2. Environmental Compliance

Setting

It is DOE-ORO and DOE National Nuclear Security Administration (DOE-NNSA) policy to conduct its 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), work smart standards, 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.

Update

All ORR sites were in compliance with all applicable environmental regulations in 2000 except for a few minor instances discussed below.

Each site achieved a National Pollutant Discharge Elimination System permit compliance rate greater than 99.9% in 2000.

In 2000, all three ORR facilities operated in compliance with the regulatory dose limits, and met the emission and test procedures, of Tennessee Rule 1200-3-11-.08 (Emission Standards for Hazardous Air Pollutants for Radionuclides).

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 plant sites.

There are several private businesses operating under leasing arrangements at the East Tennessee Technology Park under the DOE reindustrialization initiative. Lessees are accountable to comply with all applicable standards and regulations and to obtain 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. The lessees obtain their own permits separate and distinct from DOE. The lessees' compliance activities are not reflected in this report.

Principal among the regulating agencies are the U.S. 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.

During routine operations or when ongoing self-assessments of compliance status identify environmental issues, the issues are typically discussed with the regulatory agencies. In the following sections, major environmental statutes are summarized for the ORR sites.

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, batteries, 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 batteries, mercury thermostats, selected pesticides, and fluorescent/hazardous-waste lamps as universal wastes.

Subtitle C of RCRA controls all aspects of the management of hazardous waste, from the point of generation to treatment, storage, disposal, and recycle (TSDR). Hazardous waste generators must follow specific requirements for handling these. In addition, owners and operators of hazardous waste management facilities have operating and/or post-closure care permits.

Y-12, ORNL, and the ETTP are considered RCRA large-quantity generators. Each generates both RCRA hazardous waste and RCRA hazardous waste containing or contaminated with radionuclides (mixed waste). The hazardous and/or mixed wastes are accumulated by individual generators at locations referred to as satellite accumulation areas or 90-day accumulation areas, as appropriate, where they are picked up by waste management personnel and transported to a TSDR facility or shipped directly off site for treatment, storage, or disposal. At the end of 2000, Y-12 had 142 generator accumulation areas for hazardous or mixed waste. ORNL had 325 generator accumulation areas, and the ETTP maintained 45.

The Union Valley Sample Preparation Facility is also a large-quantity generator. At the end of 2000, this facility had nine satellite accumulation areas and one 90-day accumulation area.

ORISE is classified under RCRA as a conditionally exempt small-quantity generator. Its site accumulation area is located in the Chemical Safety Building on the Scarboro Operations Site.

The Central Training Facility on Bear Creek Road, the Transportation Safeguards Division Garage, ORNL's Walker Branch Watershed Laboratory, and the Freel's Bend area are also classified as conditionally exempt small-quantity generators.

Y-12 is registered as a large-quantity generator and a TSDR facility under EPA Identification (ID) Number TN3890090001. Most of the units at the Y-12 Complex are being operated under operating permits; however, several units still operate under interim status in accordance with a Part A permit application. Six RCRA Part B permit applications have been submitted for storage and treatment units at the Y-12 Complex. Four Part B applications have been approved and issued as RCRA operating permits (Table 2.1). One application has been withdrawn because the unit (Interim Reactive Waste Treatment Unit) was closed in 1997. One application has not been acted on.

The first Y-12 permit (TNHW-032) was issued by TDEC on September 30, 1994, for tank and container storage units.

On September 28, 1995, TDEC issued permit TNHW-083 for container storage units and permit TNHW-084 for production-associated units.

On September 3, 1996, TDEC issued permit TNHW-092 for the production and storage of classified waste.

Several permit modifications, involving all these permits, were submitted in 2000. The modifications included administrative changes [removing Lockheed Martin Energy Systems, Inc. (LMES) and adding BWXT Y-12, LLC (BWXT-Y-12) to TNHW-084, physical modification of the permitted areas, and the addition of portable units to TNHW-083].

ORNL is registered as a large-quantity generator and a TSDR facility under EPA ID Number TN1890090003. ORNL's most recent Part A revision on July 14, 1999, included 33 units. During 2000, 26 units operated as interim-status or permitted units; another 7 units were proposed (new construction).

A notice of deficiency (NOD) was received from TDEC on December 1, 2000, regarding the revised permit application for the Chemical Detonation Facility; the response to the NOD will be submitted in 2001. ORNL has been issued four operating permits (see Table 2.1). State approvals for four Class 1-1 permit modifications were issued in early 2000, allowing the addition of WESKEM as a co-operator on the three permits and allowing container venting in the TNHW-097 permit. Three Class 1 permit modifications (one for each operating permit) that dealt with updates to the RCRA Contingency Plan were submitted and approved.

The ETTP is registered as a large-quantity generator and a TSDR facility under EPA ID Number TN0890090004. The ETTP has received four RCRA permits (see Table 2.1). The K-1435

Table 2.1. RCRA operating permits, 2000

Permit Number	Building/Description
	Y-12 Complex
TNHW-032	Building 9811-1 Tank Storage Unit (OD-7)
	Waste Oil/Solvent Storage Unit (OD-9)
	Liquid Organic Solvent Unit (OD-10)
TNHW-083	Building 9720-9 Container Storage Unit
	Building 9720-25 Container Storage Unit
	Building 9720-31 Container Storage Unit
	Building 9720-58 Container Storage Unit
	Building 9811-1 Container Storage Unit
TNHW-084	Building 9206
	Building 9212
	Building 9720-12
	Cyanide Treatment and Storage Unit
	Organic Handling Unit
TNHW-092	Building 9720-32
	Building 9720-59
	ORNL
TNHW-010	Hazardous and Solid Waste Amendments Only
TNHW-010A	Building 7507 Container Storage Unit
	Building 7507W Container Storage Unit
	Building 7651 Container Storage Unit
	Building 7652 Container Storage Unit[a]
	Building 7653 Container Storage Unit
	Building 7654 Container Storage Unit
	Building 7669 Container Storage Unit
	Building 7934 Container Storage Unit
	Portable Buildings 1 & 2 Container Storage Unit
TNHW-027	Tank 7830A Storage Unit
TNHW-097	Building 7855 Container Storage Unit
	Building 7883 Container Storage Unit
	Building 7884 Container Storage Unit
	Building 7578 Container Storage Unit
	Building 7579 Container Storage Unit
	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 7842 Container Storage Unit
	Building 7878 Container Storage Unit
	Building 7879 Container Storage Unit
	Building 7824 Container Storage Unit
	ETTP
TNHW-015	K-1435 Toxic Substances Control Act Incinerator
TNHW-015A	K-1425 and K-1435 Container and Tank Storage Units
TNHW-056	Container Storage Units and Waste Pile Units
TNHW-057	K-1202 and K-1420-A Tank Storage Units

[a]Incorporated May 1997; was originally TN1890090003 (TNHW-010) up to May 1997.

Toxic Substances Control Act Incinerator (TSCAI) 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 this permit was submitted to TDEC in March 1997. A second permit (TNHW-015A) is for storage of waste at the incinerator. Two other permits (TNHW-056 and TNHW-057) cover container and tank storage at various locations throughout the plant.

Modifications in 1999 to all four ETTP RCRA permits included changes in perimeter fencing and an update of contingency plan information. Modifications to TNHW-015 included equipment changes and modifications. Additional minor permit modifications provided clarification and updated information regarding the individual RCRA units.

2.2.1.1 RCRA Assessments, Closures, and Corrective Measures

The Hazardous and Solid Waste Amendments (HSWAs) 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 original HSWA permit (HSWA TN-001) for the ORR was issued by the EPA as an attachment to the RCRA permit for Building 7652 at ORNL. The HSWA permit requires DOE to address past, present, and future releases of hazardous constituents to the environment. The HSWA permit requirement for corrective action has been integrated into the ORR Federal Facility Agreement (FFA) (see Sect. 2.2.2 for details). In March 1998, EPA and TDEC issued separate drafts of the HSWA permit for DOE review and comment. EPA's was issued as a stand-alone permit; TDEC's was issued as a modification to a Y-12 postclosure permit. DOE submitted comments on the draft permits; however, comment resolution is still pending.

The renewed permit will address contaminant releases from SWMUs and also from RCRA areas of concern (AOCs), but will also integrate RCRA requirements with cleanups conducted under the FFA and CERCLA programs (see Sect. 2.2.3). AOCs are areas contaminated by a release of hazardous constituents that originated from something other than a SWMU. Under the existing HSWA permit, DOE must notify EPA within 30 days of identification of a new SWMU or of planned significant changes to SWMUs that could alter further investigation or corrective action. DOE has provided to EPA a proposed Appendix A to the permit that identifies existing SWMUs and AOCs for action or no action (see Table 2.2). The renewed permits (TDEC and EPA versions) are expected to be issued in 2001.

At Y-12, 29 RCRA units have been closed since the mid-1980s. Closure of the Containerized Waste Storage Area at the Y-12 Complex was completed in 1999, and the closure certification was accepted by TDEC in 2000. The Oil Landfarm Soil Containment Pad was closed in 2000 under the CERCLA process. All soil was removed and shipped to a permitted disposal facility.

Since the mid-1980s, ORNL has closed a total of 8 RCRA units. ORNL's Solid Waste Storage Area (SWSA) 6 is an interim-status disposal site (landfill) that underwent partial closure beginning in late 1988. 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

Table 2.2. Summary of proposed Appendix A to HSWA permit, 2000

Appendix A section	Title	Number of sites proposed
1a	List of SWMUs and AOCs requiring further investigation under the FFA	257
1b	List of SWMUs and AOCs requiring further investigation	0
2	List of SWMUs and AOCs requiring no further action/ investigation at this time	296
3	List of SWMUs and AOCs requiring confirmatory sampling	0

in July 1995, actual final remediation of SWSA 6 has been deferred to CERCLA. The Melton Valley Record of Decision (ROD), which includes the selected remedy under CERCLA for SWSA 6, was signed in September 2000.

