CLEANUP PROGRESS

Annual Report to the Oak Ridge Community

Message from Assistant Manager for Environmental Management

The past year has been one of great challenges and significant accomplishments for the Oak Ridge Operations Environmental Management Program. Our stakeholder organizations, contractors, federal and state regulatory agencies, and interested members of the public have participated in and contributed to our successes.

Last year at this time, we were embarking on what we refer to as "accelerated cleanup." Under this approach, approximately $1.4 billion in cost savings will be realized over the life of the Oak Ridge program. Today, with the cooperation and teamwork of those entities mentioned above, we have hit full stride in those efforts and can see the finish line.

Challenges, both known and unknown, lie ahead, but our focus is on achieving our objectives, and we are confident in our ability to address any obstacles that might arise.

One key accomplishment during the past fiscal year was reaching a 5-year contract agreement with Bechtel Jacobs Company LLC. That contract is now the road map for safely and effectively cleaning up the Oak Ridge Reservation's high-risk areas by 2008.

Even before the contract was signed, we had made solid progress in our efforts to accelerate cleanup. The K-1070-A Burial Ground remediation was completed with the excavation and disposal of more than 28.5 tons of contaminated material. The last of five shipments of spent nuclear fuel left the Reservation in November, and the dredging, treatment, and disposal of contaminated material from four surface impoundments at Oak Ridge National Laboratory were completed.

Last year we were able to report that the Environmental Management Waste Management Facility near the Y-12 National Security Complex was open for business. By the end of fiscal year 2003, more than 174,000 tons of contaminated soil and debris had been disposed of at the facility. Safe and efficient disposal contributed heavily to the successful completion of key cleanup projects across the Reservation.

In addition, progress has been made toward the permanent establishment of an industrial/business park at the Horizon Center, and a brownfield industrial complex at the neighboring Heritage Center (also called the East Tennessee Technology Park). In 2003 we transferred portions of the Horizon Center to the Community Reuse Organization of East Tennessee for development purposes. Working in concert with Oak Ridge community, we are on our way to establishing self-sustaining industrial parks that will benefit the entire region.

Since taking this job last year, I have had the opportunity to meet with many of you in a variety of settings. I am continually impressed by your knowledge of our programs and your proactive participation—past and present—in helping us achieve our goals.

Let me echo the sentiments of my predecessor, Gerald Boyd, in last year's edition of Cleanup Progress. I want to thank you for your patience during this time of transition and assure you that I look forward to continuing a productive relationship with our stakeholders. Feel free at any time to let me know how we can do a better job of keeping you informed and involved in our activities.

Steve McCracken

CONTENTS

4 ETTP

4 ETTP Three-Building D&D Project Nearing Completion
5 ETTP Building Demolition Continues
6 Remedial Action Completed at K-1070-A Burial Ground
7 Zone 1 Record of Decision Approved
7 Zone 2 Pre-Record-of-Decision Documents Developed
8 K-1070-C/D G-Pit Waste Disposition Completed
8 K-1085 Old Firehouse Drum Site Disposition Completed

9 Melton Valley

9 Remediation Continues in Melton Valley
- 9 Hydrofracture Wells Plugging and Abandonment
- 10 New Hydrofracture Facility D&D
- 10 SWSA 4 Hydrologic Isolation

11 Spent Nuclear Fuel Shipped Off-Site
12 Fuel and Flush Salts Removal Project Progressing
13 Waste Processing Facility to Treat TRU Wastes
14 Wastes to Be Retrieved from 22-Trench Area

15 Reservation Cleanup/Waste Management

15 Various Areas Being Remediated in Bethel Valley
- 15 Bethel Valley Groundwater Engineering Study
- 15 Remediation of T-1, T-2, and HFIR Tanks

16 Surface Impoundment Waste Removed
16 Boneyard/Burnyard Remediation Completed
17 UEFPC Remediation Being Conducted in Phases
17 Building 9201-2 Water Treatment System to Be Constructed
18 Witherspoon Site Being Prepared for Cleanup
18 Tons of Wastes Placed in the EMWMF
19 Millions of Gallons of Wastewater Treated in FY 2003
20 Waste Stockpile Continues to Diminish
21 TSCA Incinerator Continues Hazardous Waste Treatment
22 Improved Technologies Being Used for Cleanup

24 Public Involvement

24 Public Involvement Continues to Be Key Aspect of Cleanup
25 ORSSAB Provides Public Input to Environmental Management Program Activities

Contact Information

If you have any comments or suggestions about this report, please contact the DOE Public Affairs Office at (865) 576-0885.

This document is approved for public release per review by the ETTP Classification and Information Control Office.

Acronyms and Initialisms

BY/BY	Boneyard/Burnyard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH	contact-handled
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DVS	dynamic verification strategy
DWI	David Witherspoon, Inc.
EE/CA	engineering evaluation/cost analysis
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ETTP	East Tennessee Technology Park
FFA	Federal Facility Agreement
FFS	focused feasibility study
FY	fiscal year
HFIR	High Flux Isotope Reactor
INEEL	Idaho National Engineering and Environmental Laboratory
LUCs	land-use control
LUCIP	land-use control implementation plan
LLLW	liquid low-level waste
LLW	low-level waste
MLLW	mixed low-level waste
MSRE	Molten Salt Reactor Experiment
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORR	Oak Ridge Reservation
ORSSAB	Oak Ridge Site-Specific Advisory Board
PCB	polychlorinated biphenyl
PEIS	preliminary environmental impact statement
PPT	parts per trillion
RFP	request for proposal
RH	remote-handled
ROD	Record of Decision
SADA	Spatial Analysis and Decision Assistance
SNF	spent nuclear fuel
STP	site treatment plan
SWSA	solid waste storage area
TDEC	Tennessee Department of Environment and Conservation
TRU	transuranic
TSCA	Toxic Substances Control Act
UEFPC	Upper East Fork Poplar Creek
UF_6	uranium hexafluoride
WPF	Waste Processing Facility
WIPP	Waste Isolation Pilot Plant

EAST TENNESSEE TECHNOLOGY PARK

ETTP Three-Building D&D Project Nearing Completion

The East Tennessee Technology Park (ETTP) Three-Building D&D Project is nearing completion, with 83 percent of the work accomplished as of the end of FY 2003. The contractor, under a fixed-price contract with the U.S. Department of Energy (DOE) awarded in August 1997, is dismantling, removing, and dispositioning the materials and equipment within the K-33, K-31, and K-29 gaseous diffusion buildings at ETTP. The three buildings cover more than 4.89 million ft^2 of floor space and housed more than 140,000 tons of contaminated or potentially contaminated material.

