

# Annual Report to the Oak Ridge Community



FY 2005

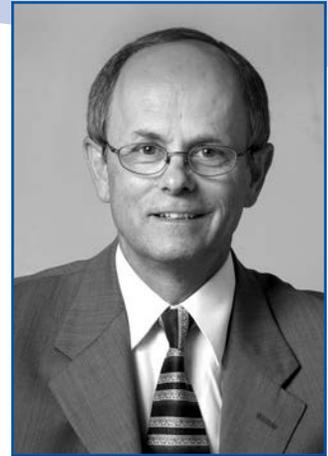
DOE/OR-2210

# CLEANUP PROGRESS





## *Message From The Assistant Manager for Environmental Management*



**W**hat an exciting time for Oak Ridge, and for everyone involved in the Oak Ridge Accelerated Cleanup Program. As we turn the page on Year-Three of the program—and look forward to Year-Four—we can begin to see the tangible results of many years of planning and preparation.

Take a look around. There are empty cylinder yards at East Tennessee Technology Park (ETTP) and vacant lots where decaying buildings once stood. There are grassy slopes of the protective caps in Melton Valley and empty buildings where tons of legacy wastes were stored.

The removal of legacy waste (low-level and mixed low-level wastes resulting from years of uranium enrichment, nuclear weapons support, and nuclear research activities) marked the completion of the first major milestone set within the Accelerated Cleanup Plan as the fiscal year drew to a close. This long-awaited accomplishment underscores the fact that this program is well on its way to being accomplished, safely and successfully.

While the legacy waste milestone is cause for celebration, a lot of work is left to be done. As we move to the completion of the remediation work at Melton Valley during 2006, the pace of ETTP work now picks up.

At ETTP, we marked the completion of the Three-Building D&D Project decontamination. Buildings K-31 and K-33 are now available for a decision on reindustrialization, and the less marketable K-29 building was transferred to the EM program for demolition and disposition. We also demolished 87 facilities, including several from a grouping known as the “laboratory facilities,” and began preparing for the demolition of buildings K-29, K-1401, and K-1420. Many more facilities will come down next year. At Building K-25, the centerpiece of the ETTP cleanup, we began equipment removal and continued making progress on transite siding removal. We shipped several hundred truckloads of contaminated scrap from the K-1065 scrap yard, transported hundreds of UF<sub>6</sub> cylinders to Portsmouth, Ohio, for disposition, and began early characterization of the K-1020 burial ground. We worked closely with regulators and stakeholders to reach a Record of Decision for ETTP Zone 2—“inside the fence.” Outside the fence, we completed the remediation of Blair Quarry—a source of building material during site construction and later a disposal site for contaminated debris—and began the intensive soil sampling in Zone 1.

At Melton Valley, we completed the protective capping—what engineers call “hydrologic isolation”—of Solid Waste Storage Areas 3, 4, and 5. Construction of the SWSA 6 cap will be completed in 2006, as we reach toward our next major milestone in September 2006.

In Bear Creek Valley, expansion of the Environmental Management Waste Management Facility was completed last year with the addition of two new cells. And soon, waste shipments from ETTP will begin rolling in via the new Haul Road, a major undertaking that required building bridges over two state highways and a creek and the construction of 4.8 miles of new roadway. While huge in scope, the Haul Road will save time, and perhaps lives, by restricting heavy truck traffic from public highways.

Meanwhile, waste shipments continue rolling in from 30 miles away in the Vestal community of South Knoxville, where tremendous progress is being made at the David Witherspoon Inc. 901 site. A recycler of scrap metal, some of which came from Oak Ridge in the early 1950s through the early 1980s, Witherspoon’s processing facilities have been demolished and shipped, and removal of contaminated soils has begun.

You’ll read more about these and many other accomplishments in the FY 2005 issue of *Cleanup Progress*. I hope you find it not only enjoyable but reassuring to see how your tax dollars are being spent, efficiently and effectively, for the betterment of our environment and our community.

**Steve McCracken**  
**Assistant Manager for Environmental Management**

# Definitions

**CERCLA:** The Comprehensive Environmental Response, Compensation and Liability Act of 1980 established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for hazardous waste releases at these sites, and established a trust fund to provide cleanup when no responsible party could be identified. The law authorizes two kinds of response actions: short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response, and long-term remedial actions, which permanently and significantly reduce the dangers associated with releases or threats of releases. Long-term actions can be conducted at sites on the Environmental Protection Agency's (EPA's) National Priorities List, a listing of the nation's most hazardous waste sites. The Oak Ridge Reservation was added to that list in 1989.

**East Tennessee Technology Park:** The former K-25 Gaseous Diffusion Plant.

**Explanation of Significant Differences:** An Explanation of Significant Differences documents necessary changes to an existing Record of Decision.

**Federal Facility Agreement:** Cleanup activities are performed in accordance with state and federal laws, and CERCLA requires an interagency agreement to facilitate the interaction between state and federal entities (for the DOE Oak Ridge Office, that would be DOE, EPA, and the Tennessee Department of Environment and Conservation). The Federal Facility Agreement for Oak Ridge was initiated in January 1992 to satisfy the interagency agreement requirement.

**Record of Decision:** Under the CERCLA process, a Record of Decision formally documents the selection of a preferred cleanup method at Superfund sites after a series of steps, including a Remedial Investigation/Feasibility Study. After a preferred cleanup alternative is selected, it is presented to the public for comment in a Proposed Plan. EPA, the state, and the lead agency then select a remedy and document it in the Record of Decision.

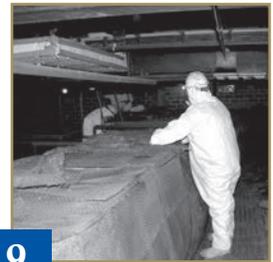
**Removal Actions:** Some cleanup activities on the Oak Ridge Reservation are conducted as Removal Actions under CERCLA. These actions provide an important method for moving sites more quickly through the CERCLA process. When a site presents a relatively time-sensitive, non-complex problem that can and should be addressed, a Removal Action would be warranted.

# Contents

**Introduction**..... 4

**ETTP**

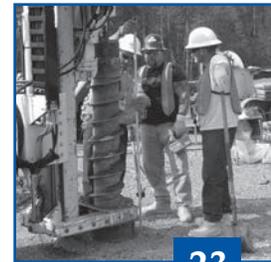
Many Buildings at ETTP Transferred or Demolished..... 8  
 K-29, K-31, & K-33 Project Completed..... 12  
 ETTP Soil Remediation Planned..... 13  
 Thousands of Tons of Scrap Metal Removed..... 13  
 Blair Quarry Remediation Complete..... 14



9

**Melton Valley**

Major Progress Made in Hydrologic Isolation Project..... 18  
 Small Facilities D&D Continues..... 20  
 Retrieval of Buried TRU Waste in Progress..... 22  
 Trenches 5 and 7 Remediation Under Way..... 23  
 Processing of Initial MSRE Flush Salt Tank Completed..... 24  
 Removal of Contaminated Soils and Sediment Nearly Complete..... 26  
 Remediation of T-1, T-2, and HFIR Tanks Completed..... 28



23

**Balance of Reservation**

Various Areas Being Remediated in Bethel Valley..... 32  
 UEFPCC Being Remediated Under Phased Approach..... 33  
 Building 9201-2 Water Treatment System Begins Operation..... 34  
 Witherspoon 901 Site D&D Complete; Soil Removal Begins..... 35  
 D&D of Remaining Hot Storage Garden Wells Deferred..... 36  
 Core Hole 8 Action Will Remove TRU Waste..... 37



36

**Waste Management**

Legacy Waste Milestone Achieved..... 38  
 Tons of Wastes Placed in the EMWWMF, Other Landfills..... 40  
 EMWWMF Cells 3 and 4 Constructed..... 42  
 Haul Road Under Construction..... 43  
 Millions of Gallons of Wastewater Treated in FY 2005..... 44  
 TSCA Incinerator Hazardous Waste Treatment Continues..... 45  
 UF<sub>6</sub> Cylinders Being Shipped Off-Site..... 46  
 Waste Processing Facility Preparing for CH-TRU Processing..... 47



45

**Public Involvement**

Public Involvement Plays Key Role in Environmental Management..... 48  
 ORSSAB Celebrates 10 Years..... 50



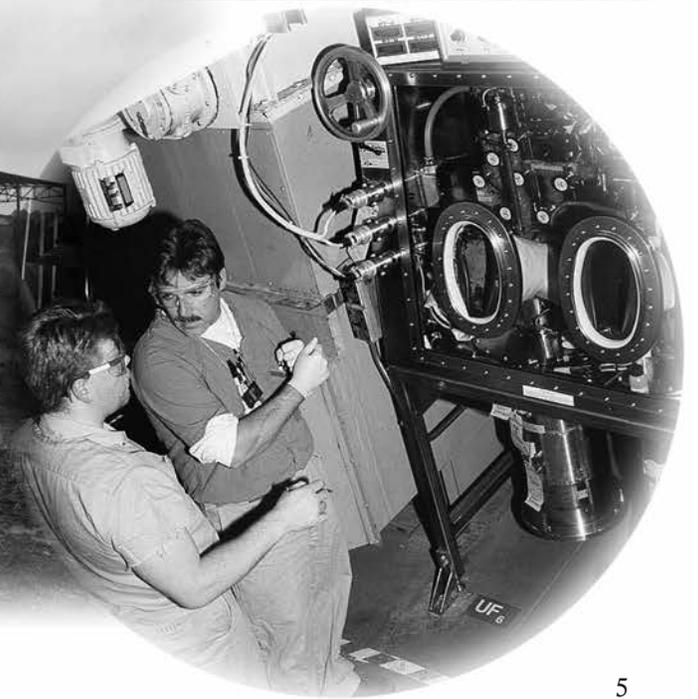
50

**Acronyms and Initialisms**..... 54

**E**nvironmental Management is the largest DOE program in Oak Ridge, with cleanup programs under way to correct the legacies remaining from 60 years of energy research and weapons production. The program includes an aggressive effort to complete the majority of environmental cleanup by 2008, including the East Tennessee Technology Park (ETTP) site. Significant progress has already been made in cleaning up large gaseous diffusion plant buildings and other facilities at this site. Reservation-wide, DOE has accelerated the completion of the Oak Ridge Environmental Management Program while significantly reducing costs.

Because of past practices, portions of land and facilities on the Oak Ridge Reservation are contaminated with radioactive elements, mercury, asbestos, polychlorinated biphenyls, and industrial wastes. The Oak Ridge Reservation is on the Environmental Protection Agency's National Priorities List and is being cleaned up under a Federal Facility Agreement with the U.S. Environmental Protection Agency and the State of Tennessee.

DOE Oak Ridge's Accelerated Cleanup Program includes three major programs—Melton Valley, ETTP, and Balance of Reservation. Completion of the Melton Valley Project is targeted for 2006, ETTP completion is expected in 2008, and the project closure date for Balance of Reservation activities is 2015. One major milestone has already been successfully completed within the Balance of Reservation Program—the removal of low-level and mixed low-level legacy wastes from the Oak Ridge Reservation, which was completed at the end of FY 2005.



# East Tennessee



**T**he former K-25 Site began operations during World War II as part of the Manhattan Project. Its original mission was to produce enriched uranium for use in atomic weapons. The plant was permanently shut down in 1987 and is undergoing transformation into a private-sector industrial park. Restoration of the environment, decontamination and decommissioning of facilities, and disposition of wastes are currently the major activities at the site.



# *Technology Park*



## Many Buildings at ETTP Transferred or Demolished

All buildings at the East Tennessee Technology Park (ETTP) are scheduled for demolition as part of the U.S. Department of Energy's (DOE's) accelerated cleanup plan except for approximately 26 facilities. These facilities are targeted for potential title transfer to private sector organizations under a reindustrialization program. As of the end of FY 2005, four buildings had been transferred.