At the ETTP, the RCRA closure of the K-1417-B Drum Storage Yard was completed in 1999. All other cleanup actions at ETTP are being conducted under CERCLA.

2.2.1.2 Land Disposal Restrictions

The 1984 RCRA amendments established land disposal restrictions (LDRs), which prohibited the land disposal of untreated hazardous wastes. The amendments require that all untreated wastes meet treatment standards before land disposal or that they be disposed of in a land disposal unit from which there will be no migration of hazardous constituents for as long as the waste remains hazardous. These restrictions also prohibit storage of restricted hazardous or mixed waste except as necessary to facilitate recovery, treatment, or disposal. Because treatment and disposal capacity for mixed wastes was unavailable for many years, DOE's storage of those mixed wastes over a year constituted RCRA LDR violations. To become compliant with RCRA, DOE entered into agreements with EPA, and later, TDEC (see Sect. 2.2.4).

2.2.1.3 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 two operating Class IV construction demolition landfills. These facilities are permitted by TDEC and accept solid waste from DOE operations on the ORR. In addition, one Class IV facility (Spoil Area 1) is overfilled by 11,700 yd and has been the subject of a CERCLA Remedial Investigation/Feasibility Study. A CERCLA ROD for this unit 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 Table 2.3.

2.2.1.4 RCRA Underground Storage Tanks

USTs containing petroleum and hazardous substances (HSs) 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, HS USTs are still regulated by EPA. Table 2.4 summarizes the status of USTs on the ORR. (See Appendix C for a summary of UST data.)

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; 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-

Table 2.3. RCRA Subtitle D landfills, 2000

Facility	TDEC Permit Number	Comments
Industrial Landfill IV	IDL-01-103-0075	Operating, Class II
Industrial Landfill V	IDL-01-103-0083	Operating, Class II
Construction and Demolition Landfill (Spoil Area 1)	DML-01-103-0012	Overfilled, Class IV Subject of CERCLA ROD
Construction and Demolition Landfill VI	DML-01-103-0036	Operating, Class IV
Construction and Demolition Landfill VII	DML-01-103-0045	Operating, Class IV
Construction and Demolition Landfill II	IDL-01-103-0189	Postclosure care and maintenance

Table 2.4. ORR UST status, 2000

	Y-12 Complex	ORNL	ETTP
Active/in-service	4	3	2
Closed	40	51[a]	14
Hazardous substance	3[b]	0[c]	6[d]
Known or suspected sites	0	0	16
Total	47	54	38

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

[b]Two USTs are deferred because they are regulated by the Atomic Energy Act of 1954. The third is a permanently closed methanol UST.

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

[d]Four USTs were permanently closed that were used to store natural gas odorant and 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.

walled, concrete-encased aboveground storage tanks; 3 were replaced by the new state-of-the-art USTs; and 22 USTs were not replaced because they were no longer needed. Case closure letters for the last three closed USTs were received in April 2000, thus completing the ORNL UST closure and replacement program.

The Y-12 UST Program includes four active petroleum USTs that meet all current regulatory compliance requirements. The UST registration certificates for these tanks are current, and certificates are posted at the UST locations, enabling fuel delivery until March 31, 2002.

All legacy petroleum UST sites at Y-12 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 rules. Fourteen other petroleum USTs have been removed or closed in place with TDEC regulators' recommendation of "case closed" status.

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 BMP. 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 the ETTP.

A detailed description of all ORNL, Y-12, and ETTP USTs and their status is included in Appendix C.

2.2.2 Comprehensive Environmental Response, Compensation, and Liability Act

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 (NPL) is a comprehensive list of sites/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 EPA NPL in December 1989, ensuring that the environmental impacts associated with past and present activities at the ORR are thoroughly investigated and that appropriate remedial actions or corrective measures are taken as necessary to protect human health and the environment. An interagency agreement, known as the ORR FFA, under Section 120(c) of CERCLA was signed in January 1991 by EPA, TDEC, and DOE. This agreement establishes the procedural framework and schedule for developing, implementing, and monitoring response actions on the ORR in accordance with CERCLA.

The FFA Appendix C lists all of the inactive sites/areas that will be investigated, and possibly remediated, under CERCLA. Milestones for completion of CERCLA documents are available in Appendix E of the FFA.

DOE-ORO has incorporated aggressive management and productivity goals into its planning for the accelerated completion of the DOE Environmental Management (EM) mission as detailed in the initial *Accelerating Clean-Up: Paths to Closure, Oak Ridge Operations Office* (DOE 1999b), published in February 1999. The following are key assumptions for the accomplishment of these goals:

- Reindustrialization is a method of accomplishment for decontamination and decommissioning. The value of assets in the form of idle equipment, facilities, land, etc., is provided to the private sector to offset some of the costs;
- The use of innovative technologies is incorporated into planning for the EM Program;
- Current environmental standards are met unless there is a reasonable assurance that the dialogue with the stakeholders/regulators will result in an acceptable alternate standard;
- Wastes are disposed of as follows:
  - — waste generated by CERCLA actions are to be disposed of in the EM Waste Management Facility, which will be operational by fiscal year (FY) 2002;
  - — low-level radioactive waste (LLW) is disposed of at the Nevada Test Site or commercial disposal sites;
  - — transuranic waste is disposed of at the Waste Isolation Pilot Plant;
  - — mixed LLW is disposed of at commercial disposal sites or Hanford;
  - — hazardous waste is disposed of at various commercial facilities; and
  - — sanitary/industrial waste is disposed of on site.

The progress toward achieving these goals is described in the *2001 Remediation Effectiveness Report/CERCLA Five Year Review for the U.S. Department of Energy Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE 2001). This report describes the individual remedial actions and provides an overview of some of the monitoring conducted to evaluate the efficacy of those actions.

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 FFA is intended to coordinate the corrective action processes of RCRA required under the HSWA 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 seven major closed waste disposal areas at Y-12 (see Table 2.6). Groundwater corrective actions required under the postclosure permits have been deferred to CERCLA. Reporting of groundwater monitoring data will comply with RCRA postclosure permit conditions as well as with CERCLA requirements.

Table 2.5. RCRA and CERCLA corrective action processes

RCRA	CERCLA	Purpose
RCRA facility assessment	Preliminary assessment/site investigation	Identify releases needing further investigations
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

Table 2.6. Postclosure permits for Y-12 Complex hydrogeologic regimes

Hydrogeologic regime	Waste area	Postclosure permit
Bear Creek Valley	1. Bear Creek Burial Grounds (including the walk-in pits) 2. Oil Landfarm 3. S-3 Pond Site (west)	TNHW-087
Chestnut Ridge	1. Chestnut Ridge Sediment Disposal Basin 2. Chestnut Ridge Security Pits 3. Kerr Hollow Quarry	TNHW-088
Upper East Fork Poplar Creek	1. New Hope Pond 2. S-3 Pond Site (east)	TNHW-089

2.2.4 Federal Facility Compliance Agreement

In June 1992, DOE negotiated a Federal Facility Compliance Agreement with EPA and established the initial requirements for treating mixed wastes stored on the reservation. Later, the Federal Facility Compliance Act was signed by Congress on October 6, 1992, to bring federal facilities (including those under DOE) into full compliance with RCRA. The Act waives the government's sovereign immunity, allowing 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 treatment plans for each site. The Act 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 1992 agreement was replaced in 1995 with a state commissioner's order. The Tennessee commissioner's order signed on September 26, 1995, culminated negotiations between DOE and the state and established a site treatment plan (STP) to address treatment and disposal of DOE's mixed waste from Oak Ridge facilities.

The ORR STP calls for LLW on the ORR to be treated by a combination of commercial treatment capabilities and existing and modified on-site treatment facilities. Mixed transuranic (TRU) waste streams on the ORR, composed of both contact- and remote-handled wastes, will be treated in the Transuranic Processing Facility (TPF) only as necessary to meet the waste acceptance criteria for disposal at the Waste Isolation Pilot Plant (WIPP). Construction of the TPF began in the spring of 2001.

The STP provides overall schedules, milestones, and target dates for achieving compliance with LDRs; a general framework for the establishment and review of milestones; and other provisions for implementing the STP that are enforceable under the commissioner's order.

Semiannual progress reports document the quantity of LDR 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. All milestones and commitments for the STP were met for CY 2000. The annual update of the STP has been issued for CY 2000.

The STP will terminate when there is no LDR mixed waste in noncompliant storage (i.e., in storage for more than 1 year). In the absence of the STP, LDR mixed waste in storage for more than 1 year 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 environ-

mentally sensitive areas. Environmentally sensitive areas include floodplains, wetlands, prime farm land, 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. These procedures 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 2000.

During 2000, ORNL operated under a procedure that provided requirements for project reviews and compliance with NEPA. It called for review of each proposed project, activity, or facility for 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) for ORNL Robotics and Process Systems Division, Instrumentation and Controls Division, and Chemical and Analytical Sciences Division that would cover proposed bench- and pilot-scale research activities. A CX is one of a category of actions defined in 40 CFR 1508.4 that does not individually or cumulatively have a significant effect on the human environment and for which neither an environmental assessment (EA) nor an environmental impact statement (EIS) is normally required. Generic CXs expedite the NEPA process by allowing ORNL to group activities and proceed with a proposed action after completion of internal screening and documentation. In addition to NEPA compliance reviews for a variety of projects that were not covered by generic CXs (Table 2.7), other NEPA reviews covered routine maintenance actions, laboratory and office renovation and upgrades, and site characterization activities. Four job-specific CXs at ORNL were prepared for Bechtel Jacobs Company projects: (1) ORNL Cooling Towers Demolition Project, (2) Well Driller's Steam Cleaning, (3) 104 KEMA Well Extraction, and (4) Cask Loading Station for Spent Nuclear Fuel.

