource Conservation and Recovery Act
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

Environmentally sensitive areas include floodplains, wetlands, prime farmland, habitats for threatened and/or endangered species, historic properties, and archaeological sites. Each ORR site NEPA program maintains compliance with NEPA through the use of its site-level procedures and program descriptions. These procedures and program descriptions assist in establishing effective and responsive communications with program managers and project engineers to establish NEPA as a key consideration in the formative stages of project planning. Table 2.7 notes the types of NEPA activities conducted at the ORR during 2006.

**Table 2.7. National Environmental Policy Act (NEPA) activities during 2006**

| Types of NEPA documentation | Y-12 Complex | ORNL | ETTP |
|---|---|---|---|
| Categorical exclusions (CX) approved | 15 | 5 | 1 |
| Approved under general actions or generic CX documents | 35[a] | 32[a] | 8 |
| Environmental assessment | 1[b] | 1 | |
| Initiated Site-Wide Environmental Impact Statement (SWEIS) | 1 | | |
| Supplement Analysis[c] | 1 | | |

[a]Projects that were reviewed and documented through the site NEPA compliance coordinator.

[b]Potable water system upgrade.

[c]Supplement to current Y-12 sitewide environmental impact statement for enriched uranium global transportation.

During 2006, ORNL operated under a procedure that provided requirements for project reviews and compliance with NEPA. This procedure called for review of each proposed project, activity, or facility to determine its potential to result in significant impacts to the environment. To streamline the NEPA review and documentation process, DOE-ORO approved "generic" categorical exclusions (CXs) that would cover proposed bench- and pilot-scale research activities and generic CXs that would cover proposed nonresearch activities (i.e., maintenance activities, facilities upgrades, personnel safety enhancements). A CX is one of a category of actions defined in 40 CFR 1508.4 that do not individually or cumulatively have a significant effect on the human environment and for which neither an environmental assessment nor an environmental impact statement is normally required. Table 2.7 provides the number of project-specific CXs that were approved by DOE-ORO during 2006.

UT-Battelle utilizes the Standards-Based Management System (SBMS) as the delivery system to manage and control work at ORNL. This system uses three work-control categories: (1) R&D programs and projects; (2) operations, maintenance and services; and (3) office environment (e.g., management, office support, and clerical activities). NEPA is an integral part of SBMS and often utilizes principal investigators, environmental compliance representatives, and environmental protection officers within each ORNL division to determine the appropriate NEPA decision. The NEPA decision is based on the approved generic CXs for a particular division, a person's NEPA training, and, when necessary, guidance from the ORNL NEPA compliance coordinator. UT Battelle projects involving the assignment of a project engineer from the ORNL Facilities Development Division, projects that are outside the scope of generic CXs, and projects that will adversely impact cultural resources are reviewed and documented by the ORNL NEPA compliance coordinator.

DOE implemented the Facilities Revitalization Project at ORNL, and groundbreaking activities for the various infrastructures (e.g., parking lots, utilities) started in March 2002. The Facilities Revitalization Project is being accomplished through a cooperative effort between DOE, the state of Tennessee, and private

entities. The environmental assessment and finding of no significant impact (FONSI) (DOE 2001b) that were prepared by DOE addressed the Facilities Revitalization Project phased program approach to cover construction and upgrading of facilities according to ORNL's Strategic Facilities Plan into FY 2011.

DOE has completed an environmental assessment (DOE 2006b) that evaluates the impacts of facility modifications and the processing of uranium-233 ($^{233}U$) stored at ORNL and other small quantities of similar material currently stored at other DOE sites. The project objectives are to modify the facility to accommodate the process equipment and operations; process the inventory in order to render it suitable for safe, economical storage; and place the Building 3019 Complex in safe and stable shutdown for decontamination and decommissioning (D&D). Based on the results of the analyses reported in the environmental assessment, DOE has determined that the proposed action is not a major federal action that would significantly affect the quality of the human environment within the meaning of NEPA. Therefore, the preparation of an environmental impact statement is not necessary, and DOE is issuing a FONSI.

In 2006, NEPA reviews at ETTP supported a number of tenant modifications and improvements to leased facilities. There was one site-specific CX prepared in 2006 for ETTP for the installation of a wastewater treatment system at the TSCA Incinerator.

At the Y-12 Complex, 14 job-specific CX documents were prepared and were approved in CY 2006 in support of the Infrastructure Reduction Program. The Infrastructure Reduction effort is focused on preparing the Y-12 Complex for modernization. During FY 2006 it reduced the Y-12 Complex "footprint" by more than 109,000 $ft^2$ through building demolition (19 buildings or structures were demolished). In addition, three general CXs prepared for the NNSA small business program were approved. Other general NEPA CX reviews covered routine actions, such as office renovations, improvements to security systems, equipment replacements, and infrastructure improvements. In CY 2006, 52 NEPA reviews were performed and approved.

The Y-12 NNSA Site Office prepared the final environmental assessment for the potable water system upgrade project to evaluate the repairs and upgrades to the existing system. The FONSI was signed March 29, 2006.

In addition, NNSA is preparing a Site-Wide Environmental Impact Statement (SWEIS) for the Y-12 Complex. The new SWEIS will evaluate new proposals as well as update the analyses presented in the original SWEIS (DOE 2000), issued in November 2001. Three action alternatives are proposed for consideration in the new SWEIS in addition to a "no action alternative." The three alternatives differ in that one includes a new, fully modernized manufacturing facility optimized for safety, security, and efficiency; another consists of upgrading the existing facilities to attain the highest level of safety, security, and efficiency possible without construction of new facilities; and the third consists of operating the current facilities until they are no longer viable and then deactivating those facilities and ceasing the associated operations. The public scoping period began December 15, 2005, and was extended through January 31, 2006, to provide the public with an opportunity to present comments and ask questions.

A supplement analysis to the Y-12 SWEIS was prepared and was approved on August 30, 2006. It presents an assessment of the impacts of transportation of foreign enriched uranium (highly-enriched uranium and low enriched uranium) to the United States. The impact analyses presented in the supplement analysis for air transport are based on hypothetical shipments that provide an upper bound for impacts of any actual shipment.

On October 19, 2006, NNSA announced its plans to prepare an environmental impact statement for the transformation and modernization of the Cold War–era nuclear weapons complex. NNSA issued in the *Federal Register* a notice of intent to prepare an environmental impact statement, which will be entitled *Complex 2030 Supplement to the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*. The notice of intent outlines the alternatives that the NNSA will consider in transforming the nuclear weapons complex to better meet future national security requirements. Earlier in the year, NNSA outlined its comprehensive plan, called Complex 2030, for a

smaller, more efficient nuclear weapons complex that would be better able and more suited to respond to future national security challenges.

### 2.2.6 National Historic Preservation Act

In March 2003, President Bush signed Executive Order 13287, "Preserve America," directing federal agencies to improve their management of historic properties and to foster heritage tourism in partnership with local communities. Section 106 of the National Historic Preservation Act (NHPA) requires that federal agencies take into account the effects of their undertakings on properties included in or eligible for inclusion in the *National Register of Historic Places* (National Park Service 2003). To comply with Section 106 of the NHPA and its implementing regulations at 36 CFR 800, DOE-ORO was instrumental in the ratification of a programmatic agreement among DOE-ORO, the Tennessee state historic preservation officer, and the Advisory Council on Historic Preservation concerning management of historical and cultural properties on the ORR. The programmatic agreement was ratified on May 6, 1994, and has been incorporated into the approved *Cultural Resource Management Plan, DOE Oak Ridge Reservation* (DOE 2001a). The plan was completed in accordance with stipulations in the programmatic agreement, including historical surveys to identify significant historical properties on the ORR. Measures were implemented in 2005 to update the plan by giving the principal participants (ORNL, Y-12 Complex, and ETTP) key sections that pertain to their sites for revision. Because of plans to demolish a significant number of buildings on the ORNL and Y-12 Complex sites, a second programmatic agreement was drafted for each site. Both agreements have been approved by DOE-ORO, the state historic preservation officer, and the council. In concurrence with the programmatic agreement, a historic preservation plan was drafted and was issued (Thomason 2004) for the management and disposition of properties managed by DOE-ORO that included the DOE offices of Science, Nuclear Energy, and Environmental Management. Requirements of the programmatic agreement (also stated in the historic preservation plan) include

1. developing and implementing an interpretive plan for ORNL by 2007,
2. developing an oral history program of current and former ORNL employees by 2005, and
3. conducting a survey to identify significant historical machinery and equipment by 2007.

The oral history program was completed in 2005, and a draft of the ORNL interpretative plan was completed and submitted to upper management for review and approval. Compliance with NHPA at ORNL, the Y-12 Complex, and ETTP is achieved and maintained in conjunction with NEPA compliance. The scope of proposed actions is reviewed in accordance with the *Cultural Resource Management Plan* (DOE 2001a). If warranted, consultation is initiated with the state historic preservation officer and the advisory council, and the appropriate level of documentation is prepared and submitted.

The Y-12 Complex, in accordance with the programmatic agreement, submitted to the state historic preservation officer Section 106 recordation, interpretation, and documentation information for the demolition of Building 9720-6. The state historic preservation officer reviewed the information and agreed that the Section 106 documentation adequately mitigated project effects upon properties eligible for listing in the National Register of Historic Places.

A machinery and equipment survey was completed December 31, 2006. This survey documented the remaining machinery and equipment associated with the historic missions of the Y-12 Complex during World War II and the Cold War. The Y-12 Complex continues ongoing efforts to demonstrate its commitment to interpret the history of Y-12 by conducting oral histories of former and current employees, maintaining several interpretive centers located at Y-12, maintaining the Y-12 History Library, collecting artifacts throughout the plant, continuing to use and maintain its historic properties, and partnering with local businesses and organizations. Planning is also under way for the two new facilities being constructed at Y-12, the New Hope Center and the Jack Case Center, to house historic exhibits that convey the history of the Y-12 Complex to the public and its employees.

ETTP was surveyed in 1994 to identify properties eligible for inclusion in the *National Register*. An archaeological survey was also completed at ETTP. Eligible properties include the ETTP Main Plant Historic District, which includes facilities within the main plant and contains 120 contributing structures; 37 noncontributing structures; and 11 structures that are not contiguous with the historic district. More detailed information on the properties eligible for inclusion in the National Register is provided in the *Cultural Resource Management Plan* (DOE 2001a).

In August 2002, DOE submitted a notification of adverse effect for a proposed undertaking that involved D&D of properties located at the ETTP. The proposed project is to decontaminate and demolish or transfer all remaining properties located within the K-25 site main plant and powerhouse historic districts located on the ORR in Roane County, Tennessee, as outlined in the Oak Ridge Comprehensive Closure Plan. The Tennessee state historic preservation officer, the advisory council, and other interested parties were invited to participate in the planning stages of the proposed undertaking and to enter into the consultation process. Consultation began to develop a path forward, and a memorandum of agreement was negotiated among the consulting parties in 2003 on the D&D of the K-25 and K-27 buildings to determine actions to avoid, minimize, or mitigate the adverse effects to those two historical properties. Other ETTP projects were reviewed in accordance with the programmatic agreement or the *Cultural Resource Management Plan*, and a memorandum of agreement was signed in 2004 for the demolition of 108 buildings and structures. Meetings were held in 2004 with the consulting parties to finalize a memorandum of agreement for the historical interpretation of the K-25 Site. The agreement was signed in 2005.

A survey of all ORISE structures was conducted to comply with the NHPA. Only one structure currently under ORISE stewardship, the Atmospheric Turbulence and Diffusion Division Laboratory main building, was identified as being included in the *National Register*. All actions performed at that site conform to the programmatic agreement with the state historic preservation officer.

### 2.2.7 Protection of Wetlands

The ORR implements protection of wetlands through each site's NEPA program in accordance with Executive Order 11990 and 10 CFR 1022, "Compliance with Floodplain/Wetlands Environmental Review Requirements," and each of the three major sites conducts surveys for the presence of wetlands on a project- or program-as-needed basis. In the 1990s, an effort was initiated to conduct a wetlands survey of the entire reservation (LMES 1995). That effort was not completed, but wetland surveys and delineations were conducted on about 5,666 hectares of the 13,931 hectares that made up the reservation at that time (LMER 1996).

About 243 hectares of wetlands have been identified, most being classified as forested palustrine, scrub/shrub, and emergent wetlands. Wetlands occur across the ORR at low elevation, primarily in riparian zones of headwater streams and their receiving streams, as well as in the Clinch River embayments. Wetlands identified to date range in size from several square meters at small seeps and springs to approximately 10 hectares at White Oak Lake. Surveys of wetlands resources presented in Identification and Characterization of Wetlands in the Bear Creek Watershed (MMES 1993), Wetland Survey of Selected Areas in the Oak Ridge Y-12 Plant Area of Responsibility, Oak Ridge, Tennessee (LMES 1997), and Wetland Survey of the X-10 Bethel Valley and Melton Valley Groundwater Operable Units at Oak Ridge National Laboratory (Rosensteel 1996), serve as reference documents to support wetlands assessments for upcoming projects and activities.

Construction of an access road to the SNS Facility at ORNL in 2000 resulted in the loss of a small amount of wetland area. To mitigate the loss, a wetlands restoration project was designed and implemented in accordance with the aquatic resources alteration permit (ARAP) issued by TDEC. The ARAP required 5 years of annual monitoring to evaluate the success of the mitigation project and required an annual report detailing vegetation, soils, hydrology, and any remedial actions necessary to address deficiencies. The fifth and final annual report, which detailed the results of the monitoring done in 2005, was completed in August 2006. The five years of monitoring indicate that the restored

wetland acreage is functioning as a viable wetland community (Peterson and Trotter 2006).

In 2005, the construction of the haul road from ETTP to the Environmental Management Waste Management Facility (EMWMF) raised concerns about the impact on several small wetland areas along the proposed route. The route was surveyed by personnel from ORNL's Environmental Sciences Division. Jurisdictional wetland areas were delineated and marked. Wherever feasible, the route of the road was modified to bypass the wetlands areas. Wetlands compensatory mitigation measures included wetlands creation and restoration and stream restoration efforts, including the construction of the Bear Creek weir bypass. The weir bypass project was completed in March 2006.

