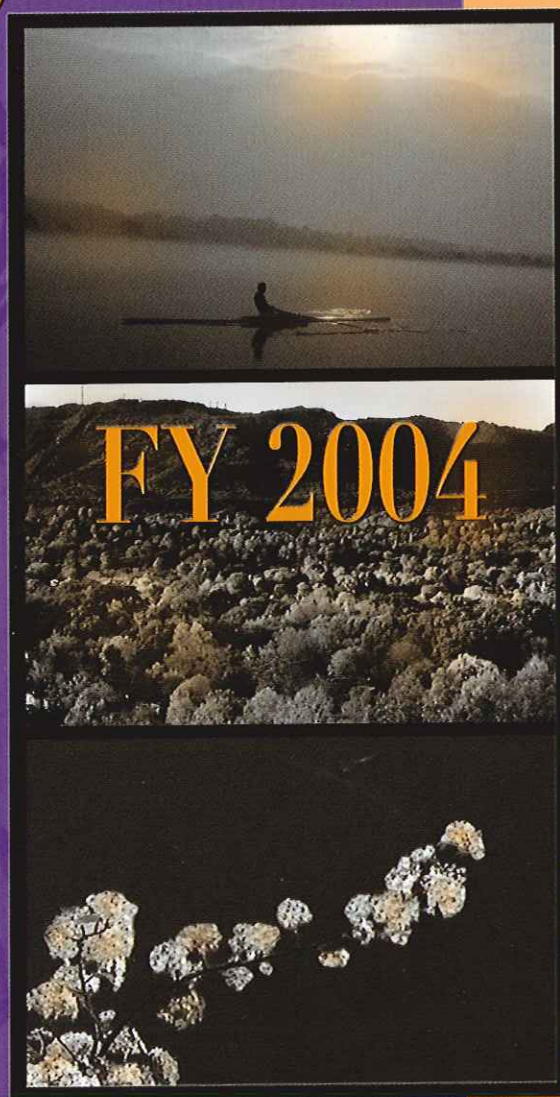


# Cleanup Progress

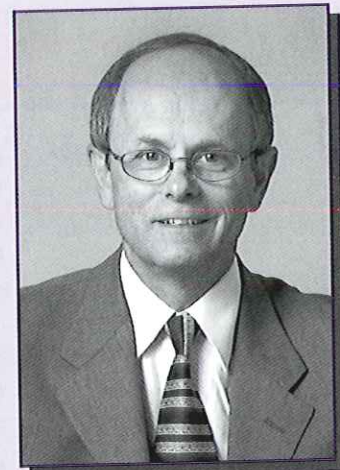


*Annual Report to the Oak Ridge Community*





## Message From Assistant Manager for Environmental Management



*For much of the 22 years since DOE established the Environmental Management program, progress was measured in paperwork—those time-consuming but necessary studies such as remedial investigations, feasibility studies, and risk assessments. Today, however, real cleanup progress is being made just about everywhere you look on the 33,750-acre Oak Ridge Reservation—from the mammoth former gaseous diffusion buildings at East Tennessee Technology Park (ETTP), to the pits and trenches in Melton Valley, and at many points in between.*

*This process was jump-started in 2001 when DOE launched its Top-to-Bottom Review, followed by what became known as “accelerated cleanup and closure.” Far from a flavor-of-the-day, as some critics predicted, this initiative has proven itself in terms of schedule acceleration and costs savings. It provides for cleanup of the Oak Ridge Reservation’s highest risk areas by 2008 (legacy waste in 2005, Melton Valley in 2006, and ETTP in 2008) while saving approximately \$1.4 billion during the life of the program through 2015.*

*With all of this activity, it is difficult to summarize the many accomplishments of the past year. Highlights include the continued cleanup of the K-33, K-31, and K-29 Buildings at ETTP; completion of Supernate transuranic waste treatment; defueling of the Tower Shielding Reactor facility; demolition of 11 facilities in the K-1064 Peninsula area; transfer of more than 23,000 cubic yards of legacy low-level waste to a disposal site; shipment of more than 1,800 cylinders of Depleted Uranium Hexafluoride to Portsmouth, Ohio; and initiation of an 800,000-cubic-yard expansion of disposal capacity to the Environmental Management Waste Management Facility. Working with the Tennessee Department of Environment and Conservation, we have also completed field work at the Atomic City Auto Parts site in east Oak Ridge and made substantial cleanup progress at the David Witherspoon Site in south Knoxville.*

*For details on these and other accomplishments, please continue reading the Cleanup Progress Report. Safety continues to be the main consideration in everything we do. Please be assured that I, as well as Gerald Boyd, our Oak Ridge Operations Manager, and our contractor leadership will continue to make safety our number one priority in the successful accomplishment of our work.*

*As we progress with cleanup of the Reservation, we undoubtedly will encounter unexpected challenges along the way. We have already overcome several, and I am confident in our ability to address any others that may arise. As I begin my third year as head of EM, the energy, dedication, and expertise of our Oak Ridge stakeholders continue to impress me. Your participation has been invaluable, and I thank you for helping make this progress possible.*

*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. I look forward to continuing our productive relationship.*

Stephen McCracken  
Assistant Manager for Environmental Management  
DOE Oak Ridge Operations Office



## Acronyms and Initialisms

ACAP	Atomic City Auto Parts
AM	action memorandum
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 Difference
ETTP	East Tennessee Technology Park
FFA	Federal Facility Agreement
FFS	Focused Feasibility Study
FY	fiscal year
HFIR	High Flux Isotope Reactor
HRE	Homogenous Reactor Experiment
ISG	in situ grouting
ISV	in situ vitrification
INEEL	Idaho National Engineering and Environmental Laboratory
LLW	low-level waste
MLLW	mixed low-level waste
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
PP	Proposed Plan
RAWP	Remedial Action Work Plan
RDR	Remedial Design Report
RH	remote-handled
RmAWP	removal action work plan
ROD	Record of Decision
SNF	spent nuclear fuel
STP	Site Treatment Plan
SWSA	Solid Waste Storage Area
TDEC	Tennessee Department of Environment and Conservation
TRU	transuranic
UEFPC	Upper East Fork Poplar Creek
UF <sub>6</sub>	uranium hexafluoride
VOC	volatile organic compound
WIPP	Waste Isolation Pilot Plant
Y-12 Complex	Y-12 National Security Complex

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## ***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.*



**East Tennessee**

**Technology Park**





# Building Demolition Continues

All buildings at East Tennessee Technology Park (ETTP) are scheduled for demolition as part of the U.S. Department of Energy's (DOE's) accelerated cleanup plan. However, as many as 26 facilities are targeted for potential transfer of title under the reindustrialization program. As of the end of fiscal year (FY) 2004, four buildings have been approved for transfer.

Building demolition is being performed through several projects: (1) K-25/27 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/appende.pdf](http://www.bechteljacobs.com/pdf/ffa/appendices/appende.pdf).

*Did You Know?*

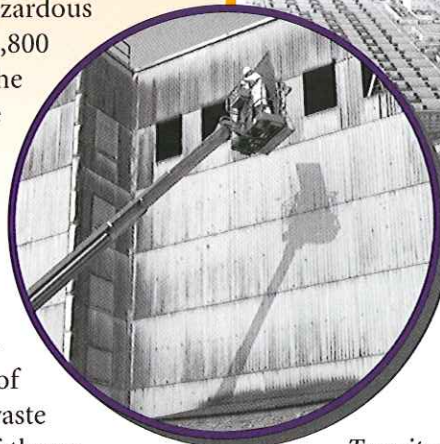
When it was built, the K-25 building was the largest building in the world.

## K-25/K-27 Facilities Decontamination and Decommissioning

The K-25 Building is the largest building on the Oak Ridge Reservation (ORR) and covers 1,637,170 ft<sup>2</sup>. The three-story, U-shaped building was built during the Manhattan Project and contains 3,018 stages of gaseous diffusion process equipment and associated auxiliary systems. Each stage (or cell) 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 decontamination and decommissioning (D&D) 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 wastes disposed. The D&D project is being executed in phases. Phase 1, hazardous materials removal, started in Spring 2002 and was approximately 50 percent complete by the end of FY 2003, and 85 percent complete by the end of FY 2004. Phase 1 activities primarily include the removal of asbestos-containing building materials from inside the K-25 and K-27 facilities. At the close of FY 2004, hazardous material abatement had been completed for 2,800 stages, and more than 550,000 ft<sup>3</sup> of waste from the K-25 and K-27 buildings had been disposed at the Environmental Management Waste Management Facility (EMWMF), a disposal facility located near the Y-12 National Security Complex (Y-12 Complex).