Building demolition is being performed through several projects: (1) K-25/K-27 Buildings, (2) K-25 Auxiliary Facilities (Main Plant), (3) Group II, Phase

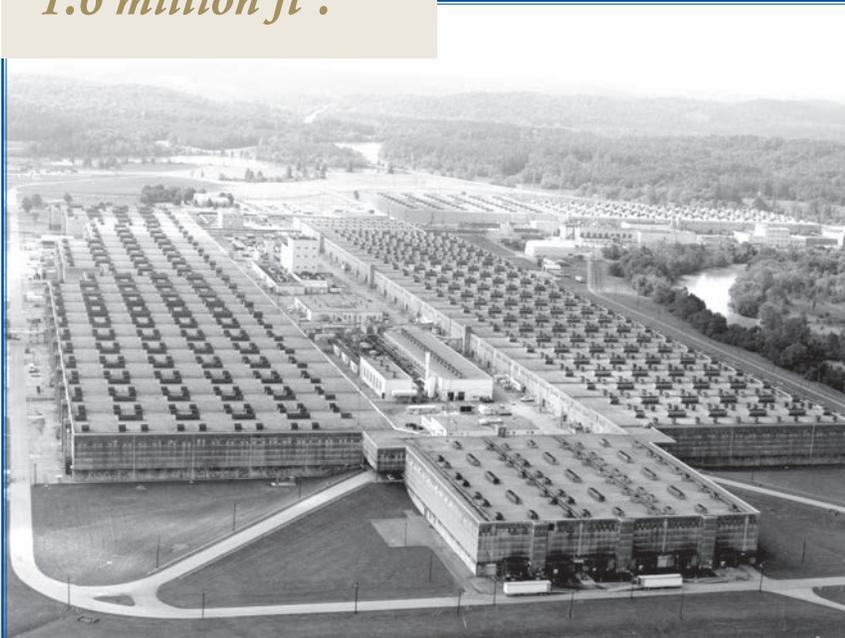
II Buildings (K-1064 Peninsula), and (4) Remaining Facilities. Because these are interim removal actions, future Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) decisions will determine the final remedy for the contaminated slabs, soils, and below-grade structures. Schedules associated with this work are contained in the Federal Facility Agreement Appendix E on the web at [www.bechteljacobs.com/pdf/ffa/appendices/appendex.pdf](http://www.bechteljacobs.com/pdf/ffa/appendices/appendex.pdf).

*The K-25 Building is the largest building on the Oak Ridge Reservation (ORR) and covers 1.6 million ft<sup>2</sup>.*

### *K-25/K-27 Buildings*

The three-story, U-shaped K-25 Building was built during the Manhattan Project and contained 3,018 stages of gaseous diffusion process equipment and associated auxiliary systems. Each stage consists of a converter, two compressors, two compressor motors, and associated piping. The K-27 Building covers 383,000 ft<sup>2</sup> and contains 540 stages of gaseous diffusion equipment and associated auxiliary equipment.

An action memorandum (AM) for the demolition of the K-25 and K-27 Buildings was signed in February 2002. The AM stipulates that the buildings be demolished to slab and the associated waste disposed. The first phase of the demolition, hazardous materials removal, started in December 2001 and was completed in June 2005. Hazardous materials removal primarily included the removal of asbestos-containing building material, such as transite panels and insulation, from inside the K-25 and K-27 Buildings. During the three-and-a-half-year period, a total of 944 waste shipments, comprising approximately 621,000 ft<sup>3</sup> of waste, were transported to the



*K-25 Building*



*Workers are moving packaged waste from the K-25 Building into a container for shipment*



*A worker is cutting wire mesh around pipe housing, exposing a layer of rock wool insulation in the K-25 Building*

Environmental Management Waste Management Facility (EMWMF), a CERCLA disposal facility located near the Y-12 National Security Complex.

Process equipment removal is under way with the shipment of 115 loose converters to the Nevada Test Site (NTS) and EMWMF for disposal, 75 of which were shipped in FY 2005. Excess materials are also being removed from the buildings. Excess materials consist of non-process items, such as laboratory equipment, laboratory samples, office equipment, tools, wooden pallets and crates, and drums of chemicals. In FY 2005, a total of 465 waste shipments, containing approximately 339,000 ft<sup>3</sup> of waste, were transported to the EMWMF for disposal.

At the end of FY 2005, removal of fixed process equipment was awaiting completion of the Operational Readiness Review and transmittal of the Notice to Proceed from DOE Headquarters. Approximately 1,500 stages in the K-25 Building have been purged of residual process gas in preparation for fixed, process equipment removal.

K-25 Building demolition continued in FY 2005 with the removal of approximately 117,000 ft<sup>2</sup> of transite panels from the exterior of the building, demolition of 72 of the 114 filter houses, and removal of transite enclosures from about half of the 150 interior stairways. The building demolition waste-handling plan was approved in FY 2005.

The Memorandum of Agreement (MOA) regarding historical preservation of the K-25 Building was ratified on March 28, 2005. This MOA allows the east and west wings of the U-shaped K-25 Building to be demolished, but retains the north wing for historic preservation purposes. The MOA also allows the placement of concrete rubble within the vaults of the east and west wings. The vault walls of the east and west wings along the interior of the “U” will be preserved. Filling and grading of the vault areas will leave the upper portion of the wall available for use by others to portray the history of Oak Ridge (e.g., murals). The footprint of the K-25 Building will be preserved and nominated as an historic landmark.

## ***K-25 Auxiliary Facilities (Main Plant)***

In FY 2000, DOE signed an AM to demolish the main plant facilities. This project began in August 2000 and was completed in December 2003. In FY 2004, the work was completed, and the Removal Action Report was prepared.

## ***Group II Buildings, Phase II Buildings (K-1064 Peninsula)***

DOE signed an AM in July 2002 for the demolition of facilities and the removal of scrap material located in the K-1064 peninsula area. During FY 2004 and 2005, 17 of the 19 facilities were demolished. Demolition of the remaining facility and removal of the scrap are planned to be completed in FY 2006.



*Demolition of K-801-H, Cooling Tower*

## Remaining Facilities

In September 2003, DOE signed an AM to demolish the approximately 500 remaining facilities. In 2005, 45 predominantly uncontaminated facilities, 19 low-risk/low-complexity facilities, and 9 facilities in a grouping called “Balance of Site - Laboratories Group” were demolished, transferred, or sold; characterization and utility deactivation continued in preparation for demolition work in FY 2006; removal of universal waste was started in the K-29 Building; and waste-handling plans were approved for K-1401, K-1420, K-29, and Centrifuge Equipment Removal.



*Demolition of K-1002 (former cafeteria)*



*In addition to building demolition, several overhead steam pipe lines were removed from the laboratory facilities area.*

## K-29, K-31, and K-33 Project Completed

In August 1997, DOE signed an AM to decontaminate and remove equipment from the K-29, K-31, and K-33 gaseous diffusion buildings. The contractor, BNG America, under a fixed-price contract with DOE awarded in August 1997, completed the work in FY 2005. K-31 and K-33 Buildings were 98 percent and 85 percent, respectively, decontaminated to specified end-point criteria. DOE will complete the decontamination of the K-31 Building utilizing another contractor and making Building K-31 available for reuse. Building K-33 decontamination will not be completed until a reuse has been identified and a decision on the final disposition is made prior to December 2007. Building K-29 has been determined to not be in satisfactory condition for reuse and will be demolished as part of the Remaining Facilities Removal Action.

A total of 159,000 tons of material has been dismantled, removed, and dispositioned as waste or recycle material for the entire project. DOE will submit the Removal Action Report to the regulators in FY 2006.



*Buildings K-33 (foreground) and K-31*

### Interesting Facts

- *More than 75 percent of waste from the K-29, K-31, and K-33 buildings was shipped to either Envirocare of Utah or the Nevada Test Site.*
- *The original estimate of metal that would have to be dispositioned from the buildings was 126,000 tons, but the project dispositioned almost 160,000 tons.*
- *More than 463 miles of piping were removed from the buildings.*
- *The total project cost was \$355.8 million.*

## ETTP Soil Remediation Planned

The soil at ETTP will be remediated to protect a future industrial work force and to protect underlying groundwater. Two Records of Decision (RODs) have been signed that address soil, slabs, subsurface structures, and burial grounds.

The Zone 1 ROD was signed by DOE, the Tennessee Department of Environment and Conservation (TDEC), and the Environmental Protection Agency (EPA) in November 2002. Zone 1 is the 1,400-acre area surrounding ETTP outside the fence. The Zone 2 ROD was signed by DOE, TDEC, and EPA in April 2005. Zone 2 includes the area within the main fence of ETTP (approximately

800 acres). The Remedial Design Report/Removal Action Work Plan for Soils, Slabs, and Subsurface Structures was approved by EPA and TDEC in September 2005.

Work associated with the K-901 and Duct Island areas was completed in FY 2005, and the Phased Construction Completion Report was submitted to the EPA and TDEC for approval.

Schedules associated with this work are contained in the Federal Facility Agreement Appendix E on the web at [www.bechteljacobs.com/pdf/ffa/appendices/appendex.pdf](http://www.bechteljacobs.com/pdf/ffa/appendices/appendex.pdf).

## Thousands of Tons of Scrap Metal Removed

Almost 22,000 tons of contaminated scrap metal were disposed at EMWMF during FY 2005 under the ETTP Scrap Removal Project. This project is responsible for disposing of approximately 47,000 tons of scrap metal from the K-770 Scrap Yard, K-1131 Area, K-1064 Scrap Yard, K-1300 Area, and K-1066-G Maintenance Yard. Remediation of contaminated soil at these sites is planned for FY 2007.



*K-770 Scrap Yard remediation*

## Blair Quarry Remediation Complete

More than 15,000 tons of contaminated soil and debris have been removed from Blair Quarry, a former waste disposal site adjacent to ETTP, and site restoration is complete.

The remediation project kicked off in mid-November 2004 and was completed in early 2005 with no recordable injuries, first aid cases, or transportation incidents. The material was disposed of at EMWMF.

Blair Quarry was created in the early 1940s by excavating into McKinney Ridge, forming a U-shaped amphitheater with exposed rock on three sides. The rock material was used to support construction of the K-25 Site. It operated as a quarry until 1945 and was then used for open burning of trash and debris through the late 1950s.

Several investigations of the type and extent of contamination at Blair Quarry were conducted before the remediation project began. The project served as a pilot for the strategy that was developed and approved for the characterization and verification of Zone 1 and Zone 2 areas at ETTP. Additional contaminants of lesser concern included polychlorinated biphenyls (PCBs) and low levels of radionuclides and metals. Based on these investigations, only one acre of the initial 67-acre area required remediation.



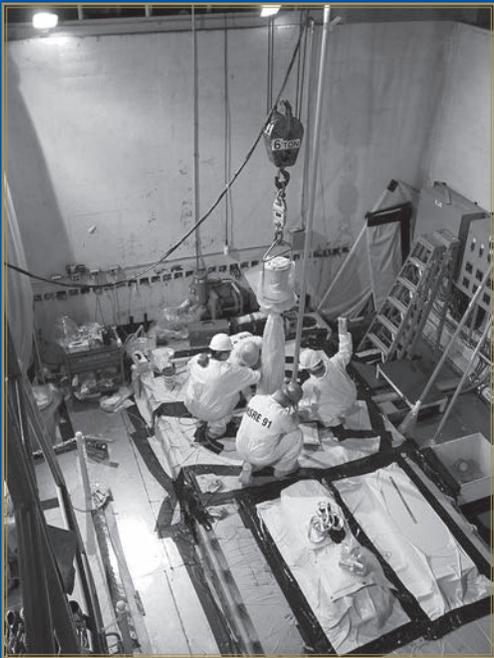
*Blair Quarry*



*Remediation activities at Blair Quarry*



# Melton Valley



**M**ore than 50 years of operation, production, and research activities at Oak Ridge National Laboratory (ORNL) have produced a legacy of contaminated inactive facilities and waste disposal areas. Many of the wastes and facilities are located in Melton Valley, which occupies approximately 1,000 acres in the southern portion of ORNL. Wastes in Melton Valley reside at a variety of locations, including trenches, tanks, landfills, pipelines, surface structures, and impoundments.





*The Hydrologic Isolation Project made a great deal of progress in FY 2005 on several remediation activities at waste burial sites and is expected to conclude its work in FY 2006.*

## Major Progress Made in Hydrologic Isolation Project

Hydrologic isolation is utilized to decrease the rainwater infiltration to waste associated with the Melton Valley burial grounds, pits, and trenches. Construction of 11 separate caps covering 104 acres in Solid Waste Storage Area (SWSA) 5, SWSA 6, and Seepage Pits and Trenches was ongoing at the end of FY 2005 with SWSA 5 being 71 percent complete, SWSA 6 being 82 percent complete, and the Pits and Trenches work being 85 percent complete. Collection and treatment of groundwater from Seepage Pits and Trench 7 has been initiated. Capping at SWSA 4 has been completed.

SWSAs 4, 5, and 6 were the principal waste burial sites in Melton Valley. Shallow land burial was used routinely at ORNL for disposal of solid low-level waste (LLW) from 1943 to 1986, when improved disposal technologies were implemented. Early burial procedures used unlined trenches and auger holes covered by either soil from the

trench excavation or a combination of concrete caps and soil. The concrete caps were used for disposal of high-activity wastes or wastes with transuranic elements. More than 850 trenches and 1,500 auger holes exist in the three main Melton Valley burial grounds.

Four seepage pits (Pits 1, 2, 3, and 4) and three trenches (Trenches 5, 6, and 7) were used for the disposal of liquid LLW from 1951 to 1966. As intended, liquid LLW seeped into the surrounding clay soil. The seepage pits and trenches were excavated in clayey soils to take advantage of the clay's low permeability and high sorption capacity for some radionuclides in the liquid LLW.