### 2.2.8 Floodplains Management

Executive Order 11988 (issued in 1977) was established to require federal agencies to avoid to the extent possible adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Agencies must determine whether a floodplain is present that may be affected by an action, assess the impacts on such, and consider alternatives to the action. The executive order requires that provisions for early public review and measures for minimizing harm be included in any plans for actions that might occur in the floodplain. Floodplain assessments and the associated notices of involvement and statements of findings are prepared in accordance with 10 CFR 1022, usually as part of the NEPA review and documentation process.

A floodplain, according to 10 CFR 1022, means the lowlands adjoining inland and coastal waters and relatively flat areas and flood-prone areas of offshore islands including, at a minimum, that area inundated by a 1% or greater chance of flood in any given year. The base floodplain is defined as the 100-year (1.0%) floodplain. The critical action floodplain is defined as the 500-year (0.2%) floodplain. Floodplain assessments and the associated notices of involvement and statements of findings are prepared in accordance with 10 CFR 1022, usually as part of the NEPA review and documentation process. The TVA has conducted floodplain studies along the Clinch River, Bear Creek, and East Fork Poplar Creek. Portions of the Y-12 Complex lie within the 100- and 500-year floodplains of East Fork Poplar Creek; portions of ORNL lie within the floodplain of White Oak Creek.

### 2.2.9 Endangered Species Protection

Good stewardship, state laws ("The Rare Plant Protection and Conservation Act of 1985," Tennessee Code Annotated Section 70-8-301 to 314, and "Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974," Tennessee Code Annotated Section 70-8-101 to 110), and federal laws ("Endangered Species Act of 1973," 16 U.S.C. 1531 et seq.) dictate that animal and plant species of concern be considered when a proposed project has the potential to alter their habitat or otherwise harm them. At the federal level, such species are classified as endangered, threatened, or species of concern. At the state level, these species are considered endangered, threatened, of special concern (plants), or in need of management (animals). All such species are termed "special concern" species in this report. Additionally, a memorandum of understanding has been established between DOE and the U.S. Fish and Wildlife Service regarding implementation of Executive Order 13186 for protection of migratory birds (Federal Register, Vol. 71, No 218, Nov. 13, 2006). The memorandum of understanding identifies specific areas in which cooperation will contribute to the conservation and management of migratory birds and their habitats.

#### 2.2.9.1 Special Concern Animals

Listed animal species known to be present on the reservation (excluding the Clinch River bordering the reservation) are given along with their status in Table 2.8. The list illustrates the diversity of birds on the ORR, which is also habitat for many unlisted species, some of which are in decline nationally or regionally. Other

**Table 2.8. Animal species of concern reported from the Oak Ridge Reservation[a]**

Sensitive wildlife species recently found on the Oak Ridge Reservation

| Scientific name | Common name | Status[b] | | |
|---|---|---|---|---|
| | | Federal | State | PIF[c] |
| | **Fish** | | | |
| *Phoxinus tennesseensis* | Tennessee dace | | NM | |
| | **Amphibians and reptiles** | | | |
| *Hemidactylium scutatum* | Four-toed salamander | | NM | |
| | **Birds** | | | |
| *Accipiter striatus* | Sharp-shinned hawk | | NM | |
| *Anhinga anhinga* | Anhinga | | NM | |
| *Caprimulgus carolinensis* | Chuck-will's-widow | | | C |
| *Ardea alba* | Great egret | | NM | |
| *Circus cyaneus* | Northern harrier | | NM | |
| *Contopus cooperi* | Olive-sided flycatcher | | NM | |
| *Dendroica caerulescens* | Black-throated blue warbler | | | C |
| *Dendroica cerulean* | Cerulean warbler | | NM | C |
| *Dendroica discolor* | Prairie warbler | | | C |
| *Egretta caerulea* | Little blue heron | | NM | |
| *Egretta thula* | Snowy egret | | NM | |
| *Falco peregrinus* | Peregrine falcon | *d* | E | |
| *Haliaeetus leucocephalus* | Bald eagle | T[e] | NM | |
| *Helmitheros vermivorus* | Worm-eating warbler | | | C |
| *Hylocichla mustelina* | Wood thrush | | | C |
| *Lanius ludovicianus* | Loggerhead shrike | | NM | |
| *Oporornis formosus* | Kentucky warbler | | | C |
| *Pooecetes gramineus* | Vesper sparrow | | NM | |
| *Protonotaria citrea* | Prothonotary warbler | | | C |
| *Seiurus motacilla* | Louisiana waterthrush | | | C |
| *Sitta pusilla* | Brown-headed nuthatch | | | C |
| *Sphyrapicus varius* | Yellow-bellied sapsucker | | NM | |
| *Spizella pusilla* | Field sparrow | | | C |
| *Tyto alba* | Barn owl | | NM | |
| *Vermivora chrysoptera* | Golden-winged warbler | | NM | C |
| *Vermivora pinus* | Blue-winged warbler | | | C |
| | **Mammals** | | | |
| *Myotis grisescens* | Gray bat | E | E | |
| *Sorex longirostris* | Southeastern shrew | | NM | |

[a]Land and surface waters of the ORR exclusive of the Clinch River, which borders the ORR. Some (e.g., anhinga) have been seen only once or a few times; others (e.g., sharp-shinned hawk, southeastern shrew) are comparatively common and widespread on the reservation.

[b]E endangered
T threatened
NM in need of management
C birds of concern

[c]Partners in Flight.

[d]The peregrine falcon was federally delisted on August 25, 1999.

[e]The bald eagle was proposed for federal delisting on July 6, 1999.

listed species may also be present, although they have not been observed recently. These include several species of mollusks (such as the spiny river snail), amphibians (such as the hellbender), birds (such as Bachman's sparrow), and mammals (such as the smoky shrew). Birds, fish, and aquatic invertebrates are the most thoroughly surveyed animal groups on the ORR. The only federally listed animal species that has recently been observed on the ORR is the gray bat, which was observed over water bordering the ORR (the Clinch River) in 2003 and over a pond on the ORR in 2004. A gray bat was mist-netted outside a cave on the ORR in 2006. The federally threatened bald eagle is increasingly seen in winter and may well begin nesting here within a few years. Similarly, several state-listed bird species, such as the anhinga, olive-sided flycatcher, and little blue heron, are currently uncommon migrants or visitors to the reservation; however, the little blue heron is probably increasing in numbers. The cerulean warbler, listed by the state as in need of management, has been recorded during the breeding season; however, this species is not actually known to breed on the reservation. Others, such as the cerulean warbler, northern harrier, great egret, and yellow-bellied sapsucker, are migrants or winter residents that do not nest on the reservation. The golden-winged warbler (*Vermivora chrysoptera*), listed by the state as in need of management, has been sighted once on the reservation. One federal and state threatened species, the spotfin chub (*Cyprinella monnacha*), has been sighted and collected in the city of Oak Ridge and is possibly present on the ORR. The Tennessee Dace has been found in some sections of Grassy Creek.

The Grassy Creek population of the Tennessee Dace is one of the most important populations of this species in Tennessee. The construction of the haul road from ETTP to EMWMF had the potential to impact that population. As a result, several mitigation measures were incorporated into the construction. Measures included construction of bridges at Bear Creek and other tributaries where the dace are suspected to live (to minimize disturbance of the streams) and the use of extra large culverts and "skylights" at the crossover points where bridges were not feasible (these features reduce sedimentation and allow more light into the culvert, which facilitates migration of the fish through these points.)

#### 2.2.9.2 Threatened and Endangered Plants

There are currently 21 listed plant species that have been observed in the last 10 years on the ORR; among them are the pink lady's-slipper and Canada lily (Table 2.9). Two species occurring on the ORR, Carey's saxifrage and the purple fringeless orchid, have been removed from the state list as of November 17, 1999. Bigtooth aspen, recently found on the ORR was down-listed by the state at the January 2007 scientific advisory committee meeting. Four species (spreading false-foxglove, Appalachian bugbane, tall larkspur, and butternut) have been under review for listing at the federal level and were listed under the formerly used "C2" candidate designation. These species are now informally referred to as "special concern" species by the U.S. Fish and Wildlife Service.

Two additional species listed by the state, the Michigan lily and the hairy sharp-scaled sedge, were identified in the past on the ORR; however, they have not been found in recent years. Several state-listed plant species currently found on adjacent lands may be present on the ORR as well, although they have not been located (Table 2.9).

### 2.2.10 Environmental Justice

On February 11, 1994, Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was promulgated. The executive order requires that federal actions not have the effect of excluding, denying, or discriminating on the basis of race, color, national origin, or income level and that federal agencies must ensure that there are no disproportionate impacts from their actions on low-income and minority communities surrounding their facilities.

An environmental justice strategy is in place at DOE under the direction of the Office of Legacy Management. It addresses the refocusing of policies and programs by departmental elements, more meaningful dialogue with stakeholders to

**Table 2.9. Vascular plant species listed by state or federal agencies, 2006**

| Species | Common name | Habitat on ORR | Status code[a] |
|---|---|---|---|
| **Currently known or previously reported from the ORR** | | | |
| *Aureolaria patula* | Spreading false-foxglove | River bluff | FSC, S |
| *Carex gravida* | Heavy sedge | Varied | S |
| *Carex oxylepis var. pubescens*[b] | Hairy sharp-scaled sedge | Shaded wetlands | S |
| *Cimicifuga rubifolia* | Appalachian bugbane | River slope | FSC, T |
| *Cypripedium acaule* | Pink lady's-slipper | Dry to rich woods | E, CE |
| *Delphinium exaltatum* | Tall larkspur | Barrens and woods | FSC, E |
| *Diervilla lonicera* | Northern bush-honeysuckle | River bluff | T |
| *Draba ramosissima* | Branching whitlow-grass | Limestone cliff | S |
| *Elodea nuttallii* | Nuttall waterweed | Pond, embayment | S |
| *Fothergilla major* | Mountain witch-alder | Woods | T |
| *Hydrastis canadensis* | Golden seal | Rich woods | S, CE |
| *Juglans cinerea* | Butternut | Slope near stream | FSC, T |
| *Juncus brachycephalus* | Small-head rush | Open wetland | S |
| *Lilium canadense* | Canada lily | Moist woods | T |
| *Lilium michiganense*[c] | Michigan lily | Moist woods | T |
| *Liparis loeselii* | Fen orchid | Forested wetland | E |
| *Panax quinquifolius* | Ginseng | Rich woods | S, CE |
| *Platanthera flava var. herbiola* | Tuberculed rein-orchid | Forested wetland | T |
| *Ruellia purshiana* | Pursh's wild-petunia | Dry, open woods | S |
| *Scirpus fluviatilis* | River bulrush | Wetland | S |
| *Spiranthes lucida* | Shining ladies-tresses | Boggy wetland | T |
| *Thuja occidentalis* | Northern white cedar | Rocky river bluffs | S |
| *Viola tripartite var. tripartita* | Three-parted violet | Rocky woods | S |
| **Rare plants that occur near and could be present on the ORR** | | | |
| *Agalinis auriculata* | Earleaf false foxglove | Calcareous barren | FSC, E |
| *Allium burdickii or A. tricoccom*[d] | Ramps | Moist woods | S, CE |
| *Berberis canadensis* | American barberry | Rocky bluff, creek bank | S |
| *Gnaphalium helleri* | Catfoot | Dry woodland edge | S |
| *Lathyrus palustris* | A vetch | Moist meadows | S |
| *Liatris cylindracea* | Slender blazing star | Calcareous barren | E |
| *Lonicera dioica* | Mountain honeysuckle | Rocky river bluff | S |
| *Meehania cordata* | Heartleaf meehania | Moist calcareous woods | T |
| *Pedicularis lanceolata* | Swamp lousewort | Calcareous wet meadow | T |
| *Pycnanthemum torrei* | Torrey's mountain-mint | Calcareous barren edge | S |
| *Solidago ptarmicoides* | Prairie goldenrod | Calcareous barren | E |

[a]Status codes:

FSC Federal Special Concern; formerly designated as C2. See Federal Register, February 28,1996.
E Endangered in Tennessee.
T Threatened in Tennessee.
S Special concern in Tennessee.
CE Status due to commercial exploitation.

[b]*Carex oxylepis var. pubescens* has not been observed during recent surveys.

[c]*Lilium michiganense* is believed to have been extirpated from the ORR by the impoundment at Melton Hill.

[d]Ramps have been reported near the ORR, but there is not sufficient information to determine which of the two species is present or if the occurrence may have been introduced by planting. Both species of ramps have the same state status.

address the impact of DOE operations on communities, and the continuation of ongoing programmatic activities with the infusion of a heightened sensitivity to the principles of environmental justice.

In addition to the strategy, federal actions that may significantly affect the quality of the human environment require NEPA documents that address minority and low-income communities. The "affected environment" and "environmental consequences" sections include a "socioeconomic impacts" subsection of the document to identify any disproportionately high and adverse impacts on low-income and minority populations.

### 2.2.11 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) of 1974 is an environmental statute for the protection of drinking water. This act requires the EPA to establish primary drinking water regulations for contaminants that may cause adverse public health effects. Although many of the requirements of the SDWA apply to public water supply systems, Section 1447 states that each federal agency having jurisdiction over a federally owned or maintained public water system must comply with all federal, state, and local requirements regarding the provision of safe drinking water.

The city of Oak Ridge supplies potable water to the Y-12 Complex and ORNL. The water treatment plant, located north of the Y-12 Complex, is owned by the city of Oak Ridge. The K-1515 sanitary water plant provides drinking water for ETTP and for an industrial park located on Bear Creek Road south of the site. The DOE-owned facility is classified as a nontransient, noncommunity water supply system by TDEC and is subject to state regulations. On April 1, 1998, operation of this leased facility became the responsibility of Operations Management International, Inc., under contract with CROET.