Phase 2, process equipment removal, performed the following activities in FY 2004: subcontractor procurement and mobilization, completion of required safety documentation, approval of the waste handling and characterization plans, approval of the removal action work plan (RmAWP), equipment characterization



*Transite panels being removed from the K-25 Building*



*K-25 Building*



(85 percent complete), and shipment of 43 loose converters to the Nevada Test Site (NTS) for disposal. Also in Phase 2, the work on removal of excess materials from the K-25 and K-27 buildings was awarded to a subcontractor. Excess materials consist of non-process items, such as laboratory equipment, laboratory samples, office equipment, tools, wooden pallets and crates, and drums of chemicals. Excess material characterization was 95 percent complete at the end of FY 2004; some of the items were tagged for historic preservation.

Phase 3, building demolition, begins in earnest in late FY 2005. However, the RmAWP was approved at the end of FY 2004, and the waste-handling plan is under development. Demolition began on a limited scale in the fourth quarter of FY 2004 with the removal of the outside covering transite panels.

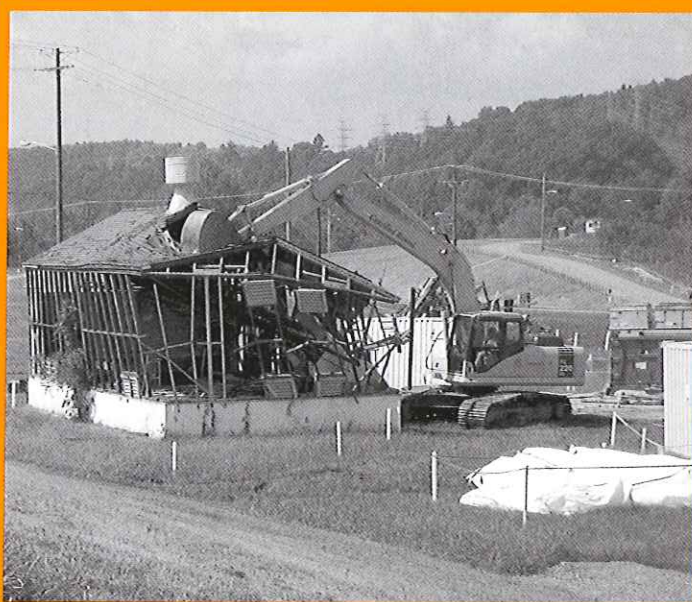
### ***Main Auxiliary Facilities (Main Plant)***

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 classified waste from Building K-1413 was disposed at the NTS, completing the required work for this Removal Action, and the final Removal Action Report was submitted to the regulators for approval.

### ***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, 11 of the 19 facilities were demolished. The remainder of the facilities are planned to be demolished in early FY 2005.

*Demolition of Building K-1025-D,  
part of the K-1064 grouping*



### ***Remaining Facilities***

In September 2003, DOE signed an AM to demolish the approximately 500 remaining facilities. In 2004, the demolition of 169 Predominantly Uncontaminated Facilities was initiated, demolition was started on the Balance of Site - Laboratories Group facilities, and characterization and utility deactivation continued as predecessor activities for significant demolition work in FY 2005. The remaining facilities will be addressed separately in the Low-Risk/Low-Complexity Facilities program or individually scheduled.

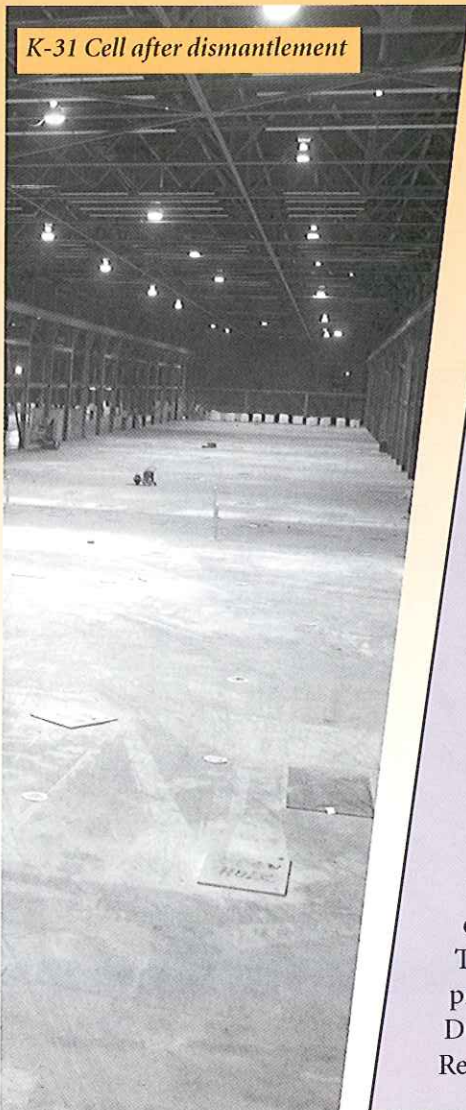


## Did You Know?

The K-29, K-31, and K-33 buildings cover more than 4.89 million square feet of floor space and once housed more than 156,000 tons of contaminated or potentially contaminated material.



K-31 Cell before dismantlement



K-31 Cell after dismantlement

## ETTP Three-Building D&D Project Nears Completion

The ETTP Three-Building D&D Project is almost complete, with 96 percent of the work accomplished at the end of FY 2004. The contractor, BNFL Inc., under a fixed-price contract with 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.

Two of the three buildings will be decontaminated to specified end-point criteria, making them available for reuse or demolition without radiological and other safety concerns.

A total of 155,707 tons of material has been dismantled, removed, and dispositioned as waste or recycle material for the entire project. During the fiscal year, more than 13 percent of the overall project was completed, including dismantlement, disassembly, removal, and dispositioning all of the remaining process equipment and material from the cascade units from Buildings K-29, K-31, and K-33. This work completed the material disposition phase for the buildings. In addition, more than 50 percent of the interiors of Buildings K-31 and K-33 was decontaminated.

Decontamination of the interiors of Buildings K-31 and K-33 is expected to be completed and the contractor demobilized in FY 2005. The interior of Building K-29 will not be decontaminated as part of this project. The project is scheduled to be completed by BNFL in April 2005. DOE will verify decontamination of the buildings before submitting the Removal Action Report to the regulators.



## Zone 2

# Record of Decision Developed

The Focused Feasibility Study (FFS), FFS addendum, and Proposed Plan (PP) for cleanup of the Zone 2 portion of ETTP were approved in FY 2004 by the Federal Facility Agreement (FFA) parties – DOE, U.S. Environmental Protection Agency (EPA), and the Tennessee Department of Environment and Conservation (TDEC). These documents detail the options and selected remedy for remediating the

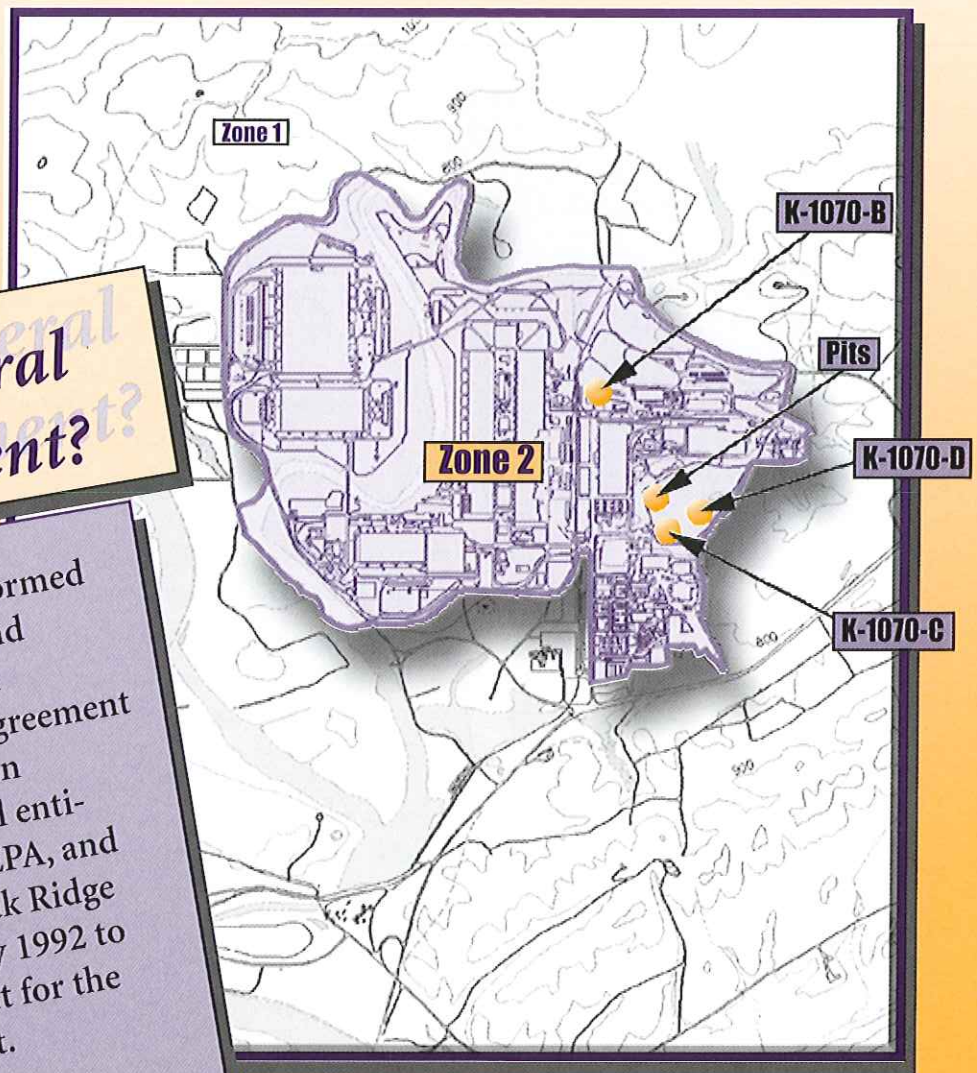
site. A public meeting was held on August 24, 2004, to discuss the Zone 2 Proposed Plan.