### *The hydrologic isolation actions consist of a combination of the following:*

- Multilayer caps over the waste units to minimize rainfall infiltration and to lower the water table;
- Stormflow diversion trenches located along the uphill edge of the waste units to intercept and divert shallow groundwater before it flows into the waste units; and
- Groundwater collection trenches located along the downhill side of the waste units to collect groundwater contaminated by leachate before the groundwater discharges to nearby streams. (Contaminated groundwater collected by the drains will be treated before it is released.)

The total cap area is about 130 acres. To facilitate cap installation, the project included the plugging and abandonment of approximately 800 unnecessary, shallow non-hydrofracture wells; the development of a 33-acre soil borrow area; relocation of Lagoon Road; construction of haul roads; demolition of any structures situated within the cap boundaries; and rerouting of several power lines.

*Aerial photo of SWSA 6  
(taken September 2005)*



*Workers are placing a liner on  
SWSA 5*



*Soil from the Copper Ridge borrow area  
is being processed to use as fill material  
for capping operations*

## Small Facilities D&D Continues

The remediation of several inactive facilities, buildings, and structures in Melton Valley is being addressed under the Melton Valley Decontamination and Decommissioning (D&D) Project. The D&D project involves demolishing surface structures to slab or below grade; decontamination; removal and/or stabilizing subsurface structures in place; waste characterization, transportation and disposal; and site restoration. Stabilization of subsurface structures will be preceded by removal or fixation of transferable contamination.

### *The buildings and structures being addressed by the D&D Project include:*

- New Hydrofracture Facility (NHF),
- Homogeneous Reactor Experiment (HRE) ancillary facilities,
- Shielded Transfer Tanks,
- Liquid LLW pumping stations,
- Equipment Storage Yard,
- Miscellaneous storage buildings, and
- Hydrofracture Well Plugging and Abandonment (P&A).

### *New Hydrofracture Facility*

The NHF was the last of two facilities built during the 1970s to perform hydrofracture operations in Melton Valley. The NHF operated from 1982 to 1984 and was designed to facilitate the injection of wastes mixed with grout into a deep underground shale formation. The high-injection pressure of approximately 3,000 psi fractured the subsurface shale and forced a waste/grout mixture into the fractures, where it hardened into grout sheets.

The majority of the NHF was demolished in previous years. All NHF ancillary facilities, including several dry storage tanks, a weighing station, and transfer piping, have been removed. Only three reinforced concrete rooms, or cells, of the main NHF structure remain, and all process equipment and piping have been removed from these cells in preparation for demolition of the cell structures.

On May 14, 2004, a contamination incident occurred that necessitated an emergency removal action. A truck transporting materials from the NHF site to EMWMF leaked radioactive contamination onto State Route 95, causing the highway to be shut down while radiological surveys and repaving took place. An accident investigation was conducted and a public meeting held to discuss the incident and the corrective actions needed to ensure that a similar incident does not reoccur.

During FY 2005, corrective actions were identified, and work planning and site preparation activities required to implement these actions were performed. Demolition of the remaining NHF structure, disposal of the waste, and preparation and approval of the Phased Construction Completion Report (PCCR) are scheduled to be completed in FY 2006.



*D&D activities at the New Hydrofracture Facility*

## *HRE Ancillary Facilities*

The HRE ancillary facilities consist of eleven separate structures, external of the main HRE reactor building, which provided support capabilities (e.g., waste management, storage, etc.) during reactor operation. The ancillary facilities include a liquid waste evaporator, a charcoal absorber that cleaned up gaseous effluents prior to discharge to the atmosphere, a decontamination pad and storage shed, an office building, and other miscellaneous structures.

D&D of three of the HRE ancillary facilities was completed during FY 2005, and planning and characterization for the D&D of the remaining facilities was performed. D&D of the remaining facilities and preparation and approval of the PCCR for all HRE ancillary facilities is scheduled to be completed in FY 2006.

## *Shielded Transfer Tanks*

The shielded transfer tanks (STTs) are five shipping casks that were originally used during the 1950s and 1960s to transport high specific activity radionuclide solutions by rail from Hanford to ORNL for further processing. The Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) for remediation

of the STTs and 7841 Equipment Storage Area was approved by EPA and TDEC in FY 2005. Planning for the characterization and disposal of the STTs and their residual contents was performed during FY 2005. The work is scheduled to be completed during FY 2006.

## *Liquid LLW Pumping Stations*

Two separate liquid LLW pumping stations, Buildings 7567 and 7952, were constructed during the 1960s to support the collection and transfer of liquid LLW from the High Flux Isotope Reactor (HFIR) facility, Radiochemical Engineering Development Center, HRE, and the Molten Salt Reactor Experiment (MSRE).

D&D and waste disposal of Building 7952 was completed during FY 2005, and D&D of Building 7567, including decontamination and stabilization of the below-grade pump vault, was completed in FY 2006. Preparation and approval of the PCCRs for both facilities, is scheduled to be completed in FY 2006.

## *Equipment Storage Yard*

The 7841 Equipment Storage Yard is a fenced facility with an area of less than 1 acre used to store a wide variety of surplus items. The inventory of items in the 7841 area includes shielded carriers, drums, high integrity containers, shields, tanks, and nearly 200 pieces of specialized equipment ranging from fuel casks and storage cabinets to tanker trailers and other vehicles.

The RDR/RAWP for remediation of the STTs and 7841 Equipment Storage Area was approved

by the EPA and TDEC in FY 2005. Site preparation activities, including erection of a material processing facility and installation of utilities were performed along with planning for waste characterization and disposal. Waste characterization, processing, and disposal are planned to be completed in FY 2006, along with preparation and approval of the PCCR for the 7841 facility.

## *Miscellaneous Storage Buildings*

Two miscellaneous facilities, Buildings 7802F and 7831A, have been used for the storage of well drilling cores and other sampling related materials, and as a waste repack facility, respectively.

The RDR/RAWP for remediation of Building 7802F was approved by EPA and TDEC in FY 2005.

The demolition and site restoration of Building 7802 was completed in early FY 2006. D&D of Building 7831A and waste disposal, along with preparation and approval of the PCCRs for both facilities, are planned to be completed in FY 2006.

## *Hydrofracture Well P&A*

P&A of unneeded hydrofracture injection and monitoring wells in Melton Valley was completed in FY 2005 along with the disposal of associated secondary waste at the EMWMF. The PCCR was drafted and comments received from the regulatory agencies. Issuance and approval of the final PCCR for hydrofracture well P&A is scheduled to be completed in FY 2006.

## **Retrieval of Buried TRU Waste in Progress**

Transuranic (TRU) wastes that have been stored in the 22-Trench Area in SWSA 5 North are slated for removal by 2006. During FY 2005, site preparation was completed and waste retrieval initiated. A total of 137 concrete casks have been retrieved, overpacked, and staged during FY 2005. Planning for the relocation of the six waste packages with the highest radiological inventory to an appropriate storage facility was also completed in FY 2005. Retrieval and overpacking of the remaining concrete casks, along with loose waste and other containers, is scheduled to be completed in FY 2006.



*A total of 137 concrete casks were retrieved during FY 2005*

During the 1970s, packages of TRU waste were retrievably stored in unlined earth trenches in the 22-Trench Area. Radionuclides in the TRU waste containers represent some of the most toxic and longest-lived radioisotopes stored on the Oak Ridge Reservation. DOE signed a consent agreement with the state of Tennessee in September 2000 committing to retrieve the TRU waste from the 22-Trench Area. Surrounding soil exceeding remediation levels designated in the Melton Valley ROD, as well as debris waste associated with excavation, will be disposed at the EMWMF or at another appropriate facility. After retrieval, the overpacked TRU waste packages will be staged pending transport to the TRU Waste Processing Facility, where the wastes will be further characterized and repackaged for off-site disposal.



## Trenches 5 and 7 Remediation Under Way

*Installation of shallow collar pipes at Trench 7 (above).  
The collar pipes in combination with a specialty grout  
around the collar will eliminate waste/contaminated grout  
from reaching the surface.*

In situ grouting (ISG) of Seepage Trenches 5 and 7 is expected to be completed in 2006. The grouting of HRE Fuel Wells, adjacent to Trench 5, is also targeted for completion.

In situ vitrification (ISV) had been the initial remedial action selected for these trenches in the Melton Valley ROD. However, during a 2003 field investigation and procurement for design and construction services, new information resulted from these activities and prompted a reassessment of this remediation approach. The new information included the presence of standing water in the trenches and a higher-than-expected cost for performing ISV. After further evaluation, DOE proposed in an amendment to the ROD that ISG be substituted as the remedial action.

ISG is a treatment process where materials, such as cement-based or chemical grouts, are injected into the subsurface (or waste unit) to reduce hydraulic conductivity. This remedy change proposed in the ROD amendment was approved in 2004.

The RDR/RAWP for the ISG of these trenches was approved in September 2004. The trenches are being treated by the permeation grouting method, utilizing Portland cement-based grouts injected under low pressure into the crushed limestone trench material. The soil adjacent to the trench walls will be treated with a solution grout (e.g., polyacrylamide) to reduce migration of contaminants away from the trench by sealing off seepage pathways.



## Processing of Initial MSRE Flush Salt Tank Completed

*Workers are removing the Probe Glove Box from over the Fuel Flush Tank*

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, the 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 the 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 re-circulated 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, compensatory and removal actions were implemented to reduce risk and to safely manage the fuel and

flush salts in their respective drain tanks, pending completion of planned remedial activities.

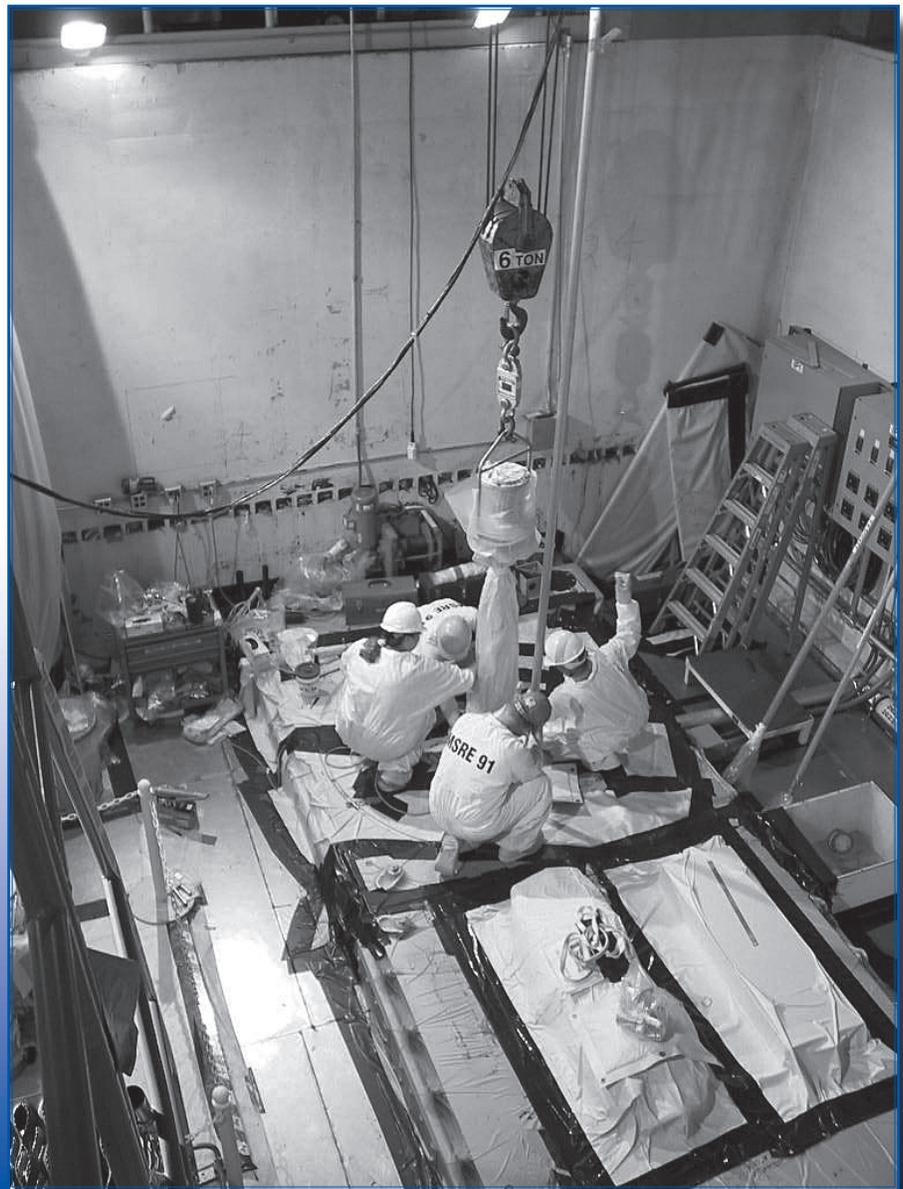
In 1998, DOE signed a ROD for interim action to remove fuel and flush salts from the MSRE.