The Y-12 Complex, ORNL, and ETTP perform certain monitoring activities, including analyses for free residual chlorine, bacteriological agents, disinfectant by-products, and copper and lead. The Y-12 Complex and ORNL potable water systems are classified as a nontransient, noncommunity water supply system by TDEC.

The Y-12 Complex and ORNL distribution systems have qualified for triennial lead and copper sampling. The Y-12 Complex distribution system was last sampled in 2005 and is scheduled to be sampled again in 2008; the ORNL system was sampled in 2006. The Y-12 Complex and ORNL were compliant with the lead and copper requirements. In addition, the ORNL drinking water distribution system's bacteriological sample analyses were satisfactory in 2006. There was one exception at Y-12. On March 6, 2006, a letter of a violation of the National Primary Drinking Water Regulations for the compliance period ending January 31, 2006, was received from TDEC. Regulation 1200-5-1-07 requires water systems to collect and submit eight bacteriological sample results during each month. While eight samples were sent for analysis, only seven were documented as being received. Y-12's response included changes in site notification, procedures, and sampling handling. At no time was there any indication of contamination of the water supply. Analytical results were satisfactory for disinfection by-products (total trihalomethanes and haloacetic acids) for the Y-12 and ORNL water systems.

ORNL and ETTP have cross-connection prevention programs to prevent the contamination of potable water through the use of backflow preventers, engineering design, and physical separation. Backflow preventers that fail performance checks are repaired, or the water supply to the equipment is taken out of service. Y-12 continues to revise its cross-connection control program in response to TDEC comments. Y-12 is also developing a sampling program to validate the adequacy of check valves on approximately 120 antifreeze loop fire systems containing propylene glycol that are connected to the potable water supply. A potable water upgrade project, scheduled for completion in 2010, is planned to install backflow preventers on those systems.

### 2.2.12 Clean Water Act

The objective of the CWA is to restore, maintain, and protect the chemical, physical, and biological integrity of the nation's waters. With continued amendments, the CWA serves as the basis for comprehensive federal and state programs to protect the nation's waters from pollutants. Congress continues to work on amendments to and reauthorization of the CWA.

(See Appendix D for reference standards for water.)

### 2.2.12.1 National Pollutant Discharge Elimination System

One of the strategies developed to achieve the goals of the CWA was EPA's establishment of limits on specific pollutants that are allowed to be discharged to waters of the United States by municipal sewage treatment plants and industrial facilities. The EPA established the National Pollutant Discharge Elimination System (NPDES) permitting program to regulate compliance with these pollutant limitations. The program was designed to protect surface waters by limiting effluent discharges into streams, reservoirs, wetlands, and other surface waters. Authority for implementation and enforcement of the NPDES program has been delegated by EPA to the state of Tennessee.

#### Y-12 Complex

The Y-12 Complex continued to operate under Permit TN0002968, issued in 1995, through April 2006. The TDEC Division of Water Pollution Control issued a new permit on March 13, 2006, and monitoring under the new permit began on the permit-effective date of May 1, 2006. The new permit expires on December 31, 2008. An appeal to certain terms, including limitations on legacy constituents such as mercury and polychlorinated biphenyls (PCBs), and new chlorine limits at several outfalls, was filed with the Division of Water Pollution Control on April 18, 2006.

Presently about 60 active point-source discharges or in-stream monitoring locations are monitored for compliance with the permit. In 2006 the Y-12 Complex achieved an NPDES permit compliance rate of > 99.9%. In 2006 there was one NPDES noncompliance (chlorine at outfall 201 on February 7, 2006). Information on the exceedance is provided in Appendix E, Sect. E.1. The new permit requires routine monitoring at two East Fork Poplar Creek in-stream locations, storm water sampling at a number of individual outfalls plus four in-stream locations and Clinch River raw water discharge. The permit continues radiological monitoring of surface water under a revised Radiological Monitoring Plan, a revised Biological Monitoring and Abatement Program, and biotoxicity testing on three major outfalls. It sets forth a compliance schedule for more stringent total residual chlorine sampling.

#### ORNL

ORNL is currently operating under NPDES Permit TN0002941, which was renewed by TDEC on December 6, 1996, and which went into effect on February 3, 1997. A four-volume permit renewal application was submitted to TDEC and EPA in June 2001. In 2006 ORNL and TDEC staffs held discussions about renewal of the ORNL permit. The ORNL NPDES permit lists 164 point-source discharges and monitoring points that require compliance monitoring. Approximately 100 are storm drains, roof drains, and parking lot drains. Compliance was determined by approximately 7000 laboratory analyses and measurements in 2006, in addition to numerous field observations by ORNL field technicians. The NPDES permit limit compliance rate for all discharge points for 2006 was nearly 100%, with only five out of about 7000 individual measurements exceeding their respective permit limit (Fig. 2.1). Information on the exceedances is provided in Appendix E, Sect. E.3. None of the five exceedances resulted in any discernable ecological impact.

The current permit requires ORNL to conduct detailed characterization of numerous storm water outfalls, develop and implement a radiological monitoring plan, develop and implement a storm water pollution prevention plan, implement a revised Biological Monitoring and Abatement Program (BMAP) plan, and develop and implement a chlorine-control strategy. In 1997 DOE appealed certain limits and conditions of the 1996 ORNL permit, including numeric limits on effluent mercury, arsenic, and selenium.

#### ETTP

An application for renewal of ETTP NPDES Permit TN0002950 was submitted to TDEC in March 1997. To facilitate the transfer of ownership and operation of ETTP facilities to other parties, it was determined that separate NPDES permits would be required for each of the ETTP treatment facilities. In addition, it was determined that a separate NPDES permit for the

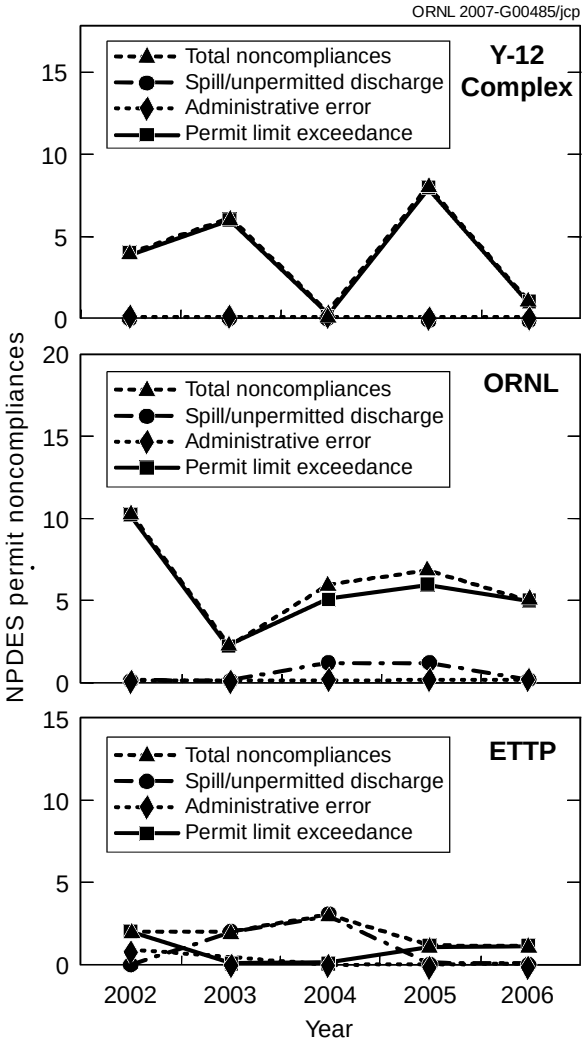


**Fig. 2.1. Five-year summary of NPDES noncompliances.**

storm water drainage system would be necessary. A general NPDES permit for former outfalls 009 (K-1515 Sanitary Water Plant) and 013 (K-1513 Sanitary Water Intake Backwash Filter) was issued on January 14, 2000, and became effective on March 1, 2000. Issuance of the permit (Permit Number TN0074233) allowed outfalls 009 and 013 to be removed from ETTP NPDES Permit Number TN0002950. A permit for the K-1203 sewage treatment plant (permit number TN0074241) was issued by TDEC and became effective on August 1, 2003. This allowed outfall 005 to be removed from ETTP NPDES Permit Number TN0002950. A permit for the K-1407-J Central Neutralization Facility (permit number TN0074225) was issued on October 7, 2003, and became effective on November 1, 2003. The permit allowed outfall 014 to be removed from ETTP NPDES Permit Number TN0002950.

ETTP storm water outfalls continue to discharge under NPDES Permit Number TN0002950; the permit was reissued on March 1, 2004, with an effective date of April 1, 2004. The reissued NPDES Permit Number TN0002950 includes 121 storm water outfalls. Of these 121 outfalls, 39 are monitored on a routine basis as part of the requirements of the NPDES permit. In accordance with this NPDES permit, the ETTP is authorized to discharge storm water, steam condensate, and groundwater to the Clinch River, Poplar Creek, and Mitchell Branch.

In 2006, 48 spills were reported at ETTP. Only one of them resulted in an NPDES permit noncompliance. With approximately 580 laboratory analyses in 2006, this represents a compliance rate of almost 100% (Fig. 2.1). ETTP had one NPDES permit noncompliance in 2006. Details of the noncompliance are given in Sect. 4.4.1 and in Appendix E, Sect. E.2.

### 2.2.12.2 Sanitary Wastewater

#### Y-12 Complex

The CWA includes pretreatment regulations for publicly owned treatment works. Sanitary wastewater from the Y-12 Complex is discharged to the city of Oak Ridge treatment works under an industrial and commercial wastewater discharge permit. The Y-12 Complex was issued a new industrial user discharge permit by the city of Oak Ridge effective April 1, 2005. The permit establishes discharge limits for total suspended solids, biochemical oxygen demand, total nitrogen, and various metals and requires monitoring and reporting of uranium, gross alpha and beta radiation, and several organic compounds. Compliance with the permit is determined from samples taken at the East End Sanitary Sewer Monitoring Station, located on the east end of the complex where the Y-12 system ties into the city's sanitary sewer collection system.

City personnel performed semiannual compliance inspections on March 16 and August 1, 2006. During 2006, there was no noncompliance to the Y-12 Complex industrial user discharge permit. During the year Y-12 conducted sanitary

sewer system flow studies to determine the location of excessive inflow or infiltration. One subarea of the sanitary sewer system, the abandoned biology area, was identified as a contributor to excessive flows. The sewer line draining that area into the main system has been plugged. Status reports regarding flow-reduction efforts were submitted to the city of Oak Ridge in a letter dated July 17, 2006, and as part of the third-quarter (October 18, 2006) compliance report.

Compliance to a state-issued operating permit for a holding tank/pump-and-haul at office trailer 9983-AZ was also maintained.

Sanitary sewer radiological sample results at the Y-12 Complex are routinely reviewed to determine compliance with DOE Order 5400.5, "Radiation Protection of the Public and Environment." Sample results are compared to the derived concentration guides (DCGs) listed in the order. No radiological parameter that is monitored (including uranium) has exceeded a DCG.

### ORNL

At ORNL, sanitary wastewater is collected, treated, and discharged separately from other liquid wastewater streams through an on-site sewage treatment plant. Wastewater discharged into the system is regulated by means of internally administered waste-acceptance criteria based on the plant's NPDES operating permit parameters. Wastewater streams currently processed through the plant include sanitary sewage from facilities in Bethel and Melton valleys, area runoff of rainwater that infiltrates the system, and specifically approved small volumes of nonhazardous biodegradable wastes, such as scintillation fluids. The effluent stream from the sewage treatment plant is ultimately discharged into White Oak Creek through an NPDES-permitted outfall (X-01). Infiltration into the system and the discharge from the on-site laundry have, at times, caused the sludge generated during the treatment process to become slightly radioactive. ORNL has completed a line-item project for comprehensive upgrades of its sanitary sewage system to reduce infiltration of contaminated groundwater and surface water and to redirect discharges from the laundry to appropriate alternative treatment facilities. The radioactivity level of ORNL sewage treatment plant sludge continues to decline. In 1998, ORNL's sewage sludge was accepted into the city of Oak Ridge's Biosolids Land Application Program. ORNL transported no sewage sludge to the Oak Ridge sewage treatment plant in 2006 because the plant was undergoing an expansion project. During 2006, ORNL's sewage sludge was dried and handled as solid low-level waste (LLW). Shipments of sludge to the city of Oak Ridge may resume in 2007. In 2006, an application was submitted for a state-issued operating permit for a small holding tank/pump-and-haul at Bldg 3544.

### ETTP

ETTP domestic wastewater is treated at the on-site K-1203 sewage treatment plant and is discharged pursuant to the NPDES Permit TN0074241; this permit became effective on August 1, 2003. Beginning on April 1, 1998, operation of that leased facility became the responsibility of publicly owned treatment works under a contract with CROET. Bechtel Jacobs Company LLC (BJC) operates a holding tank/pump-and-haul system to dispose of sanitary wastewater from the K-1310-DF facility at ETTP. The permit to operate this system (State Operation Permit No. SOP-99033) was issued April 28, 2000, and was renewed April 29, 2005. It expires April 20, 2010. An application to renew the permit was submitted October 20, 2004. Operations reports are submitted each month to the TDEC Environmental Assistance Center; there were no noncompliances or operational problems in 2006. Weskem LLC, a BJC subcontractor, operates a pump-and-haul system (State Operation Permit No. SOP-01042) for sanitary waste at ETTP. The permit for that facility was issued November 30, 2006, and expires May 31, 2010. A pump-and-haul system is also operated at the Washington Safety Management Solutions Waste Transportation Project Site, which is located off Blair Road near Portal 6. The permit for operation of that facility (State Operation Permit SOP-05068) was issued on February 28, 2006, and became effective on April 1, 2006. The permit expires on February 28, 2009.

## 2.2.12.3 Storm Water Protection Permits

Storm water discharges associated with construction activities that disturb 1 acre or more of

land must be NPDES-permitted. Coverage under a general permit is typically approved for a construction project if the proper notice of intent is filed. In February 2004 a general permit for storm water associated with construction activity for the Highly Enriched Uranium Materials Facility and Hollow-Fill Project at Y-12 was approved. The permit remained in effect during 2006, and construction proceeded in compliance.