Zone 2 includes the area within the main fence of the plant (approximately 800 acres). Zone 1 is the area surrounding ETTP outside the fence. These documents address soil, slab, subsurface structure, and burial ground contamination. Remedial action objectives have been set to

provide for protection of a future industrial work force and to protect underlying groundwater. A Record of Decision (ROD) has been developed for EPA and TDEC to review and approve. Signature of the ROD will take place in FY 2005.

## What is the 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 (in this case, DOE, EPA, and TDEC). The FFA for Oak Ridge was initiated in January 1992 to satisfy this requirement for the interagency agreement.



ETTP Zone 2



# ETTP Sitewide Record of Decision Project Under Way

The ETTP Sitewide ROD addresses contamination in groundwater, surface water, and sediment for the protection of human health and the environment. In addition, it will determine if additional soil action is necessary to protect the environment. The geographic areas included in this decision are Zone 1 (outside the main plant) and Zone 2 (inside the plant fencing).

After a series of data quality objectives workshops focusing on groundwater, surface water, sediment, and soil

actions, a Work Plan for additional investigations was developed and submitted to EPA and TDEC for approval. Fish sampling and aquatic community surveys were conducted as stated in the work plan. Additionally, the three FFA parties developed a detailed schedule of the ensuing activities to allow for signature of the ROD in early FY 2007.

## *What is a Record of Decision?*

Under the CERCLA process, a ROD 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 a ROD.



# ETTP

## Begins Removing Scrap Waste

The ETTP Scrap Removal Project began shipping contaminated scrap from the K-770 Scrap Yard to the EMWMF on July 26, 2004. As of September 30, 2004, a total of 3,432 tons had been disposed. The total project includes 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 the scrap yard is planned for FY 2005.

*Scrap metal is being removed from the scrap yard.*



*Scrap yard after scrap metal removed*

## ETTP Outdoor Legacy Waste Disposition Continues

The ETTP Outdoor Legacy Waste is composed of 6,209 containers of low-level waste that were the result of past operations at the site. This waste has been characterized to support disposal and shipment to the EMWMF, which is in progress. Approximately 80% of the waste (by volume) has been disposed.



# Waste Characterization at Blair Quarry Completed

Characterization of waste at Blair Quarry, located on Blair Road at ETTP, was completed in FY 2004.

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 (now called ETTP). It operated as a quarry until 1945 and was then used for open burning of trash and debris through the late 1950s.

Removal of more than 10,000 yd<sup>3</sup> of contaminated soil and debris began in November 2004. The contaminated material is being removed in approximately 700 truck shipments and will be disposed of at the EMWME.

Several streamlined investigations were conducted as part of the Blair Quarry Pilot Project to characterize the nature and extent of the waste at the site. Based on these investigations, only one acre of the initial 67-acre area was determined to require remediation.

The remediation work is being performed by an environmental remediation subcontractor (PAS-COY) under subcontract to Bechtel Jacobs Company LLC, DOE's environmental management contractor for the Oak Ridge Reservation.

*Approximately 700 truckloads of Blair Quarry waste are expected to be disposed.*



*Excavation at Blair Quarry will remove more than 10,000 yd<sup>3</sup> of contaminated soil and debris.*



**Melton**

**Valley**





# Remediation Continues in Melton Valley

**R**emedial design was completed for all Melton Valley completion projects, and field construction is in progress on all projects except for remediation of Seepage Trenches 5 and 7.

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.

An amendment and two explanations of significant difference (ESDs) to the Melton Valley ROD were approved in FY 2004. The amendment changed the treatment of Seepage Trenches 5 and 7 from in situ vitrification (ISV), which is specified in the original Melton Valley ROD remedy, to in situ grouting. One of the ESDs added the Intermediate Waste Management Facility, Tumulus I, and Tumulus II to the capping and hydraulic isolation remedial action already selected for the Solid Waste Storage Area (SWSA) 6. The other ESD added eleven new inactive Melton Valley units that were considered "active" at the time of the Melton Valley ROD signature. Some of these units require demolition to facilitate hydrologic isolation of the burial grounds under the Melton Valley ROD remedy.

Individual actions completed before FY 2004 include remediation of the Process Waste Sludge Basin; remediation of the Old Hydrofracture Facility (OHF) pond and tanks; plugging and abandonment (P&A) of hydrofracture wells, except for the New Hydrofracture Facility (NHF) injection well; and demolition of various surface structures in Melton Valley.

## Did You Know?

In addition to accepting waste from operations at ORNL, Melton Valley was also used in the 1950s and 1960s by the Atomic Energy Commission as the Southeastern Regional Burial Ground for radioactive wastes from more than 50 government agencies, universities, and commercial entities.



*Melton Valley*



# Major Progress Made in Hydrologic Isolation Project

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. The principal waste burial sites in Melton Valley are SWSAs 4, 5, and 6. 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 low-level waste (LLLW) from 1951 to 1966. As intended, LLLW 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 LLLW.

Hydrologic isolation is the remedial action being taken to prevent the migration of contamination from the burial grounds (SWSAs 4, 5, and 6); Pits 1, 2, 3, and 4; and Seepage Trench 6.

## *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.
- 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 P&A 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.

The Remedial Design Report (RDR)/Remedial Action Work Plans (RAWPs) for SWSA 4, SWSA 5, SWSA 6, and the Pits and Trenches Area were approved in May 2000, October 2003, May 2004, and January 2004, respectively. Hydrologic isolation of the SWSA 5 North 4-Trench Area was completed in FY 2004.



*Pits and Trenches area*



*Construction activities associated with the remaining units include the following:*

- Installation of the upgradient groundwater diversion and downgradient groundwater collection trenches and installation of all geo-synthetic liner components of the multilayer cap at SWSA 4 have been completed, final protective soil and topsoil placement is almost complete, and pumping and treatment of groundwater collected in the downgradient trench will be initiated in FY 2005.
- Installation of the downgradient groundwater collection trench has been completed, and installation of the multilayer cap associated with the hydrologic isolation of the eastern portion of SWSA 5 South has been initiated.
- Approximately 10 of 12 acres of trees have been cleared, and installation of the first of five multilayer caps in SWSA 6 has been initiated.
- Installation of the downgradient groundwater collection trench and the multilayer cap (except for installation of the protective soil cover and seeding) associated with Seepage Pits 2, 3, and 4 has been completed.
- The multilayer cap (except for installation of the protective soil cover and seeding) associated with Seepage Trench 6 has been completed.

Hydrologic isolation of these remaining units will be completed in FY 2006.



SWSA 4

Cap Installations



SWSA 5



SWSA 6



## Small Facilities D&D Continues

The remediation of inactive buildings and structures continues in Melton Valley. The Small Facilities D&D Project involves demolishing surface structures to slab and stabilizing subsurface structures in place. Stabilization of subsurface structures will be preceded by removal, or fixation, of any transferable contamination.