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

A total of 128,854 tons of material have been dismantled, removed, and disposition as waste or recyclable material for the entire project. During the fiscal year, more than 18 percent of the overall project was completed, including dismantlement, disassembly, removal, and dispositioning of all of the process equipment and material from four of the five remaining cascade units in Bldg. K-31 and one of the three cascade units in Bldg. K-29. More than 43,000 tons of metal have also been processed as low-level waste to the Envirocare Disposal Facility and NTS Disposal Facility and disposed of 6,000 yd^3 of concrete pedestal material in the EMWMF.

Completion of the dismantlement, disassembly, and disposal of the remaining cascade unit in Bldg. K-31 and the remaining two cascade units in Bldg. K-29 is expected in FY 2004. Decontamination of the interiors of Bldgs. K-33 and K-31 is also expected to be completed in FY 2004. The interior of Bldg. K-29 will not be decontaminated as part of this project. The project is scheduled to be completed by August 2004.

K-33 Cell floor before dismantlement

K-33 Cell floor after dismantlement

ETTP Building Demolition Continues

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

Buildings and facilities have been divided into two groups: (1) K-25/27 facilities decontamination and decommissioning (D&D) and (2) remaining facilities D&D, which is broken into several subprojects. Because these are interim removal actions, future Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) decisions will determine the final remedy for the contaminated slabs, soils, and below-grade structures.

K-25/K-27 Facilities D&D

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

Transite removal from cell enclosure in Building K-25

A public information session was held in 2001 to solicit comments from the public on the engineering evaluation/cost analysis (EE/CA) developed for this project. An action memorandum for the D&D of the K-25 and K-27 buildings was signed in February 2002. Phase 1, hazardous materials removal, started in spring 2002 and was approximately 50 percent complete by the end of fiscal year (FY) 2003. Phase 1 activities primarily include the removal of asbestos-containing building materials from the inside of the K-25 and K-27 facilities. At the close of FY 2003, hazardous material abatement had been completed in 26 units (260 cells), and more than 280,000 ft^3 of waste from the K-25 building had been disposed of at the Environmental Management Waste Management Facility (EMWMF) located near the Y-12 National Security Complex.

Phase 2, process equipment removal, activities in FY 2003 included detailed meetings with the D&D core team to resolve comments on the process-equipment-removal waste handling and characterization plans. The Phase 2 process equipment removal request for proposal (RFP) was issued during FY 2003, and the proposal was under review at year-end. Additionally, the work on removal of excess materials from the K-25 and K-27 buildings was issued for bids. The corresponding draft versions of the waste handling plan, waste characterization plan, and removal action work plan were also prepared. Excess material removal and the process equipment removal work are planned to begin in FY 2004.

On September 30, 2003, DOE signed an action memorandum for the remaining facilities (approximately 500) to undergo D&D under the EE/CA for the K-25 Auxiliary Facilities Demolition Project, Group II. The *Remaining Facilities Demolition Standard Operating Protocol and Waste Handling Plan – Part I* was prepared and submitted to the regulators for approval on September 18, 2003.

In 2004 the first subproject under the remaining facilities to begin D&D will be the Balance of Site Laboratories Group, which includes 23 facilities. The request for proposal will be issued in early FY 2004. The subproject *Waste Handling Plan – Part II* will be issued to the regulators before the start of demolition, and fieldwork is scheduled to start in late FY 2004. Also in FY 2004 limited characterization, utility deactivation planning, and RFP preparation are scheduled for the main plant and powerhouse subprojects. Other remaining facilities subprojects are scheduled to begin in FY 2005, with completion scheduled for FY 2008.

Main Plant (10 building) Demolition Project

The main plant (10 building) Demolition Project involves characterization, sampling, hazardous material abatement, radiological decontamination, demolition, and disposal of ten buildings on the ETTP project site. The facilities include K-1300, K-1301, K-1302, K-1303, K-1404, K-1405, K-1407, K-1408, K-1413, and K-1045A. This project began in FY 2001 and continued in FY 2003. During FY 2003, the K-1300 uranium hexafluoride (UF_6) vent lines were demolished, and all remaining waste from the facilities was disposed, with the exception of the low-level classified waste from K-1413. The uncontaminated waste went to the ORR Industrial Landfill, while the low-level waste was disposed at the EMWMF. The K-1300 vent line waste was disposed at the Nevada Test Site (NTS).

Classified waste from K-1413 will be disposed at the NTS in early FY 2004, and the removal action report will be submitted to the regulators, completing this project.

Group II Buildings, Phase II Demolition Project (K-1064 Area D&D) FY 2003 Actions

DOE signed an action memorandum for the decontamination and demolition of 18 ETTP facilities and the removal of scrap material on July 31, 2002. These facilities and the scrap material are primarily located in the K-1064 peninsula area of ETTP. During FY 2003, the removal action work plan and waste handling plan were prepared and submitted to the regulators. Demolition of the 18 facilities is scheduled for FY 2004

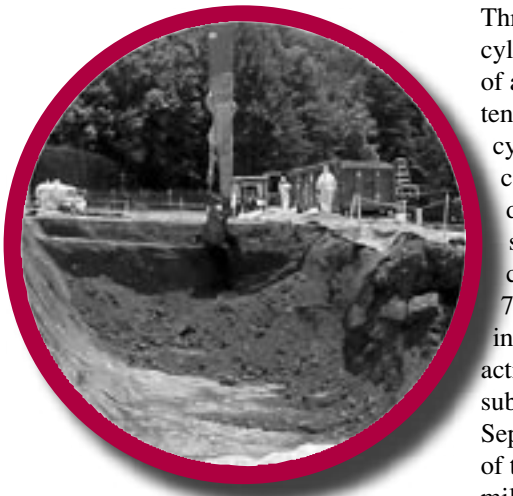
Remaining Facilities Demolition Project (Accelerated Closure Project) FY 2003 Actions

In 2004 the first subproject under the remaining facilities to begin D&D will be the Balance of Site Laboratories Group, which includes 23 facilities. The request for proposal will be issued in early FY 2004. The subproject *Waste Handling Plan – Part II* will be issued to the regulators before the start of demolition, and fieldwork is scheduled to start in late FY 2004. Also in FY 2004 limited characterization, utility deactivation planning, and RFP preparation are scheduled for the main plant and powerhouse subprojects. Other remaining facilities subprojects are scheduled to begin in FY 2005, with completion scheduled for FY 2008.