The selected remedy includes the following:

- 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.

MSRE fuel and flush salt removal operations were initiated in December 2004. Design, procurement, fabrication, and installation of fuel salt removal equipment were completed in FY 2002. Initial testing of fuel salt removal equipment and systems was completed in FY 2003. Operating procedures were developed based on results of the testing. Operator training to these procedures, comprehensive operational readiness reviews, and final systems integration testing were completed in FY 2004.

Processing of the initial flush salt tank at the MSRE was initiated in December 2004 and completed in June 2005, with recovered uranium transported to an on-site storage facility. However, a salt plug blockage in a small pipe prevented removal of the flush salts from the flush salt tank. Corrective actions are being implemented to allow flush salt removal after completion of the two fuel salt drain tanks. Fuel and flush salt removal are planned to be completed in CY 2006.



*Workers are removing the Salt Melter Probe Secondary Containment System from over the Fuel Flush Tank*

# Removal of Contaminated Soils and Sediment Nearly Complete

A great deal of progress has been made in the Melton Valley Closure Soils and Sediments Project as of the end of FY 2005, including the following:

- **Excavation of the HFIR Impoundments.** These four unlined impoundments, located at the High Flux Isotope Reactor (HFIR) facility, received liquid process waste streams mostly from floor and laboratory drains, steam condensates, and pressure vessel cooling waters. Remediation of the surface impoundments has been completed and the site restored. Remediation consisted of removing standing water and excavating and disposing the contaminated sediment at the EMWMF.
- **Remediation of the HRE Cryogenic Pond.** This pond received contaminated condensate from the Homogeneous Reactor Experiment (HRE) waste evaporator, and from discarded shielding water. The pond was taken out of service, and backfilled. This backfilled pond later served as a demonstration for cryogenic stabilization in which soil around the pond was frozen to form a barrier to groundwater for several years. The cryogenics system was shut down in February 2004 in preparation for system dismantling and pond excavation. Excavation of the pond, backfill, and cryogenics material has been completed.

*Excavation at the HRE pond*



- **Removal of contaminated soil.** Many of the sites contaminated as a result of pipeline leaks or hydrofracture experiments have been excavated. As a result of verification walkover surveys and sampling, additional contamination areas were identified and excavated.
- **Final Verification.** The project includes a final verification activity designed to confirm that all of Melton Valley has been cleaned up sufficiently to meet the remediation levels. Walkover surveys and sampling have been conducted on more than 500 acres of the watershed that lie outside the footprint of the hydrologic isolation caps. Data collected from the Final Verification activities are being used to confirm that the post-remediation conditions in Melton Valley are compatible with the anticipated future land uses for Melton Valley.

The soil contamination sites are being cleaned up to remediation levels designated in the Melton Valley ROD. These remediation levels are based on specific risk reduction and exposure limit goals derived from reasonably anticipated future land uses for Melton Valley. The designated land uses are a waste management area for the western two-thirds of the watershed addressed in the Melton Valley ROD and a controlled industrial area in the eastern third.

Sediment and soils from the HFIR surface impoundments and HRE Cryogenic Pond were disposed in the EMWMF. Material excavated from the Melton Valley Pumping Station, Engineering Test Facility, Lysimeters, and Facility 7848 will also be disposed at EMWMF. Selected soils from the remaining sites—generally containing only minor amounts of contamination—are used as contour fill beneath one of the hydrologic isolation caps.

### *Pipeline Grouting*

In addition to the remediation of contaminated soils, the Melton Valley Soils and Sediment Project has begun stabilizing and isolating inactive liquid waste transfer pipelines throughout Melton Valley. The inactive waste pipeline system consists of a complex series of buried waste pipelines and appurtenances (e.g., vents, valve pits, pump vaults, etc.) historically used to transport liquid process waste and LLW

between generator facilities in Melton Valley, storage and disposal sites in Melton Valley, and storage/treatment facilities in Bethel Valley. The selected remedy in the ROD for inactive process and liquid LLW transfer pipelines is isolation, removal, or stabilization. Approximately half of the inactive pipelines subject to grouting have been completed. The waste from this activity will be taken to EMWMF.

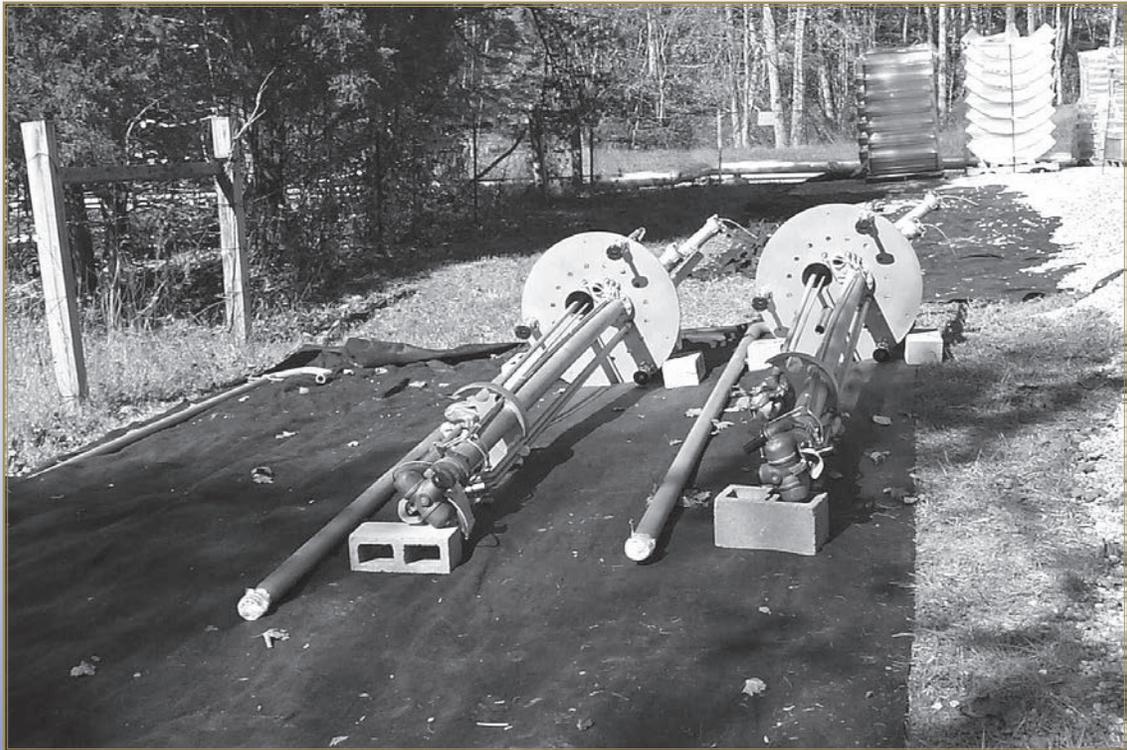
## *Remediation of T-1, T-2, and HFIR Tanks Completed*

Three inactive underground liquid LLW storage tanks identified as Tanks T-1 and T-2, and the HFIR Tank contained liquids and a mixture consisting primarily of spent transuranic (TRU) ion-exchange resin and sludge.

In FY 2005, the liquid waste from the HFIR tank was transferred into the ORNL liquid LLW system for treatment. The HFIR Tank and remaining sludge was stabilized in place with grout. The waste in Tanks T-1 and T-2 was mixed with liquid using a pulse-jet system and the resulting slurry transferred to the active ORNL liquid LLW

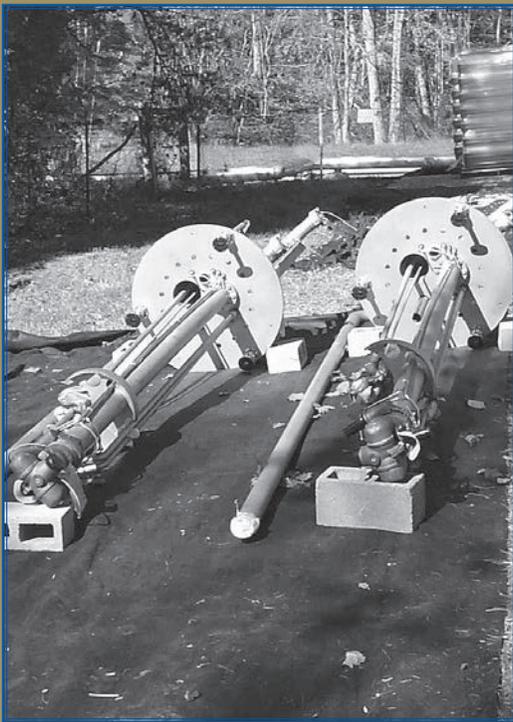
system. Approximately 3,000 gallons of sludge was transferred from the tanks and will undergo treatment at the TRU Waste Processing Facility prior to final disposal. The empty tanks were filled with grout and closed in place. Associated equipment was removed from the site and either transferred to other projects for reuse or disposed at the EMWWMF along with the remaining secondary waste. The PCCR documenting completion of the T-1, T-2, and HFIR Tanks Remediation was submitted to EPA and TDEC for approval. Final regulatory approval is expected in FY 2006.

*Pulse jet system used to mix tank waste with liquid*

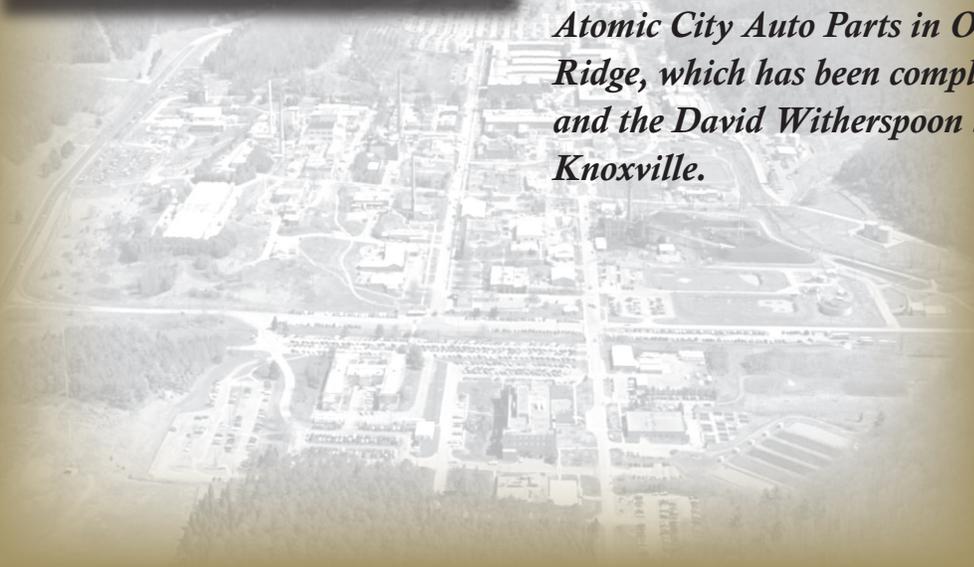




# Balance of



**T**he remaining sites are categorized into one grouping known as the “Balance of Reservation Closure Project.” This project encompasses cleanup activities in Bethel Valley at ORNL, sites associated with the Y-12 National Security Complex, and remedial actions for the remainder of the Reservation. It also includes three contaminated off-site projects: Atomic City Auto Parts in Oak Ridge, which has been completed, and the David Witherspoon Sites in Knoxville.



# *Reservation*



## 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. Remediation work mandated by the Bethel Valley ROD is currently scheduled to continue through FY 2014. Two of the first projects to be performed under the ROD are the Bethel Valley Groundwater Engineering Study and remediation of the T-1, T-2, and HFIR Tanks.