### *The buildings and structures being addressed by the project include:*

- the New Hydrofracture Facility (NHF),
- Homogeneous Reactor Experiment (HRE) ancillary facilities,
- shielded transfer tanks,
- liquid LLW pumping stations,
- an equipment storage yard, and
- miscellaneous storage buildings.

The NHF was the last of two facilities built to perform hydrofracture operations in Melton Valley. It operated from 1982 to 1984, replacing the OHE, which operated from 1963 to 1979. The NHF was designed to facilitate the injection of wastes into the 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.



*Shielded transfer tanks*

The majority of the NHF has been demolished. All NHF ancillary facilities, including several dry storage tanks, a weighing station, and transfer piping, have been removed. Only three rooms, or cells, of the main NHF structure remain. All process equipment and piping have been removed from these cells in preparation for demolition of the cell structures. The cell structure will be decontaminated further prior to demolition, which will be completed by mid-2005.

Selected portions of the NHF equipment and materials that were not contaminated were sent for recycle/reuse with the remaining demolition debris going to disposal at the EMWMF.

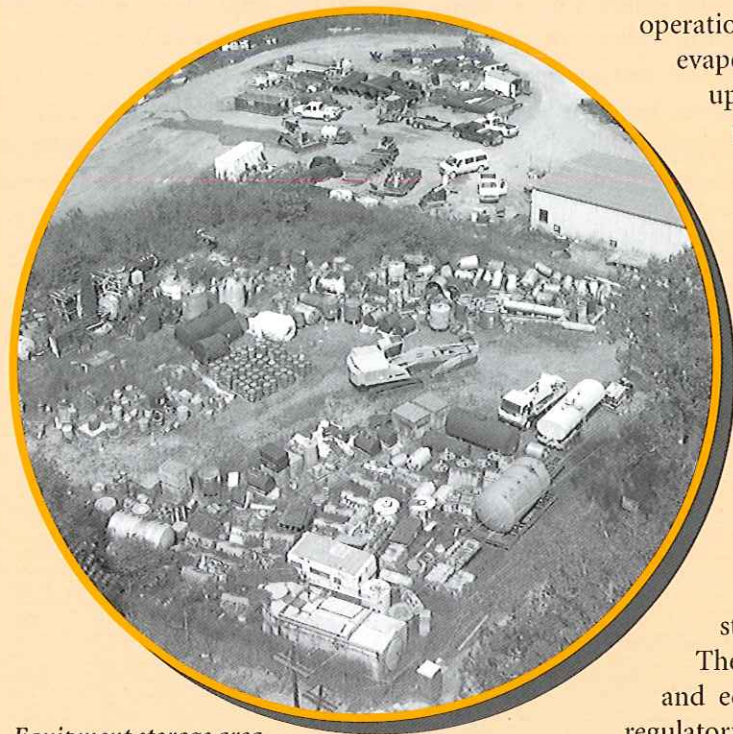
On Friday, May 14, 2004, a contamination incident occurred that necessitated an emergency removal action. A truck transporting materials from the NHF site to EMWMF leaked strontium-90 onto State Route 95, causing the highway to be shut down for a couple of days while extensive radiological surveys and repaving took place. This concluded the emergency removal action. 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 occur.

The HRE ancillary facilities consist of various structures, external of the main reactor building, that provided waste management or storage capabilities during reactor



*Demolition of the New Hydrofracture Facility*





Equipment storage area

operation. These 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.

The shielded transfer tanks are five shipping casks that were used originally during the 1950s and 1960s to transport a cesium nitrate solution from Hanford to ORNL's Fission Product Development Laboratory for further processing. The solution contained a high concentration of cesium-137 in a resin medium.

The RDR/RAWP for the HRE ancillary facilities, pumping stations, and miscellaneous storage buildings was approved in June 2004. The RDR/RAWP for the shielded transfer tanks and equipment storage yard was submitted to the regulatory agencies in August 2004 for approval.

## Removal of Contaminated HFIR Ponds Sediment Initiated

Remediation of the four surface impoundments located at the High Flux Isotope Reactor (HFIR) facility is in progress. Remediation consists of removing standing water and excavating and disposing the contaminated sediment. These impoundments are unlined and received liquid process waste streams mostly from floor and laboratory drains, steam condensates, and pressure vessel cooling waters.

*Remediation of the HFIR impoundments is part of the larger Melton Valley Closure Soils and Sediments Project, which also includes the following:*

- Excavation of the pond at the HRE facility. This pond has been backfilled and contains no standing water. It has served for several years as a demonstration for cryogenic stabilization in which soil around the pond was frozen to form a barrier to groundwater. The cryogenics system was shut down in February 2004 in preparation for system dismantling and pond excavation.
- Removal of contaminated soil associated with historical pipeline leak sites.
- Removal of floodplain soil contaminated above remedial action levels.
- Removal of other miscellaneous contaminated soil areas in Melton Valley.
- Stabilization (grouting) of the inactive liquid waste transfer pipelines in Melton Valley.



Sediment and soils from the surface impoundments will be disposed in the EMWME. Selected soils from the remaining sites—generally containing only minor amounts of contamination—will be used as contour fill beneath one of the hydrologic isolation caps.

The soil contamination sites will be 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. These land uses are a waste management area for the western two-thirds of the watershed and a controlled industrial area in the eastern third.

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 both systematic and biased sampling will be 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 will confirm that the post-remediation conditions in Melton Valley are compatible with the anticipated future land uses for Melton Valley.

The RDR/RAWP for the soils and sediments project was approved in May 2004.

*Excavation of contaminated sediment at HFIR pond*



*Aerial view of HFIR impoundments*





## Trenches 5 and 7 **Remedy Changed**

The selected remedial action for Seepage Trenches 5 and 7 in the Melton Valley ROD was ISV. The ISV process would immobilize the radionuclides and other non-volatile pollutants within vitrified glass, a chemically stable, leach-resistant material similar to obsidian. An off-gas hood would be placed over the area being vitrified to collect off-gases, which would be treated before release.

During 2003, a predesign field investigation and a procurement for design and construction services were conducted in preparation for performing ISV. New information resulted from these activities and prompted a reassessment. The new information included the presence of standing water in the trenches and a much higher-than-expected cost for performing ISV. After further evaluation, DOE proposed in an amendment to the ROD that an alternative treatment, in situ grouting, be substituted for ISV for Trenches 5 and 7. In situ grouting is a treatment process where materials, such as cement-based or chemical grouts, are injected into the subsurface (or waste unit) to reduce the hydraulic conductivity

of the subsurface (or waste unit). This remedy change was approved in 2004 by the regulatory agencies, and the ROD amendment is in its final approval signature cycle.

The RDR/RAWP for the in situ grouting of these trenches was approved in September 2004. The trenches will be treated by the permeation grouting method, utilizing Portland cement-based grouts injected under low pressure into the crushed limestone trench material. The grout will form a solid mass with the crushed limestone and the finer sediments, greatly reducing the permeability of the trench materials. 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. Grouting of the trenches is scheduled for the latter half of 2005.



*Trench 5*

**Aerial shots of Trenches 5 and 7**



*Trench 7*



# Preparation for MSRE Fuel and Flush Salts Removal Nearing Completion

Preparation for Molten Salt Reactor Experiment (MSRE) fuel and flush salt removal is nearing completion. 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 and comprehensive operational readiness reviews were completed in FY 2004. Final systems integration testing is in progress. Fuel and flush salt removal will be initiated in FY 2005 and completed in FY 2006.

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.