Remedial Action Completed at K-1070-A Burial Ground

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

Included in the 21,651 yd^3 of waste were 344 intact gas cylinders and various-size containers that were unearthed and underwent nondestructive assay analyses to determine uranium-235 enrichment. Three hundred thirty-four of these cylinders were breached and disposed of at the EMWMF; the remaining ten cylinders, including two 10-ton cylinders that had the potential to contain UF_6, were transferred to and dispositioned by the UF_6 Project. The site has been regraded to its original contours and restored. More than 70,600 hours were worked without incident or injury. The remedial action report for the burial ground was submitted to the regulatory agencies in September 2003, three months ahead of the Federal Facility Agreement milestone.



Excavation at K-1070-A

Zone 1 Record of Decision Approved

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

The potentially impacted area of ETTP is divided into two areas: Zone 1 and Zone 2

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

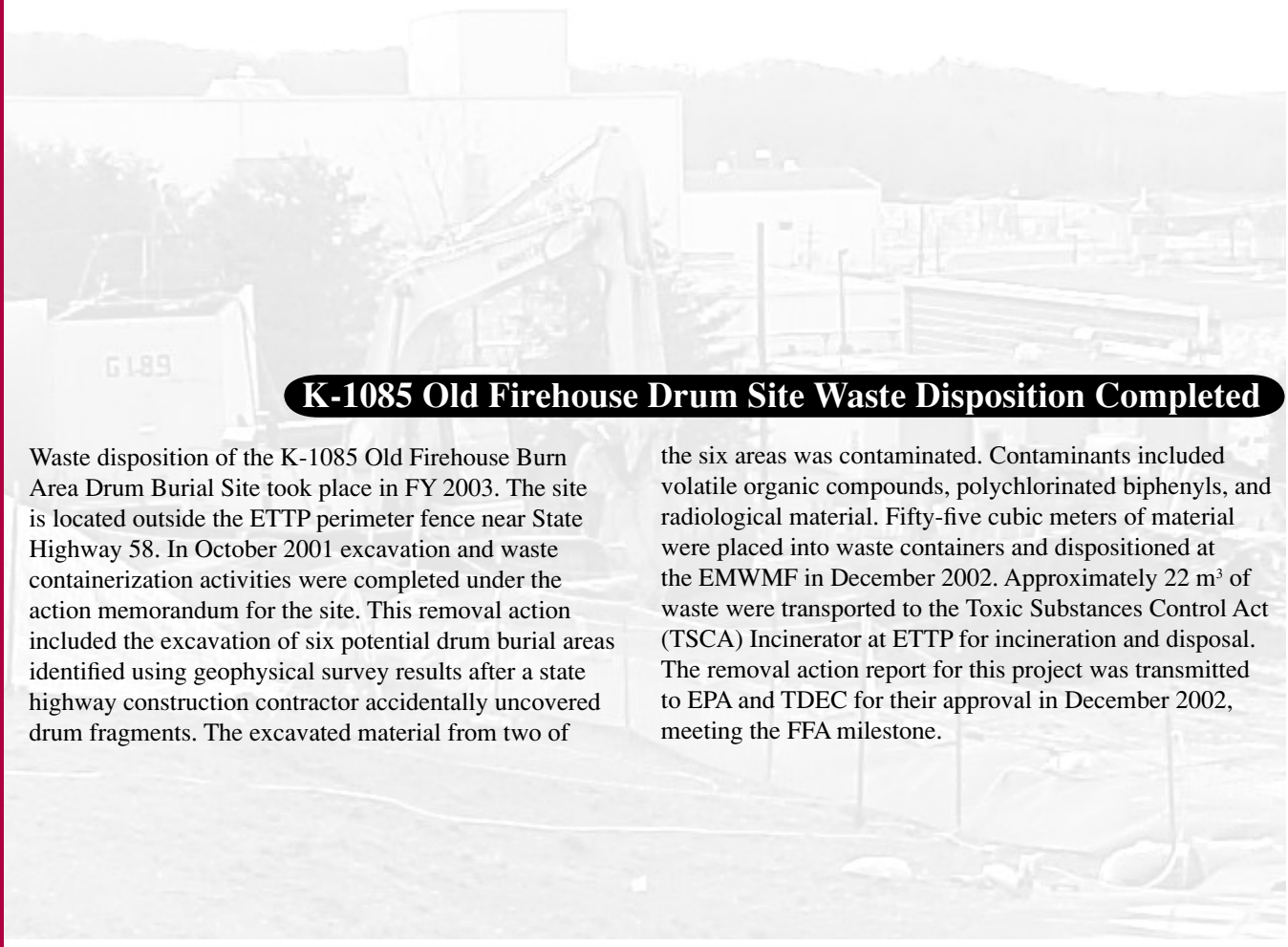
Zone 2 Pre-Record-of-Decision Documents Developed

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

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

Portions of the K-1070-C/D Burial Ground were remediated in a two-phase project. Phase I consisted of excavation, segregation, characterization, and packaging of buried material in G-Pit, located in the K-1070-C/D Burial Ground, and covering of the K-1071 concrete pad, also located at the burial ground. Phase II of the remedial action consisted of the treatment and disposal of the excavated material from G-Pit.

During Phase I, the concrete pad was covered with approximately 2 feet of soil, over an existing plastic cover, to prevent direct contact with and provide radiation shielding at the K-1071 concrete pad area. This activity was completed in April 1999. Approximately 230 yd^3 of waste in G-Pit were also excavated and placed in interim storage within the K-1070-C/D Burial Ground until they were treated and disposed of in December 2002 following approval of an authorized-limit request by DOE Headquarters and a special waste request from TDEC. During Phase II this waste was disposed of at the ORR Industrial Landfill at the Y-12 Complex. Approximately 40 yd^3 of secondary construction waste were accepted for disposal and incinerated at the TSCA Incinerator in September 2003. The remedial action report was submitted to EPA and TDEC in December 2002, meeting the FFA milestone, followed by a letter notification of completion of incineration of the secondary waste stream in September.