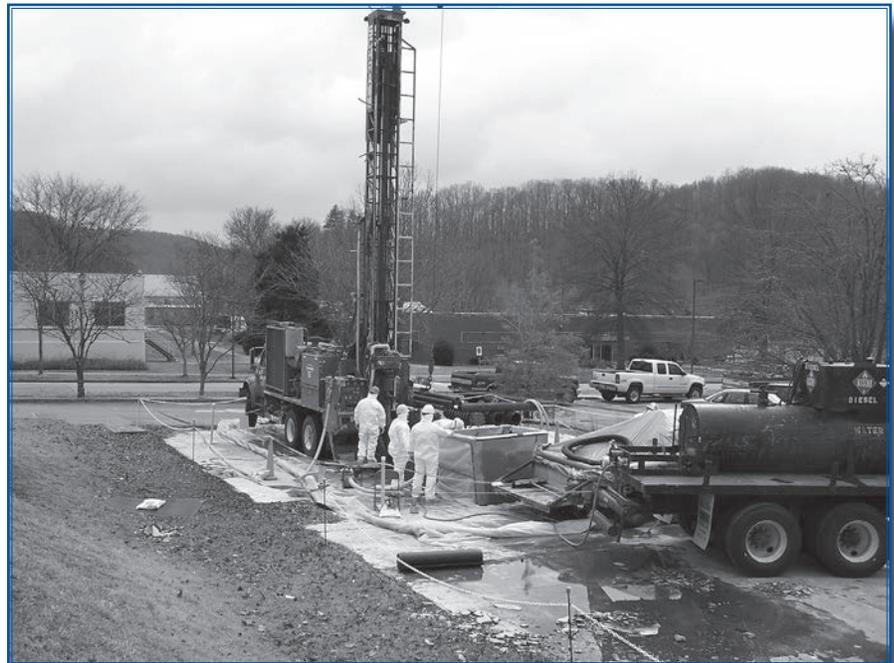
### *Bethel Valley Groundwater Engineering Study Fieldwork in Progress*

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 (VOC) 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 included 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.

In 2005, the Bethel Valley Groundwater Engineering Study completed the remaining components of the required fieldwork. This included an additional 48 soil push probes to make a total of 283 locations with approximately 450 soil samples collected and analyzed. Fifteen monitoring wells were installed and sampled in FY 2005.

All the data from the soil samples, process lines, storm sewer lines, surface water and monitoring wells were received and evaluated. The results were published in comprehensive Engineering Study Report and submitted to the regulatory agencies for review and comment. Once approved,

the recommendations will be used for determining the necessary soil remediation activities to be performed as part of the signed Bethel Valley ROD.

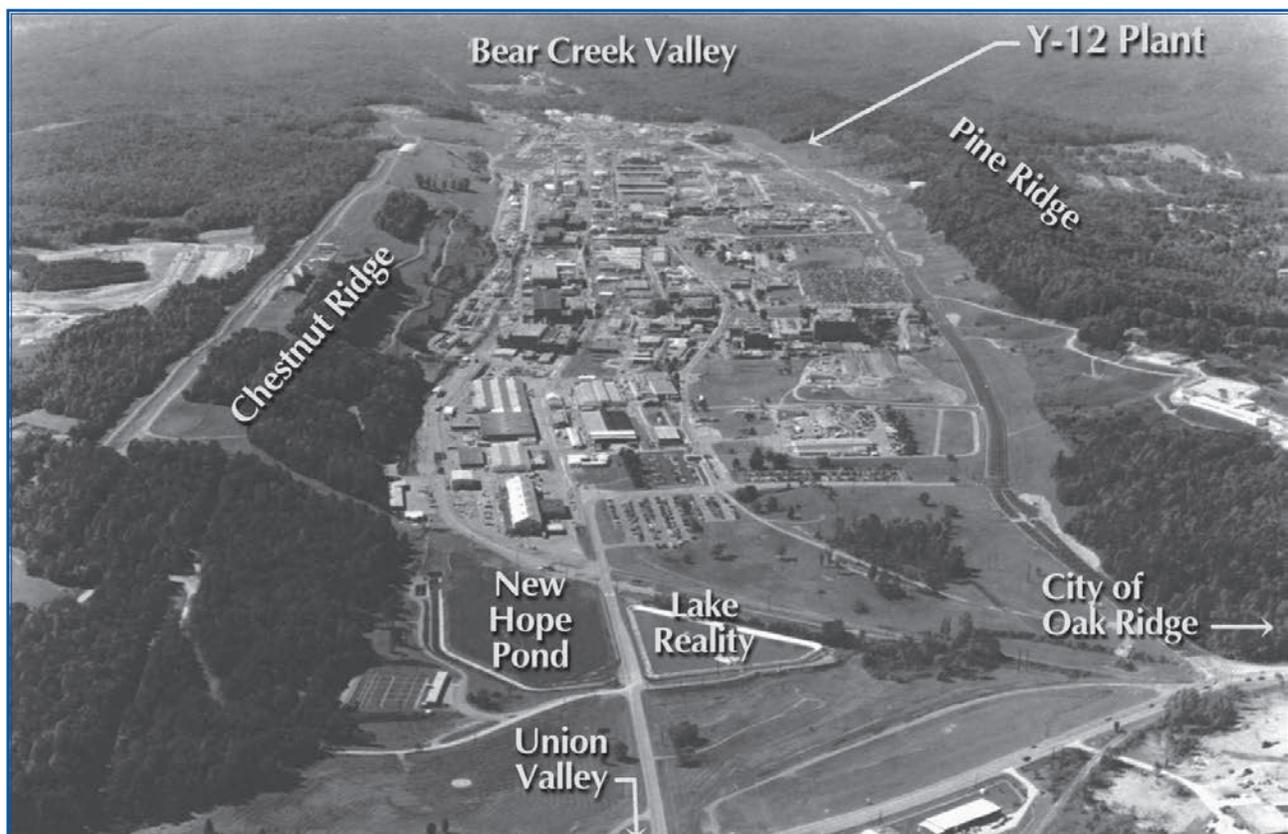


*Construction of Well 4573 at ORNL*

## UEFPC Being Remediated Under Phased Approach

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 2005, regulators provided comments on the draft Proposed Plan for Phase 2 interim remedial actions for accessible soil, buried waste, or subsurface structures that contribute significantly to contamination above acceptable risk levels in UEFPC. The Proposed Plan was finalized and a public meeting was held in March 2005. Comments from the public meeting and from members of the public were addressed in the Responsiveness Summary portion of the draft ROD. Regulator comments on the draft ROD were received at the end of FY 2005. The Phase 2 ROD is anticipated to be finalized and approved in FY 2006.



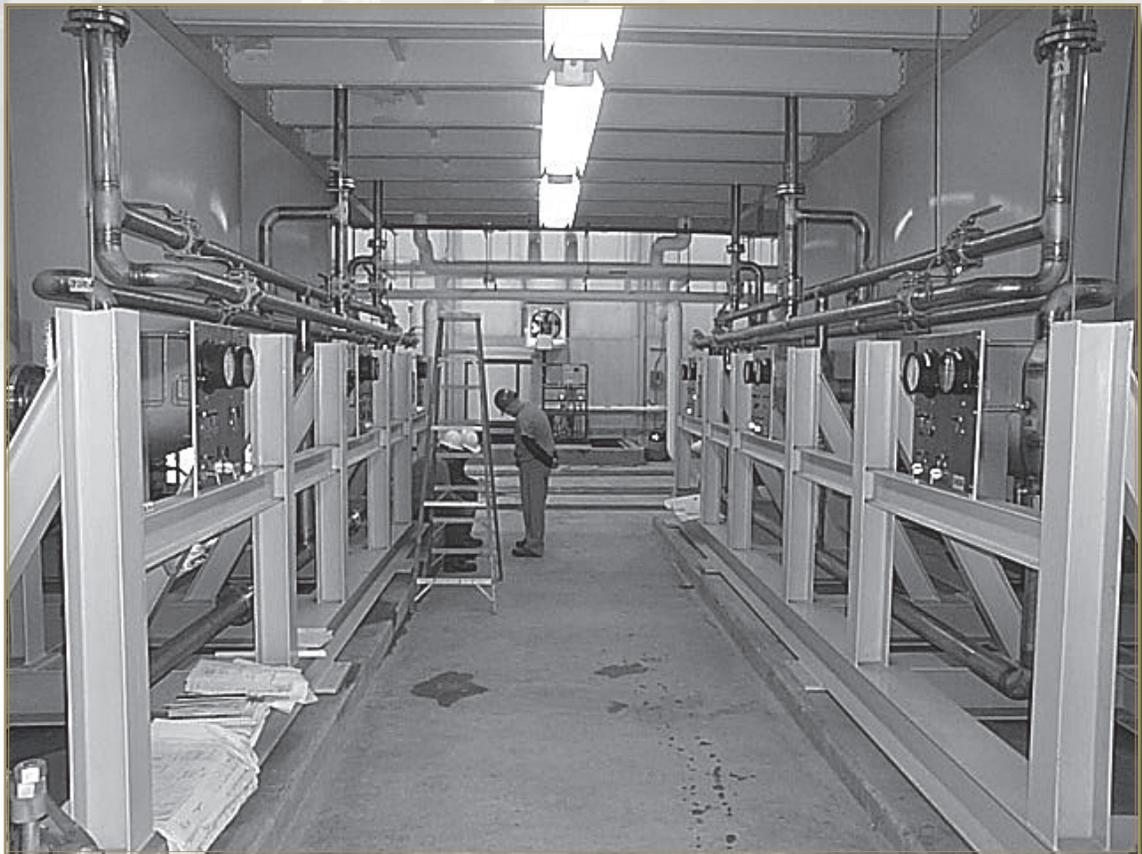
UEFPC Watershed

## Building 9201-2 Water Treatment System Begins Operation

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

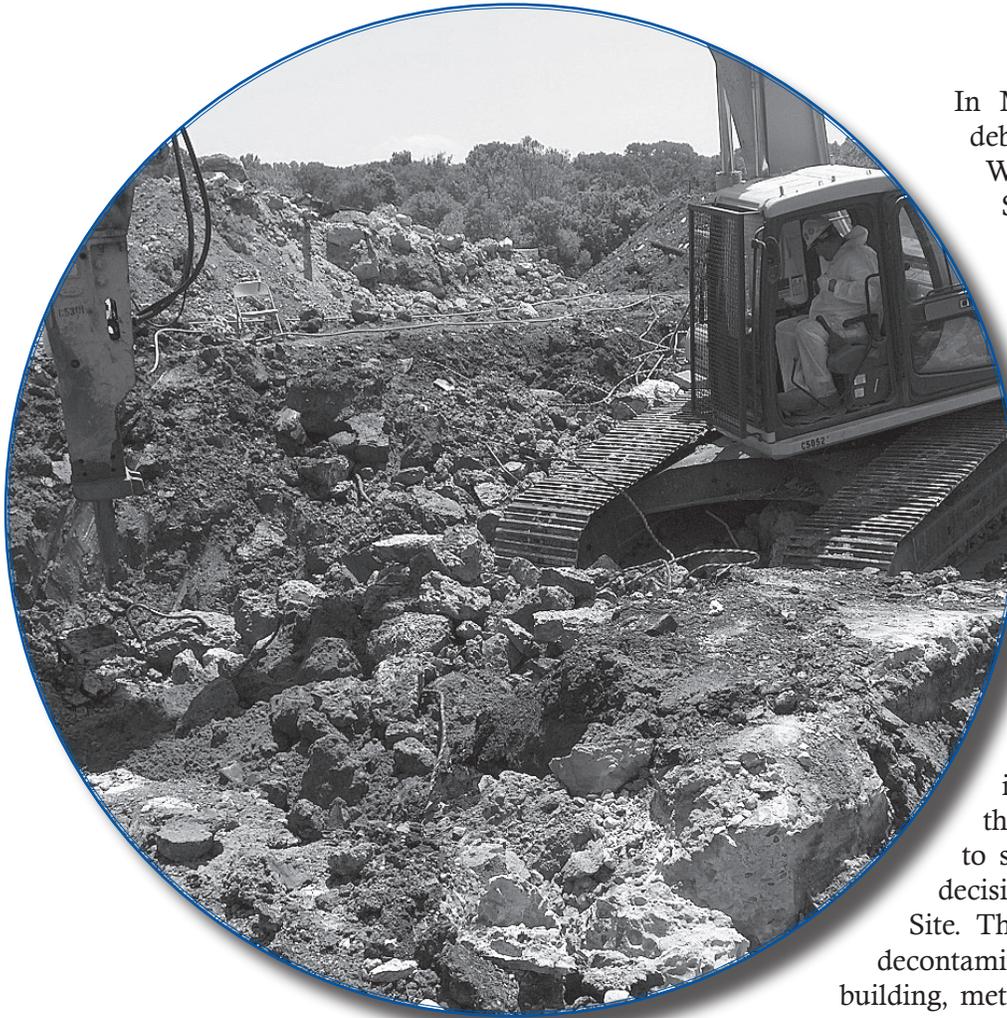
The 300-gallon per minute water treatment system was constructed near Bldg. 9201-2. The system uses a series of granular activated carbon columns to reduce the mercury concentrations in the system effluent to levels of 200 ppt or less. The system influent will include the

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 began in March 2004 and was completed on March 2005 with the PCCR being submitted on March 18, 2005. Initial operations began August 4, 2005. Preliminary results show that the mercury is being removed to a level well below the goal of 200 ppt.