In 2006, ORNL had three construction projects covered by the Tennessee General Permit for Storm Water Runoff Associated with Construction Activity. These included the SNS project, the ORNL Research Support Center, and the ORNL 24 inch Water Line Replacement Project.

### 2.2.12.4 Aquatic Resources Protection

The Army Corps of Engineers, TVA, and TDEC conduct permitting programs for projects and activities that could affect aquatic resources, including navigable waters, surface waters (including tributaries), and wetlands. These are the Corps of Engineers Section 404 dredge-and-fill permits, TDEC ARAPs, and TVA 26A approvals.

In February 2004, TDEC issued a general NPDES permit for discharges associated with the Y-12 Highly Enriched Uranium Materials Facility and Hollow-Fill Project. The permit remains active, and the work is being conducted in compliance. In October 2006, TDEC issued a General ARAP for Construction of Intake and Outfall Structures associated with construction of the new dechlorination facilities which are designed to remove chlorine at five Y-12 NPDES outfalls.

No TVA or Corps of Engineers permits were issued to the Y-12 Complex in 2006.

In 2006, ORNL had six projects that were conducted under ARAPs. These included two ARAPs for the East Campus Landscaping Addition project, three ARAPs for the East Campus Parking Expansion Project and one for the Freels Bend Boathouse Removal Project. Army Corps of Engineers permit coverage was also established for the Freels Bend project.

### 2.2.12.5 Oil Pollution Prevention

Section 311 of the CWA regulates the discharge of oils or petroleum products to waters of the United States and requires the development and implementation of a spill prevention, control, and countermeasure plan to minimize the potential for oil discharges. Currently, each facility implements a site-specific plan. This section of the CWA was significantly amended by the Oil Pollution Act of 1990, which has as its primary objective the improvement of responses to oil spills. On July 17, 2002, EPA issued the new final rule for 40 CFR Part 112, "Oil Pollution Prevention and Response; Non-Transportation-Related Onshore and Offshore Facilities," in the *Federal Register*. The rule contains significant changes in the requirements for spill prevention, control, and countermeasure plans, including how the plans are prepared, reviewed, and certified and the information that must be included in the plans. Existing plans must be amended as necessary to bring them into compliance with rule revisions, and the amended plans must be fully implemented by October 31, 2007. The ORNL Spill Prevention, Control, and Countermeasure Plan was revised in August 2006, including incorporation of the new EPA requirements.

### 2.2.12.6 Clean Water Action Plan

The Clean Water Action Plan, which essentially reflects a commitment by federal agencies to work cooperatively to improve water quality in the United States, is structured around watershed-based approaches in four key areas of need:

- prioritizing and undertaking water quality assessments,
- preparing restoration action strategies,
- developing and refining water quality standards, and
- enhancing stewardship of water resources on federal lands.

On a national level, the Department of Agriculture and the Department of the Interior are developing the Unified Federal Policy for Ensuring a Watershed Approach to Federal Land and Resource Management, to which other agencies (including DOE) are contributing. The goals and principles of this multiagency policy are to

- use a consistent and scientific approach to managing lands and resources and for as-

sessing, protecting, and restoring watersheds;
- identify specific watersheds in which to focus budgetary and other resources and to accelerate improvements in water quality and watershed condition;
- use the results of watershed assessments to guide planning and management activities;
- work closely with states, tribes, local governments, and stakeholders to implement this policy;
- meet CWA responsibilities to adhere to federal, state, tribal, interstate, and local water quality requirements to the same extent as nongovernmental entities; and
- take steps to ensure that federal land and resource management actions are consistent with federal, state, tribal, and, where appropriate, local government water quality management programs.

### 2.2.13 Clean Air Act

Authority for implementation and enforcement of the Clean Air Act (CAA) has been delegated to the state of Tennessee by EPA as described in the State Implementation Plan. Air pollution control rules are developed and administered by TDEC.

#### 2.2.13.1 General CAA Compliance

The TDEC air pollution control rules ensure compliance with the CAA. The TDEC Air Permit Program is the primary method by which emission sources are reported to and regulated by the state.

CAA compliance program staff participate in regulatory inspections and internal audits to verify compliance with applicable regulations or permit conditions. Air emission sources subject to the permitting requirements are permitted, and relevant compliance documentation for these sources is maintained at each site. In addition, a number of sources that are exempt from permitting requirements under state rules but subject to listing on Title V major source operation permits are documented, and information about them is available upon request from the state. Programs for permitting, compliance inspection, and documentation are in place and ensure that all ORR operations remain in compliance with all federal and state air pollution control regulations.

#### 2.2.13.2 Title V Operating Permits

All three sites are subject to the CAA Title V Operating Permit Program. The Y-12 site was issued two permits, one for BWXT operations and one for BJC operations. The ORNL site was also issued two permits, one for UT-Battelle operations and one for BJC operations. TDEC has not issued a Title V permit for BJC operations at the ETTP site. Operations at the ETTP site operate under permits issued prior to implementation of the Title V program. An update for each site follows.

The DOE/NNSA and BWXT Y-12 Title V permit includes 35 air emission sources and more than 100 air emission points. All remaining emission sources are categorized as insignificant and exempt from permitting. During 2006, a significant permit modification to the Y-12 Complex Title V permit was issued to identify new requirements and compliance methodologies for the Y-12 steam plant maintenance project. The new requirements will be effective upon completion of the project. Also, the permit modification identified new requirements to implement a future applicable Maximum Achievable Control Technology (MACT) standard for hazardous air pollutants at the Y-12 Steam Plant. One minor permit amendment was made to the Y-12 Title V permit in 2006. Permit change requests submitted in 2006, which were still pending at the end of 2006, include a minor modification request to convert one construction permit to an operating permit, a request to revise the Steam Plant MACT conditions, and a request to add Fuel Station Stage 1 emission control requirements to the permit.

DOE and UT-Battelle were issued a Title V permit covering ten emission sources for ORNL Office of Science Operations. One construction permit was also active for the Central Exhaust Facility, located at the SNS facility. All remaining emission sources are categorized as insignificant and are exempt from permitting. Semiannual reports were submitted on time and with no compliance issues.

DOE and BJC were issued two Title V permits in October and November 2004 for two air emission sources located at ORNL and one source at Y-12. At the end of 2005, there were

82 active air emission sources under DOE control at ETTP. The total includes 25 sources covered by 3 TDEC operating permits and 2 new construction permits. A new construction permit was issued for the TSCA Incinerator that supersedes the previous permit to operate until such time that a Title V permit is issued for ETTP that included recently promulgated regulations not covered by the previous permit. The second construction permit was issued for the K-1423 TSCA Solid Waste Repacking facility that reflects changed compliance requirements due to a new member of the public location. All remaining active air emission sources are exempt from permitting requirements. Permitted sources under DOE's Reindustrialization Program are not reported in this report except for the portion of the year that the source was under DOE control.

Air permit data are summarized in Appendix F.

### 2.2.13.3 National Emission Standards for Hazardous Air Pollutants for Radionuclides

Under Section 112 of the CAA, on December 15, 1989, the EPA promulgated "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities" at 40 CFR 61, Subpart H. This emission standard limits emissions of radionuclides to the ambient air from DOE facilities not to exceed amounts that would cause any member of the public to receive in any year an effective dose equivalent (EDE) of 10 mrem/year. As noted in the preamble to the rule, the entire DOE facility at Oak Ridge, Tennessee, must meet this emission standard.

On June 10, 1996, EPA delegated authority for regulation of airborne radionuclide emissions from DOE facilities in Tennessee to the TDEC Division of Air Pollution Control. TDEC adopted the federal rule verbatim as Tennessee Rule 1200-3-11-.08, "Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities." In addition, TDEC codified that all past formal agreements between DOE and EPA, including the March 1994 *Compliance Plan* (MMES 1994), would be recognized provided that they are current, valid, and supported by appropriate documentation. The TDEC Division of Air Pollution Control has given primary administrative authority of the radionuclide emission standard to the TDEC Division of Radiological Health, which also licenses non-DOE nuclear facilities in the state. However, authority to approve alternative methods and procedures still resides with EPA Region 4.

In October 2001, EPA Region 4 approved two addendums to the compliance plan, Addendum C.1, "Monitoring for Fugitive and Diffuse Sources," and Addendum C.2, "Monitoring Plan for On-Site Receptors." Addendum C.1 formalizes the use of environmental measurements from ambient air monitoring to confirm compliance for fugitive and diffuse sources for the ORR. This compliance approach has been in place since January 1993. Addendum C.2 formalizes EPA guidance in a February 1, 2001, guidance letter, that allows the use of environmental measurements from ambient air monitors in lieu of continuous stack monitoring as an alternative method to demonstrate compliance with 40 CFR Part 61, Subpart H, for sources that are major when modeled to "on-site" receptors, but minor when modeled to off-site receptors. In March 2005, EPA Region 4 approved a third addendum to the plan, Addendum C.3, "ANSI/HPS N13.1-1999 Upgrade Policy," which clarifies when an existing source on the ORR undergoing a modification must be upgraded to meet the new design criteria of the ANSI/HPS N13.1-1999 Standard in accordance with the September 9, 2002, amendment to 40 CFR Part 61, Subpart H. During the March 2005 approval cycle, the title page to the compliance plan was updated with a DOE document number (DOE 2005b), and a revision to Sect. 2.1 of the plan was approved that incorporated updated criteria under 10 CFR Part 835.

Beginning in 2000, the TDEC Division of Radiological Health required DOE to assess the dose from airborne radionuclide emissions to members of the public located on the ORR. Specifically, dose was determined for lessees located in areas of the ORR where access to the public is not restricted. Beginning in 2001, dose was also determined for construction workers supporting activities at construction sites that were deeded to a non-DOE entity.

During 2006, the ORR facilities operated in compliance with the Radionuclide National Emission Standards for Hazardous Air Pollutants (NESHAP) dose limit of 10 mrem/year to

the most exposed member of the public. Based on modeling of radionuclide emissions from all major and minor point sources, the EDE in 2006 to the most exposed member of the public was 0.8 mrem/year.

Continuous sampling for radionuclide emissions is conducted at the ETTP TSCA Incinerator, major sources at ORNL, and exhaust stacks serving uranium-processing areas at the Y-12 Complex. Compliance with the off-site dose limit is demonstrated by using grab samples and other EPA-approved estimation techniques on the remaining minor emission points and on grouped area sources to estimate confirmatory measurements of emissions. Fugitive emissions continue to be monitored by the ORR Perimeter Air Monitoring System. In addition, ETTP continued to operate a site-specific ambient air monitoring system for surveillance of TSCA Incinerator uranium emissions and fugitive emissions from remedial actions and D&D projects. In addition to the ORR regulatory compliance program, the EPA and DOE Oversight Division also conduct independent ambient air monitoring programs.

### 2.2.13.4 NESHAP for Asbestos

The ORR facilities have numerous buildings and equipment that contain asbestos-containing materials. The compliance program for management of removal and disposal of asbestos-containing materials includes demolition and renovation notifications to TDEC and inspections, monitoring, and prescribed work practices for abatement and disposal of asbestos materials. No releases of reportable quantities of asbestos were reported at ETTP, ORNL, or the Y-12 Complex in 2006.

### 2.2.13.5 NESHAP for Source Categories

The EPA has missed congressionally established promulgation dates for a number of NESHAP MACT standards (see 40 CFR Part 63, Subpart B, starting at § 63.50). Sources that may be subject to a delayed standard must comply with the "MACT hammer" permitting provisions in Section 112(j) of the CAA. Impacted sources must submit applications for case-by-case MACT determinations in two parts. Part 1 notifies agencies of the applicability of the delayed MACT standard to the facility. Part 2 is a detailed application based on a number of requirements and is due on a specific date, depending upon the applicable MACT standard.

In 2003, ORR facilities submitted Part 1 applications regarding applicability of several MACT standards (e.g., industrial heaters/process boilers, site remediation). There are currently only three sources on the ORR subject to MACT standards. One source is the TSCA Incinerator; another source, registered with the EPA, is a waste drum storage area at ETTP designated for storage of waste received from off site, making this area subject to the Off-Site Waste and Recovery Operations standard. The Y-12 Steam Plant is subject to the Industrial Commercial, and Institutional Boilers and Process Heaters MACT Standard. The effective date for compliance with this standard is September 2007.

### 2.2.13.6 Stratospheric Ozone Protection

DOE remains committed to continued reductions in the use of regulated ozone-depleting substances (ODSs) and, where possible, replacing them with materials that have less ozone-depleting potential. For example, DOE has committed to replacing refrigeration appliances at all DOE installations if the appliances were installed before 1984, contain Class I ozone-depleting substances, and have cooling capacities of 150 tons or greater, except in certain cases where replacement is not economical and will not benefit the environment. All units meeting this criterion at ETTP, ORNL, and the Y-12 Complex have been evaluated and replaced.

### 2.2.13.7 Chemical Accident Release Prevention

All DOE sites on the ORR have determined that there are no processes or facilities containing inventories of chemicals in quantities exceeding thresholds specified in rules pursuant to Title III, Section 112(r), "Prevention of Accidental Releases." Therefore, no DOE sites are subject to this rule.

## 2.2.14 Toxic Substances Control Act

TSCA was passed in 1976 to address the manufacture, processing, distribution in commerce, use, and disposal of chemical substances

and mixtures that present an unreasonable risk of injury to human health or the environment. TSCA mandated that EPA identify and control chemical substances manufactured, processed, distributed in commerce, and used within the United States. EPA imposes strict information-gathering requirements on both new and existing chemical substances, including PCBs.

EPA's TSCA regulations present specific requirements for disposal of PCB wastes. TSCA requires disposal of certain PCB wastes in chemical waste landfills or incinerators and allows disposal of other PCB wastes (i.e., drained equipment with PCB concentrations below specific levels, PCB remediation wastes below specific levels, and PCB bulk product wastes) in certain permitted solid waste landfills. In the state of Tennessee, under TSCA regulations, TDEC requires a special waste review and approval for the disposal of PCB waste in solid waste landfills. Several special waste approvals for disposal of drained PCB equipment, and PCB bulk product waste (demolition debris and/or equipment coated with dried paint containing PCBs) at the Y-12 landfill have been approved by TDEC.