K-1085 Old Firehouse Drum Site Waste Disposition Completed

Waste disposition of the K-1085 Old Firehouse Burn Area Drum Burial Site took place in FY 2003. The site is located outside the ETTP perimeter fence near State Highway 58. In October 2001 excavation and waste containerization activities were completed under the action memorandum for the site. This removal action included the excavation of six potential drum burial areas identified using geophysical survey results after a state highway construction contractor accidentally uncovered drum fragments. The excavated material from two of the six areas was contaminated. Contaminants included volatile organic compounds, polychlorinated biphenyls, and radiological material. Fifty-five cubic meters of material were placed into waste containers and dispositioned at the EMWMF in December 2002. Approximately 22 m^3 of waste were transported to the Toxic Substances Control Act (TSCA) Incinerator at ETTP for incineration and disposal. The removal action report for this project was transmitted to EPA and TDEC for their approval in December 2002, meeting the FFA milestone.

MELTON VALLEY

Remediation Continues in Melton Valley

Continued well plugging and abandonment, D&D of the New Hydrofracture Facility, and hydraulic isolation at Solid Waste Storage Area (SWSA) 4 were among the remediation activities in Melton Valley in FY 2003.

The FFA parties signed the Melton Valley ROD in September 2000. The Melton Valley ROD presents the selected remedy for environmental remediation of various burial grounds and other contaminated waste units within the Oak Ridge National Laboratory (ORNL) Melton Valley area. Remediation will be accomplished through a combination of responses that includes containment, stabilization, removal, treatment, monitoring, and interim land-use controls (LUCs).

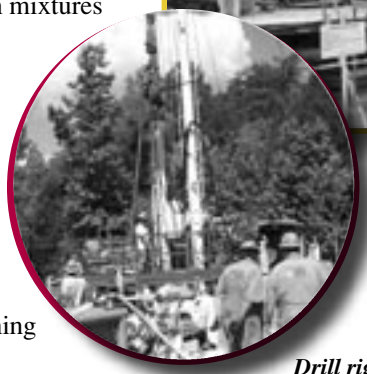
Regulators approved a remedial design work plan in May 2001, with the approval of the LUCIP still outstanding. The LUCIP specifies what actions must be taken to implement and maintain the required LUCs. Remediation work mandated by the Melton Valley ROD has been ongoing and will continue through FY 2006.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

Two other projects under the Melton Valley ROD completed subcontractor procurement and remedial design activities in FY 2003 in preparation for FY 2004 construction. These projects are hydrologic isolation for the SWSA 5 burial grounds and for the Seepage Pits and Trenches Area. Design efforts in FY 2004 will be performed for hydrologic isolation of the SWSA 6 burial grounds, in situ vitrification of Seepage Trenches 5 and 7, remediation of Melton Valley soil and sediment, and D&D of ancillary structures at the Homogeneous Reactor Experiment facility and various other facilities throughout Melton Valley.

Hydrofracture Wells Plugging and Abandonment

Forty-five wells were plugged and abandoned in FY 2003, which is in addition to the 33 wells that were plugged in FY 2001 and the 32 in FY 2002. Plugging and abandoning these wells will prevent migration of contaminated fluids to shallower groundwater zones.

Coil tubing unit used for well cleanouts and to cement wells after casing perforation



Drill rig and support equipment setup; drill rig used for well washover

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

These surplus wells are potential pathways for the migration of contaminated fluids from the grout sheets and from deep groundwater to shallower groundwater zones. To prevent this migration, a remedial action was initiated in 2001 to plug and abandon 111 wells consisting of 4 injection and 107 monitoring wells.

The remaining well (injection well 1968), which is located within the New Hydrofracture Facility, is scheduled for completion in early FY 2004.

New Hydrofracture Facility D&D

The New Hydrofracture Facility was built at ORNL between 1979 and 1982 and operated from 1982 to 1984. This facility replaced the Old Hydrofracture Facility, which operated between the late 1950s to the mid-1970s. The New Hydrofracture Facility was designed to facilitate the injection of a mixture of radioactive waste solutions and grout into an impermeable shale formation at depths between 700 and 1000 feet below grade. The hydrofracture process is essentially a batch process in which the waste/grout mixture is pumped down a tubing string in the injection well and out into the shale formation. The high injection pressure of approximately 3,000 psi fractures the subsurface shale and forces the waste/grout mixture into the fractures, where it hardens into "grout sheets."

The objective of the D&D of the New Hydrofracture Facility is the removal and disposition of the main and ancillary facilities, including some subsurface structures. D&D of the Old Hydrofracture Facility was completed in FY 2002. To date all New Hydrofracture Facility ancillary facilities, including dry storage tanks, the weighing station, and transfer piping, have been removed and dispositioned. The remainder of the facility is expected to be demolished in January 2004.

Ongoing demolition of the New Hydrofracture Facility

SWSA 4 Hydrologic Isolation

Aerial view of the Intermediate Holding Pond and the eastern portion of SWSA 4 after excavation

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

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

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

The remedial design report/remedial action work plan for this project was approved in May 2002. Bridge and haul road upgrades, borrow area development, and the plugging and abandonment of 167 shallow wells have

been completed. Approximately 24,300 tons (17,200 yd^3) of contaminated soil from the Intermediate Holding Pond were excavated and disposed in the EMWMF. A portion of the Intermediate Holding Pond is being used as a holding pond for the SWSA 4 cap remediation; the remainder has been backfilled and reseeded. An approximately half-mile section of Lagoon Road has been relocated to a position farther to the north of the SWSA 4 cap. A downgradient trench has been constructed for collection of leachate from SWSA 4. Contour fill placement for the cap construction is approximately 85 percent complete, and a landfill liner has been installed over approximately a quarter of SWSA 4. A wastewater treatment plant, which will treat the collected leachate from SWSA 4, is nearing completion. Hydrologic isolation of SWSA 4 will be completed in FY 2004.

Spent Nuclear Fuel Shipped Off Site

The shipping of spent nuclear fuel (SNF) stored at ORNL began in FY 2003. The material is being consolidated with other SNF in storage at the Idaho National Engineering and Environmental Laboratory (INEEL).

By the end of September 2003, three of the five planned shipments to INEEL had been completed. The last two shipments of SNF to INEEL are planned to be completed early in FY 2004. These five shipments will transfer 62 SNF canisters and 9 intact Peach Bottom Reactor fuel assemblies with a total of 0.22 metric ton of heavy metal from Oak Ridge to INEEL. These shipments will also complete the removal of more than 100,000 curies of radionuclides from the ORR.