*Carbon columns for the Water Treatment System*

## Witherspoon 901 Site D&D Complete; Soil Removal Begins



*Concrete demolition at DWI site*

In March 2005, the D&D and debris removal at the David Witherspoon Inc. (DWI) 901 Site was completed. The site, located on Maryville Pike in Knoxville, Tenn., 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 Tennessee Division of Superfund took control of the property.

The objective of this off-site project is to perform interim actions and complete the supporting documentation to support a “no further action” decision 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 EMWWMF. The contaminated soils will be excavated and treated to meet land disposal restrictions.

The interim action for D&D and debris removal started in April 2004. Approximately 7000 yd<sup>3</sup> of waste was sent to landfills in Oak Ridge for disposal. Starting in April 2005, large concrete foundations and building slabs were excavated and rubblelized. Soil excavation began in July 2005. More than 1,400 truckloads of soil have been shipped to the EMWWMF, and an estimated 2600 truckloads of waste remains to be excavated and shipped. The soils excavation and site restoration phase is scheduled to be completed late 2006.



*Truck loaded with soils at DWI 901 Site being directed into tarping station*

## D&D of Remaining Hot Storage Garden Wells Deferred

Beginning in the mid-1950s, the Hot Storage Garden supported research at ORNL by storing radioactive material, including spent fuel rods, in the below-grade wells and partially above-grade water-filled canal. All the fuel was transferred for storage to a solid waste storage area in the mid-1980s. The facility was then placed in the surveillance and maintenance (S&M) program.

In 2003, some additional funding was made available to perform D&D on a facility currently in the S&M program. The Hot Storage Garden was selected because it was small facility that could be D&D'ed with the available funding and existing documentation indicated that the source material had been removed with no indication of residual contamination.

The project started in the summer of 2004 and removed all the surface structures and removed and cut 5 of the 14 well sleeves. High concentrations of removable alpha-emitting contamination were found near the bottom of one of the well sleeves. The sleeve had been cut in half using a reciprocating saw. It is thought that the vibration caused by the reciprocating saw caused the contaminants near the bottom to become airborne. As a result, four workers received an unexpected dose.

The project was immediately stopped and the area secured. Additional characterization was performed to and a fixative applied to the interior and exterior of the well sleeves. The sleeves were then containerized and safely disposed in the EMWMF. As a result of the unexpected residual contamination, the D&D of the remaining 9 wells were deferred until a final cleanup effort begins in 2009.

## Core Hole 8 Action Will Remove TRU Waste

An area of groundwater contamination, called the Core Hole 8 plume, and its source were the focus of early actions taken by DOE at ORNL. The plume is located in the central portion of the ORNL main plant area. The plume emanates from contaminated soil surrounding Tank W-1A in the North Tank Farm and migrates westward to First Creek. The principal plume contaminants are strontium-90 and uranium isotopes. Since late 1994, DOE has been implementing various coordinated actions to minimize the release of contaminants, including

- intercepting, collecting, and treating approximately six million gallons per year of contaminated groundwater migrating toward First Creek; and
- removing a significant portion of the source (i.e., 90 percent of the contaminated soil surrounding Tank W-1A).

The first action implemented by DOE was to install a groundwater interceptor on the western part of ORNL to reduce contaminant discharge to First Creek. The next action was the construction of a groundwater interceptor trench near the existing Core Hole 8 plume interceptor system. A third action was implementation of hydraulic controls on the plume by pumping groundwater from an existing monitoring well. The last action was in

2001 that addressed the contaminant source that contributed to the plume by removing a significant portion of the soil surrounding Tank W-1A.

This was a CERLCA Removal Action performed under an Action Memorandum. Approximately 900 cubic yards of the soil were removed. However, during excavation of soil adjacent to the tank, analytical results from grab samples of soil indicated that approximately 100 cubic yards of soil around and under the tank contained very high concentrations of TRU radionuclides. Since there is no disposal facility that could accept soil at these levels, these soils and the tank were left in place.

In preparation for the upcoming Removal Action that will remove the remaining 100 cubic yards of soil, the project team is preparing to obtain additional soil samples for detailed analysis. This characterization effort will determine how much of the soil meets the definition of TRU waste and provide radiological contaminant data. It will also provide characterization data on the soil that does not meet the definition of the TRU waste (low-level). The TRU soil will be containerized and stored until the waste disposal facility—the Waste Isolation Pilot Plant—is ready to receive. The low-level soil is expected to be disposed at EMWMF.

# Waste Manag

## Legacy Waste Milestone Achieved



Workers are shown processing mixed low-level waste drums

**I**n FY 2005, DOE and its environmental cleanup contractor, Bechtel Jacobs Company LLC, accomplished a major milestone in cleaning up the Oak Ridge Reservation with the safe disposition of more than 1 million cubic feet of legacy waste.

Legacy waste is defined as “waste belonging to the EM program prior to September 30, 2000, when waste inventories were baselined.” It is categorized as either low-level waste (containing low-level radioactivity) or mixed low-level (containing both radioactive and hazardous waste components).

Most of Oak Ridge’s legacy waste inventory stemmed from Cold War operations that took place at three sites – the Y-12 Complex, ORNL, and ETTP. Historically, Oak Ridge has had the largest inventory of LLW and mixed LLW in the DOE complex.

Storage of these materials occupied more than 27,000 containers, including concrete casks, large metal boxes, and Sealand® containers. The waste consisted of a variety



(continued on page 40)

# ement



of materials, including radioactive scrap metal, contaminated soil, construction debris, organic liquids, waste water, and sludge residues. DOE's contract with Bechtel Jacobs Company required the safe management, treatment, and disposal of all legacy LLW and legacy mixed LLW stored on the Oak Ridge Reservation by September 30, 2005, and this milestone was completed on time.

The legacy waste included about 1.2 million cubic feet of low-level waste and 36,000 cubic feet of mixed low-level waste located across the Reservation. This volume equates to a football field covered more than 30 feet high.

Legacy waste removal and disposal is the first major milestone of DOE's Accelerated Cleanup Program.

## Tons of Wastes Placed in the EMWWMF, Other Landfills

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

During FY 2005, EMWWMF operations collected, analyzed, and dispositioned more than 1.6 million

gallons of leachate and 660,000 gallons of contact water at the ORNL Liquids and Gases Treatment Facility. An additional 7.1 million gallons of contact water was collected and analyzed, and after determining that the volumes of contact water met the release criteria, this contact water was released to the sediment basin. The operations also effectively controlled site erosion and sediments.

***The EMWWMF received 7,204 truckloads of waste accounting for 82,436 tons during FY 2005. Projects that have used the EMWWMF include the following:***

- Off-Reservation sites, including Atomic City Auto Parts Remedial Action Project and David Witherspoon 901 Site Remedial Action Project;
- HFIR Soils and Sediments Project at ORNL;
- Blair Quarry Remedial Action Project;
- ETTP Scrap Removal Project;
- ETTP Main Plant Facilities, including K-1064 Peninsula Facilities D&D;
- Melton Valley Soils and Sediments Project, Intermediate Holding Pond Project, and Intermediate Holding Pond Remedial Action Project at ORNL;
- K-25/K-27 D&D Project;
- Legacy LLW Project; and
- MSRE D&D Project at ORNL.

Synergistic to the activities at the EMWMF, DOE also operates solid waste disposal facilities located near the Y-12 Complex, called the ORR Sanitary Landfills. In FY 2005, more than 136,000 yd<sup>3</sup> of industrial, construction/demolition, classified, and spoil material waste were disposed.

In accordance with the schedule for consumption of airspace at the ORR Sanitary Landfills, Construction Demolition Landfill (CDL) VII, design for Area IV

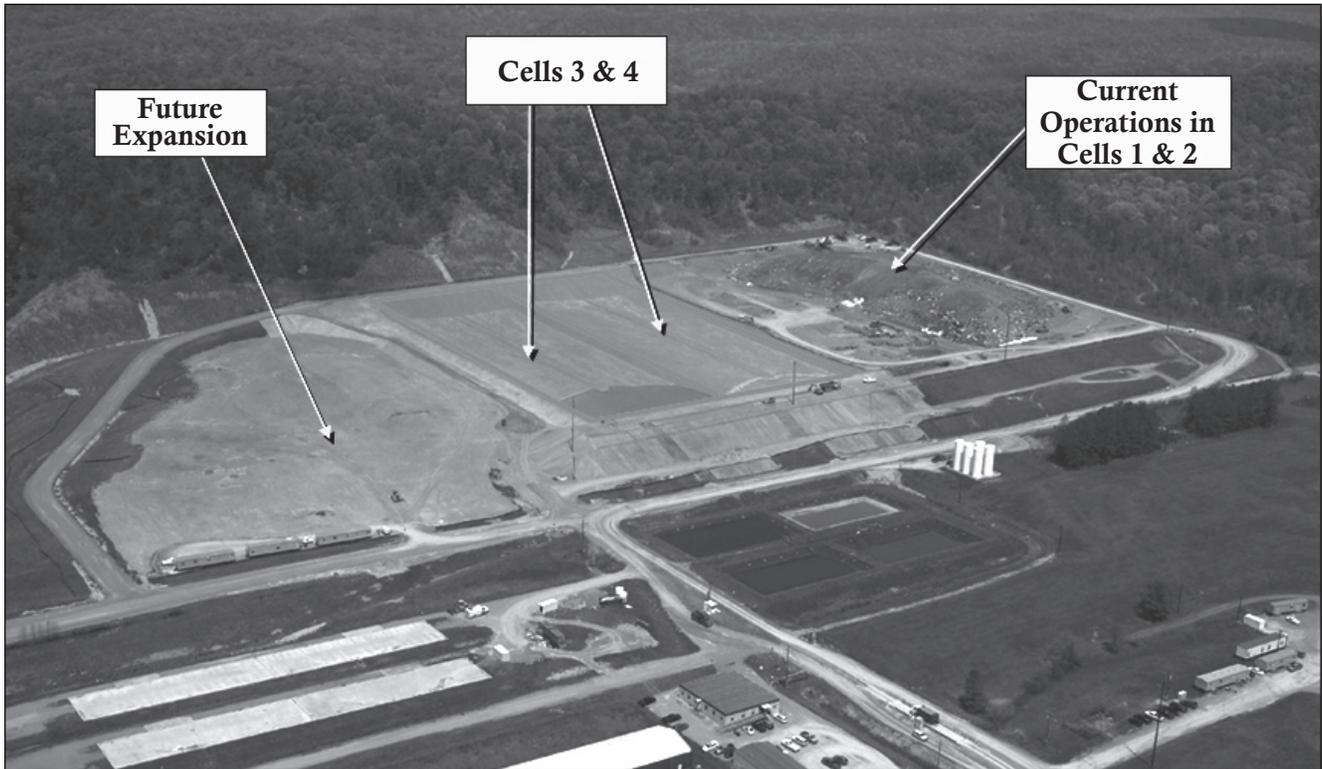
was near completion at the end of FY 2005. CDL-VII will be the repository for much of the uncontaminated debris generated by demolition of buildings at ETTP. Consequently, construction of Area IV will be completed in FY2006. Area IV will add another 336,000 yd<sup>3</sup> of capacity to CDL-VII.

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.



*Waste from Witherspoon site being disposed at EMWMF*

## EMWWMF Cells 3 and 4 Constructed



*Cells at EMWWMF*

During FY 2005, design and construction of Cells 3 and 4 at EMWWMF were completed. These disposal cells increase the capacity of the EMWWMF by 800,000 yd<sup>3</sup>, bringing the total waste disposal capacity to 1.2 million yd<sup>3</sup>. These cells, identical to Cells 1 and 2, were tied into the liner system as well as the existing leachate collection system. Waste disposal operations in Cells 3 and 4 are expected to be begin in early FY 2006.