DOE is proposing to implement a facilities revitalization project (FRP) at ORNL. The FRP would be accomplished through a cooperative effort between DOE, the state of Tennessee, and private entities. The goal of this collaboration is to upgrade ORNL's research and development (R&D) capabilities, to ensure worker health and safety, and to reduce operating costs and energy consumption. The FRP would be developed as a phased program. DOE has drafted an EA to assess

Table 2.7. NEPA activities during 2000

Types of NEPA documentation	Y-12 Complex	ORNL	ETTP
Categorical exclusion (CX) recommendation	4, 1[a]	10, 4[a]	5
Specific CX granted	4, 1[a]	8, 4[a]	5
Approved under general CX documents	38, 9[a]	69	81
Environmental assessment (EA)	0	2	0
EA determination	0	1[a]	0
Special EA	0	0	0
Programmatic EA	0	0	0
Supplemental analysis	0	0	0
Environmental impact statement (EIS)	1[b]	1	0
Supplemental EIS	0	0	0
Programmatic EIS	0	0	0

[a]Bechtel Jacobs Company.

[b]Site wide environmental impact statement (SWEIS) is in progress for operations of the Y-12 Complex.

potential environmental impacts of the project, and the "finding of no significant impact" (FONSI) is expected to be signed and issued in April 2001. The proposed action alternative includes upgrading existing facilities, constructing new facilities on brownfield sites, relocating ORNL staff from substandard facilities, and either maintaining deactivated facilities in a safe, "cheap-to-keep" mode or transferring them to the Environmental Management Program.

DOE has prepared a draft EA for the United States Enrichment Corporation (USEC) Centrifuge Research and Development Project at ETTP. This EA analyzes the potential environmental impacts of USEC's leasing several facilities (K-1600, K-101, and portions of K-1220 and K-1037) at the ETTP for approximately a 5-year period for the purpose of conducting an R&D project under a cooperative research and development agreement (CRADA) between DOE, USEC, and UT-Battelle. The purpose of the USEC Centrifuge R&D project is to use DOE's centrifuge technology to develop an economically attractive gas-centrifuge machine and process. The schedules for various NEPA milestones (i.e., EA and FONSI) are being revised and will be determined in 2001.

Much of the NEPA activity at the ETTP during 2000 involved review of potential leases of the land and facilities. The *Final Environmental Assessment, Lease of Land and Facilities Within the East Tennessee Technology Park, Oak Ridge, Tennessee* (ORO 1997) was completed and approved in 1997 and was issued in December with a FONSI. The EA was written to describe the baseline environmental conditions at the site, to analyze potential generic impacts to the baseline environment from future tenant operations based on defined bounding scenarios, and to identify and characterize cumulative impacts of future industrial uses of the site. In addition, the EA provides DOE with environmental information for developing lease restrictions. In 2000, NEPA reviews supported 52 potential lease actions. An EA determination was prepared and approved in August 2000 for Proposed Changes to the Sanitary Sludge Land Application Program on the ORR. Other NEPA reviews covered more routine maintenance actions, such as roof repairs, transfer of properties, fencing projects, equipment removal, sampling and support activities, and CRADA activities. Five job-specific CXs were prepared and approved in 2000 for ETTP:

- two for deactivation and demolition of facilities,
- one for dismantlement and removal of coal-handling equipment,
- one for equipment removal in the K-1401 basement, and
- one for deactivation/stabilization of potentially shock-sensitive properties of waste at RCRA waste storage units.

At Y-12, job-specific CX documents were prepared and approved in 2000 for one project to construct a new substation and one project to treat bulk quantities of waste sodium-potassium metal. Other general CX NEPA reviews covered routine actions, such as office renovations, improvements to communications and security systems, equipment replacements, and infrastructure improvements. One Y-12 CX was prepared for Bechtel Jacobs Company projects for the Subsurface Containment Technology Project. The CX for deactivation/stabilization of potentially shock-sensitive waste prepared by Bechtel Jacobs also applied to RCRA waste storage units at Y-12.

In March 1999, DOE published the Notice of Intent to prepare a site-wide environmental impact statement (SWEIS) for the Y-12 Complex. The draft SWEIS was issued for public review in December 2000. The SWEIS analyzes current and ongoing operations at Y-12 as projected for the next 5 to 10 years. In addition, specific analyses were presented for two proposals for new facilities and alternatives for the highly enriched uranium (HEU) Storage and the Special Materials Missions at Y-12. Alternatives considered for the HEU Storage Mission include No Action (continue to use existing Y-12 storage facilities), construction of a new HEU Materials Facility at one of two proposed sites, or construction of a new addition to an existing building. Alternatives considered for the Special Materials Mission include No Action (continue to use existing special materials operations facilities) or construction of a new Special Materials Complex at one of three proposed sites. Public meetings will be scheduled to receive comments on the draft docu-

ment. Comments will be addressed and the final SWEIS is scheduled for publication in the summer of 2001, with a ROD to follow approximately 30 days later.

2.2.6 National Historic Preservation Act

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*. 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 (SHPO), 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. It stipulated that DOE-ORO would prepare a cultural resource management plan (CRMP) for the ORR and would provide a draft of the CRMP to the Tennessee SHPO and Advisory Council on Historic Preservation within 24 months of the ratification of the agreement. The agreement also stipulated that DOE-ORO would conduct surveys to identify significant historical properties on the ORR. A draft CRMP has been completed and reviewed by the SHPO and the Advisory Council. Comments from the SHPO, the Advisory Council, and the public have been incorporated into the CRMP. The final document is pending approval by DOE.

Compliance with NHPA at ORNL, Y-12, and ETTP is achieved and maintained in conjunction with NEPA compliance. The scope of proposed actions is reviewed in accordance with the programmatic agreement, and, if warranted, consultation is initiated with the SHPO and the Advisory Council on Historic Preservation and the appropriate level of documentation is prepared and submitted. ORNL submitted two historical reviews in 2000 for the demolition of Buildings 2019 and 5000, and for the ORNL Facilities Revitalization Project. Two reviews were prepared and submitted in 2000 for the ETTP and were approved by the SHPO. These two reviews were for demolition of facilities located at the ETTP. In addition, in July 2000 notification of an adverse effect to historical properties was sent to the SHPO for the decontamination and decommissioning of the K-25 and K-27 buildings, and consultation was initiated to determine actions to avoid, minimize, or mitigate the adverse effects to these historical properties.

The Y-12 project reviews were covered under the programmatic agreement; therefore, no project summaries were submitted to the SHPO for concurrence in 2000.

ETTP and Y-12 have been surveyed to identify sites eligible for inclusion in the *National Register*. An archaeological survey has also been completed. Results of the Oak Ridge Y-12 Plant Cultural Resources Survey, which consists of two reports, *An Evaluation of Previous Recorded and Inventoried Archeological Sites Within Portions of the Oak Ridge Y-12 Plant, Anderson and Roane Counties, Tennessee*, Y/TS-1759 and *Architectural/Historic Evaluation of the Oak Ridge Y-12 Plant Oak Ridge Reservation, Anderson and Roane Counties, Tennessee*, Y/TS-1414 has been approved by the SHPO. Y-12 has 93 historical properties as a result of its association with the Manhattan Project, development as a nuclear weapons component plant within the overall post-World War II government-sponsored scientific movement, and for early nuclear research. Two buildings (Buildings 9731 and 9204-3) have been recommended for National Historic Landmark status because of their national roles in uranium enrichment and in the production of stable isotopes. ORR-wide surveys to identify and evaluate pre-World War II structures and known archaeological sites for eligibility in the *National Register* were completed in 1995. Survey results were incorporated into the CRMP. One archaeological survey was completed and submitted to the SHPO for approximately 30 acres for relocation of Lagoon Road at the Oak Ridge National Laboratory.

A survey of all ORISE structures was conducted to comply with the NHPA. Two properties, the Freel's Cabin and the Atmospheric Turbulence Diffusion Laboratory, were identified as previously included in the *National Register*. Management responsibilities for the Freels Cabin have since been transferred to ORNL. Section 106 of the NHPA requires federal agencies to coordinate with the state and to allow the SHPO to review

proposed demolition projects and other activities adversely affecting existing structures. During the past 3 years, ORISE removed 40 surplus structures (some requiring decontamination) from the ORR.

2.2.7 Protection of Wetlands

Executive Order 11990 (issued in 1977) was established to mitigate adverse effects to wetlands caused by destruction or modification of wetlands and to avoid construction in wetlands wherever possible. Avoidance of these effects is ensured through implementation of the sensitive-resource analysis conducted as part of the DOE NEPA review process. Protective buffer zones and application of best management practices (BMPs) are required for activities on the ORR. Coordination with TDEC, the U.S. Army Corps of Engineers (COE), and TVA is necessary for activities involving Waters of the United States and Waters of the State, which include wetlands and floodplains. Generally, this coordination results in permits from the COE, TVA, and/or the state (see Sect. 2.2.12.4 for permitting details). In addition, TDEC has developed a regulatory position on impacted wetlands that includes mitigation: affected wetlands must be replaced in area and function by restoration of disturbed wetlands, construction of wetlands, or enhancement of previously impacted areas.

The ORR implements protection of wetlands through each site's NEPA program in accordance with 10 CFR 1022, "Floodplain/Wetlands Environmental Review Requirements." Each of the sites has also conducted surveys for the presence of wetlands and conducts surveys on a project- or program- as-needed basis. Wetland surveys and delineations have been conducted on about 14,000 acres (5668 ha) of the 34,424 acres (13,968 ha) that make up the reservation. About 800 acres (324 ha) of wetlands have been identified in the areas in which surveys have been conducted. Surveys for the remaining 20,500 acres (8300 ha) will be conducted only as needed.