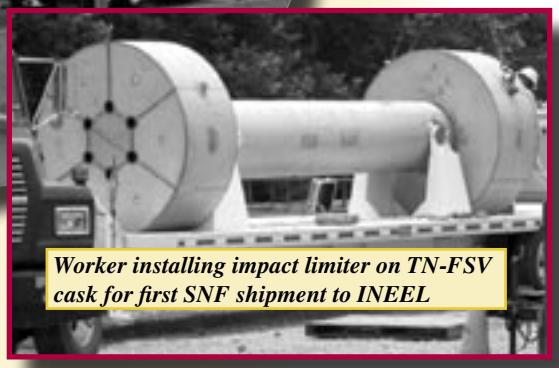
Research and development programs related to nuclear reactor fuel have historically been a part of ORNL's mission. Many of these programs involved the post-irradiation examination and testing of SNF from various types of reactors. After these programs were completed, the remaining SNF was collected and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

With the issuance of the programmatic environmental impact statement (PEIS) ROD for SNF in 1995, smaller sites, like Oak Ridge, were directed to ship aluminum-clad SNF to the Savannah River Site and non-aluminum-clad SNF to INEEL. Following the issuance of the ROD for the PEIS, an environmental assessment was prepared for the Oak Ridge SNF activities, and a finding of no significant impact was issued.

Aluminum-clad SNF was retrieved, repackaged, and shipped to the Savannah River Site in three shipments in October, November, and January of FY 1998. These shipments consisted of 11 canisters with a total of 0.019 metric ton of heavy metal. Retrieval and repackaging of SNF were completed in FY 2002. Repackaged SNF was placed in temporary storage, pending shipment to INEEL.

DOE approved the safety basis for loading SNF in the shipping cask in March 2003, and then approved readiness to load SNF in the shipping cask in June 2003. Immediately following that approval, the first shipment of SNF was loaded and prepared for shipment to INEEL.

First shipment of SNF leaving Oak Ridge for INEEL



Worker installing impact limiter on TN-FSV cask for first SNF shipment to INEEL

Fuel and Flush Salts Removal Project Progressing

Testing of fuel salt removal equipment and a cold trap system was successfully completed at the Molten Salt Reactor Experiment (MSRE) facility in FY 2003. Operating procedures were developed based on results of the testing. MSRE is currently participating in an operational readiness review process in preparation for fuel and flush salt removal, which will occur in FYs 2004 and 2005.

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

The molten salt that circulated in MSRE consisted of a mixture of lithium fluoride, beryllium fluoride, zirconium fluoride, and uranium fluoride. A small amount of plutonium fluoride was also added to the salt. When the reactor was shut down, the molten salt was drained into two fuel salt storage tanks, where it solidified. A flush salt, similar in composition to the fuel salt but without the uranium, was recirculated through the reactor and drained into a third storage tank and solidified. All three storage tanks are located in an underground, concrete-shielded drain tank cell adjacent to the reactor cell.

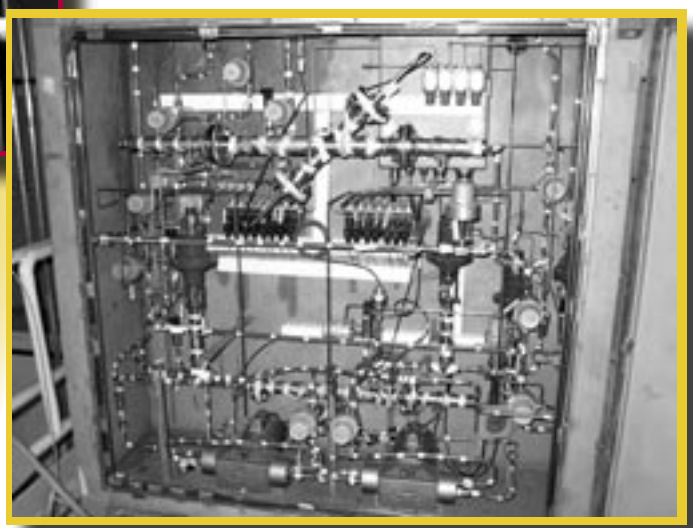
Surveillance activities in 1987 indicated elevated radiation levels in off-gas lines connected to the three drain tanks. Samples of the off-gas taken in March 1994 revealed the presence of fluorine and uranium fluoride gas, which was caused by interaction of radiation and salt. After these gases were detected, various removal actions were taken to reduce the risk and safely manage the fuel and flush salts in their respective drain tanks.

In 1998 DOE signed a ROD for interim action to remove fuel and flush salts from the MSRE. The selected remedy includes

- separation of the uranium from the fuel and flush salts,
- removal of the fuel and flush salts from the drain tanks,
- disposition of the uranium material as a more stable form,
- stabilization/repackaging of the residual salt, and
- placement of the residual salt in interim storage until an end-point location is selected for final disposition.

Design, procurement, fabrication, and installation of fuel salt removal equipment were completed in FY 2002. Equipment/component startup testing and initial operator training were also completed in FY 2002.

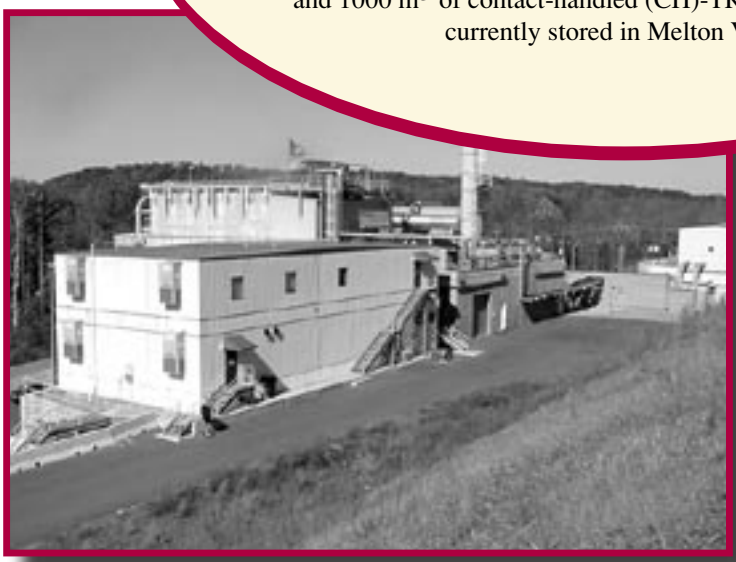
MSRE process control panels



Reactive gas process equipment system for fuel salt removal

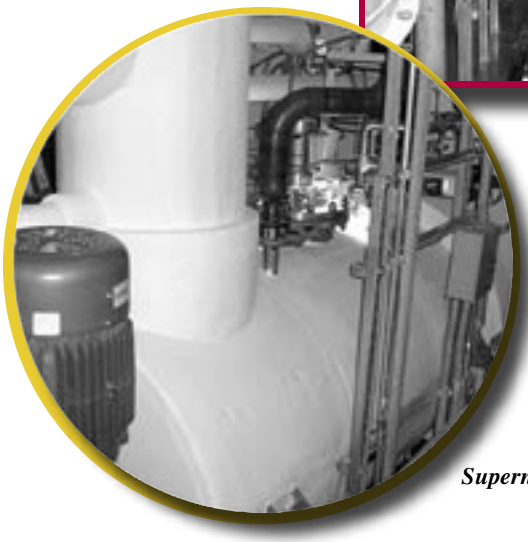
Waste Processing Facility to Treat TRU Wastes