*Installation of salt melter probe*



*Aerial shot of the MSRE facility*



# Waste Processing Facility **Treatment and Shipment** of Supernate Completed

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

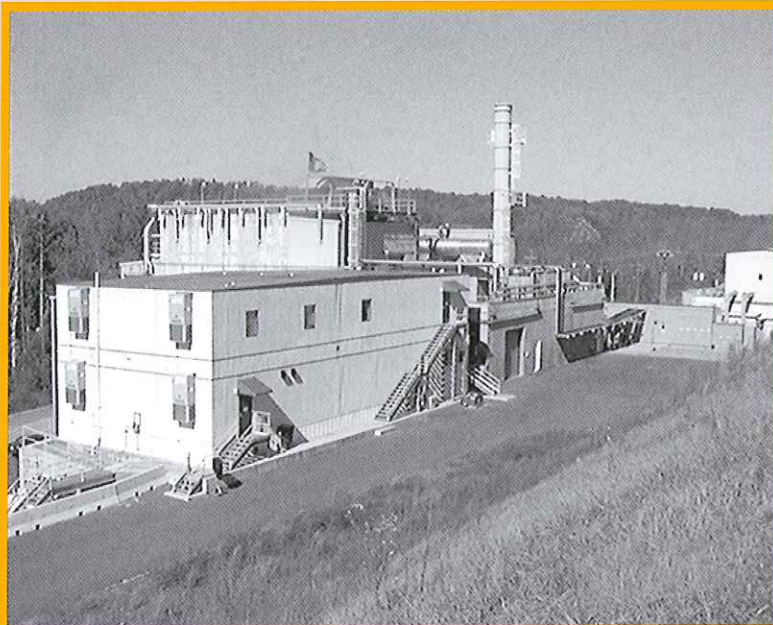
decommission a Waste Processing Facility. Construction of the facility was completed in FY 2004. The facility will treat and dispose 900 m<sup>3</sup> of remote-handled (RH) TRU sludge, 550 m<sup>3</sup> of RH-TRU/alpha LLW solids, 1,600 m<sup>3</sup> of RH-LLW supernate, and 1,000 m<sup>3</sup> of contact-handled (CH)-TRU/alpha LLW solids currently stored in Melton Valley.

Between January 2004 and the end of October 2004, the 1,600 m<sup>3</sup> (approximately 429,000 gallons) of highly contaminated tank waste, known as supernate, was retrieved from ORNL storage tanks, solidified at the facility, and shipped to the NTS for disposal.

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 two of the Oak Ridge waste streams at the WIPP is pending the outcome of permitting actions by DOE with the state of New Mexico.



*Shipment of supernate to the NTS*



*Waste Processing Facility*

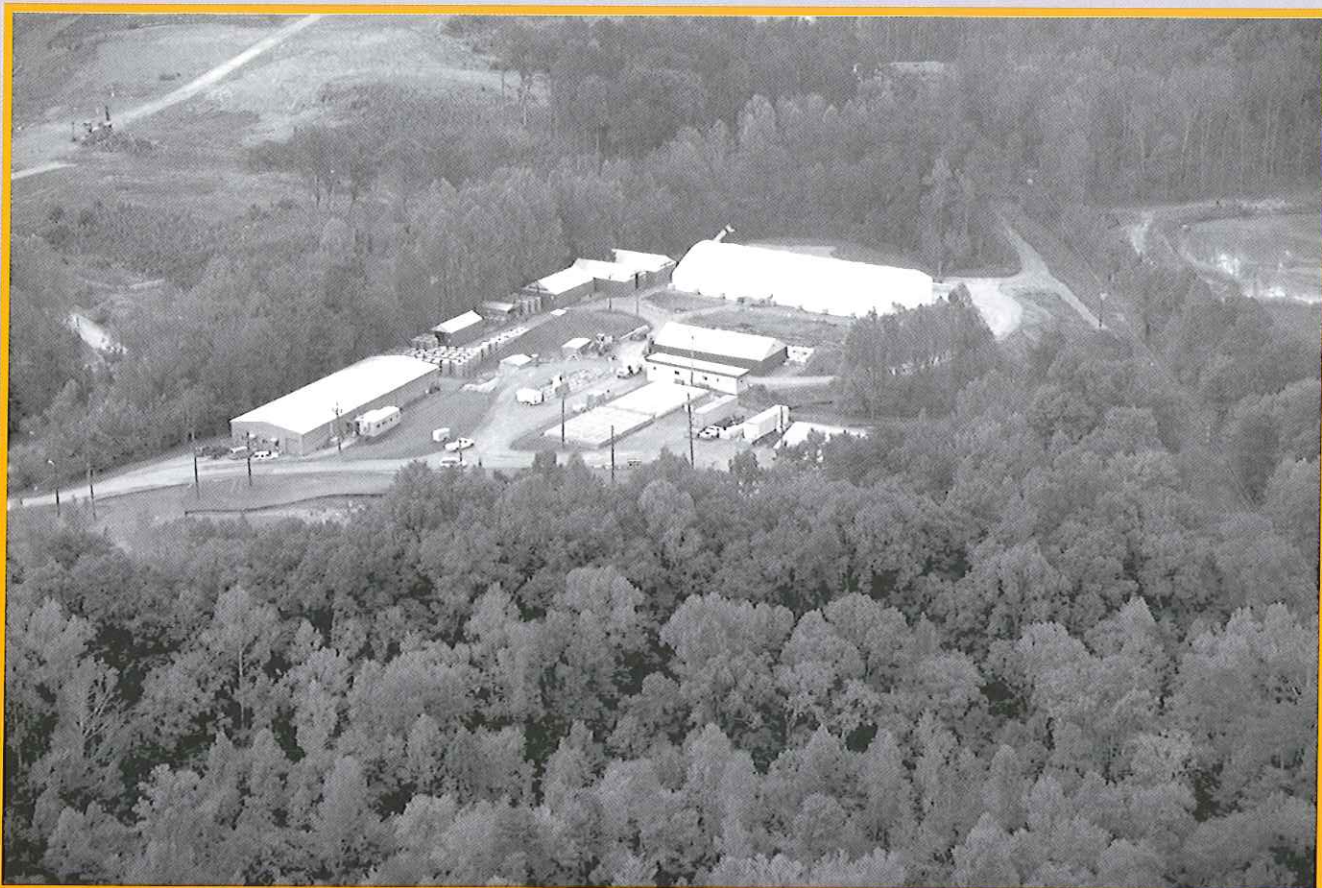


## Preparation for **Retrieval of TRU Waste** in Progress

TRU wastes that have been stored in the 22-Trench Area in SWSA 5 North are slated for removal by 2006.

During the 1970s, packages of TRU waste were retrievably stored in the 22-Trench Area. 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 in September 2000, to retrieve the TRU waste from the 22-Trench Area under DOE's Atomic Energy Act authority.

Waste retrieval will be accomplished under a temporary enclosure, and shielded equipment shall be used to minimize worker exposure. After retrieval, the waste packages will be placed in overpack containers and staged in appropriate areas pending transport to the TRU Waste Processing Facility. At that facility, the wastes will be repackaged to meet the acceptance criteria for off-site disposal and then shipped.



*Aerial view of SWSA 5 North showing temporary protective enclosure*



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.

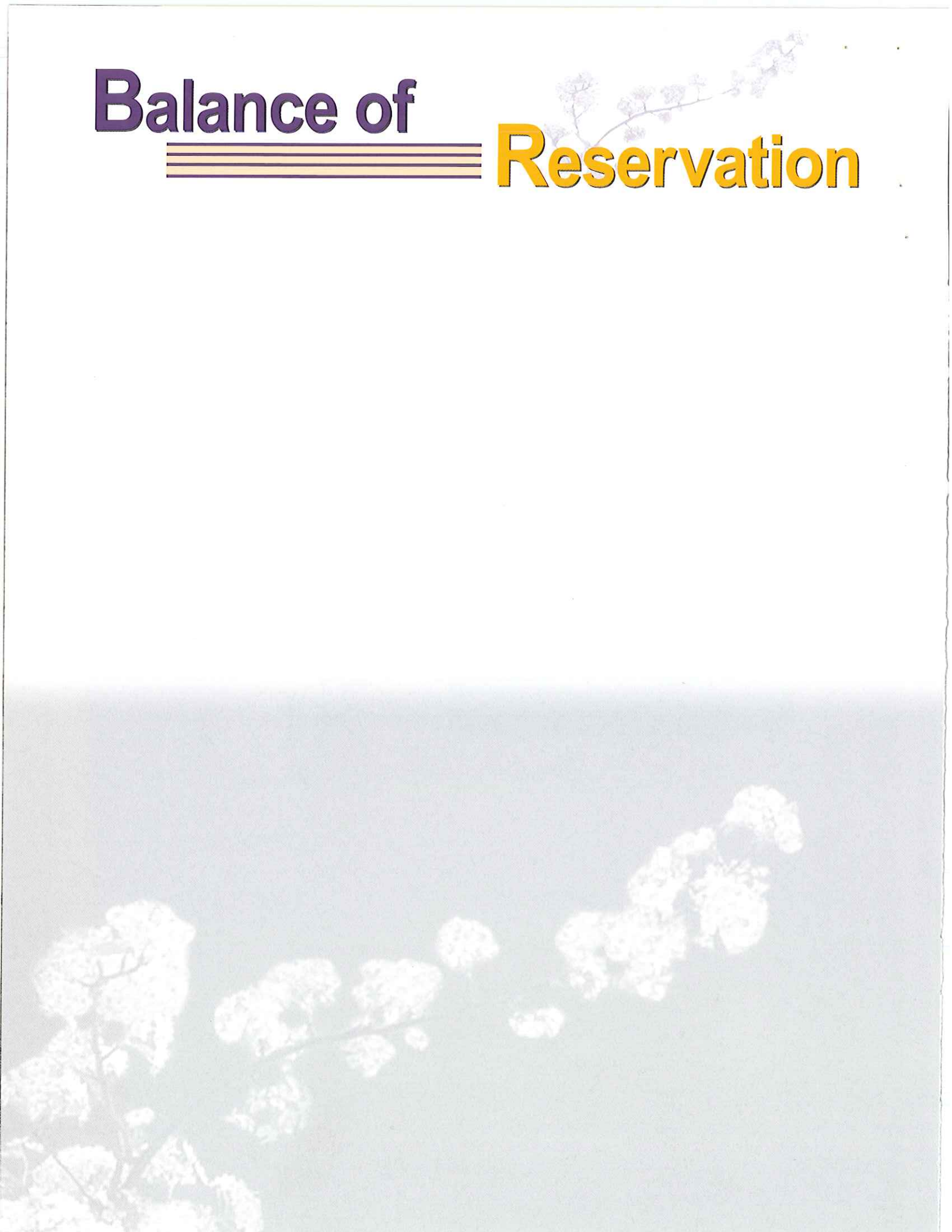
A subcontract was awarded for this work in 2003. The RDR/RAWP for this project was approved in February 2004. Site preparation and temporary enclosure construction have been completed. Cask retrieval will be initiated early in FY 2005 and completed in FY 2006.