Y-12 has conducted two surveys of its wetlands resources. *Identification and Characterization of Wetlands in the Bear Creek Watershed* (MMES 1993) was completed in October 1993, and a wetland survey of selected areas in the Y-12 Complex area of responsibility was completed in October 1994. The first report surveys the Y-12 Complex and surrounding areas; the second report, *Wetland Survey of Selected Areas in the Oak Ridge Y-12 Plant Area of Responsibility, Oak Ridge, Tennessee*, Y/ER-279, January 1997 (LMES 1997b), surveys additional areas for which restoration activities are planned.

A wetlands mitigation project is planned to offset wetlands that will be impacted by CERCLA activities in Bear Creek Valley. The project is discussed in Sect. 3.6.1.

In 1995, TDEC approved a wetlands mitigation plan for First Creek at ORNL in conjunction with a sediment-removal project on Melton Branch. Implementation of the plan was completed on schedule in March 1996 with annual reports submitted to TDEC as required. The plan required that a 1000-lin-ft reach of First Creek be planted in specific trees and shrubs and that it be protected and maintained as a stream-buffer zone. This protection and maintenance continued through 2000. A wetlands survey of ORNL areas, *Wetland Survey of the X-10 Bethel Valley and Melton Valley Groundwater Operable Units at Oak Ridge National Laboratory* (Rosensteel 1996), serves as a reference document to support wetlands assessments for upcoming ORNL projects and activities. In addition, a project-specific wetlands survey of a selected area on the ORR was conducted for the SNS project, and in 2000, ORNL provided environmental protection guidance during initial SNS project construction activities. The survey, *Ecological Resource Surveys for the Proposed National Spallation Neutron Source Site on the Oak Ridge Reservation: 1. Potential Habitat for Federal- and State-Listed Animal and Plant Species. 2. Jurisdictional Wetlands* (Rosensteel et al. 1997) was completed and published in April 1997.

In 1999, a partial survey of the ETTP wetlands was conducted. Approximately 75% of the ETTP area was surveyed, and the wetland areas were mapped. The remainder of the ETTP is scheduled to be mapped in 2001. The map will be used to provide guidance on wetlands protection to construction crews, remediation projects, and other ETTP operations. The *East Tennessee Technology Park Blair Road Wetland Monitoring Report* (BJC 2000) was prepared and issued in June 2000.

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.

2.2.9 Endangered Species Act

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 "threatened and endangered" (T&E) species in this report.

2.2.9.1 Threatened and Endangered 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 listed species may also be present, although they have not been observed recently. These include several species of mollusks (such as the spiny riversnail), 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 have been recently observed (e.g., the gray bat) are represented by one to several migratory or transient individuals rather than by permanent residents, although this situation may change as these species continue to recover. 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, double-crested cormorant, and little blue heron are currently uncommon migrants or visitors to the reservation; however, the double-crested cormorant and little blue heron are increasing or will probably increase in numbers. 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.

2.2.9.2 Threatened and Endangered Plants

There are currently 21 plant species listed by the state of Tennessee as threatened or endangered 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. 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 former C2 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, Michigan lily and hairy sharp-scaled sedge, were identified in the past on the ORR; however, they have not been found in recent years. Several state-

Table 2.8. Animal species of concern reported from the ORR[a]

Species		Legal status[b]	
		Federal	State
	Fish		
Phoxinus tennesseensis	Tennessee dace		NM
	Amphibians and reptiles		
Hemidactylium scutatum	Four-toed salamander		NM
	Birds		
Haliaeetus leucocephalus[c]	Bald eagle	T	NM
Falco peregrinus[d]	Peregrine falcon		E
Dendroica cerulea	Cerulean warbler	C	NM
Accipiter striatus	Sharp-shinned hawk		NM
Circus cyaneus	Northern harrier		NM
Anhinga anhinga	Anhinga		NM
Casmerodius alba	Great egret		NM
Egretta thula	Snowy egret		NM
Contopus borealis	Olive-sided flycatcher		NM
Lanius ludovicianus	Loggerhead shrike		NM
Sphyrapicus varius	Yellow-bellied sapsucker		NM
Egretta caerulea	Little blue heron		NM
	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.

[b]E = endangered, T = threatened, C = species of concern, NM = in need of management.

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

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

listed plant species currently found on adjacent lands may be present on the ORR as well, although they have not been located (Table 2.10).

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-ORO under the direction of the Diversity Programs Office. It addresses the need to communicate DOE activities effectively to minority communities. Efforts are under way to ensure that DOE activities are presented to the public in a manner that does not require stakeholders to possess a technical background in order for them to effectively participate in the decision-making process.

In addition, each DOE planned action that is addressed under NEPA must include an analysis of the health, environmental, economic, and demographic impacts of the planned action on surrounding minority and low-income communities that could be affected by the action.

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 EPA to establish primary drinking water regulations for con-

Table 2.9. Vascular plant species reported from the ORR listed by state or federal agencies, 2000

Species	Common name	Habitat on ORR	Status code[a]
Aureolaria patula	Spreading false-foxglove	River bluff	C2, T
Carex gravida	Heavy sedge	Varied	S
Carex oxylepis var. pubescens[b]	Hairy sharp-scaled sedge	Shaded wetlands	S
Cimicifuga rubifolia	Appalachian bugbane	River slope	C2, T
Cypripedium acaule	Pink lady's-slipper	Dry to rich woods	E-CE
Delphinium exaltatum	Tall larkspur	Barrens and woods	C2, 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	C2, 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	Push'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 tripartita var tripartita	Three-parted violet	Rocky woods	S

[a]Status codes:
- C2 Special concern, under review for federal listing; was listed under the formerly used C2 candidate designation. More information needed to determine status.
- 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 relocated during recent surveys.
[c]*Lilium michiganense* is believed to have been extirpated from the ORR by the impoundment at Melton Hill.

taminants 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. Because the systems that supply drinking water to the ORR were DOE-owned in a portion of CY 2000, the requirements of Section 1447 apply. The Underground Injection Control (UIC) program, adopted pursuant to the SDWA, regulates the emplacement of fluids into the subsurface by means of injection wells.

The city of Oak Ridge supplies potable water to Y-12 and ORNL. The Water Treatment Plant, located north of the Y-12 Complex was originally owned by DOE but was transferred by DOE to the city of Oak Ridge on April 1, 2000. Prior to April 2000 operation of the plant was managed by East Tennessee Mechanical Contractors in partnership with Johnson Controls World Services, Inc., for DOE.

In December 2000, ORNL began construction of a new 1.5-million-gal potable water storage tank. Construction was completed during 2001.

Y-12 and ORNL perform certain monitoring activities, including chlorine, bacteriological, and copper and lead analysis. The Y-12 distribution

Table 2.10. Additional rare plants that occur near and could be present on the ORR

Species	Common name	Habitat on ORR	Status code[a]
Agalinis auriculata	Earleaf false foxglove	Calcareous barren	C2, E
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
Solidago ptarmicoides	Prairie goldenrod	Calcareous barren	E
Pycnanthemum torrei[b]	Torrey's mountain-mint	Calcareous barren edge	
Allium burdickii or A. tricoccom[c]	Ramps	Moist woods	S, CE

[a]*Status* codes:
- C2 Special concern, under review for federal listing; was listed under the formerly used C2 candidate designation. More information needed to determine status.
- E Endangered in Tennessee.
- T Threatened in Tennessee.
- S Special concern in Tennessee.
- CE Status due to commercial exploitation.

[b]The scientific advisory committee on listing plants in Tennessee decided (12/17/99) not to list this species until a specimen is placed in the University of Tennessee Herbarium.

[c]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.

system has qualified for triennial lead and copper sampling and was last sampled in 1999; the ORNL system was last sampled in 2000. All ORNL analyses were satisfactory. Lead and copper sampling is not planned again until 2002. The Y-12 and ORNL drinking water distribution system bacteriological sample analyses were satisfactory in 2000; the bacteriological monitoring plan was revised in late July 2000.

Y-12 has a cross-connection prevention program to prevent the contamination of potable water through the use of backflow preventers, engineering design, and physical separation. Backflow preventers that failed performance checks have been repaired, or the equipment served by the units has been taken out of service.

A July 2000 TDEC water supply system inspection of the city of Oak Ridge and Y-12 identified a need for a backflow preventer on the 16-in. water line located on the eastern end of the Y-12 Complex. This line supplies water from the city of Oak Ridge to Y-12. The inspection also identified the need to increase the frequency of flushing end-of-line locations in the distribution system.

Engineering cost estimates were prepared for a backflow preventer on the 16-in. water line at the eastern end, and discussions of alternatives were held with the city of Oak Ridge. An evaluation of alternatives determined that the best alternative was to extend the water line serving Union Valley to the water treatment plant and to disconnect the 16-in. line serving Y-12 from the line serving Union Valley. The city of Oak Ridge will install a new line to serve Union Valley.

SDWA regulations are being evaluated for applicability at Y-12.

The K-1515 Sanitary Water Plant provides drinking water for the ETTP and for an industrial park located on Bear Creek Road south of the site. The DOE-owned facility is classified as a nontransient, non-community water supply system by TDEC and is subject to state regulations. On April 1, 1998, operation of the facility became the responsibility of Operations Management Inter-

national, Inc. (OMI) under contract with the CROET.

As a result of concerns expressed by ill workers at a July 31, 2000, public meeting, the Sampling, Planning, and Oversight Team (SPOT) was created to plan, manage, and oversee a sampling initiative to determine the quality of the water at ETTP. Between August 8 and August 22, 2000, SPOT sampled the drinking (i.e., finished) water, the dedicated water supply for fire-suppression activities (i.e., firewater) and the untreated water taken directly from the Clinch River (i.e., raw water). The non-drinking water systems were sampled to draw a correlation of their potential impact on the drinking water system if there were cross-connections to the drinking water system. This extensive one-time sampling project confirmed there were no levels of contaminants in the drinking water that exceeded published EPA and/or state-regulated levels.