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



Waste Processing Facility

LLLW Tank Vault Room



Supernate Dryer

Construction for the Supernate Processing System of the WPF is complete, and the operational readiness reviews are under way. Supernate processing is to begin in FY 2004. Construction and testing of the CH system is scheduled to resume shortly after supernate operations begin. CH operations are expected to start in October 2004. The construction and testing of the RH solids and sludge systems will resume sometime in 2005, depending on the status of the RH permit for the Waste Isolation Pilot Plant (WIPP) that is currently expected to be approved and in place by July 31, 2006.

Wastes to Be Retrieved from 22-Trench Area

TRU wastes that have been stored in the 22-Trench Area in SWSA 5 North, Melton Valley, will be removed soon.

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

The RFP for the 22-Trench Area retrieval project was issued for bid early in FY 2003. The proposals were evaluated and a subcontract awarded for this work. The scope of work consists of retrieving the TRU waste packages, placing the waste packages in overpacks, and staging the waste in appropriate areas pending transport to the TRU WPF when directed by DOE. There the wastes will be repackaged to meet the acceptance criteria for off-site disposal facilities and then shipped off-site for disposal. Soil exceeding remediation levels in the Melton Valley ROD and debris waste associated with the excavation will be disposed at the EMWMF or other appropriate facility. Design and planning have been initiated and DOE and the regulators have reviewed preliminary design packages. Field activities will begin in FY 2004 and continue until completion in FY 2006.

Historical photograph of TRU waste casks lying in a trench before backfilling

Aerial photograph of SWSA 5 North

RESERVATION CLEANUP/ WASTE MANAGEMENT

Various Areas Being Remediated in Bethel Valley

The Bethel Valley ROD, signed by the FFA parties in May 2002, presents the selected remedy for environmental remediation of various contaminated areas within the ORNL Bethel Valley area. Higher risk sites will be addressed first. Remediation work mandated by the Bethel Valley ROD will continue through FY 2014.

The first two projects to be performed under the ROD are the Bethel Valley Groundwater Engineering Study and the remediation of the T-1, T-2, and High Flux Isotope Reactor (HFIR) tanks.

Bethel Valley Groundwater Engineering Study

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

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

The Bethel Valley ROD requires the contents of three underground tanks (T-1, T-2, and HFIR) to be removed to the extent practical and the tanks to be grouted in place. Initially, the project was part of the FFA tanks program, but the organic resins present in the tanks made it difficult for the contents to meet the waste acceptance criteria of the liquid low-level waste (LLLW) system. An innovative and cost-effective set of technologies was identified that allows removal of tank contents and destruction of the organic resin, thereby allowing the contents to be accepted by the LLLW system.

The current scope of the project allows the contents of the HFIR tank to be grouted in place and the waste in Tanks T-1 and T-2 to be removed and treated for disposition in the LLLW system. The project is well under way and scheduled for completion in FY 2006. Currently, the AEA Technology equipment is being installed at the Tanks T-1 and T-2 site, with treatment scheduled to begin in early spring 2004.

Bethel Valley

Surface Impoundment Waste Removed

Solidified sediment awaiting final transport to a disposal facility

Waste from four surface impoundments at ORNL was disposed in FY 2003.

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

Sediment was transferred from Impoundments 3539 and 3540 to 3513 in 1998. Sediment was transferred from impoundment 3524 to 3513 in 2000. Following sediment transfer, Impoundments 3524, 3539, and 3540 were backfilled with rock, and grout was added to the rock to fill empty spaces. Gravel pads were installed over the backfilled impoundments to provide space for the construction and operation of a sediment treatment system and to create a staging area for treated waste forms before shipment for disposal. The treatment system became operational in late 2001. Since then all the sediment (approximately 6350 yd^3) has been removed, treated, and converted to 981 concrete final waste forms. As of the end of FY 2003, the treated waste had been disposed, and the treatment plant was being demolished, with completion planned for early FY 2004.

Truck transport of treated waste from Impoundment A storage to ETTP for rail shipment to Utah.

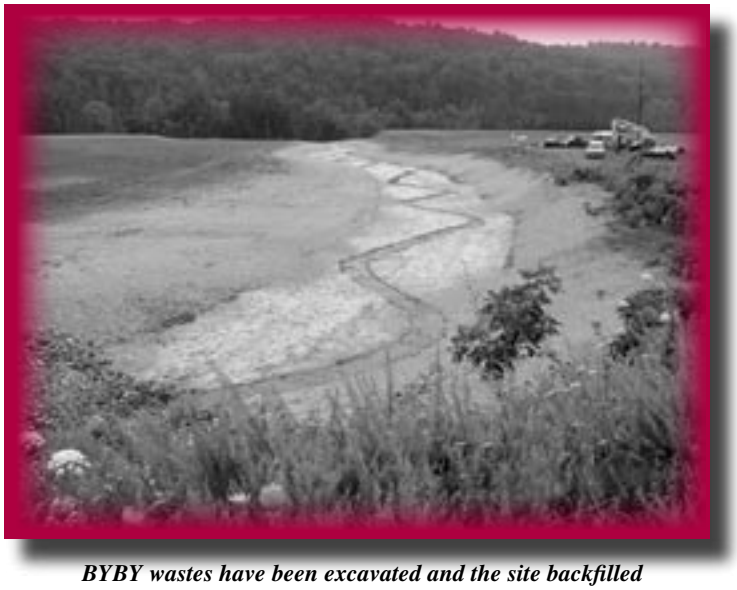
Impoundment 3524 being backfilled

Boneyard/Burnyard Remediation Completed

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

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

Three release sites are associated with the BY/BY remediation project: (1) the Oil Landfarm Soils Containment Pad; (2) the Hazardous Chemical Disposal Area; and (3) the BY/BY, including Bear Creek Tributary 3 Floodplain Soils. The Oil Landfarm Soils Containment Pad structure was a below-grade storage pad that contained approximately 570 yd^3 of polychlorinated biphenyl (PCB)-contaminated soils excavated during



BYBY wastes have been excavated and the site backfilled

closure of the Oil Landfarm. The Hazardous Chemical Disposal Area was historically used to dispose of chemicals that were deemed to be hazardous to plant workers, including acids, bases, and miscellaneous liquids. The area was covered in the late 1980s with an engineered cap, similar to the type required under the Resource Conservation and Recovery Act. The BY/BY was used for the disposal of combustible wastes, including uranium turnings, which were placed either on the surface or in unlined trenches and set on fire. The area was also used for storing abandoned equipment, which resulted in surface contamination. These wastes were leaching from the BY/BY to shallow groundwater, which then discharged to surface water.