### 2.2.14.1 Polychlorinated Biphenyls

TSCA specifically bans the manufacture, processing, and distribution in commerce of PCBs but authorizes the continued use of some existing PCBs and PCB equipment. TSCA also imposes marking, storage, and disposal requirements for PCBs. The regulations governing PCBs mandated by TSCA are administered by EPA. Most of the regulatory requirements are matrix- and concentration-dependent. TDEC restricts PCBs from being disposed of in landfills and classifies PCBs as special wastes under Tennessee solid waste regulations. A special waste approval is required from the state of Tennessee to dispose of solid PCB-contaminated waste in certain permitted solid waste landfills. In the state of Tennessee, TDEC requires a special waste review and approval for the disposal of PCB waste in solid waste landfills. Several special waste approvals for receipt of drained PCB equipment, PCB remediation waste, and PCB bulk product waste (painted construction debris and/or equipment) at the Y-12 landfill have been approved by TDEC.

### 2.2.14.2 PCB Compliance Agreements

The Oak Ridge Reservation Polychlorinated Biphenyl Federal Facilities Compliance Agreement (ORR/PCB/FFCA) between EPA Region 4 and DOE-ORO became effective on December 16, 1996. The agreement addresses PCB compliance issues at ETTP, ORNL, the Y-12 Complex, and ORISE. It specifically addresses the unauthorized use of PCBs, storage and disposal of PCB wastes, PCB spill cleanup and/or decontamination, PCBs mixed with radioactive materials, PCB R&D, and records and reporting requirements for the ORR.

In 2006, UT-Battelle received and implemented a risk-based disposal approval from EPA for the management of PCB bulk product and PCB remediation waste for UT-Battelle operations at ORNL and at ORNL/Y-12.

### 2.2.14.3 Authorized and Unauthorized Uses of PCBs

Specific applications of PCBs are authorized by EPA for continued use under restricted conditions. A variety of PCB systems and equipment have been in service at the ORR during its 60-year history. Many of the systems and equipment were used in accordance with industry standards at the time, and their continued use was authorized under the 1979 PCB regulations. Systems that were authorized included transformers, capacitors, and other electrical distribution equipment; heat-transfer systems; and hydraulic systems. The vast majority of these PCB uses have been phased out on the ORR. Small amounts of PCBs remain in service in PCB light ballasts; however, ballasts containing PCBs are being replaced by non-PCB ballasts during normal maintenance. Most transformers that contained PCBs either have been retrofilled (replacement of PCB fluid with non-PCB dielectric fluid) to reduce the PCB concentration to below regulated limits or have been removed from service altogether.

The 1979 regulations did not anticipate the use of PCBs in many applications for which they were used. The proposals to the 1998 "Mega Rule" that would have addressed uses still prevalent on the ORR were omitted from the final rule. As a result, past uses not specifically

authorized continue to present compliance issues for DOE under TSCA.

At the ORR, unauthorized uses of PCBs have been found in building materials, lubricants, paint coatings, paint sealants, adhesives, and nonelectrical systems (including a rolling mill and a reactor-positioning device). More such unauthorized uses are likely to be found during the course of D&D activities. The most widespread of these unauthorized uses of PCBs are PCBs in paint and PCB-impregnated gaskets in the gaseous diffusion process motor ventilation systems at ETTP. The discoveries of such uses include rubber gasket components used to seal glove-box units, paint coatings used on hydraulic equipment at the Y-12 Complex, and interior and exterior wall paints. In 1998, ORNL reported finding PCBs at regulated levels in roofing paint used on Buildings 2000 and 2001. An annual sampling and monitoring plan was prepared and was submitted for the site. EPA approval of the sampling and monitoring plan was verbally issued on February 11, 1999. Annual monitoring has been conducted since 1999. Summaries of the 1999, 2002, 2003, 2004, and 2005 results of that sampling were submitted to EPA as required. Submittals of the 2000, 2001, and 2006 monitoring results were not required. In 2006, ORNL decontaminated the Building 2519 No. 5 Stack of its PCB-contaminated paint. In 2005, DOE notified EPA of issues regarding historical uses of PCBs associated with the calutron operations in Building 9204-3 (ORNL/Y-12) and proposed that those issues be addressed under the ORR/PCB/FFCA.

In 2006, BWXT Y-12 reported finding PCBs at regulated levels in interior and exterior paint for several facilities and/or their structural components. The Y-12 Complex issued notification letters to EPA, in accordance with the terms of the ORR/PCB/FFCA, declaring that a pre-TSCA PCB use had been discovered. Administrative controls and postings are in place to ensure that painted surfaces are not disturbed until proper evaluations are conducted. Additionally, administrative and engineering controls are used to ensure the protection of workers and the environment. Additionally in 2006, the Y-12 Complex reported finding regulated concentrations of PCBs in a hydraulic system in a building ventilation duct gasket and notified EPA Region 4 in accordance with the terms of the ORR/PCB/FFCA. Both the hydraulic system and the ventilation duct gasket are historical uses of PCBs and are being addressed under the ORR-PCB-FFCA.

In 1998, depleted uranium hexafluoride ($UF_6$) steel cylinders were found to contain high concentrations of PCBs in the paint. The ETTP notified EPA of the $UF_6$ cylinder population under terms of the compliance agreement. DOE obtained approval from Regions 4 and 5 to ship contaminated cylinders to the Portsmouth Gaseous Diffusion Plant in Portsmouth, Ohio, in 2005. Once the cylinders arrive at the Portsmouth plant, the product remaining in the cylinders is processed, and the cylinders are disposed of as PCB bulk product waste. The K-1066-B, and K-1066-E, K-1066-F, K-1066-J, K-1066-K and K-1066-LK cylinder storage yards are currently empty, and the K-1066-B yard demolition has been completed. The concrete rubble from the demolition of the K-1066-B concrete storage pad is planned for use as fill material for the on-site K-25 D&D Project.

In the fall of 2005, a notification was made to EPA Region 4 of the discovery of PCB contamination in Building K-1035, located at the ETTP. Due to the PCB contamination and several other unrelated issues, the property could not be cost-effectively transferred to CROET for long-term ownership as planned. Demolition of the building, which is scheduled to begin in 2007, depends upon DOE-EM funding levels. The building is identified in the CERCLA Federal Facilities Agreement and will be demolished in accordance with the CERCLA Remaining Facilities Demolition Action Memorandum decision document.

Building K-726, located at ETTP, previously contained materials contaminated with low-level uranium and was used as a PCB waste storage facility. In 1992, a container of PCB waste was discovered leaking onto the floor of the storage unit. The floor of the building underwent several decontamination attempts, but the contamination remained above regulatory limits. In 1996, in agreement with EPA Region 4, Building K-726 was added to the list of Environmental Restoration units in the Federal Facilities Agreement for future decontamination and demolition. In October of 2006, the K-726 Building was demolished, and approximately 516 $yd^3$ of PCB remediation waste debris was

generated from the demolition. The PCB waste generated from the demolition of the building was transported to the EMWMF for disposal.

In 1994, PCBs were discovered in the K-1206-E Firewater tower, located at ETTP. On September 29, 1995, EPA Region 4 concurred by letter with the DOE's proposed plan for the removal and management of the PCB-contaminated water within the tank and the firewater system. The proposed ORR/PCB/FFCA identified this tank for future action under the CERCLA Federal Facilities Agreement. The K-1206-E Firewater Tower was demolished in June 2006 and the waste was disposed of in the Y-12 Landfill as PCB bulk product waste.

### 2.2.14.4 ETTP TSCA Incinerator PCB Disposal Approval

The ETTP TSCA Incinerator is currently operating under an extension of EPA Region 4 approval granted on March 20, 1989. This extension is based on submittal of a reapplication for PCB disposal approval filed with EPA Region 4 on December 20, 1991, which was within the time frame allowed for reapplication. Minor amendments, updates, and corrections to this reapplication identified by DOE have been made in the interim and have been submitted to EPA. Since the submittal of the December 20, 1991, reapplication, a joint RCRA/PCB permit reapplication has been under development. This joint reapplication was submitted in March 1997 to TDEC under RCRA for treatment of hazardous wastes and to EPA Region 4 for disposal of PCB wastes. The new reapplication will replace the December 20, 1991, PCB disposal reapplication. In anticipation of this joint application, EPA Region 4 has delayed action on renewal of the PCB incineration approval.

## 2.2.15 Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act (EPCRA), also referred to as SARA Title III, requires reporting to federal, state, and local authorities of emergency planning information, hazardous chemical inventories, and releases of certain toxic chemicals to the environment. The ongoing requirements are contained in Sects. 302, 303, 304, 311, 312, and 313 of EPCRA and in 40 CFR Parts 355, 370, and 372. Table 2.10 describes the main parts of EPCRA. All DOE-ORO sites in Oak Ridge are in compliance with all aspects of EPCRA. Executive Order 13148, "Greening the Government Through Leadership in Environmental Management," requires all federal agencies to comply with provisions of EPCRA and the Pollution Prevention Act.

### 2.2.15.1 Planning Notification and Extremely Hazardous Substance Release Notifications (Sections 302–304)

The ORR did not have any releases of extremely hazardous substances, as defined by EPCRA, in 2006.

### 2.2.15.2 Material Safety Data Sheet/Chemical Inventory (Sections 311–312)

The required Sect. 311 notifications were made as hazardous materials were determined to be over threshold for the first time. Inventories, locations, and associated hazards of hazardous and extremely hazardous chemicals were submitted in an annual report to state and local emergency responders as required by the Sect. 312 requirements. Of the chemicals identified for CY 2006 on the ORR, 66 were located at the Y-12 Complex, 31 at ORNL, and 12 at ETTP.

Private-sector lessees associated with the reindustrialization effort were not included in the CY 2006 submittals. Under the terms of their lease, lessees must evaluate their own inventories of hazardous and extremely hazardous chemicals and must submit information as required by the regulations.

### 2.2.15.3 Toxic Chemical Release Reporting (Section 313)

DOE submits annual toxic release inventory reports to EPA and TDEC on or before July 1 of each year. The reports cover the previous calendar year and address releases of certain toxic chemicals to air, water, and land as well as waste management, recycling, and pollution prevention activities. Threshold determinations and reports for each of the ORR facilities are made separately. Operations involving toxic release

**Table 2.10. Descriptions of the main parts of The Emergency Planning and Community Right-to-Know Act (EPCRA)**

| Title | Description |
|---|---|
| Sections 302–303, Planning notification | Requires that local planning committee and state emergency response commission be notified of EPCRA-related planning |
| Section 304, Extremely hazardous substance release notification | Addresses reporting to state and local authorities of off-site releases |
| Section 311–312, Material safety data sheet (MSDS)/chemical inventory | Requires that either MSDSs or lists of hazardous chemicals for which MSDSs are required be provided to state and local authorities for emergency planning. Requires that an inventory of hazardous chemicals maintained in quantities over thresholds be reported annually to the Environmental Protection Agency. |
| Section 313, Toxic chemical release reporting | Requires that releases of toxic chemicals be reported annually to the Environmental Protection Agency |

inventory chemicals were compared with regulatory thresholds to determine which chemicals exceeded the reporting thresholds based on amounts manufactured, processed, or otherwise used at each facility. After threshold determinations were made, releases and off-site transfers were calculated for each chemical that exceeded one or more of the thresholds.

The following text explains how the reporting thresholds were exceeded. Table 2.11 summarizes releases and off-site transfers for those chemicals exceeding reporting thresholds.

## Y-12 Complex

Total 2006 reportable toxic releases to air, water, and land and waste transferred off site for treatment, disposal, and recycling were more than the amounts reported for the Y-12 Complex in 2005. This was the result of increased methanol usage in the methanol brine system. The following list describes the reported chemicals for the Y-12 Complex.

- **Chromium, copper, and nickel.** The processing threshold for each of these metals was exceeded as a result of off-site metal recycling and metal machining and welding operations.
- S**ulfuric acid (aerosol form).** Sulfuric acid aerosols were coincidentally manufactured in excess of the reporting threshold as a combustion by-product from burning coal at the steam plant.
- **Lead and lead compounds.** The "otherwise-use" threshold for lead was exceeded at the steam plant and at the Central Training Facility firing range. The processing threshold for lead was exceeded as a result of off-site metal for recycling.
- **Mercury and mercury compounds.** Mercury compounds were otherwise used and coincidently manufactured as a combustion by-product from burning coal in excess of the 10-lb reporting threshold at the steam plant.
- **Methanol.** Most of the methanol at the Y-12 Complex is otherwise used in the chiller buildings for the brine-methanol system.
- **Nitrate compounds.** Nitrate compounds were coincidentally manufactured in excess of the reporting threshold as by-products of neutralizing nitric acid wastes and in the sanitary sewer. The compounds are also contained in various mixtures used throughout the complex.
- **Nitric acid.** Nitric acid was used in excess of the otherwise-use threshold as a chemical-processing aid.

## ETTP

The otherwise-use activity threshold for PCBs was exceeded at ETTP by the incineration of PCBs in waste received from off site in the TSCA Incinerator.