Historically, there have been some suspected and confirmed cases of cross-connections between the drinking-water and the other water systems at the ETTP. Phase II of the ETTP Drinking Water Quality Project will investigate the recent and historical water systems. This investigation will determine the potential that workers could have been exposed to contaminated drinking water. The project is investigating and assessing the drinking water and steam systems and the potential for exposure through any route possible due to cross-connections or via other means from other utility systems (including water for fire suppression, recirculating cooling water, and water from storm drains and sanitary sewers). Phase II will define worker scenarios and will characterize potential exposures to profile populations at risk. The results will be used to assist in clinical medical evaluations and for any physicians involved with diagnosing and/or treating potentially exposed individuals. Phase II will be conducted independently by a team of experts.

2.2.12 Clean Water Act

The CWA was originally enacted as the Water Pollution Control Act in 1948. It was then established as the Federal Water Pollution Control Act in 1972. Since that time, the CWA received two major amendments. 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 has established a comprehensive federal and state program 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 and data 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 allowed to be discharged to waters of the United States by municipal sewage treatment plants and industrial facilities. In 1972, 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.

The current Y-12 Complex NPDES permit (TN0002968) became effective on July 1, 1995, and expired on April 28, 2000. In October 1999, a complete application for renewal of the Y-12 NPDES permit was submitted to the TDEC. Y-12 continues to operate under the existing 1995 permit until TDEC completes the renewal process. Presently, approximately 93 active point-source discharges or storm-water monitoring locations are monitored for compliance with the permit. Monitoring resulted in approximately 11,500 laboratory analyses in 2000 in addition to numerous field observations. Monitoring of discharges demonstrates that the Y-12 Complex has achieved an NPDES permit compliance rate of nearly 100%. At the Y-12 Complex, there were six NPDES noncompliances in 2000, four in 1999, and nine in 1998 (Fig. 2.1). Information on these noncompliances is provided in Appendix E, Table E.1.

Personnel from TDEC conducted a compliance evaluation inspection of the Y-12 NPDES program on May 9 and 10, 2000. There were no deficiencies noted during the inspection. EPA personnel conducted a multimedia inspection of Y-12 in June and July 2000. The only potential NPDES issue identified was in regard to the

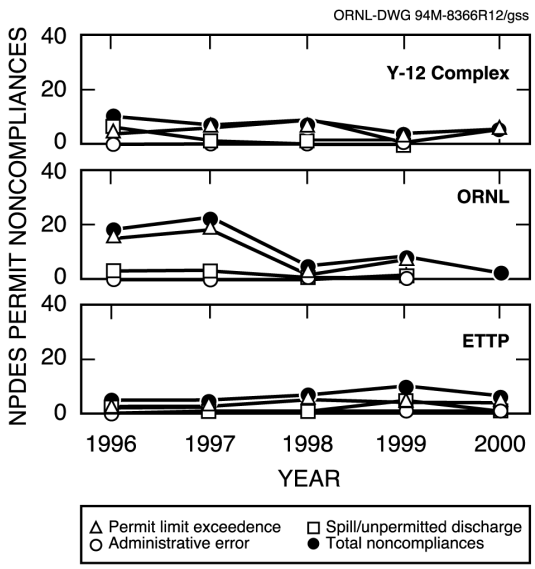

Fig. 2.1. Five-year summary of NPDES noncompliances.

regulatory interpretation for updating the Y-12 Stormwater Pollution Prevention Plan.

In September 1999, a consent order agreed to by DOE and Tennessee Water Quality Board resolved the outstanding permit appeals regarding biotoxicity and mercury limitations in East Fork Poplar Creek (EFPC). The requirements for instream mercury monitoring and limits were deleted from the NPDES permit and were placed under the CERCLA program. The current permit requires storm water characterizations at selected monitoring locations in accordance with the Y-12 Complex Storm Water Pollution Prevention Plan. Other documents submitted to TDEC in accordance with the NPDES permit include the Radiological Monitoring Plan (revised in 1997) and the *Oak Ridge Y-12 Plant Biological Monitoring and Abatement Program Plan* (revised in 1998) (Adams et al. 1998). A report on the analysis of fecal coliform bacteria levels at selected storm water monitoring points has been previously submitted.

ORNL is currently operating under NPDES Permit TN 0002941, which was renewed by TDEC on December 6, 1996, and went into effect February 3, 1997. The ORNL NPDES permit lists 164 point-source discharges and monitoring points that require compliance monitoring. Approximately 100 of these are storm drains, roof drains, and parking lot drains. Compliance was determined by approximately 6500 laboratory analyses and measurements in 2000, in addition to numerous field observations by ORNL field technicians. The NPDES permit limit compliance rate for all discharge points for 2000 was nearly 100%, with only 2 out of about 6500 individual measurements exceeding their respective permit limits (Fig. 2.1). The two exceedences were of instream temperature criteria, required to be measured under the Biological Monitoring and Abatement Plan (BMAP), and were not exceedences of actual numeric permit limits.

The current permit requires ORNL to conduct detailed characterization of numerous storm water outfalls, conduct an assessment and evaluation to modify the radiological monitoring plan, develop and implement a storm water pollution prevention plan, implement a revised BMAP plan, and develop and implement a chlorine control strategy. DOE appealed certain limits and conditions of the renewed ORNL permit, including numeric limits on effluent mercury, arsenic, and selenium.

The ETTP NPDES permit included 3 major outfalls, 1 minor outfall, and 136 storm-drain outfalls. From about 35,000 NPDES laboratory and field measurements completed in 2000, only 6 noncompliances occurred, indicating a compliance rate of more than 99% (Fig. 2.1). (See Appendix E, Table E.2.)

The ETTP is operating under NPDES Permit TN0002950, issued with an effective date of October 1, 1992. A major permit modification became effective June 1, 1995, and the permit expired on September 29, 1997. In anticipation of reindustrialization activities at ETTP and to facilitate the transfer of ownership/operation of ETTP facilities to other parties, the NPDES permit application submitted in March 1997 included a request to TDEC to issue four separate NPDES permits for wastewater treatment facilities, the sanitary water treatment facility, and the storm-water drainage system. A permit for the K-1515 sanitary water plant (TN0074233) was issued on June 12, 2000. The remainder of the site continues to operate under the terms and conditions of the expired permit until new permits are issued.

In addition to the outfall monitoring requirements, the current ETTP NPDES permit includes requirements to develop and implement a storm water pollution prevention plan, a BMAP plan, a wastewater control and surveillance plan for

wastewater treatment facilities, and monitoring of the TSCA Incinerator scrubber effluent. Additionally, four compliance schedules were included in the permit when it was issued in October 1992. These compliance schedules required termination of discharges at three major outfalls and compliance with chlorine limitations at seven outfalls. All requirements specified by the compliance schedules were met by the required deadlines.

2.2.12.2 Sanitary Wastewater

The CWA includes pretreatment regulations for publicly owned treatment works (POTWs). Sanitary wastewater from the Y-12 Complex is discharged to the city of Oak Ridge POTW under an industrial and commercial wastewater discharge permit. City personnel performed semiannual inspections on February 8 and August 31, 2000. No deficiencies of the Y-12 Sanitary Sewer Compliance Program were noted during the inspections.

A new industrial user discharge permit was issued to Y-12 on January 1, 2000, by the city of Oak Ridge. This 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, 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.

During 2000, the Y-12 Complex experienced one exceedence of the industrial user discharge permit. On January 5, the zinc limit of 0.75 mg/L was exceeded. The result obtained was 0.93 mg/L.

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. Typically, sample results indicate that the Y-12 Complex radiological discharges are three orders of magnitude below their respective DCG.

Two applications for pump-and-haul permits were submitted to TDEC in 1999. Both of these applications were approved in the year 2000. The requests are for the removal of sanitary wastes from the Clark Center Park restroom facilities and for the removal of similar wastes from a Y-12 office trailer designated as Building 9983-AZ.

At ORNL, sanitary wastewater is collected, treated, and discharged separately from other liquid wastewater streams through an on-site sewage treatment plant (STP). Wastewater discharged into this 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 STP 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 redirecting discharges from the laundry to appropriate alternative treatment facilities. The radioactivity level of ORNL STP sludge continues to decline. In 1998, ORNL's sewage sludge was accepted into the city of Oak Ridge's Biosolids Land Application Program. During 2000, ORNL transported fourteen tanker loads of sewage sludge to the Oak Ridge STP. Each tanker load was sampled and analyzed, and the resulting data/transfer was approved by the city of Oak Ridge prior to delivery.

ETTP domestic wastewater is treated at the on-site K-1203 STP and discharged pursuant to the NPDES permit. Beginning April 1, 1998, operation of the facility became the responsibility of OMI under a contract with CROET. A sewer-use ordinance and a wastewater control and surveillance program are in effect to ensure adequate treatment of wastewater at the K-1203 STP and also to ensure that effluent from the facility continues to meet all NPDES permit limits. Bechtel Jacobs Company, submitted an application in 1999 for a sanitary sewage pump-

and-haul permit for the K-1350-DF Facility at ETTP. The permit to operate this pump-and-haul system (State Operation Permit Number 99-033) was received on March 15, 2000. Excess property sales are conducted in this area.

2.2.12.3 Storm Water Protection Permits

Storm water discharges associated with construction activities that disturb more than five acres of land must be NPDES permitted. Coverage under a general permit is typically available to a construction project if the proper Notice of Intent (NOI) is filed. In October 1999, ORNL submitted an NOI for storm water discharges associated with the construction of the SNS. Based on the NOI, construction activities continued through 2000, in cooperation with TDEC regulatory personnel.

2.2.12.4 Aquatic Resources Protection

COE, TVA, and TDEC conduct permitting programs for projects and activities that could potentially affect aquatic resources, including navigable waters, surface waters (including tributaries), and wetlands. These are the COE Section 404 dredge-and-fill permits, TDEC applicable or relevant and appropriate requirements (ARARs), and TVA 26A approvals.