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

UEFPC Remediation Being Conducted in Phases

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

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

Building 9201-2 Water Treatment System to Be Constructed

To mitigate the mercury being released into UEFPC, the Bldg. 9201-2 Water Treatment System was designed and will be constructed as the first action of the approved ROD for Phase 1 Interim Source Control Actions in the UEFPC Characterization Area.

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

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

Witherspoon Site Being Prepared for Cleanup

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

Aerial of Witherspoon site

The objective of this off-site project is to perform interim actions and complete the supporting documentation resulting in a ROD at the DWI 901 Site.

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

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

Tons of Wastes Placed in the EMWMF

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

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

By the end of FY 2003, 174,300 tons of soil and debris waste had been disposed of at the facility. Projects that have used the EMWMF include the

- BY/BY Remedial Action Project near the Y-12 Complex,
- Intermediate Holding Pond Remedial Action Project at ORNL,
- K-1070-A Remedial Action Project at ETTP,
- ETTP Main Plant Facilities,
- Melton Valley Old Hydrofracture Facility D&D Project at ORNL, and
- Surface Impoundment Operable Unit Project at ORNL.

The EMWMF, located in East Bear Creek Valley near the Y-12 Complex, is an on-site waste facility that is being used to contain the waste generated during cleanup of ORR and associated sites in Tennessee. The EMWMF accepted its first waste shipment in May 2002.

Synergistic to the activities at the EMWMF, DOE also operates solid waste disposal facilities at the Y-12 Complex, called the ORR Landfills. In FY 2003 more than 108,000 yd^3 of industrial, construction/demolition,

SIOU waste being disposed of at the EMWMF

classified, and spoil material waste were disposed of — 40% above the forecast as the result of acceleration of cleanup activities across the ORR.

The EMWMF and ORR Landfills are serving the disposal needs of the ORR cleanup program as well as the active missions of the Y-12 Complex and ORNL

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

Millions of Gallons of Wastewater Treated in FY 2003

During FY 2003, the Environmental Management Program treated 26.0 million gallons of liquid waste at the Groundwater Treatment Facility, East End Mercury Treatment System, Central Mercury Treatment System, and East End Volatile Organic Compound System.

The West End Treatment Facility and the Central Pollution Control Facility at the Y-12 Complex processed about 837,000 gallons of wastewater, primarily in support of National Nuclear Security Administration operation activities. This wastewater included hazardous materials such as PCBs, cyanide, mercury, cadmium, chromium, and uranium. The hazardous materials end up in the sludge that results from wastewater treatment. A total of 900,000 kg of sludge was treated and shipped for off-site disposal in compliance with site treatment plan (STP) milestones. The total quantity of mixed-waste sludge disposed of since the project began in 1997 is 8,300,000 kg (about 9,200 tons). The remaining sludge inventory will be treated and disposed of by the end of FY 2004.

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

At ORNL approximately 245,000,000 gallons of wastewater were treated and released at the Process Waste Treatment Complex. In addition, the LLLW evaporator at ORNL treated 216,000 gallons of such waste. Finally, 2.3 billion m^3 of gaseous waste were treated at the ORNL 3039 Stack Facility. These important waste treatment activities supported both Environmental Management and Office of Science mission activities in a safe and compliant manner.

More than 35 million gallons of waste were treated at the Central Neutralization Facility in FY 2003

Waste Stockpile Continues to Diminish

Operations at the ORR produce wastes that frequently contain radionuclides. Such wastes are characterized as either LLW or TRU wastes. Mixed low-level wastes (MLLWs) are those that contain materials deemed hazardous and are regulated under the Resource Conservation and Recovery Act.

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

TRU waste processing facility

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

The ORR has the largest inventory of legacy LLW in the DOE complex. In addition, active DOE missions at the Y-12 Complex and ORNL produce newly generated LLW that must be managed and disposed safely and efficiently. In FY 2003, DOE shipped 112 legacy LLW monoliths (2161 yd^3) to the Nevada Test Site for disposal, leaving fewer than 40 of these large legacy LLW containers. Characterization and planning activities are nearly complete for ensuring that the entire inventory of legacy LLW will be disposed by the end of FY 2005. Almost 9,000 yd^3 of newly generated LLW was also shipped for disposal in FY 2003.

A monolith being prepared for shipment off-site

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

Also in FY 2003, DOE and its contractors completed a 2-year effort to identify and safely disposition more than 1,000 potentially shock-sensitive chemical items. Rigorous planning and careful execution brought about a successful outcome to ridding the ORR of these items in a safe and compliant manner.

TSCA Incinerator Continues Hazardous Waste Treatment

The Toxic Substances Control Act (TSCA) Incinerator, located at ETTP, treated 567,289 pounds of liquid waste and 162,664 pounds of solid waste in FY 2003. Plans are in place to increase the throughput at the incinerator to ensure cost-effective operations in support of the DOE complex's cleanup mission. In FY 2004, approximately 900,000 pounds of combined liquid and solid waste are planned for treatment at the incinerator.

The TSCA Incinerator plays a key role in treatment of radioactive PCB and hazardous wastes (mixed wastes) from the ORR and other DOE facilities. It burns wastes generated by Oak Ridge cleanup projects as well as those from numerous out-of-state DOE sites. The incinerator is expected to be closed at the end of FY 2006.

TSCA Incinerator

Quick Facts About the TSCA Incinerator

- Since full operation began in 1991, the TSCA Incinerator has treated more than 28 million pounds of waste.
- The Incinerator operated under rules and regulations issued by DOE, the Environmental Protection Agency, and the State of Tennessee.
- A comprehensive performance test will be performed in 2004 to demonstrate compliance with new emission standards.
- The incinerator operates with temperatures of more than 1,500 degrees to 2,200 degrees Fahrenheit.
- Some 99.99 percent of the hazardous organics and 99.9999 percent of the PCBs are destroyed during incineration.