**Table 2.11. EPCRA Section 313 toxic chemical release and off-site transfer summary for the ORR, 2006**

| | Year | Quantity (lb)[a] | | | |
|---|---|---|---|---|---|
| | | Y-12 Complex | ORNL | ETTP | Total |
| Chlorine | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | 34,698 | 34,698 |
| Chromium | 2005 | 1,274 | *b* | *b* | 1,274 |
| | 2006 | *c* | *b* | *b* | *b,c* |
| Cobalt | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | *b* | *b* |
| Copper | 2005 | 932 | *b* | *b* | 932 |
| | 2006 | *c* | *b* | *b* | *b,c* |
| Copper/copper compounds | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *c* | *b* | *b* | *b,c* |
| Freon 11 | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | *b* | *b* |
| Freon 113 | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | *b* | *b* |
| Hexachlorobenzene | 2005 | *b* | *b* | *160* | 160 |
| | 2006 | *b* | *b* | 19 | 19 |
| Hydrochloric acid (aerosol) | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | 35,685 | 35,685 |
| Lead/lead compounds | 2005 | 9,626 | *b* | *b* | 9,626 |
| | 2006 | 10,049 | *b* | *b* | 10,049 |
| Manganese | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | *b* | *b* |
| Mercury/mercury compounds | 2005 | 109 | *b* | *b* | 109 |
| | 2006 | 39 | *b* | *b* | 39 |
| Methanol | 2005 | 34,307 | *b* | *b* | 34,307 |
| | 2006 | 140,840 | *b* | *b* | 140,840 |
| Nickel | 2005 | 3,393 | *b* | *b* | 3,393 |
| | 2006 | *c* | *b* | *b* | *b,c* |
| Nitrate compounds | 2005 | 7,922 | 51,000 | *b* | 58,922 |
| | 2006 | 0 | 51,000 | *b* | 51,000 |
| Nitric acid | 2005 | 18,701 | 53,990 | *b* | 72,691 |
| | 2006 | *c* | 54,013 | *b* | 54,013 |
| Ozone | 2005 | *b* | *b* | *b* | *b* |
| | 2006 | *b* | *b* | *b* | *b* |
| PCBs | 2005 | *b* | *b* | 2,951 | 2,951 |
| | 2006 | *b* | *b* | 77,261 | 77,261 |
| Sulfuric acid (aerosol) | 2005 | 52,000 | *b* | *b* | 52,000 |
| | 2006 | 52,000 | *b* | *b* | 52,000 |
| Total | 2005 | 128,264 | 104,990 | 3,111 | 236,365 |
| | 2006 | 202,928 | 105,013 | 147,663 | 455,604 |

[a]Represents total releases to air, land, and water and includes off-site waste transfers. Also includes quantities released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes. 1 lb = 0.45359237 kg.

[b]No reportable releases because the site did not exceed the applicable Toxic Release Inventory reporting thresholds.

[c]Not applicable because releases were less than 5000 lb, and hence a Form A was submitted.

### ORNL

ORNL reported nitric acid and nitrate compounds. Lead metal was not reported again for 2006 because the lead shop has been shut down since October 2004. Nitric acid is used to regenerate ion-exchange columns at the Process Waste Treatment Complex and at the HFIR, in the separation process for californium by the Nuclear Science and Technology Division, and for pH adjustment at the Process Waste Treatment Complex. Nitrate compounds are coincidentally manufactured as by-products of neutralizing nitric acid waste and as by-products of sewage treatment.

## 2.2.16 Environmental Occurrences

CERCLA requires that the National Response Center be notified if a nonpermitted release of a reportable quantity or more of a hazardous substance (including radionuclides) is released to the environment within a 24-h period. The CWA requires that the National Response Center be notified if an oil spill causes a harmful-quantity release on navigable waters, such as rivers, lakes, or streams. When notified, the National Response Center alerts federal, state, and local regulatory emergency organizations for determination of appropriate government response.

There were no releases of hazardous substances exceeding reportable quantities, no reportable oil sheens, and no fish kills at Y-12 during 2006. There were two events that triggered occurrence reports under DOE's Occurrence Reporting System, but neither resulted in an environmental impact. On January 12, 2006, demolition and modification of small chiller building resulted in overflow of a small amount of brine (21% methanol and water) into the storm sewer system. On March 30, 2006, a random survey of a two-wheeled hand truck/dolly by the TDEC Division of Radiological Health found radiological contamination on a tire at the excess Property Sales building. The dolly never entered the public domain and was returned to the Y-12 Complex.

At ETTP, on November 27, 2006, during a routine weekly NPDES storm water sampling event, a noncompliance with the NPDES Permit limit for total residual chlorine (TRC) concentration was identified at storm water outfall 100. The sample result was 0.20 mg/L. This result exceeded the NPDES Permit limit for TRC for that outfall, which is a daily maximum concentration of 0.140 mg/L.

On November 28, 2006, field investigations were initiated by environmental subcontractor personnel to identify the source of the TRC in the discharge from outfall 100. Based on that investigation, the source of the TRC was thought to be an underground sanitary water line break in the vicinity of the northwest corner of the K-1006 building. The exact location of the water line break could not be determined at the time of the investigation. Also on November 28, 2006, the ETTP utilities contractor began deploying dechlorination tablets into the outfall 100 drainage network. Field monitoring of the TRC levels upstream and downstream of the dechlorination tablets was performed on a daily basis to evaluate the effectiveness of the dechlorination tablets in the removal of TRC from the outfall 100 discharge. The dechlorination tablets remained in the outfall 100 drainage network until the broken sanitary water line was repaired. On December 15, 2006, excavation of the broken sanitary water line was completed, and repairs to the pipe were made.

On December 11, 2006, during routine NPDES permit compliance sampling activities, sampling subcontractor personnel observed several dead fish in the riprap-lined channel that transports discharges from the outfall 100 storm drain network to the K-1007-P1 Pond. Initial examination of the dead fish did not identify any obvious causes for their deaths. However, levels of TRC upstream of the outfall 100 discharge channel continued to be elevated because the location of the water line break had still not been found.

On December 12, 2006, storm water outfall 100 was revisited to determine whether additional dead fish were present. A large number of dead and dying fish were noted during this visit. ORNL Environmental Sciences Division personnel were contacted to collect the dead and dying fish in an effort to determine the cause of the fish kill. They collected or visually counted 811 dead fish. Because some of the fish could not be recovered, it was estimated that the total mortality was in excess of 1000 fish.

Outfall 100 and the K-1007-P1 pond were visited several times daily between December 12, 2006, the day after the fish kill was noted,

and December 15, 2006, when the sanitary water line break was repaired. Observations of those areas revealed that there were no additional dead or distressed fish.

One reportable oil sheen occurred at ORNL in 2006. On November 16, 2006, a utility contractor's street sweeper leaked hydraulic fluid on Bethel Valley Road, and runoff from the area of the incident caused a visible sheen on White Oak Creek. Spill response staff immediately placed absorbents, including spill booms, to contain the release and to minimize the extent of the sheen. The incident did not cause any discernable impact on fish or other aquatic species. The release was reported to the National Response Center on November 16.

### 2.2.17 DOE Order 450.1, Environmental Protection Program

DOE Order 450.1, "Environmental Protection Program," encompasses environmental management systems (EMSs), pollution prevention, affirmative procurement, ozone-depleting substances, energy management and fleet management, and beneficial landscaping requirements. The order affirms DOE's approach to improving environmental performance through the use of management systems and aggressive pollution prevention initiatives.

The ORR sites are addressing the requirements of the order as well as all other requirements related to those areas. The 2006 efforts and associated results across the ORR are summarized in the remainder of this section.

#### 2.2.17.1 Implementation of Environmental Management Systems

The EMSs and Integrated Safety Management Systems (ISMSs) at DOE facilities are integrated to provide a unified strategy for the management of resources; the control and attenuation of risks; and the establishment and achievement of the organization's environment, safety, and health goals. ISMS and EMS both strive for continual improvement through a "plan-do-check-act" cycle. Under ISMS, the term "safety" also encompasses environmental safety and health, including pollution prevention, waste minimization, and resource conservation. Therefore, the guiding principles and core functions in ISMS are as applicable to the protection of the environment as they are to safety. Figure 2.2 depicts the relationship between EMS and ISMS.

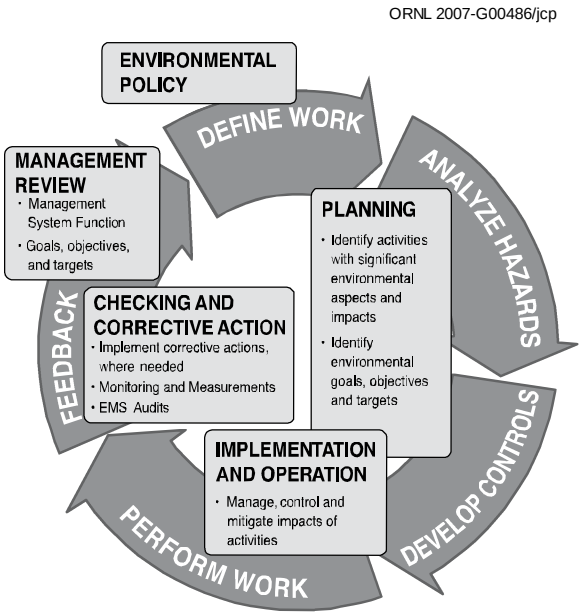


**Fig. 2.2. The relationship between environmental management systems and the Integrated Safety Management System.**

UT-Battelle, as the management and operating contractor for ORNL, and BWXT Y-12 have both chosen to implement EMSs that are modeled after the international standard established by the International Organization for Standardization (ISO) 14001. The purpose of the EMSs is to achieve, maintain, and demonstrate continuing environmental improvement by assessing and controlling the impact of activities and facilities on the environment. The system is designed to ensure that activities are in compliance with environmental laws and regulations, and it provides a framework for integrating compliance, pollution prevention, and other environmental considerations into the planning and implementation phases of site activities. The ISO 14001 EMS is consistent with ISMS core functions and guiding principles and includes the following features:

- policy,
- identified significant environmental aspects and controls,
- applicable legal requirements,

- objectives and targets,
- training requirements,
- communication with stakeholders,
- records and document control requirements,
- monitoring and measurement requirements,
- an emergency preparedness and response program, and
- provisions for handling nonconformances and corrective/preventive actions.

Environmental aspects are elements of an organization's activities, products, or services that can interact with the environment. In the ISMS, these may be thought of as environmental hazards associated with a facility operation or work activity.

## UT-Battelle EMS Implementation Status

The UT-Battelle EMS is integrated into ISMS through the work control process. All significant environmental aspects are incorporated into work control to ensure that appropriate controls are in place.

In 2004, UT-Battelle's EMS was registered to the ISO 14001 Standard by a third-party registrar. In July 2006, NSF International Strategic Registrations, Ltd., conducted a surveillance audit of the ORNL EMS to ensure continued conformance to the ISO 14001:2004 requirements. No major nonconformances were noted by the audit team. One minor nonconformance, related to document control, was promptly resolved. A number of noteworthy practices were also identified. ORNL was recognized for its outstanding environmental management system and compliance record in 2007 by being accepted into the EPA's National Performance Track Program.

ISO 14001 encourages organizations to provide information on environmental policy and significant environmental aspects of their activities.

The UT-Battelle Policy for ORNL is a high-level document that contains scientific; technical; and environment, safety, and health commitments. As required by ISO 14001, the policy contains commitments to (1) comply with applicable requirements, (2) prevent pollution, and (3) continually improve. The environmental policy statements in the UT-Battelle Policy for ORNL are available on the external web site (http://train.ornl.gov/wbt/EnvPolicy.cfm).

UT-Battelle has identified the following aspects as potentially having significant environmental impacts:

- hazardous waste,
- radioactive waste,
- mixed waste,
- PCB waste,
- permitted air emissions,
- regulated liquid discharges,
- storage or use of chemicals or radioactive materials.

Activities containing these aspects are carefully controlled to minimize or eliminate impacts to the environment. Monitoring activities associated with these aspects are described in Chaps. 3, 5, and 7.

## BWXT Y-12 EMS Implementation Status

BWXT Y-12 has self-declared implementation of an EMS based on the principles of the ISO 14001 standard and has integrated the EMS with the BWXT Y-12 ISMS policies and procedures. Y-12 made the self-declaration after verifying and validating implementation based on a second-party independent assessment.

There is a synergistic relationship between the Y-12 EMS and the Pollution Prevention Program with the pollution prevention implementation playing an integral part. In concert, the EMS provides a forward-thinking framework for environmental management that supports the recognition and implementation of pollution prevention.

Our environment, safety and health policy contains environmental commitments required by ISO 14001 to

- protect the environment,
- prevent pollution,
- comply with applicable legal and other requirements, and
- continually improve.

Y-12's policy has been communicated to all its employees, and they know and understand how the commitments relate to their work activities.

Y-12 has evaluated its activities and services to identify those activities with a potential to impact the environment. Activities involving these aspects are evaluated and are controlled to minimize potential impacts to the environment. Monitoring activities associated with these aspects are described in Chaps. 6 and 7. The following aspects have been identified as potentially having significant environmental impact:

- waste generation—excess materials and chemicals and low-level radiological, hazardous, mixed, PCB universal, special industrial, medical, and sanitary wastes;
- air emissions—criteria pollutants, hazardous air pollutants and other nonradiological air contaminants, ozone, and radiological emissions;
- liquid discharges—process wastewater, cooling water, sanitary wastewater, flow management discharges, and chlorinated water discharges;
- potential releases from spills, leaks, and runoff—storage of radiological and nonradiological materials, oil and gas, waste, storm water runoff;
- spread of legacy contamination—historical waste management units, legacy mercury and PCB spills, demolition of excess and surplus facilities, and groundwater contamination;
- interactions with historical and cultural resources and wildlife habitat;
- natural resource consumption—power and energy use; and
- natural resource conservation—purchasing materials with recycled content, recycling, and preventing pollution.

Each year environmental objectives and targets (goals) that are consistent with the environmental policy and reflect our commitment to pollution prevention and continual improvement are established at the Y-12 Complex. During 2006 Y-12 accomplished the following goals that had been established at the beginning of the year:

- reduced inventory of ozone-depleting substances by more the 5000 lb,
- implemented a plan to survey sanitary sewer in-flow/infiltration,
- implemented 100% use of E-85 (85% ethanol) in flex fuel vehicles in fleet (76 vehicles),
- eliminated 5% of the outdoor LLW storage areas,
- completed FY 2006 milestone for mixed waste disposition,
- recycled 34,020 metric tons of material in FY 2006,
- reduced visible mercury from a storm drain,
- achieved 11.4% reduction in energy use (relative to 2004 baseline),
- achieved 44% reduction in number of storm water outfalls requiring monitoring, and
- achieved progress in implementing sustainability principles in design and construction of new facilities.