An Aquatic Resources Alteration Permit (ARAP) (permit number 98-318) was issued to Y-12 in 1998 for removal of debris in EFPC at the Oil/Water Separator. This permit remains valid for this location until September 2003. No TVA or COE permits were issued to Y-12 in 2000.

One new ARAP (permit number 00-042) was issued to ORNL in 2000 for the SNS access road. An Army COE Permit (permit number 2000-00307) was also issued for the SNS access road.

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 countermeasures (SPCC) plan to minimize the potential for oil discharges. Currently, each facility implements a site-specific SPCC plan. This section of the CWA was significantly amended by the Oil Pollution Act (OPA) of 1990, which has as its primary objective the improvement of responses to oil spills.

2.2.12.6 Clean Water Action Plan

The Clean Water Action Plan essentially reflects a commitment by federal agencies to work cooperatively to improve water quality in the United States and 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 a 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 multi-agency policy are to

- use a consistent and scientific approach to managing lands and resources and for assessing, protecting, and restoring watersheds;
- identify specific watersheds in which to focus budgetary and other resources and 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 federal 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 are documented for internal purposes. 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 Title V Operating Permit Program. Permit applications were submitted and were determined to be complete by TDEC. However, no Title V permits have been issued for DOE operations on the ORR to date. All sites continue to be covered under the application shield provision of the Tennessee Title V permitting rule, which covers permitted air emission sources under existing air permits until issuance of the site-level Title V air permits.

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 of 10 mrem/year. As noted in the preamble to this rule, the entire DOE facility at Oak Ridge, Tennessee, must meet this emission standard.

During 1991 and 1992, DOE and EPA Region 4 negotiated a Federal Facilities Compliance Agreement (FFCA) for the purpose of bringing the ORR into full compliance with 40 CFR 61, Subpart H. As required by the FFCA, the *Compliance Plan: National Emission Standards for Hazardous Air Pollutants for Airborne Radionuclides on the Oak Ridge Reservation, Oak Ridge Tennessee (MMES 1994a)*, was submitted to EPA Region 4 in 1991. ORR completed all other obligations under the compliance schedule of the FFCA by December 15, 1992. In September 1993, EPA Region 4 conducted an inspection of the ORR to verify that all requirements of the FFCA were completed. All requirements were found to have been satisfactorily completed, and no deficiencies were noted. In May 1994, the *Compliance Plan* was updated to reflect additional agreements between EPA Region 4 and ORR since the original *Compliance Plan* was submitted in 1991.

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 (DAPC). 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 would be recognized provided that they are current, valid, and supported by appropriate documentation. The TDEC-DAPC has given primary administrative authority of the radionuclide emission standard to the TDEC-Division of Radiological Health (DRH), which also licenses non-DOE nuclear facilities in the state.

The ORR facilities operated in compliance with the Radionuclide National Emission Standards for Hazardous Air Pollutants (Rad-

NESHAP) dose limit of 10 mrem/year to the most exposed member of the public during 2000. Based on modeling of radionuclide emissions from all major and minor point sources, the effective dose equivalent (EDE) to the most exposed member of the public was 0.39 mrem/year in 2000.

Beginning in 2000, the TDEC-DRH 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.

Continuous sampling for radionuclide emissions is conducted at the ETTP TSCA Incinerator and K-33 Decontamination Room, major sources at ORNL, and exhaust stacks serving uranium-processing areas at the Y-12 Complex. Grab samples and other EPA-approved estimation techniques are used on remaining minor emission points and grouped area sources to estimate emissions confirmatory measurements demonstrating compliance with the off-site dose limit. Fugitive emissions continue to be monitored by the ORR Perimeter Air Monitoring (PAM) System. In addition to this, ETTP continued to operate a site-specific ambient air monitoring system for surveillance of TSCA Incinerator uranium emissions. In addition to the ORR regulatory compliance program mentioned above, the EPA and DOE Oversight Division (TDEC/DOE-O) 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 (ACMs). The compliance program for management of ACM removal and disposal 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 (RQs) of asbestos were reported at ETTP, ORNL, or the Y-12 Complex in 2000.

2.2.13.5 Air Permits

BWXT Y-12 has 37 active air permits covering 138 air emission points. There are 137 documented exempt minor sources and 349 exempt minor emission points. During 2000, one new construction permit was issued.

During CY 2000 ORNL held 23 operating permits and 1 construction permit. All remaining emission sources are categorized as insignificant and are exempt from permitting.

At the end of CY 1999, there were 88 active air emission sources under DOE control at the ETTP. The total includes 30 sources covered by 8 TDEC air operating permits to construct. All remaining active air emission sources are exempt from permitting requirements. Permitted sources under DOE's Reindustrialization Initiative are no longer reported in this annual report, except for the portion of the year the source was under DOE control.

Air permit data are summarized in Appendix F.

2.2.13.6 NESHAP for Source Categories

There are only two sources on the ORR subject to Maximum Achievable Control Technology (MACT) standards. One source is the TSCA Incinerator the other 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 MACT.

2.2.13.7 Stratospheric Ozone Protection

DOE remains committed to continued reductions in usage of regulated ozone-depleting substances (ODSs) and substituting, where possible, ODSs with materials reported to have less ozone-depleting potential. For example, DOE has committed to replacing Class I ODS-containing refrigeration appliances older than 1984 and with cooling capacities at 150 tons or greater located at all DOE installations, except in certain cases where replacement is not economical and will not benefit the environment. All units meeting this criterion at ETTP, ORNL, and Y-12 have been evaluated and replaced, except for seven units located at ORNL. These seven units serve facilities with no continuing, funded mission, or they serve facilities with adequate backup capacity.

The units will be decommissioned as funding and circumstances allow.

2.2.13.8 Chemical Accident Release Prevention

All sites on the ORR have evaluated all DOE processes for inventories of chemicals contained in quantities exceeding thresholds specified in rules pursuant to Title III, Section 112(r), Prevention of Accidental Releases. No risk management program plans are required for a regulated substance at any DOE facility on the ORR. Administrative measures were implemented for some processes to limit the quantity of a regulated substance that could be present in a process at any given time.

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 polychlorinated biphenyls (PCBs).

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 found at 40 CFR 761 and are administered by EPA. Most of the requirements of 40 CFR 761 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 landfills.

2.2.14.2 PCB Compliance Agreements

The Oak Ridge Reservation PCB Federal Facilities Compliance Agreement (ORR-PCB-FFCA) between EPA Region 4 and DOE became effective on December 16, 1996. The agreement addresses PCB compliance issues at ETTP, ORNL, the Y-12 Complex, and ORISE. For ETTP, the agreement supersedes a previous agreement known as the Uranium Enrichment Toxic Substances Control Act Federal Facilities Compliance Agreement (UE-TSCA-FFCA). The UE-TSCA-FFCA continues in force for the Portsmouth and Paducah gaseous diffusion plants.

The ORR-PCB-FFCA specifically, addresses the unauthorized use of PCBs, storage and disposal of PCB wastes, spill cleanup and/or decontamination, PCBs mixed with radioactive materials, PCB R&D, and records and reporting requirements for the ORR. In 1998, changes to the ORR-PCB-FFCA were proposed by DOE to reflect the TSCA/PCB amendments, specifically, storage of PCB/radioactive waste beyond 1 year and alternative safe secondary containment system requirements for radioactive waste. DOE is awaiting EPA concurrence on the requested changes.

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 50-year history. Many of these 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 at 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. Unfortunately, the proposals to the new amendments 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, 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 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 submitted for the site. EPA approval of the sampling and monitoring plan was verbally issued on February 11, 1999. Annual monitoring was conducted in 1999 and 2000. A summary of the 1999 results of the sampling and recommendations for corrective action was submitted to EPA in February 2000. Submittal of the 2000 monitoring results was not required. In 2000, ORNL reported finding PCBs at regulated levels in ductwork associated with Building 6010.

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 Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) governs the sale and use of pesticides and requires that all pesticide products be registered by EPA before they can be sold. If a pesticide can be used according to directions without unreasonable adverse effects on the environment or applicator (i.e., if no special training is required), it is classified for general use. A pesticide that can harm the environment or injure the applicator even when being used according to directions is classified for restricted use. The regulations for the application of restricted-use pesticides are presented in 40 CFR 171.

The Y-12 Complex, ETTP, and ORNL maintain procedures for the storage, application, and disposition of pesticides. Individuals responsible for application of FIFRA materials are certified by the Tennessee Department of Agriculture.

No restricted-use pesticide products are used at the Y-12 Complex, the ETTP, or ORNL. An inventory of pesticide products is maintained at each facility.

2.2.16 Emergency Planning and Community Right-To-Know Act

The Emergency Planning and Community Right-to-Know Act (EPCRA), also referred to as the Superfund Amendments and Reauthorization

Act (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 Sections 302, 303, 304, 311, 312, and 313 of EPCRA, and 40 CFR Parts 355, 370, and 372. Table 2.11 describes the main parts of EPCRA. All DOE-ORO sites in Oak Ridge are in compliance with all aspects of EPCRA. Executive Order 12856 *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements* requires all federal agencies to comply with provisions of EPCRA and the Pollution Prevention Act.

2.2.16.1 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 2000.

2.2.16.2 Material Safety Data Sheet/Chemical Inventory (Sections 311-312)

Inventories, locations, and associated hazards of hazardous and extremely hazardous chemicals were submitted as required. Of the chemicals identified for CY 2000 on the ORR, 56 were located at the Y-12 Plant, 31 at ORNL, and 15 at the ETTP.

Private-sector lessees to the DOE Reindustrialization Initiative were not included in the CY 2000 submittals. Under terms of their contract, lessees must evaluate their own inventories of hazardous and extremely hazardous chemicals and must submit information as required by the regulations.