Improved Technologies Being Used for Cleanup

The mission of the Environmental Technology Program is to provide the scientific foundation, new approaches, and new technologies to bring about significant reductions in risk, cost, and schedule for completion of the environmental management accelerated cleanup mission. The need for real-time technology solutions has been made even more urgent with the renewed emphasis on site closure. In FY 2003 the DOE Oak Ridge Operations (ORO) Environmental Technology Program focused on several key problem areas at DOE-ORO sites.

The Y-12 Complex has had historical releases of mercury from four main process buildings. The loss of an estimated 2 million pounds of mercury to soil and surface waters has created a mercury-management problem involving contamination of numerous sumps and outfalls. The Environmental Technology Program is working with academia and the private sector to investigate phytoremediation for the stabilization and transpiration of mercury.

Additionally in FY 2003 development and field testing of a microcantilever sensor for the detection of mercury in water at the parts-per-trillion level were advanced.

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

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

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

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

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

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

PUBLIC INVOLVEMENT

Public Involvement Continues to Be Key Aspect of Cleanup

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

DOE sought public input on a number of key documents and decisions, including the

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

A unique type of public involvement took place on September 15, 2003, as more than 700 current and former Oak Ridge K-25 Site workers, as well as members of the public, attended the 60th anniversary celebration for the K-25 Site. Participants not only heard about exciting plans for accelerated cleanup of the site, but also saw firsthand the changing landscape of open spaces where buildings once stood.

The event, held outside the fenced area of ETTP, featured displays, music, presentations, and a lot of reminiscing. DOE and local government leaders also participated in the event. Commemorative lapel pins, anniversary publications, and other items were given to attendees.

K-25 Site's 60th anniversary provided the public a chance to honor and find out more about the site's history

Other notable FY 2003 public involvement initiatives included the following:

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

ORSSAB Provides Public Input to Environmental Management Program Activities

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

The board generated 17 recommendations this year on a variety of environmental management topics, including

- "Recommendation to Accelerate Removal of Remote-Handled Transuranic (TRU) Waste from the Oak Ridge Reservation,"
- "Recommendation Concerning the Depleted Uranium Hexafluoride Disposition Program,"
- "Recommendation Concerning the DOE Action Memorandum for the Corehole 8 Plume Source,"
- "Comments on the Environmental Assessment for Proposed Changes to the Sanitary Biosolids Land Application Program," and
- "Recommendation Concerning the RCRA Part B Permit Renewal for the TSCA Incinerator."

Other significant FY 2003 accomplishments are described in the following sections.

Oak Ridge Site Specific Advisory Board members

TRU Waste Issues

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

Environmental Management Waste Management Facility

A rising groundwater problem was identified beneath the EMWMF in spring 2003. To remedy the problem DOE proposed several alternatives to the facility design, which were presented to EPA and the state of Tennessee. Because building of the CERCLA waste facility had significant public support, the regulators insisted on getting the public's input on the alternatives before making a decision. ORSSAB provided this forum. Presentations were made to the board, and public notices were placed before the board's meetings on this topic, resulting in excellent public attendance.

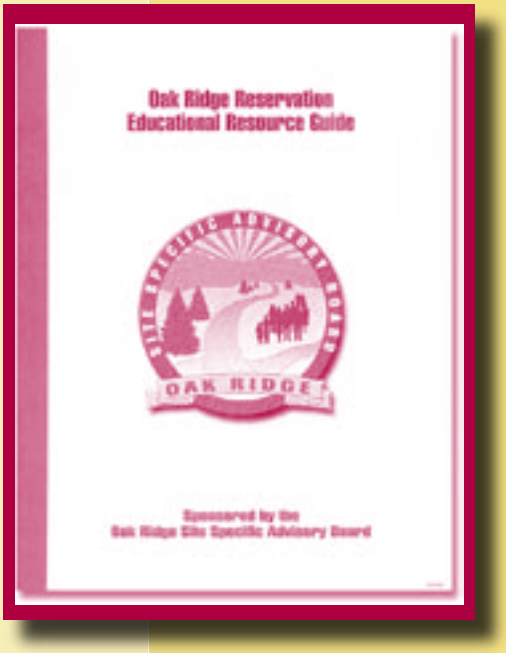
In July 2003, ORSSAB endorsed DOE's preferred method for placement of an underdrain to address the high groundwater. Without a quick decision on the design issue, the scheduled build-out of additional waste cells would have significantly impacted waste disposition in 2005, forcing off-site disposition, cost increases, and/or slowed remediation activities.

Long-Term Stewardship

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

Educational Resource Guide

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



Video Lending Library

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

Jessie Roberson, Assistant Secretary for Environmental Management (center), is pictured during a visit to Oak Ridge with (from left) Norman Mulvenon, ORSSAB vice chair; Dave Mosby; ORSSAB chair; Gerald Boyd, DOE Oak Ridge Operations Manager; and Donna Campbell, ORSSAB member.

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

Information Resources

DOE Information Center

475 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
Phone: (865) 241-4780
Fax: (865) 574-3521
Hours 8 a.m. to 5 p.m., Monday – Friday

Telephone Numbers

DOE Public Affairs Office
(865) 576-0885

DOE-ORO Public Information Line
1-800-382-6938

Oak Ridge Site Specific Advisory Board
(865) 576-1590
1-800-382-6938

Local Oversight Committee
(865) 483-1333

Tennessee Department of Environment and Conservation
(865) 481-0995

Environmental Protection Agency; Region IV
1-800-241-1754

Agency for Toxic Substances and Disease Registry
1-888-422-8737
Oak Ridge Office:
(865) 220-0295

Internet Sites

DOE Main Web Site	www.energy.gov
DOE-ORO Home Page	www.oakridge.doe.gov
DOE-ORO Environmental Management Program	www.oakridge.doe.gov/em
Oak Ridge Site Specific Advisory Board	www.oakridge.doe.gov/em/ssab
Oak Ridge Accelerated Cleanup	www.bechteljacobs.com/doeclean/
Agency for Toxic Substances and Disease Registry	www.atsdr.cdc.gov
Environmental Protection Agency	www.epa.gov/region4/
Tennessee Department of Environment and Conservation	www.state.tn.us/environment/doe
DOE Information Center	www.oakridge.doe.gov/info_cntr

Publication of the U.S. Department of Energy