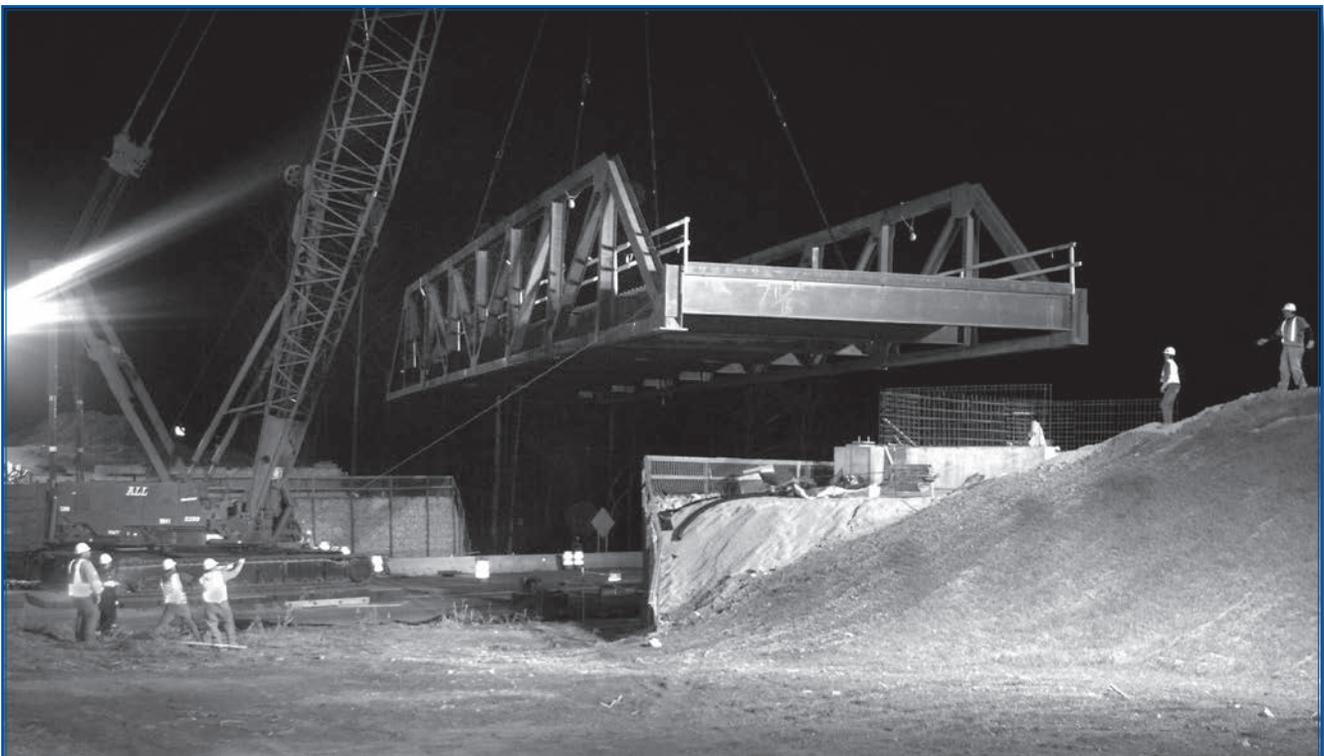
## Haul Road Under Construction

Design of the new ETTP-to-EMWWMF Haul Road commenced early in FY 2005 along with the issuance of the Explanation of Significant Differences (ESD) to the EMWWMF Record of Decision. The ESD addressed the need for the haul road.

The design was issued to the regulators in the form of a Remedial Design Report and a subsequent addendum. Since the scope of the project included constructing bridges over state highways, which required implementing traffic controls, additional reviews of project design documents were conducted by the Tennessee Department of Transportation. Clearing of the route began in early spring.

At about the same time, work began on upgrading Flannigan Loop, an existing 0.8 mile gravel road that was incorporated into the Haul Road. As the year progressed, construction started on the 1.3 mile ETTP segment from Portal 5 to Flannigan Loop. By the end of FY 2005, the approaches for the three bridges had been constructed, the steel truss bridges had been delivered, and construction had started on the 3.5 mile Bear Creek Valley segment of the road. Waste shipments from ETTP to EMWWMF will be made via the Haul Road beginning in 2006 to reduce the risks associated with mixing heavy trucks in with traffic on public roads and improve the efficiency of waste hauling.

*Placement of haul road bridge crossing Highway 58*





*More than 25 million gallons of wastewater was disposed at the Central Neutralization Facility in FY 2005.*

## Millions of Gallons of Wastewater Treated in FY 2005

During FY 2005, the Environmental Management (EM) Program treated 26 million gallons of liquid waste at the Groundwater Treatment Facility, East End Mercury Treatment System, Central Mercury Treatment System, and East End VOC System.

The West End Treatment Facility and the Central Pollution Control Facility at the Y-12 Complex processed about 1.1 million gallons of wastewater, primarily in support of National Nuclear Security Administration operational activities. This wastewater included hazardous materials such as PCBs, cyanide, mercury, cadmium, chromium, and uranium. The hazardous materials end up in the sludge that is generated from wastewater treatment.

At ETTP, the Central Neutralization Facility treated more than 25 million gallons of wastewater in FY 2005. 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 off-site.

At ORNL, approximately 165 million gallons of wastewater were treated and released at the Process Waste Treatment Complex. In addition, the liquid LLW evaporator at ORNL treated 163,000 gallons of such waste. Finally, 2.3 billion m<sup>3</sup> of gaseous waste were treated at the ORNL 3039 Stack Facility. These important waste treatment activities supported both EM and Office of Science mission activities in a safe and compliant manner.

## TSCA Incinerator Hazardous Waste Treatment Continues

The Toxic Substances Control Act (TSCA) Incinerator, located at ETTP, treated 438,000 pounds of waste in FY 2005. The TSCA Incinerator successfully demonstrated compliance with the Maximum Achievable Control Technology standards for Hazardous Waste Combustors in FY 2005. In FY 2006, approximately 1.5 million pounds of waste are planned for incineration.

The TSCA Incinerator is a one-of-a kind thermal treatment unit in the United States. It plays a key role in treatment of radioactive PCB and hazardous wastes (mixed wastes) from the ORR, as well as other facilities across the DOE complex, thus facilitating compliance with regulatory and site closure milestones. DOE plans to continue operating the incinerator for one to three years past FY 2006.



*Workers are placing solid waste material into feed containers*



*UF<sub>6</sub> cylinder being loaded for transport*

## UF<sub>6</sub> Cylinders Being Shipped Off-Site

Approximately 6,000 cylinders containing uranium hexafluoride (UF<sub>6</sub>) are being shipped to the Portsmouth Site for disposition. Most of these contain depleted UF<sub>6</sub>. These steel cylinders hold up to 10 to 14 tons of depleted UF<sub>6</sub>. They are stored in storage yards in aisles and are stacked two high. A total of 2,747 of these cylinders were shipped in FY 2005, bringing the total shipped to 4,726.

Natural UF<sub>6</sub> was used as feed material during the gaseous diffusion process to enrich uranium at the former K-25 Site. The percentage of uranium-235 was increased from the original feed material in the process (i.e., enriched). The remaining material is depleted UF<sub>6</sub>. It is stored as a white, crystalline solid that is slightly less radioactive than natural uranium.

A total of 429 empty and near-empty cylinders containing residual uranium compounds other than depleted UF<sub>6</sub> have been disposed of at the Nevada Test Site in FY 2003, completing that phase of the project.

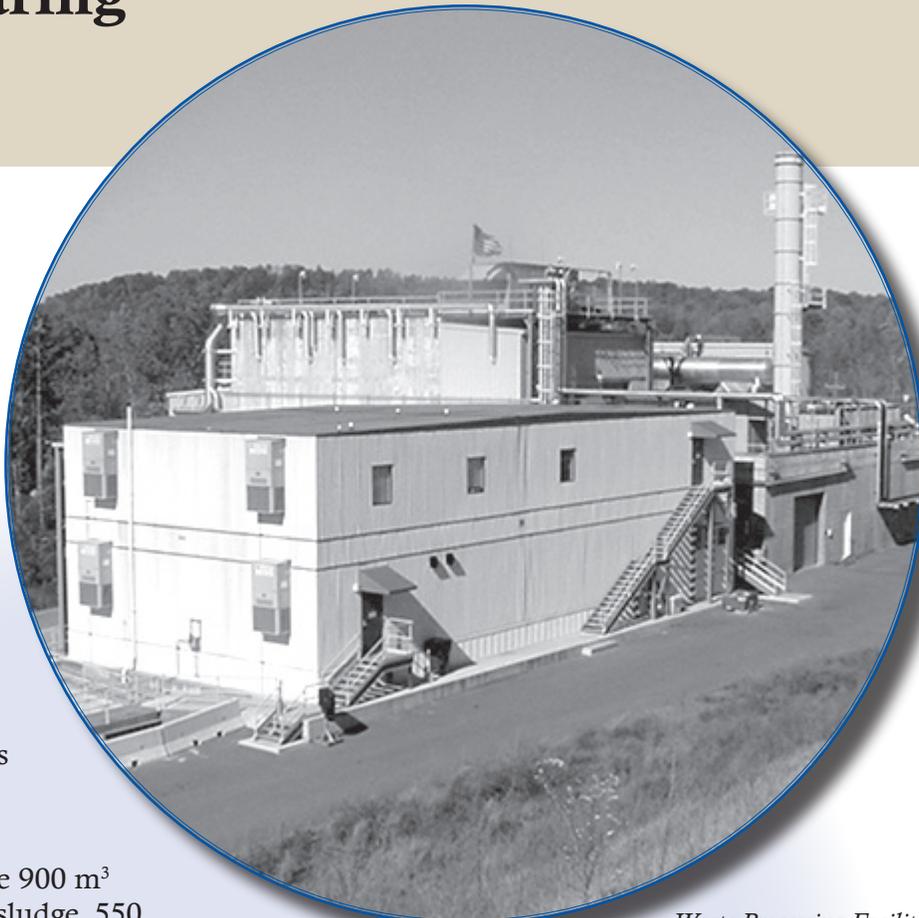
## Waste Processing Facility Preparing for CH-TRU Processing

The mission of the Oak Ridge TRU Program is to provide cost-effective, safe, and environmentally compliant treatment and disposal of all TRU waste stored at ORNL. In 1998, DOE entered into a fixed-price privatization contract with Foster Wheeler Environmental Corporation to construct, operate, decontaminate, and decommission a Waste Processing Facility. Construction of the facility was completed in FY 2004.

The facility was designed and constructed to treat and dispose 900 m<sup>3</sup> of remote-handled (RH) TRU sludge, 550 m<sup>3</sup> of RH-TRU/alpha LLW solids, 1,600 m<sup>3</sup> of RH-LLW supernate, and 1,000 m<sup>3</sup> of contact-handled (CH) TRU/alpha LLW solids currently stored in Melton Valley.

Supernate processing was completed in FY 2004. Since the start of FY 2005, the Waste Processing Facility has been preparing the facility, safety documentation, and procedures for CH-TRU waste processing. Processing is scheduled to start in early FY 2006.

The project will ultimately retrieve the remaining three waste streams stored at ORNL, treat them at the facility as required for transportation and disposal, and ship the treated waste forms to either the NTS or the Waste Isolation Pilot Plant (WIPP) in New Mexico. Acceptance of the two RH-TRU waste streams at the WIPP is pending the outcome of permitting actions by DOE with the state of New Mexico.



*Waste Processing Facility*

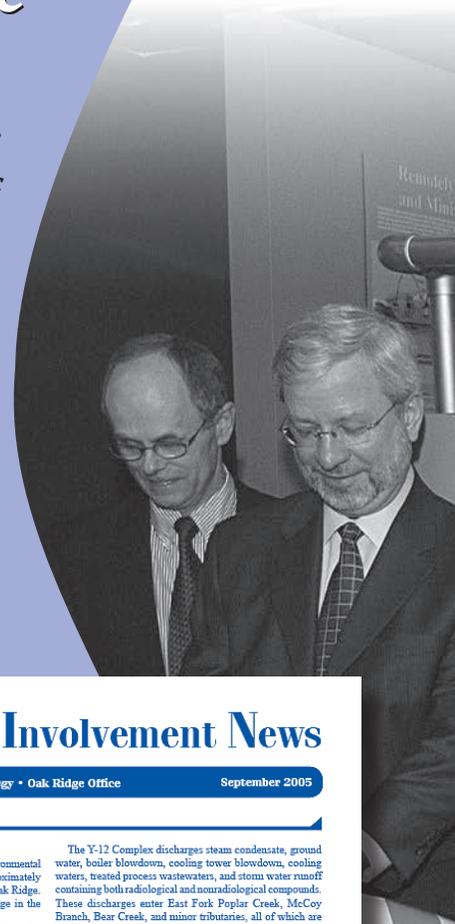
# Public

## Public Involvement Plays Key Role in Environmental Management

**M**any projects have moved from the decision-making phase to actual fieldwork. However, DOE is still seeking public involvement in many decisions affecting cleanup of the Oak Ridge Reservation. Public input was sought in FY 2005 on a variety of initiatives, including the following:

- Proposed Plan for remedial actions in Zone 2 (fenced area) at ETTP;
- Draft management plan for approximately 3,000 acres of the Black Oak Ridge Conservation Area located on the Oak Ridge Reservation;
- Proposed Plan for interim actions for contaminated soils and scrap yard in Upper East Fork Poplar Creek;
- Covenant Deferral Request to transfer a parcel of vacant land, known as Parcel ED-5 East, to Heritage Center LLC, a subsidiary of the Community Reuse Organization of East Tennessee;
- Interim Action Work Plan for soil removal at the David Witherspoon Inc. site;
- Construction of the ETTP-to-EMWFM Haul Road and bridges;
- Covenant Deferral Request to transfer approximately 1 acre of federal property located at ORNL to the State of Tennessee; and
- Draft Environmental Assessment for transferring approximately 360 acres, known as Parcel ED-6, to the City of Oak Ridge.