2.2.16.3 Toxic Chemical Release Reporting (Section 313)

DOE submits an annual Toxic Release Inventory (TRI) Report to EPA and TDEC on or before July 1 of each year. The annual TRI report covers the previous calendar year and addresses releases of certain toxic chemicals to air, water, and land as well as waste management, recycling, and pollution prevention activities. The toxic chemicals included in the report were aggregated for all DOE operations on the ORR and were compared with regulatory thresholds to determine which chemicals exceeded the reporting thresholds. After the threshold determination is made, release calculations and off-site transfers are calculated for each chemical that exceeded one or more thresholds.

Three new chemicals were added to the report this year:

- dioxin and dioxin-like compounds: The threshold of 0.1 g for dioxin was exceeded at Y-12 due to the coincidental manufacture of

Table 2.11. Descriptions of the main parts of the 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/chemical inventory	Requires that either material safety data sheets (MSDSs) or lists of hazardous chemicals for which MSDSs are required be provided to state and local authorities for emergency planning
Section 313, Toxic chemical release reporting	Requires that releases of toxic chemicals be reported annually to EPA

dioxin and dioxin-like compounds as a combustion by-product at the steam plant. The same activity threshold was exceeded at ETTP because of the Toxic Substances Control Act Incinerator (TSCAI).

- Freon 113: The threshold of 10,000 lb for Freon 113 was exceeded at Y-12.
- PCBs: The PCB threshold was exceeded at ETTP by incineration of PCB wastes in the TSCAI. There were incidental amounts of PCBs in wastes shipped from Y-12 and ETTP by the Bechtel Jacobs Company Waste Disposition project.

Dioxin and PCBs were added because of newly promulgated regulations on persistent, bioaccumulative, or toxic (PBT) chemicals. These two are included on the PBT list of 18 chemicals or chemical categories.

The following chemicals were also included in DOE's Annual TRI report for 2000. The following text explains how the reporting thresholds were exceeded. Table 2.12 summarizes releases and off-site transfers for those chemicals exceeding reporting thresholds. Therefore the numbers in the text and table are not generally the same.

Table 2.12. EPCRA Section 313 toxic chemical release and off-site transfer summary for the ORR, 2000

Chemical	Year	Quantity (lb)[a]			
		Y-12 Complex	ORNL	ETTP	Total
Copper	1999	165	1,602	100,138	101,905
	2000	49	235	1,488,037	1,488,321
Dioxin and dioxin-like compounds	1999	*b*	*b*	*b*	*b*
	2000	<1	*b*	*b*	*b*
Freon 113	1999	*b*	*b*	*b*	*b*
	2000	17,778	*b*	*b*	17,778
Hydrochloric acid (aerosol)	1999	138,595	52,603	16	191,214
	2000	132,882	38,146	21,994	193,022
Lead	1999	4,923	11,723	1,895	18,541
	2000	7,237	127,045	385	134,667
Mercury/mercury compounds	1999	141	712	23	876
	2000	23	11	0	34
Methanol	1999	30,597	517	0	31,114
	2000	59,422	0	404	59,826
Nitrate compounds	1999	5,641	62,091	2,057	69,789
	2000	7,048	50,000	2,413	59,461
Nitric acid	1999	296	81	1	378
	2000	1,773	0	26	1799
Ozone	1999	*c*	*c*	*c*	*c*
	2000	*c*	*c*	*c*	*c*
PCBs	1999	*b*	*b*	*b*	*b*
	2000	2,447	*b*	9,836	12,287
Sulfuric acid (aerosol)	1999	53,283	29,015	221	82,519
	2000	52,917	19,510	0	72,427
Total	1999	233,641	158,344	104,351	496,336
	2000	281,576	234,947	1,523,095	2,039,622

[a]Represents total releases to air, land, and water and includes off-site waste transfers.
[b]No reportable releases.
[c]Not applicable because releases were less than 500 lb and hence a Form A was submitted.

- **Copper.** Approximately 1.55 million lb of copper from the DOE Fernald site were recycled by DOE subcontractors at ETTP.
- **Hydrochloric acid (HCl) (aerosol form).** This is coincidentally manufactured as a combustion by-product in the TSCAI; however, the releases are removed from the exhaust stack, and therefore, releases are within permit limits. Also, HCl is a combustion by-product from burning coal at the Y-12 and ORNL steam plants.
- **Lead.** The ORNL Lead Shop melted 118,000 lb of lead to form shielding bricks. Also, 127,000 lb of lead were shipped for recycling at an off-site facility.
- **Methanol.** Most of the methanol at ORR is used at Y-12 in the chiller buildings for the brine systems.
- **Mercury compounds.** Approximately 40,000 lb of mercury were used in a pilot plant study at ORNL.
- **Nitrate compounds.** Nitrate compounds were coincidentally manufactured as a by-product of neutralizing nitric acid waste at both ORNL and Y-12, and as a by-product of sewage treatment at ORNL.
- **Nitric acid.** ORNL used nitric acid at the High Flux Isotope Reactor (HFIR) to regenerate ion exchange columns that produce makeup water to HFIR and in the separation process for californium by the Chemical Technology Division. At Y-12, nitric acid is used for passivation, cleaning, stable-isotope purification, and bulk storage tank makeup.
- **Ozone.** Ozone is manufactured at Y-12 cooling towers for microbial control.
- **Sulfuric acid (aerosol form).** Sulfuric acid (H_2SO_4) is coincidentally manufactured in an aerosol form as a combustion by-product in the TSCAI; however, the releases are removed from the exhaust stack, and therefore releases are within permit limits. Also, H_2SO_4 is a combustion by-product of the burning of coal at the Y-12 and ORNL steam plants.

Total reportable ORR TRI chemical releases to air, water, and land and waste transferred off site for treatment, disposal, and recycling increased dramatically compared with the amounts reported in 1999. This increase was due primarily to the 1.5 million lb of copper recycled at ETTP. Figure 2.2 depicts total reportable ORR TRI chemical releases for each reporting year (RY) beginning with RY 1993.

Reportable releases to the air, water, and land from each ORR site can be reviewed in the EPA database at http://www.epa.gov/tri/tri99/index.htm.

2.2.17 Environmental Occurrences

CERCLA requires that the National Response Center be notified if a nonpermitted release of an RQ or more of a hazardous substance (including radionuclides) is released to the environment within a 24-h period. The CWA requires that the

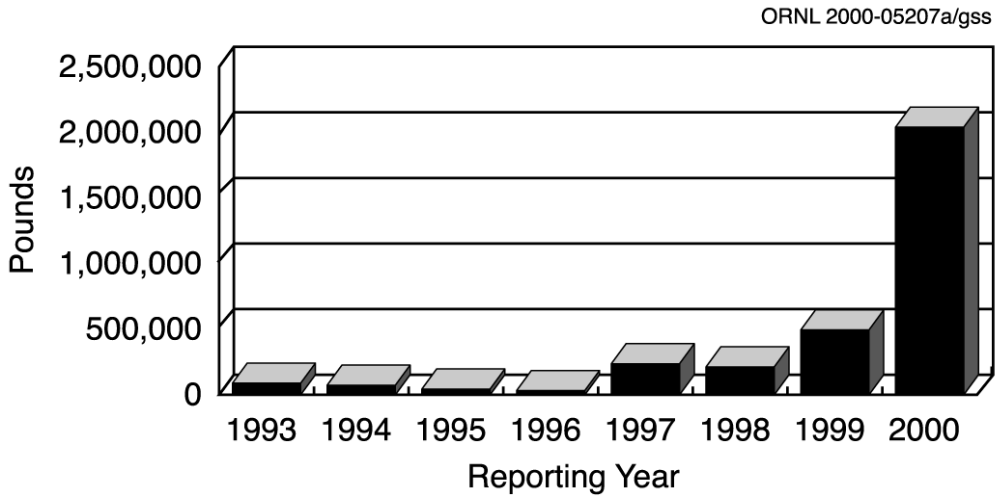

Fig. 2.2. Total reportable TRI chemical releases, 1993–2000.

National Response Center be notified if an oil spill causes a sheen on navigable waters, such as rivers, lakes, or streams. When notified, the National Response Center alerts federal, state, and local regulatory emergency organizations so they can determine whether government response is appropriate.

During 2000, Y-12 reported one CERCLA RQ release to federal and state agencies for mercury in June 2000. There were no reportable oil sheens observed at Y-12 during CY 2000. The National Response Center and Tennessee Emergency Management Agency (TEMA) were notified of one oil sheen observed on Melton Branch at ORNL during CY 2000. ORNL had no releases of hazardous substances exceeding RQs in CY 2000.

During 2000, ETTP reported no CERCLA RQ releases or oil sheens to federal or state agencies.

2.2.18 Implementation Status of DOE Order 435.1

DOE Order 435.1, *Radioactive Waste Management*, was issued to ensure that all DOE radioactive waste is managed in a manner that protects the environment and worker and public safety and health. This order, effective July 1, 1999, cancels DOE Order 5820.2A, *Radioactive Waste Management*, and includes the requirements that DOE facilities and operations must meet in managing radioactive waste.

UT-Battelle, BWXT Y-12, and Bechtel Jacobs each developed an implementation plan that identified actions that were necessary to meet DOE Order 435.1 requirements. These plans included required tasks, schedules, and procedures. UT-Battelle's responsibilities related to this order are limited to those incumbent upon waste generators due to the division of responsibilities between UT-Battelle and Bechtel Jacobs. UT-Battelle has completed the 18 actions relating to waste generation planning, waste certification, waste characterization, waste packaging, waste accumulation and staging, and waste transfer to TSDR providers required to achieve compliance with the order.

Y-12 has developed an implementation plan that outlines the strategy for compliance with the order. Affected operations at Y-12 include all low-level waste-generation processes and accumulation/storage areas for waste generated from such processes. Bechtel Jacobs has completed all corrective actions required in its Implementation Plan, according to DOE's schedule.