## BJC EMS Implementation Status

BJC uses ISMS core functions and guiding principles to integrate EMS considerations into work activities. By integrating EMS considerations within the elements of ISMS, the BJC Environment, Safety, and Health Organization provides procedures and processes for identifying environmental protection controls and compliance impacts and concerns prior to performing a scope of work, during work activities, and after the work is completed. Issued in September 2000, the BJC environmental management policy is a key attribute of the EMS. The policy reflects the mission, goals, and responsibilities of the company with respect to environmental aspects and impacts, including pollution prevention. At the beginning of each project, subject-matter experts, called "environmental compliance and protection leads," are assigned to each subcontractor's work activity to support the formation of project and subproject teams in identifying and analyzing environmental hazards and in implementing controls that comply with DOE Work Smart Standards and applicable laws and regulations. The EMS is supported by communication between BJC and its subcontractors through the project's environmental compliance and protection lead. The EMS ensures that periodic assessments against the EMS attributes are conducted to evaluate the ISMS performance of each project and the subcontractor in charge of managing the project.

During 2005 BJC updated the company's ISMS description document to incorporate EMS,

completed implementation of an Awareness Training Program on the EMS, and updated the self-performed EMS implementation gap analysis initiated in 2003. During 2005 BJC formally identified six significant environmental aspects and 48 accompanying activities that could result in environmental impacts, six targets, and five objectives for the EMS and integrated these into the ISMS description. BJC performed an independent assessment of the EMS in September 2005 to confirm that the system met all requirements under DOE Order 450.1, "Environmental Protection Program." In December 2005, BJC formally self-declared to DOE-ORO that the EMS was fully implemented to meet both the DOE order and Executive Order 13148.

### 2.2.17.2 Pollution Prevention

During 2006, the ORR continued to implement a substantial number of pollution prevention projects. Results are summarized by program secretarial office in Table 2.12. The EM Program at the ETTP site is also using Six Sigma projects as a means of capturing additional pollution prevention project-related data. The project-specific waste volume reduction and cost avoidance data are not as yet being reported as it is confidential information proprietary to Bechtel Jacobs Company, LLC, and undergoes a review prior to public release. Pollution-prevention-specific information is also available on the DOE pollution prevention homepage (http://www.eh.doe.gov/p2/).

The ORR sites' pollution prevention programs are driven by federal and state laws and regulations; executive orders; and DOE policies, notices, and orders. During 2006, in addition to supporting the implementation of pollution prevention projects, the ORR facilities performed activities to ensure that both the requirements established by DOE Order 450.1 and all other existing requirements were addressed.

In December 2005, DOE issued DOE Order 450.1, Change 2, "Environmental Protection Program." An integral part of the order was the establishment of new, more qualitative EMS-related pollution prevention performance goals and strategies. The new goals and strategies replace the prior quantitative goals, which have been declared achieved by DOE Headquarters. The ORR facilities must complete pollution-prevention-related requirements such as planning and reporting to comply with many regulatory requirements, including RCRA, the Tennessee Hazardous Waste Reduction Act, and the EPCRA/Pollution Prevention Act. The ORR facilities must also comply with DOE requirements, including the reporting of pollution prevention project and program activities. The *Annual Report on Waste Generation and Pollution Prevention Progress*, the annual *Environmentally Preferable Purchasing Report*, and reports on pollution prevention projects completed by each site are designed to provide data used to measure progress. Reported reduction results for

**Table 2.12. ORR pollution prevention project implementation results summary, 2006[a]**

| Program secretarial office | Total projects reported in FY 2006 | Total quantity of waste reduced in FY 2006 (MT) | Total cost avoidance in FY 2006 ($M) |
|---|---|---|---|
| NNSA | 84 | 138,609.52 | 5.7 |
| EM | 12 | 13,715.1 | *b* |
| SC/Other R&D | 26 | 1,708.51 | 3.7 |

[a]Abbreviations:
EM Environmental Management
NNSA National Nuclear Security Administration
R&D research and development
SC Office of Science

[b]Bechtel Jacobs Company, LLC, proprietary information.

FY 2006 (percentages based on a 1993 baseline) are summarized by program secretarial office or by the site as appropriate in Table 2.13.

provides national-level DOE waste management and cleanup data to the public.

**Table 2.13. ORR affirmative procurement and waste reduction progress summary, 2006[a]**

| Program secretarial office | Waste reduction by office (%)[b] | | | | Site | Sanitary waste reduction by site (%)[b] | |
|---|---|---|---|---|---|---|---|
| | Transuranic | Mixed low-level and RCRA | Low-level waste | Affirmative procurement | | Landfill | Recycling |
| NNSA | N/A | 97 | 78 | 94 | Y-12 | 88 | 71 |
| EM | N/A | *c* | *c* | 84 | ETTP | *d* | *d* |
| SC/Other R&D | 67 | 72 | 76 | 19 | ORNL | 47 | 52 |

[a]Abbreviations:

| | |
|---|---|
| EM | Environmental Management. |
| NNSA | National Nuclear Security Administration |
| RCRA | Resource Conservation and Recovery Act |
| SC | Office of Science |
| R&D | research and development |

[b]Percentages based on a 1993 baseline.

[c]The facilities at ETTP are undergoing decontamination and decommissioning (D&D) to support privatization and reindustrialization of ETTP or for demolition as part of site closure activities. The accelerated closure contract has and is resulting in increased waste generation volumes. As a result, waste generation from on-site DOE activities is expected to fluctuate significantly from year to year. Also, the DOE Office of Environmental, Safety, and Health did not require EM sites to report waste generation data beginning in FY 2006.

[d]As a result of ongoing D&D activities at the ETTP site as well as those activities associated with the accelerated closure contract on-site recycling activities can be expected to fluctuate significantly from year to year.

The ORR also supports DOE's efforts of reducing off-site releases and transfers of toxic chemicals by assessing operations associated with releases and transfers. However, because of substantial changes since 1993 in the operations included in the EPCRA-related reporting from which these values are obtained, the ORR does not anticipate an overall reduction when compared with the 1993 baseline. Information on program secretarial office-specific and site-specific waste generation, recycling, and environmentally preferable purchasing is available on the DOE pollution prevention homepage (http://www.eh.doe.gov/p2/).

Additionally, each site's data are included in DOE's complex-wide reports. Elements of DOE's annual reports are extracted and are included in DOE's central internet database, which

In FY 2006, ORR-related activities received the following pollution-prevention awards in recognition of specific 2005 pollution-prevention accomplishments.

- 2006 DOE Office of Science Pollution Prevention—Best in Class Award. ORNL received the award for Overall Laboratory Operations. Specifically, ORNL was recognized for leadership in the development and implementation of Conceptual Landscape Plan Design Guidelines, implementation of a Green Transportation Initiative, continued evaluation and implementation of source-reduction technologies, and implementation of new recycling initiatives.
- BWXT Y-12 was awarded the 2006 White House Closing the Circle Award—Partnering at Y-12 through Y-12's Multiorganizational Reduce/Reuse/Recycle Team.
- BWXT Y-12 was awarded the FY 2006 NNSA Pollution Prevention Award for FY 2005 Environmental Stewardship Best in

Class Award—Recycling Category—Partnering at Y-12 through Y-12's Multiorganizational Reduce/Reuse/Recycle Team.
- BWXT Y-12 was awarded the FY 2006 NNSA Pollution Prevention Award for FY 2005 Environmental Stewardship Award—Waste/Pollution Prevention Category—Y-12 Oil-Free Vacuum Pump Implementation.
- BWXT Y-12 was awarded the 2005 Defense Programs Award of Excellence for 2004 Activities—Y-12 Pollution Prevention Awareness and Outreach Team.
- BWXT Y-12 was awarded the Tennessee Chamber of Commerce and Industry 2006 Comprehensive Environmental Excellence Award.
- BWXT Y-12 was awarded the Tennessee Chamber of Commerce and Industry 2006 Hazardous Waste Management Achievement Certificate.
- BWXT Y-12 was awarded the Tennessee Chamber of Commerce and Industry 2006 Solid Waste Management Achievement Certificate.
- BWXT Y-12 was awarded the Tennessee Chamber of Commerce and Industry 2006 Air Quality Achievement Certificate.

To support future pollution prevention implementation, compliance, and goal achievement, the ORR sites' pollution prevention programs continue to pursue site projects, perform required activities, and complete required reporting.

### 2.2.17.3 Ozone-Depleting Substances Phase-Out Efforts

Significant progress has been made in eliminating use of Class I and Class II ozone-depleting substances at the Y-12 Complex, and a number of projects have been identified to further reduce ozone-depleting substance uses. The Y-12 Complex Ozone Depleting Substances (ODS) Phase-Out and Management Plan (Y-12 2003), was revised and updated in June 2005 and provides a complete discussion of requirements and compliance activities at the Y-12 Complex.

Y-12 has implemented an ongoing program to identify and retrofit or replace chillers that use Class I ODSs to satisfy DOE goals and requirements. As of March 2004, the Y-12 Complex had replaced all of their large-capacity chillers (> 150 tons) containing Class I ODSs. In 2006, Y-12 shipped more than 6000 lb of R-11 to the Defense Logistics Agency as a result of retrofit and demolition of chillers.

ORNL has implemented a plan to eliminate the use of Class I ODSs. The plan includes the replacement, retrofit, or decommissioning of all chillers that require Class I substances, the gradual phaseout of smaller refrigeration systems that require Class I substances, the elimination of all fire-protection systems that use Class I substances, and the elimination of all other systems or processes that require Class I substances. Currently, as the small refrigeration systems such as refrigerators and window air conditioners fail, they are replaced with new units that use Class II or unregulated refrigerants.

ETTP completed the phaseout of Class I ODS equipment in the mid-90s. At that time, ETTP surplused and moved all Class I ODSs to other DOE sites so they are no longer part of the ETTP ODS inventory.

### 2.2.17.4 Energy Management (Including Fleet Management)

BWXT Y-12 prepared a multiyear Energy Management Plan that defines the general energy requirements of the Y-12 Complex and provides a brief history of energy-reduction efforts and a timetable for further energy-saving measures. The primary focus for energy conservation is on electricity, with secondary concentrations on reducing the use of natural gas, fuel (gasoline and diesel), coal, and water.

Over the past 15 years, the energy consumption at the Y-12 Complex has been reduced by more than 40%. Much of the reduction came as a result of reduced production activities and energy-savings measures, such as replacing chillers, eliminating cooling towers, and regularly overhauling steam plant boilers.

ORNL's Energy Management and Implementation Plan outlines the strategy for managing and implementing short- and long-range energy-related activities. As a result of ORNL's emphasis on energy and utilities management and projects, standard building energy intensity

has been reduced by approximately 7% compared with FY 2005 usage (based on British thermal units per gross square foot). FY 2005 is the Energy Policy Act 2005 baseline year for building energy intensity reductions. Specific activities include the following.

- **Energy Star.** ORNL currently has two EPA Energy Star buildings, and FY 2007 energy-efficiency modifications are expected to result in additional Energy Star awards in FY 2008.
- **Leadership in Energy and Environmental Design (LEED®) and Sustainability.** The recent East Campus Modernization project at ORNL used third-party financing to add three buildings and more than 300,000 $ft^2$ of energy-efficient office, laboratory, and computer space and achieve a savings of $0.5 million in annual energy costs (30% savings compared with the baseline conventional design). All three facilities have been approved by the U.S. Green Building Council as LEED-certified. Additionally, a fourth building has been LEED-certified, and a fifth building in the grouping has been certified LEED-Silver. A sixth building has recently been certified LEED-Gold. Modernization efforts at Y-12 have incorporated many LEED-guided sustainable building practices and techniques into the design and construction of the Jack Case and New Hope centers with New Hope pursuing LEED certification (see Sect. 6.11.3).
- **Chlorinated fluorocarbon (CFC) reductions.** As part of an aggressive chiller replacement program, ORNL has replaced 18 chillers, totaling 9,060 tons in cooling capacity, well ahead of legislated requirements. As a result, chiller energy use has dropped an average of 21% for an annual savings of $300 thousand, and CFC emissions have been cut by more than 5000 lb/year. The chiller replacement program has effected an electrical demand reduction of approximately 1 MW.
- **Water savings.** Water-related projects and management efforts have resulted in water usage being reduced by 276.4 million gal (24.5%) since FY 2000.
- **Green power.** ORNL participates in TVA's "Green Power Switch" program. ORNL was TVA's first industrial green power participant and purchases 675 MWh in green power annually.
- **Distributed energy resource.** In FY 2001 a natural-gas-fired microturbine was installed by the ORNL Engineering, Science, and Technology Division, and it continues in service. The turbine is tied into the TVA electrical power grid and can generate 30 kW of power. The turbine can be remotely monitored, started, and stopped. Although it is tied into the electrical power grid, the turbine is primarily being used for research in the area of enhancing the energy efficiency of components and systems.
- **Greenhouse gas emission reductions.** Even though the gross square footage of nonprocess facilities at ORNL has increased almost 34% since FY 1995, improvements at the central steam plant has reduced $CO_2$-equivalent greenhouse gas emissions by 26.82% over the same time period.
- **Vehicle fleet management.** ORNL and Y-12 are working to minimize the use of petroleum-based fuels in the vehicle fleet. To minimize gasoline consumption, ORNL has put 91 ethanol-burning vehicles in service, and Y-12 has put 76 into service. Additional alternative-fuel vehicles are being added to the fleet as funding allows. E-85, a mixture of 85% ethanol and 15% petroleum, is available at the ORNL Garage and at Y-12 for use in flex fuel vehicles in the fleet. Approximately 13% of the vehicles in the ORNL fleet are flex fuel vehicles, and the number of petroleum vehicles continues to be downsized.