Other Public Involvement initiatives included the monthly distribution of *Public Involvement News*, distribution of the FY 2004 version of *Cleanup Progress*, and updates of project fact sheet that are made available at the DOE Information Center and other venues.



### Public Involvement News

U.S. Department of Energy • Oak Ridge Office

September 2005

#### Announcements

##### Parcel ED-6 EA Available for Review

DOE is seeking public comments on a draft Environmental Assessment (EA) for the proposed transfer of approximately 360 acres, known as Parcel ED-6, to the City of Oak Ridge. This land is located on the west end of Oak Ridge in the vicinity of Wisconsin Avenue.

Copies of the EA are available at the DOE Information Center and on the Web site [http://www.oakridge.doe.gov/info\\_centr](http://www.oakridge.doe.gov/info_centr) in the "New Documents" section. Comments should be forwarded by September 12 to Gary Hartman, U.S. Department of Energy, Oak Ridge Office (SE-32), P.O. Box 2001, Oak Ridge, TN 37831.

Contact: Walter Perry, (865) 576-0885

##### CDR Available for ORNL

As part of DOE's Facilities Revitalization Program for Oak Ridge National Laboratory (ORNL), DOE proposed to transfer approximately 1 acre of federal property located at ORNL to the State of Tennessee. A new Joint Institute for Biological Sciences will be built on the property, which is located on the west end of the ORNL campus.

The proposed property transfer is pursuant to CERCLA Section 120(b) (3) (C), which allows the transfer of federal property before all remedial actions are complete.

The property will not be transferred until the Environmental Protection Agency Region 4 (EPA) determines, with concurrence of the Governor of the State of Tennessee, that transfer of the property is consistent with protection of human health and the environment and suitable for its proposed use.

The Covenant Deferral Request (CDR) is available for review at the DOE Information Center. Please submit any comments by September 14 to Mark Belvin, U.S. Department of Energy, P.O. Box 2001, Oak Ridge, TN 37830; phone, (865) 576-7321.

Contact: Walter Perry, (865) 576-0885

##### Public Hearing Planned on Y-12 Discharge Permit

The Tennessee Division of Water Pollution Control (WPC) plans to seek public comments regarding the renewal of a water quality discharge permit to DOE's Y-12 National Security Complex (NPDES Permit No. TN0002968), Oak Ridge, Anderson County, Tenn.

The Y-12 Complex discharges steam condensate, ground water, boiler blowdown, cooling tower blowdown, cooling waters, treated process wastewaters, and storm water runoff containing both radiological and nonradiological compounds. These discharges enter East Fork Poplar Creek, McCoy Branch, Bear Creek, and minor tributaries, all of which are within the Clinch River watershed.

The Division of Water Pollution Control will hold a public hearing at 7 p.m., Thursday, September 22, at the TDEC Division of DOE Oversight, 761 Emory Valley Road, Oak Ridge, TN 37830, (865) 481-0995.

The draft permit may be viewed on the WPC Web site [www.state.tn.us/environment/wpc/wpcppo](http://www.state.tn.us/environment/wpc/wpcppo), at the DOE Oversight office, or at these Division of WPC offices: Knoxville Environmental Field Office, 2700 Middlebrook Pike, Suite 200, Knoxville, Tenn., and WPC Permit Section, 401 Church Street, L & C Annex, 6th Floor, Department of Environment and Conservation, Nashville, Tenn.

##### Environmental Justice Report Available

The DOE Office of Legacy Management has issued the report "Environmental Justice at the U.S. Department of Energy—A Decade of Progress." The July 2005 report highlights accomplishments in implementing Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Copies are available at the DOE Information Center and on the Web at [http://www.lm.doe.gov/env\\_justice/decade.pdf](http://www.lm.doe.gov/env_justice/decade.pdf).

Contact: Melinda Downing, DOE-HQ, (202) 586-7703

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#### Public Meeting

##### Site Specific Advisory Board Meeting

The Oak Ridge Site Specific Advisory Board (ORSSAB) will meet at 6 p.m., Wednesday, September 14, at the DOE Information Center, 475 Oak Ridge Turnpike. The meeting presentation will feature an overview of the risk assessment process.

Contact: Pat Halsey, (865) 576-4025  
ORSSAB Support Office, (865) 576-1590  
Internet: <http://www.oakridge.doe.gov/en/ssab/>

# *Involvement*

Partnering for the Future.  
Cleanup of the Manhattan Project  
at the Oak Ridge Reservation



*The Oak Ridge Site Specific Advisory Board (ORSSAB) celebrated its 10th anniversary this year with a series of public outreach events as it moved forward in its mission to provide informed advice and recommendations to the DOE-ORO EM program.*

## ORSSAB Celebrates 10 Years



*DOE-ORO EM Manager Steve McCracken (far left), OR SSAB Federal Coordinator Pat Halsey, and ORSSAB Chair Kerry Trammell perform the honorary cake cutting duties at the ORSSAB's 10th anniversary celebration, held September 12, 2005, at the American Museum of Science and Energy.*

## 10th Anniversary Celebration

In September 2005, the Board took a break from its busy year to host a 10th anniversary party at the American Museum of Science and Energy (AMSE). Attending the festivities were many current and former Board members, as well as Doug Frost, DOE's Designated Federal Officer for the nine SSABs across the DOE complex; Gerald Boyd, DOE-ORO Manager; Steve McCracken, DOE-ORO Assistant Manager for EM; and David Bradshaw, Mayor of Oak Ridge. A highlight of the event was the presentation of commemorative plaques signed by the Secretary of Energy and Mayor Bradshaw. The event also provided the Board with an opportunity to show off its new museum exhibit.

In the 10 years since the SSAB was established in 1995, the Board has issued 137 recommendations to DOE on various issues related to the cleanup operations on the Oak Ridge Reservation. These recommendations have covered almost every aspect of the cleanup program—from health and safety issues to the nuts and bolts of specific project details. The board has also performed a very important function by serving as the focal point for community outreach activities related to the cleanup program. ORSSAB members are unpaid volunteers who have devoted thousands of hours of their time to the government as a public service.



*FY 2006 ORSSAB members, ex officios, and student representatives. Seated, left to right: Steve Douglas, Ben Adams, Kerry Trammell, Chris Grove, Pat Halsey (Federal Coordinator). Second row, left to right: Tonya Justice (Student Representative), Linda Grandage, Connie Jones (EPA Ex Officio), Rhonda Bogard, Meredith James (Student Representative), Pat Hill, Norman Mulvenon, Donna Campbell, Lance Mezga, Darryl Bonner. Third row, left to right: John Owsley (TDEC Ex Officio), Dave Adler (DOE Ex Officio), Steve Dixon, Bob Olson, Ken Sadler. Not pictured: Heather Cothron, Steve McCracken (Deputy Designated Federal Official), James Miller, Tim Myrick, Sandy Reagan.*

## *AMSE Exhibit*

ORSSAB unveiled its museum exhibit in February 2005 with a ribbon-cutting ceremony attended by about 50 members of the Board, the public, and media. Speakers at the event included Gerald Boyd, Steve McCracken, David Bradshaw, ORSSAB Chair Kerry Trammell, and Museum Director Steven Stow.

Located on the second floor of the museum, the display uses touch-screen kiosks, displays, and posters to tell the story of the Oak Ridge EM program. The centerpiece of the exhibit is a scale model of the EMWMF in Bear Creek Valley, which provides visitors an idea of the magnitude of the cleanup effort on the Oak Ridge Reservation. The touch-screen kiosks take visitors on an interactive journey through the cleanup process at the Gunitite Tanks, one of the highly successful remediation projects at Oak Ridge National Laboratory. Suspended over the exhibit is one of the remotely controlled planes that used infrared photography to survey waste disposal sites on the Reservation.



*A new exhibit highlighting the EM Program and ORSSAB's role in the cleanup progress was unveiled February 17, 2005, at the American Museum of Science and Energy in Oak Ridge. Pictured from left are: Steve McCracken and Gerald Boyd of DOE-ORO, ORSSAB Chair Kerry Trammell, Museum Director Steve Stow, ORSSAB Student Representative Katie Meersman, and Oak Ridge Mayor David Bradshaw.*

## *Educational Outreach*

In March 2005, the Board launched its Stewardship Education Resource Kit, which was developed over the course of three years to provide high school educators with materials on the background, science, history, and cleanup of contaminated areas on the Oak Ridge Reservation and the stewardship of residually contaminated sites.

The kit contains lesson plans, videos, a fictional case study based on actual cleanup operations, an appendix of supporting materials, and a video CD on the background and use of the kit. The kit offers

teachers a complete resource for educating students about long-term stewardship of contaminated land. It provides a lot of flexibility for teachers to tailor the lessons to a number of grade levels and specific subject areas, such as environmental science, chemistry, biology, ecology, civics, or history.

ORSSAB is currently working with school systems in the area and with the University of Tennessee to develop a workshop for teachers on how to use the kit. The event will be held in February 2006 at Pollard Auditorium.

## *National Initiatives*

Each year the Chairs of the nine SSABs nationwide gather to discuss EM projects and policy, share ideas and concerns among sites, and identify and work on common issues. In 2005, the Chairs developed two important recommendations on waste disposition issues.

The first recommendation was that DOE convene a national stakeholder workshop on waste disposition. The intent of the workshop is to determine where all of DOE's waste is located, what the department's plans

are for disposing of it, and what barriers impede the disposition of the wastes. The goal of the workshop is to formulate solutions to overcome the barriers to disposition.

The second recommendation was also related to waste issues. In it the Chairs offered their support, and comment if solicited, to the New Mexico Environment Department regarding permit modifications at the Waste Isolation Pilot Plant for remote-handled transuranic wastes. The Chairs also urged DOE to con-

tinue to address the issue of high-level waste disposition at several sites around the DOE complex. Lastly, the Chairs expressed their concern regarding pre-1970 TRU waste because no consistent national policy exists regarding characterization and retrieval of these buried wastes. The Chairs wrote that they would like to participate with DOE in the development of a national policy to properly dispose of these wastes.

# Acronyms and Initialisms

AM	action memorandum
AMSE	American Museum of Science and Energy
CDL	Construction Demolition Landfill
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CH	contact-handled
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DWI	David Witherspoon Inc.
EM	Environmental Management
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
ETTP	East Tennessee Technology Park
FY	fiscal year
HFIR	High Flux Isotope Reactor
HRE	Homogenous Reactor Experiment
ISG	in situ grouting
ISV	in situ vitrification
LLW	low-level waste
MOA	Memorandum of Understanding
MSRE	Molten Salt Reactor Experiment
NHF	New Hydrofracture Facility
NTS	Nevada Test Site
OHF	Old Hydrofracture Facility
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
ORSSAB	Oak Ridge Site Specific Advisory Board
P&A	plugging and abandonment
PCB	polychlorinated biphenyl
PCCR	Phased Construction Completion Report
PP	Proposed Plan
RAWP	Remedial Action Work Plan
RDR	Remedial Design Report
RH	remote-handled
ROD	Record of Decision
S&M	surveillance and maintenance
STT	shielded transfer tank
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 <sub>6</sub>	uranium hexafluoride
VOC	volatile organic compound
Y-12 Complex	Y-12 National Security Complex

# 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

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

U.S. Environmental Protection Agency  
Region IV  
1-800-241-1754

Agency for Toxic Substances and  
Disease Registry  
1-888-422-8737

## Internet Sites

DOE Main Web Site	<a href="http://www.energy.gov">www.energy.gov</a>
DOE-ORO Home Page	<a href="http://www.oakridge.doe.gov">www.oakridge.doe.gov</a>
DOE-ORO Environmental Management Program	<a href="http://www.oakridge.doe.gov/external">www.oakridge.doe.gov/external</a> (Click on “Program,” then select “Environmental Management”)
Oak Ridge Site Specific Advisory Board	<a href="http://www.oakridge.doe.gov/em/ssab">www.oakridge.doe.gov/em/ssab</a>
Oak Ridge Accelerated Cleanup	<a href="http://www.bechteljacobs.com/doeclean/">www.bechteljacobs.com/doeclean/</a>
Agency for Toxic Substances and Disease Registry	<a href="http://www.atsdr.cdc.gov">www.atsdr.cdc.gov</a>
U.S. Environmental Protection Agency	<a href="http://www.epa.gov/region4/">www.epa.gov/region4/</a>
Tennessee Department of Environment and Conservation	<a href="http://www.state.tn.us/environment/doe">www.state.tn.us/environment/doe</a>
DOE Information Center	<a href="http://www.oakridge.doe.gov/External">www.oakridge.doe.gov/External</a> (Click “Public Activities,” then “Info Center”)



***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 ETPP Classification and Information Control Office.**