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



# Balance of Reservation





# Various Areas Being Remediated in Bethel Valley

**T**he 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 three projects to be performed under the ROD are the Bethel Valley Groundwater Engineering Study; remediation of the T-1, T-2, and HFIR Tanks; and partial remediation of the Hot Storage Garden.

## 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 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.

In calendar year 2004, the Bethel Valley Groundwater Engineering Study completed most of the components of the required fieldwork. Two hundred and thirty-five soil push probes were completed with soil and groundwater samples obtained. Forty-eight additional push probe locations will be installed in FY 2005 to supplement the original two hundred and thirty-five. The soil gas installations were completed and the data acquired and analyzed. All of the surface water, groundwater, process waste system, storm sewer, and outfall sampling has been completed. Well installations were also scheduled to be initiated in early FY 2005 and completed in April 2005.



Bethel Valley

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

ORNL has a mixture of TRU 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 stored in the HFIR Tank. Although remediation of these tanks is included in the Bethel Valley ROD, they are physically located in Melton Valley. The HFIR Tank waste will be stabilized in place with grout. The T-1 and T-2 Tanks' waste has been mixed using a pulse-jet system and the slurry transferred to the active ORNL LLLW system. Some 90 percent of the waste, or 3,000 gallons



of the total 3,300 gallons of sludge, was transferred using a new transfer pump tied into the existing inactive LLLW underground transfer pipeline to the active tank W-23. The transferred slurry will eventually undergo solidification at the TRU Waste Processing Facility and disposal at the WIPP. The three empty tanks (HFIR, T-1, and T-2) will be filled with grout and closed. The RDR/RAWP for this project was approved in January 2004. Transfer of the waste from T-1 and T-2 is completed. The project will be completed in 2005.

### ***Hot Storage Garden D&D Begins***

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 program.

In 2003, some additional funding was made available to perform D&D on a facility currently in the surveillance and maintenance program. The Hot Storage Garden was selected because it was a 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.

Additional characterization data were obtained by analyzing radiological smears from the below-grade canal, residual well water, and wells. However, smears of the removable well sleeves were only obtained to approximately one-half the well depth.

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. Each of the sleeves had been cut

in half using a reciprocating saw. The vibration caused by the reciprocating saw is believed to have caused the contaminants to become airborne. As a result, four workers received an unexpected dose of less than 500 millirems, or 10 percent of the maximum annual dose allowed by nuclear regulations.

The project was immediately stopped and the area secured. The project is in the planning stages to perform additional characterization on the five removed well sleeves. The characterization will include sampling and analysis to ensure all the residual radionuclides on the well sleeves are identified and quantified. The sampling will be performed in a negative air enclosure through glove ports to minimize the chance of creating airborne contamination. After sampling, a fixative will be applied to the interior and exterior of the well sleeves. Once the characterization is complete, the analytical data will be reviewed to determine the appropriate containerization and disposition approach. Once this is determined, the removed well sleeves will be containerized and transported to the appropriate disposal facility. As a result of the unexpected residual contamination, the remaining 9 wells will be sealed until a final cleanup effort begins in 2009.

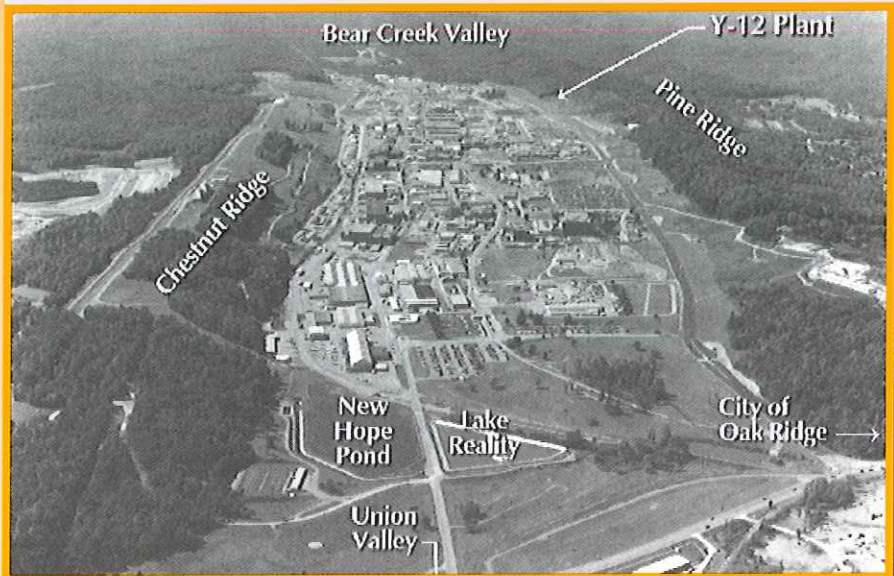
## **UEFPC Soils and Scrapyard Decision on Track**

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 2004, regulator comments were received on a draft FFS for remediation of UEFPC contaminated soils, scrap, and buried materials. Comments were incorporated, and the revised document was approved by the regulators. A Proposed Plan was prepared identifying the selected alternative to protect workers in the industrial plant area and to minimize further contamination of groundwater and surface

water. It accomplishes this 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 public meeting will be held to present the preferred alternative, and a ROD will be developed incorporating public input.

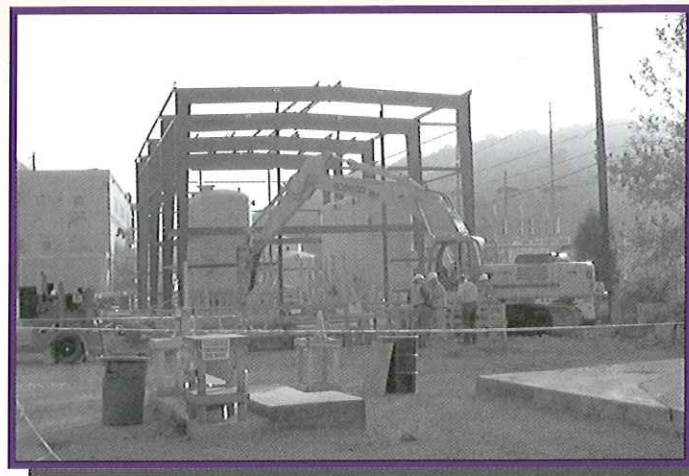


UEFPC Watershed

## Building 9201-2 Water Treatment System Construction Begins

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 *Record of Decision for Phase 1 Interim Source Control Actions in the UEFPC Characterization Area*.

A 300-gallon per minute water treatment system is being constructed near Bldg. 9201-2. The system will use 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.