### 2.2.17.5 Beneficial Landscaping Practices

DOE Order 450.1 incorporates Executive Order 13148, "Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds." The guidance applicable to DOE-site landscaping includes

- use of regionally native plants for landscaping;
- design, use, or promotion of construction practices that minimize adverse effects on the natural habitat;
- seeking to prevent pollution;

- implementing water- and energy-efficient practices;
- creating outdoor demonstration projects; and
- other initiatives.

Y-12/NNSA partners with ORNL regarding stewardship responsibilities for lands on the ORR. Y-12 requires extensive use of erosion controls in construction projects (e.g., use of settling ponds and storm water detention areas), minimal use of water for irrigation, and use of trees where possible to provide shade for energy conservation. Active environmental compliance and preservation programs, such as an ongoing sitewide Pollution Prevention Program, Storm Water Pollution Prevention Plan activities, and policies requiring minimal use of pesticides and fertilizers also minimize environmental impacts. Additionally, Y-12 has limited its modernization construction to brownfield sites, thereby preserving ORR greenfield space.

ORNL has various ongoing programs and initiatives that involve or facilitate environmentally and economically beneficial landscaping practices:

- incorporation of native plants into planning for restoration or landscaping in areas across ORNL;
- development of the ORNL Conceptual Landscape Plan and Design Guidelines, which calls for use of native plant species;
- use of an internal stream corridor protection effort to encourage the growth of native plants in the riparian zone surrounding ORNL creeks;
- the formation of an informal interagency Native Grass Working Group;
- integration of native-plant requirements into facilities-development projects;
- evaluation of upcoming projects by the ORNL Land and Facilities Use Committee on potential impacts, including impact on natural habitat;
- creation of an ongoing sitewide Pollution Prevention Program and a Storm Water Pollution Prevention Plan and Program;
- minimal use of pesticides and fertilizers, and use of organic fertilizers;
- extensive use of erosion controls in construction projects (e.g., settling ponds and bioretention areas);
- minimal use of water for irrigation;
- incorporation of plants into project designs for energy conservation by providing shade and cooling to paved surfaces;
- provision of public-awareness interaction on invasive plants, nuisance wildlife, and restoration of native grasses;
- use of brownfield areas for siting new ORNL developments, when practicable; and
- implementation of an interagency cooperative agreement on conversion of TVA power-line rights-of-way from fescue grass to native grasses and shrubs.

## 2.2.18 Release of Property

DOE Order 5400.5 establishes standards and requirements for operations of DOE and its contractors with respect to protection of members of the public and the environment against undue risk from radiation. In addition to discharges to the environment, the release of property containing residual radioactive material is a potential contributor to the dose received by the public, and DOE Order 5400.5 specifies limits for unrestricted release of property to the public.

BWXT Y-12, UT Battelle, and BJC each utilize a graded approach for release of material and equipment for unrestricted use by the public. Material has been categorized so that in some cases an administrative release can be accomplished without a radiological survey. Such material originates from nonradiological areas and includes the following:

- documents, mail, diskettes, compact disks, and other office media;
- nonradioactive items or materials received that are immediately (within the same shift) determined to have been misdelivered or damaged;
- personal items or materials;
- paper, plastic products, aluminum beverage cans, toner cartridges, and other items released for recycling;
- office trash;
- nonradiological area housekeeping materials and associated waste;
- break-room, cafeteria, and medical wastes;
- medical and bioassay samples; and
- other items with an approved release plan.

Items originating from nonradiological areas within the sites' controlled areas not in the listed categories are surveyed prior to release to the

public, or a process knowledge evaluation is conducted to ensure that material has not been exposed to radioactive material or beams of radiation capable of creating radioactive material. In some cases both a radiological survey and a process knowledge evaluation are performed (e.g., a radiological survey is conducted on the outside of the item, and a process knowledge form is signed by the custodian for inaccessible surfaces.) When the process knowledge approach is employed, the item's custodian is required to sign a statement that specifies the history of the material and that confirms that no radioactive material has passed through or contacted the item. Items advertised for public sale via an auction are also surveyed on a random basis by state of Tennessee personnel, giving further assurance that material and equipment are not being released with inadvertent contamination.

A similar approach is used for material released to state-permitted landfills on the ORR. The only exception is for items that could be contaminated in depth; items contaminated in depth are also sampled by laboratory analysis to ensure that landfill permit criteria are met.

ORR contractors continue to follow the requirements of the scrap metal moratorium. No scrap metal originating from radiological areas is being released for recycle.

## 2.3 Appraisals and Surveillances of Environmental Programs

Numerous appraisals, surveillances, and audits of ORR environmental activities were conducted during 2006 (see Table 2.14). The table does not include internal DOE prime contractor assessments for 2006.

## 2.4 Environmental Permits

Table 2.15 contains a summary of environmental permits for the three ORR sites. Continuing permits, required at each of the ORR facilities, are RCRA operating permits, NPDES permits, and air operating permits. Additional permit information is provided in Appendix F.

## 2.5 Notices of Violations and Penalties

ORNL received one NOV from TDEC in 2006 for RCRA nonconformances. The RCRA issues were based on observations found during the May 2006 RCRA inspection. The NOV included violations for failure to label two used oil containers, failure to properly label a satellite area container, and failure to comply with the Low-Level Waste Management Agreement. A fourth violation was later rescinded by TDEC. Corrective actions were undertaken where necessary.

One NOV was issued by TDEC on April 26, 2006, for ETTP RCRA operations as a result of a February 2006 inspection. The NOV included violations for failure to provide accumulation start dates and labeling of some containers, failure to close a hazardous waste container when bulking operations ceased, containers stored greater than one year with Burden of Proof considered unacceptable, failure to comply with the Low-Level Waste Management Agreement, container label for pesticide did not state "universal waste," and decanted waste labeled as newly generated. The alleged violation for failure to close a container after bulking operations had ceased was rescinded. Based on the out-brief information provided by TDEC, the violations were fully corrected except for those related to interpretation of the LLW Agreement between DOE and the state of Tennessee and the adequacy of the Burden-of-Proof documentation for waste destined for disposal at the TSCA Incinerator. Discussions have been initiated by DOE, BJC and TDEC to further review and reach and understanding and to decide upon a path forward for the resolution of these two interpretational issues

Y-12 received one NOV in late 2006 for RCRA violations found during the November 2006 inspection. The issue involved the storage of universal waste (used lamps) greater than one year. Following the inspection, the used lamps were shipped to an off-site recycle facility, and the issue has been resolved. An NOV dated January 11, 2006, was received from the TDEC for the Dry Ash Handling System Baghouse pressure drop readings which were reported as being below the permitted range in July 2005.

**Table 2.14. Summary of environmental audits and assessments, 2006[a]**

| Date | Reviewer | Subject | Issues |
|---|---|---|---|
| | | **Y-12 Complex, BWXT Y-12** | |
| 3/16 | City of Oak Ridge | Sanitary Sewer pretreatment inspection | 0 |
| 3/23–24 | TDEC—City of Knoxville | TDEC Annual Clean Air Compliance inspection | 0 |
| 8/1 | City of Oak Ridge | Sanitary Sewer pretreatment inspection | 0 |
| 9/9 | EPA | Spill Prevention Control and Countermeasures Plan | 0 |
| 11/14–16 | TDEC | TDEC Annual RCRA inspection | 0 |
| | | **Y-12 Complex, UT-Battelle** | |
| 11/14–16 | TDEC | TDEC Annual RCRA Inspection | 0 |
| | | **Y-12 Complex, Bechtel Jacobs** | |
| 11/14 | TDEC | TDEC Annual RCRA inspection | 1 |
| | | **ORNL, UT-Battelle** | |
| 3/29 & 12/7 | TDEC | NPDES permit renewal | 0 |
| 5/15–5/18 | TDEC, RCRA | TDEC Annual RCRA Inspection | 2 |
| 6/20–21 | TDEC | NPDES Program | 0 |
| 09/12 | EPA | SPCC Plan and Program | 0 |
| 10/14 | TDEC, CAA | Title V Air Permit | 0 |
| 12/07 | TDEC, CAA | Relative Accuracy Test Audit | 0 |
| | | **ORNL, Bechtel Jacobs Company** | |
| 5/15–5/18 | TDEC | TDEC Annual RCRA Inspection | 1 |
| 11/14 | TDEC, CAA | Title V Air Permit | 0 |
| | | **ORNL, 0800 Area** | |
| 8/1 | TDEC | RCRA Inspection | 0 |
| | | **ETTP** | |
| 2/13 | TDEC | Annual RCRA Inspection | 1 |
| 2/23 | TDEC | Air Source Inspection | 0 |
| | | **NTRC** | |
| 3/22 | EPA/TDEC | RCRA Inspection | 1 |

[a]Abbreviations:

| | |
|---|---|
| CAA | Clean Air Act |
| EPA | Environmental Protection Agency |
| ETTP | East Tennessee Technology Park |
| NPDES | National Pollutant Discharge Elimination System |
| NTRC | National Transportation Research Center |
| ORNL | Oak Ridge National Laboratory |
| RCRA | Resource Conservation and Recovery Act |
| SPCC | spill prevention, control, and countermeasure |
| TDEC | Tennessee Department of Environment and Conservation |

There was no insult to the environment, and subsequently the permit was revised to accommodate the readings experienced in July 2005. A response to the NOV was submitted on January 30, 2006.

NTRC received one NOV in 2006 for a RCRA violation found during a March 2006 inspection. That violation was for failure to label used oil containers and was corrected during the inspection.

## 2.6 Tennessee Oversight Agreement

The Tennessee Oversight Agreement is a voluntary agreement entered into between DOE and the state of Tennessee. The agreement reflects an extension through June 30, 2011, of the agreement between the DOE and the state executed on May 13, 1991, and continues to reflect

**Table 2.15. Summary of permits as of December 2006**

| | Y-12 Complex | ORNL | ETTP |
|---|---|---|---|
| **Resource Conservation and Recovery Act (RCRA)** | | | |
| RCRA operating (Parts A and B) | 2 | 2[a] | 3 |
| Part B applications in process | 0 | 0[b] | 0 |
| Postclosure | 3[c] | 0 | 0 |
| Solid waste landfills | 6[d] | 0 | 0 |
| Annual petroleum underground storage tank facility certificate | 2 | 1 | 1 |
| Transporter permit | 1 | 1 | 1 |
| Hazardous Waste Corrective Action Permit | 1[e] | 1[e] | 1[e] |
| **Clean Water Act** | | | |
| National Pollutant Discharge Elimination System (NPDES) | 1[f] | 2 | 4[g] |
| Storm water | 1[h] | 1[h] | 1[h] |
| Aquatic resource alteration | 1 | 6 | 1 |
| Army Corps of Engineers 404 permits | 0 | 1 | 1 |
| General storm water construction | 1[i] | 3 | 0 |
| **Clean Air Act** | | | |
| Operating Title V Major Source Permit | 2 | 2 | 8[j] |
| Construction | 2 | 1 | 2 |
| Prevention of significant deterioration | 0 | 0 | 0 |
| **Sanitary Sewer** | | | |
| Sanitary sewer | 1 | 0 | 0 |
| Pump-and-haul permit | 2 | 2[k] | 3 |
| **Toxic Substances Control Act (TSCA)** | | | |
| TSCA Incinerator | 0 | 0 | 1 |
| Research and development for alternative disposal methods | 0 | 0 | 0 |
| **Safe Drinking Water Act** | | | |
| Class V underground injection control permits | 0 | 0 | 0 |

[a]Two permits have been issued, representing 16 active units and 5 proposed units. One additional permit covers corrective action (Hazardous and Solid Waste Amendments) only.

[b]Two Part B Permit renewals are in process.

[c]Three permits have been issued, representing units closed under RCRA in Bear Creek Hydrogeologic Regime, Chestnut Ridge Hydrogeologic Regime, and Upper East Fork Poplar Creek Regime.

[d]Three landfills are operational; one is inactive and has a record of decision under the Comprehensive Environmental Response, Compensation, and Liability Act; one is closed pending certification; and one is in postclosure care and maintenance.

[e]Oak Ridge Reservation (ORR) permit (TNHW-121). Requirements for corrective action have been integrated into the ORR Federal Facility Agreement.

[f]Issued 4/28/95 and effective 7/1/95. TDEC has incorporated requirements for storm water into individual NPDES permits.

[g]Only two NPDES permits are directly administered by DOE contractor. Two permits are administered through the Community Reuse Organization of East Tennessee.

[h]TDEC has incorporated into individual NPDES permits.

[i]Notice of intent that accesses a general NPDES permit. A notice of intent remains on file for construction of the Highly Enriched Uranium Materials Facility and hollow-fill.

[j]ETTP has not been issued a Title V major source permit. The listed number represents the total of all applicable source-specific operating and construction permits previously issued by the state.

[k]This includes one pump-and-haul permit for Y-12 and two for office trailers at ORNL, as well as one at Clark Center Park, which is operated by East Tennessee Mechanical Contractors.

the obligations and agreements regarding DOE's technical and financial support.

The agreement is designed to assure the citizens of Tennessee that their health, safety, and environment are being protected through existing programs and through substantial new commitments by DOE. Through a program of independent monitoring and oversight, the state will advise and assist in verifying that DOE's activities do not adversely impact the public health, public safety, or the environment. DOE and the state, in a spirit of partnership and cooperation, agree to find ways to achieve clean air, water, and land in concert with sustainable economic growth.

To date, a variety of activities have been conducted under the agreement. DOE has provided security clearances and training necessary for state employees to gain access to the sites. Environmental data and documents pertaining to the environmental management, restoration, and emergency management programs are provided or are made available to the state for its review. The TDEC/DOE Oversight Division routinely visits the three DOE sites to attend formal meetings and briefings and conducts walk-throughs of buildings to assess compliance with environmental regulations. The TDEC/DOE Oversight Division also collects air samples, water samples, and soil samples and occasionally performs radiological surveys. Also, prior to surplus sales, the TDEC/DOE Oversight Division performs a radiological survey of all equipment and material to be auctioned off.

The TDEC/DOE Oversight Division also prepares an annual environmental monitoring report of its activities (TDEC 2005), which is available on the web (http://www.state.tn.us/environment/doeo/).