2.3 APPRAISALS AND SURVEILLANCES OF ENVIRONMENTAL PROGRAMS

Numerous appraisals, surveillances, and audits of the ORR environmental activities were conducted during 2000 (see Tables 2.13, 2.14, and 2.15). These tables do not include internal DOE prime contractor assessments for 2000.

An EPA multimedia surprise inspection was conducted a the Y-12 Complex during June and July of CY 2000. The audit team was composed of individuals from the EPA Atlanta office. Accompanying the EPA auditors were individuals from the Knoxville and Oak Ridge offices of the TDEC. The scope of the audit included inspection of numerous DOE program activities conducted by multiple contractors working at the Y-12 Complex. The audit addressed areas such as most of the environmental compliance programs (including PCBs), the SDWA (including UIC), and USTs. A report of the multimedia inspection, received in December 2000, identified what EPA considered three possible violations of regulatory requirements and included numerous recommendations for improvements. The possible violations related to maintenance actions at the Y-12 steam plant, updating of the Stormwater Pollution Prevention Plan, and storage criteria for PCB items. The response provided to EPA includes additional information on steam plant operations and concludes that Y-12 is operating in full compliance with the requirements under review.

2.4 ENVIRONMENTAL PERMITS

Table 2.16 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.

Table 2.13. Summary of environmental audits and assessments conducted at the Y-12 Complex,[a] 2000

Date	Reviewer	Subject	Issues
		Lockheed Martin Energy Systems, Inc.	
2/8	City of Oak Ridge	Sanitary Sewer Pretreatment Inspection	0
2/22	TDEC	RCRA CEI-GW Postclosure Permit Compliance	0
2/22	TDEC	TDEC Hazardous Waste Annual Inspection	0
5/9–10	TDEC	NPDES CEI	0
6/22	TDEC	GWPP well inspection audit	0
6/26–30	TDEC	TDEC RCRA hazardous waste	0
6/26–7/20	EPA	EPA multimedia inspection	TBD[b]
8/31	City of Oak Ridge	Pretreatment inspection	0
		Bechtel Jacobs Company	
2/21	TDEC	RCRA (RCRA inspection)	0
6/26	EPA, TDEC	RCRA (Hazardous waste inspection)	0
7/19	EPA, TDEC, TDEC/DOE-O	Multimedia inspection (Safe Drinking Water, Wastewater, Clean Air, Underground Injection, UST, Pollution Prevention, PCBs)	0

[a]TDEC Division of Safe Drinking Water conducted an inspection of the Y-12 Complex drinking water distribution system in July 2000.

[b]Final EPA report not issued.

Table 2.14. Summary of environmental audits and assessments conducted at ORNL, 2000

Date	Reviewer	Subject	Issues
2/28	TDEC	Inspection of RCRA treatment, storage, disposal, and recycling operations and groundwater monitoring	0
6/13–14	TDEC, TDEC/DOE-O[a]	CWA Inspection: Annual compliance evaluation inspection of ORNL NPDES Program (included Bechtel Jacobs Company and UT-Battelle facilities)	0
6/23	TDEC/DOE-O, COE	Inspection of stream sediment removal site, 6556 Area	0
7/19	TDEC, TDEC/DOE-O	Inspection of SNS site erosion controls	3
8/22	Federal Energy Regulatory Commission	Safe Dams Inspection: White Oak Dam	0
10/23[b]	TDEC	Solid Waste Inspection: ORNL Cooling Tower Project	0
12/14	TDEC	Observation of relative accuracy test audit for continuous emission monitoring system on Boiler 6	0
12/15–16 and 12/20	TDEC	CAA Inspection: FY 2000 annual compliance inspection of permitted emissions sources	0

[a]TDEC/DOE-O = Tennessee Department of Environment and Conservation/DOE-Oversight Division.

Table 2.15. Summary of environmental audits and assessments conducted at ETTP, 2000

Date	Reviewer	Subject	Issues
1/18	EPA, TDEC	Soil sampling	0
1/25	TDEC, TDEC/DOE-O	CAA inspection: annual compliance inspection of air emission sources at ETTP	0
2/15	TDEC	RCRA (informal visit to discuss organizational changes)	0
5/16	TDEC, TDEC/DOE-O	CWA inspection: annual NPDES inspection at ETTP	0
8/22	EPA	Fourth Annual Progress Meeting for the ORR PCB FFCA	0
9/12	TDEC	RCRA inspection: ETTP	0
9/28	TDEC	RCRA inspection: K-31 and TSCA Incinerator	0
10/16	TDEC	Collect surface water samples at K-901	0
11/14	TDEC	Collect surface water samples at K-901	0
11/16	TDEC	Solid waste inspection: observe mini test at the TSCA Incinerator	0
12/11	TDEC	CWA inspection: conduct sanitary survey of ETTP's drinking water and distribution system)	0
12/12	TDEC	Collect surface water samples at K-901	0
12/20	TDEC	RCRA inspection: storage units in K-1065, K-711, and K-1036	0

2.5 NOTICES OF VIOLATIONS AND PENALTIES

The Y-12 Complex received no Notices of Violations (NOVs) in 2000.

ORNL received two NOVs in 2000, one for alleged violations of Tennessee petroleum UST requirements, and one for the deteriorating condition of potable water supply tanks. ORNL provided responses to TDEC describing corrective actions for the excursions cited in the NOVs. The petroleum UST NOV has been closed, and a corrective action plan has been submitted to TDEC on the second NOV. No fines or penalties were assessed by TDEC in connection with the ORNL NOVs.

ETTP received an NOV in 2000 for an NPDES permit limit exceedence for total residual chlorine, which occurred on December 27, 1999. ETTP initiated corrective actions for the exceedence at the time that it was first reported. ETTP also provided a response to TDEC describing these corrective actions. No fines or penalties were assessed by TDEC in connection with this NOV.

2.6 TENNESSEE OVERSIGHT AGREEMENT

On May 13, 1991, the state of Tennessee and DOE entered into a 5-year monitoring and oversight agreement in which DOE agreed to provide the state with financial and technical support for "independent monitoring and oversight" of DOE activities on the ORR. In June 1996, the state and DOE signed a 5-year extension of the agreement that will expire in June 2001. During 2000, negotiations began between DOE and the state for extension of the agreement. The agreement provides the state of Tennessee $26.15 million over the 5-year period. Activities conducted under the agreement include oversight of DOE's environmental monitoring, waste management, environmental restoration, and emergency management programs. The agreement is intended to assure Tennessee citizens that their health, safety, and environment are being protected by DOE through existing programs and substantial new commitments.

Table 2.16. Summary of permits as of December 2000

	Y-12 Complex	ORNL	ETTP
Resource Conservation and Recovery Act			
RCRA operating (Parts A and B)	4[a]	4[b]	4
Part B applications in process	0[c]	1	0
Postclosure	3[d]	0	0
Permit-by-rule units	13[e]	115[e]	9[e]
Solid waste landfills	6[f]	0	0
Annual petroleum UST facility certificate	2	1	1
Transporter permit	1	1	1
Hazardous and Solid Waste Amendments (HSWA) Permit	1[g]	1[g]	1[g]
Clean Water Act			
NPDES	1[h]	1	1
Storm water	1[i]	1[i]	1[i]
Aquatic resource alteration	1	4	0
COE 404 permits	0	3	1
General storm water construction	1[j]	1	0
Clean Air Act			
Operating air	35	22	8
Construction	2	1	2
Prevention of significant deterioration	0	0	0
Sanitary Sewer			
Sanitary sewer	1	0	0
Pump-and-haul permit	2	0	1
Toxic Substances Control Act			
TSCA Incinerator	0	0	1
R&D for alternative disposal methods	0	2	0
Safe Drinking Water Act			
Class V underground injection control permits	0	1	0

[a]Four permits have been issued, representing 15 active units.

[b]Four permits have been issued, representing 19 active units and 7 proposed units. One permit covers corrective action (HSWA) only.

[c]A Part B permit application for three waste piles was previously submitted to TDEC, but a permit is no longer being pursued because the waste piles are scheduled to be closed.

[d]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 (UEFPC) Regime.

[e]Number of units reported in 3016 Report/Inventory of Federal Hazardous Waste Activities. This report/inventory includes each tank unit (i.e., facility) and does not count individual tanks as separate units.

[f]Four landfills are operational: one (Spoil Area 1) is inactive and has a ROD under CERCLA, and one (Landfill II) is in postclosure care and maintenance.

[g]ORR permit. Requirements for corrective action have been integrated into the ORR FFA.

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

[i]TDEC has incorporated into individual NPDES permits.

[j]Notice of intent that accesses a general NPDES permit. A notice of intent remains on file for construction at Landfill V, VII.

TDEC is the lead Tennessee state agency for implementation of the agreement. TDEC has established the Tennessee Department of Environment and Conservation/DOE Oversight Division (TDEC/DOE-O), located in the city of Oak Ridge. TDEC has entered into contracts with various state and local agencies to support oversight activities. Agreements are in place with the TWRA for fish and wildlife monitoring activities, TEMA for emergency management support, and the ORR Local Oversight Committee for assistance in achieving a better public understanding of the issues and activities on the ORR.

A DOE-Tennessee Oversight Agreement (TOA) steering committee composed of site and major program representatives has been established to coordinate implementation of the TOA and to promote consistency in its implementation across the ORR. Bechtel Jacobs Company, BWXT Y-12, UT-Battelle, and other selected DOE prime contractors have established internal organizations, including the designation of TOA coordinators, to facilitate implementation of the agreement.

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 made available to the state for its review. TDEC/DOE-O routinely visits the three DOE sites to attend formal meetings and briefings, conduct walk-throughs of buildings and grounds, and conduct observations of site operations to assess compliance with environmental regulations. The TDEC/DOE-O also prepares an annual environmental monitoring report of its activities (TDEC 2000a). The report covering CY 2000 will be issued in July 2001.