Treatment building erected around carbon columns



# Witherspoon Site Being Prepared for Cleanup

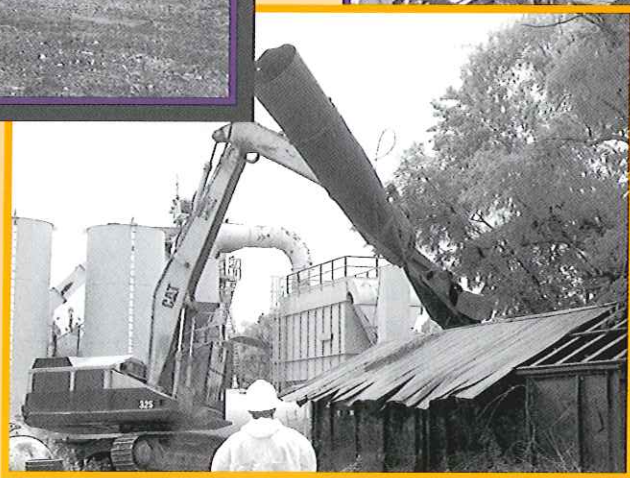
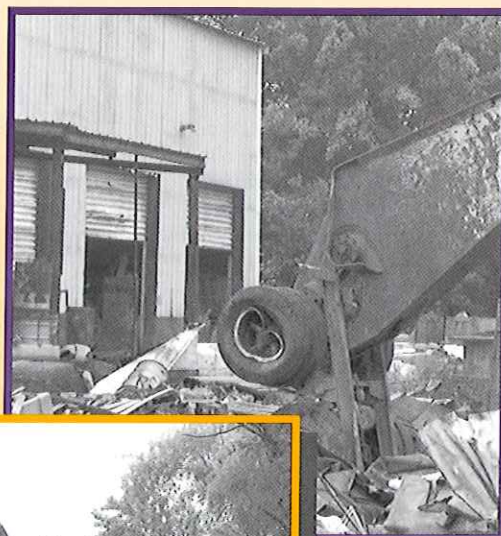
The David Witherspoon, Inc. (DWI) 901 Site, located on Maryville Pike in Knoxville, Tenn., consists of a 9.5-acre parcel formerly owned and operated as the DWI Recycling Center and a 0.5-acre parcel owned by CSX Transportation, Inc. A 1993 court order forced cessation of DWI operations at the site, and 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 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 polychlorinated biphenyl (PCB) mixed waste in the EMWME. 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. At the end of FY 2004, nine of the 10 buildings had been demolished, 970 yd<sup>3</sup> of building material and debris had been sent to the Y-12 Landfill, 1,960 yd<sup>3</sup> of site debris were shipped to the EMWME, and five loads of universal waste were shipped for off-site disposal.

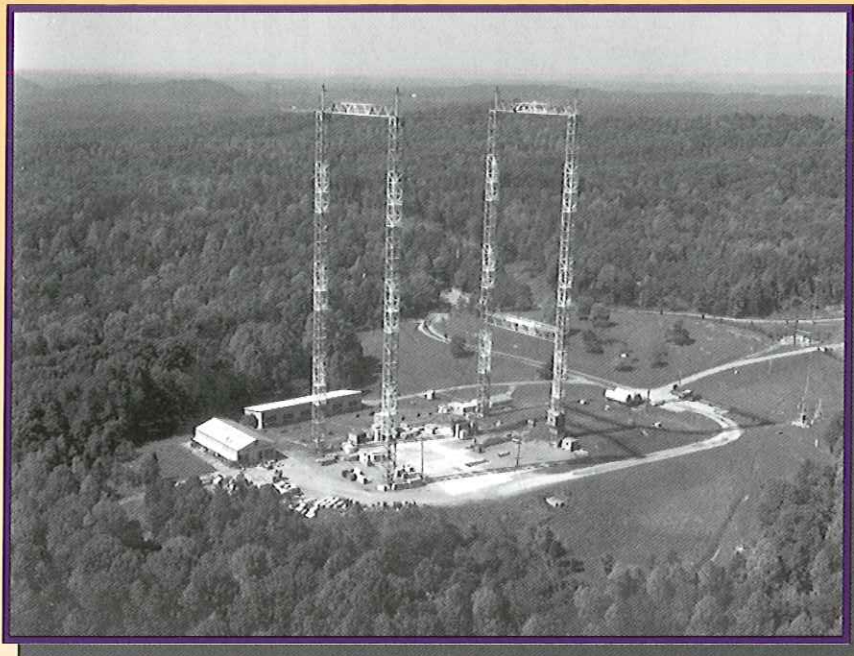
During FY 2005, the soil removal interim action work plan will be completed and excavation of soil will begin. This phase of the Witherspoon work is scheduled to be completed in FY 2007.



Demolition activities  
at DWI Site



# Tower Shielding Reactor **Defueled**



*Tower Shielding Facility*

DOE has completed the removal of fuel from a unique Oak Ridge nuclear reactor built in the 1950s to develop the technology for an atomic-powered aircraft.

Aircraft powered by atomic fission were never built, but since 1953, the Tower Shielding Reactor Facility, which has the ability to lift a reactor up to 200 feet from the ground, has been used for a wide range of nuclear research. While the reactor fuel has been removed, the towers—which are 360 feet tall and are visible from Interstate 40—will remain in place until cleanup of the site is completed in 2009.

After the 1950s, the Tower Shielding Reactor was used for the development of power reactor technology, missile silo protection, and the study of shielding for space applications. The towers were later used as a drop test facility to test the structural integrity of shipping casks for transport of radioactive materials. The reactor was shut down in 1992.

## **Atomic City Auto Parts** **Field Work Completed**

DOE has completed the cleanup of the Atomic City Auto Parts (ACAP) Site, which is located in northeast Oak Ridge. This 5-acre site was originally used as a coal distribution center by the Manhattan Project and was sold in 1954. From 1954 to 1975, the site was used as a private salvage business and received contaminated metals from the Y-12 Complex. After 1975, the business operated as an automobile salvage/repair and scrapyard facility. In 1994, the ACAP Site was declared a TDEC Superfund Site. Subsequent investigations found contamination existed from the past salvage and automobile repair operations. The contaminants of concern included uranium, PCBs, and heavy metals. The wastes resulting from remediation were sent to the EMWMF. A ceremony was held in October 2004 with TDEC Commissioner Betsy Child to recognize completion of field work at the site.



*Mayor David Bradshaw, DOE Oak Ridge Manager Gerald Boyd, TDEC Commissioner Betsy Child, and DOE Assistant Manager for Environmental Management Stephen McCracken listen to Rodger Daniel (far right), President of American Environmental & Construction Services, Inc., about the completion of environmental cleanup field work at the ACAP Site.*



# Waste Management





# Tons of Wastes **Placed in the EMWMF,** Other Landfills

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 wastes generated during cleanup of the ORR and associated sites in Tennessee. The EMWMF accepted its first waste shipment in May 2002.

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 percent reduction in total suspended solids measured in surface waters during the year.

The EMWMF received 5,275 truckloads of waste accounting for 69,999 tons during FY 2004. Projects that have used the EMWMF include the following:

- Boneyard/Burnyard 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 OHF D&D Project and Old Hydrofracture D&D Project at ORNL,
- Surface Impoundment Operable Unit Project at ORNL,
- K-25/27 D&D Project,
- Legacy LLW Project, and
- K-1085 D&D Project.

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 2004, more than 97,000 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 was expanded in 2004. Areas II and III were constructed to add 175,000 yd<sup>3</sup> of capacity. CDL-VII will be the repository for much of the uncontaminated debris generated by demolition of buildings at ETTP. Consequently, design work for construction of Area IV also commenced in 2004. Area IV will add another 336,000 yd<sup>3</sup> of capacity to CDL-VII.

## Did You Know?

Since the facility opened, 244,239 tons of soil and debris wastes have been disposed at the EMWMF (through the end of FY 2004).



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.

*More than 4,500 truckloads of waste were disposed at the EMWMF in FY 2004.*



## Changes Made at the EMWMF

### *Underdrain Constructed to Lower Water Table*

An underdrain to lower the water table beneath the EMWMF was constructed in 2004. The 1,050-foot-long drain was built using a core of rocks the size of railroad ballast, surrounded by a layer of smaller crushed stone the size of parking lot gravel, which was surrounded by a layer of sand. This three-component drain was

installed in the bottom of a 25-foot-deep trench that was dug 12 feet wide and subsequently backfilled as the drain construction progressed. The site water table is dropping as predicted because approximately 8 gallons of groundwater per minute flow across the outlet weir and into the remnant channel of North Tributary 4.



*Construction of Cell 3 at EMWMF*

### ***Build-Out to Add to Disposal Capability***

Another notable construction project started at the EMWMF in 2004. A build-out to add 800,000 yd<sup>3</sup> of disposal capacity kicked off in June. An addendum to the RDR detailing the build-out was approved by EPA and TDEC. This effort will add Cells 3 and 4 to the two cells that were completed in 2002. Construction of Cells 3 and 4 will finish in May 2005. Waste disposal operations in the new cells can commence upon approval of the Construction Completion Report by EPA and TDEC. The Construction Completion Report is the compilation of all of the quality control and quality assurance testing and monitoring that was performed to ensure that the build-out was constructed in accordance with the approved design.



## **Haul Road Planned**

It became apparent in early FY 2004 that removing shipments of ETTP waste bound for the EMWMF from public roads would better serve project and public interests. Conceptual design work to identify feasible routes to construct a haul road between ETTP and the EMWMF was initiated in early summer. This road enhances public safety by eliminating the hazards presented by large trucks mixing with passenger vehicles on public roads. It also reduces cleanup costs by decreasing the cycle time for each load of ETTP waste that is disposed at the EMWMF. As FY 2004 closed, the preferred route for the haul road was being presented to the regulators and to the Oak Ridge Site Specific Advisory Board (ORSSAB). An ESD to the EMWMF ROD was planned to provide the regulatory framework for the Haul Road project. An addendum to the EMWMF RDR will be issued for regulator approval. Construction will start and finish in 2005, just in time for the start of the intensive waste hauling campaign from the ETTP cleanup.

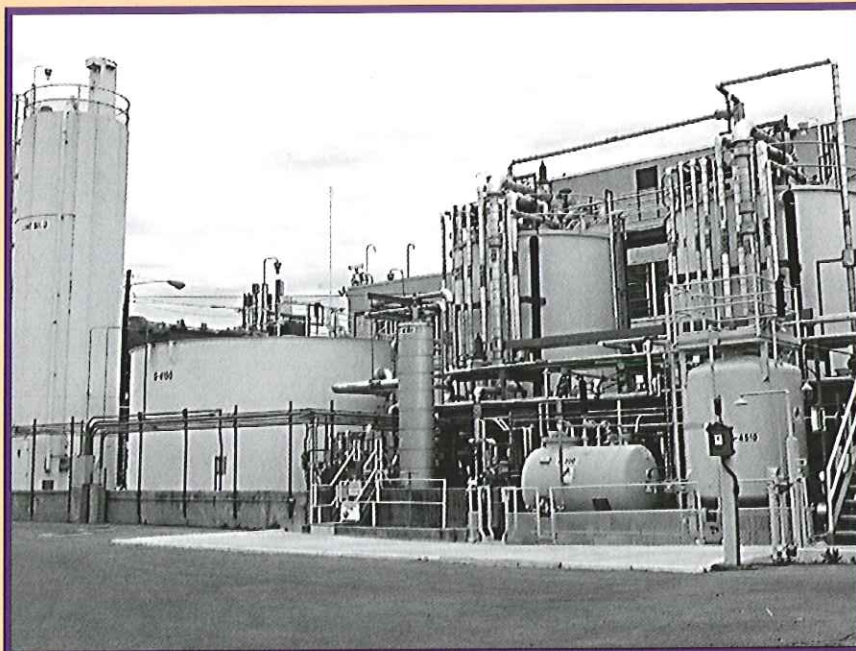
## **Millions of Gallons of Wastewater Treated in FY 2004**

During FY 2004, the Environmental Management (EM) Program treated 25 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 1.3 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 results from wastewater treatment.

At ETTP, the Central Neutralization Facility treated more than 33 million gallons of wastewater in FY 2004. 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 160 million gallons of wastewater were treated and released at the Process Waste Treatment Complex. In addition, the LLLW evaporator at ORNL treated 217,000 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.



*More than 33 million gallons of wastewater was disposed at the Central Neutralization Facility in FY 2004.*



# Mixed Low-Level Sludge Project Completed

A total of 1,430,806 kg of mixed low-level sludge was treated and shipped from the Oak Ridge Reservation for off-site disposal in compliance with site treatment plan milestones. The total quantity of mixed-waste sludge disposed since the project began in 1997 is 9,748,614 kg (about 10,748 tons). The FY 2004 work completed the treatment and disposal of the Y-12 mixed low-level sludge that were addressed under the site treatment plan.

## 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 of 1976.



*Monolith leaving Oak Ridge Reservation*

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

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 1,000-foot 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 began in early FY 2004.

The ORR has the largest inventory of legacy (i.e., waste from historic reservation operations) 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 (2,161 yd<sup>3</sup>) to the NTS for disposal, leaving fewer than 40 of these large legacy LLW containers. These remaining monoliths were shipped for disposal in FY 2004.

Disposal of the legacy LLW inventory got well under way in FY 2004. Approximately 28,100 m<sup>3</sup> of legacy LLW were characterized for processing and disposition. Also during FY 2004, approximately 18,600 m<sup>3</sup>, or 54 percent of the of legacy LLW inventory, were shipped for disposal.

The ORR also has a large inventory of MLLW, but most of it has been dispositioned since the STP agreement was signed in 1995. In FY 2003, 323,069 kg of STP waste were dispositioned.

By the end of FY 2005, the entire inventory of STP "Table 3.4" mixed waste, excluding the East Chestnut Ridge Waste Pile, will be safely disposed, closing an important chapter in the cleanup of the ORR. At the beginning of FY 2004, approximately 445,000 gross kg of Table 3.4 mixed waste remained in inventory. During FY 2004, approximately 228,000 gross kg of this waste were shipped for treatment. The remainder of the waste is planned for shipment in FY 2005.



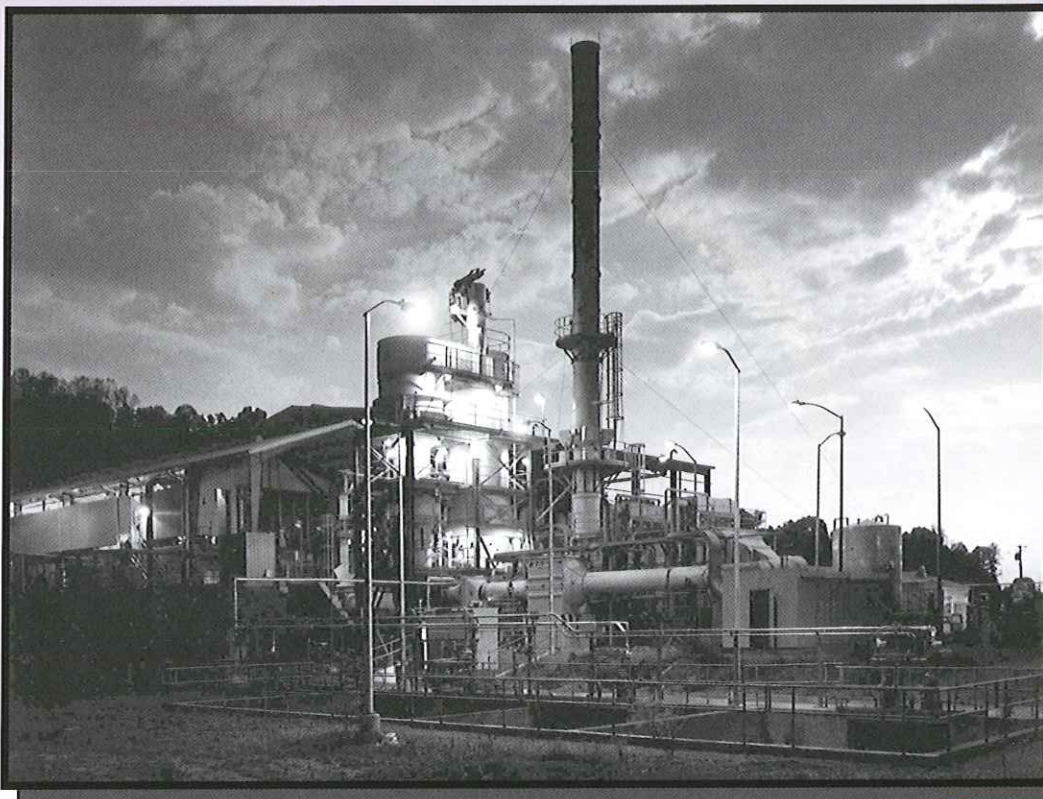
# TSCA Incinerator **Hazardous** **Waste Treatment Continues**

The Toxic Substances Control Act (TSCA) Incinerator, located at ETTP, treated 613,300 pounds of liquid waste and 208,429 pounds of solid waste in FY 2004. 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 2005, approximately 874,000 pounds of liquids and 396,000 pounds of solids are planned for incineration.

## *Did You Know?*

The TSCA Incinerator operates with temperatures of more than 1,500 degrees to 2,200 degrees Fahrenheit. Destruction efficiencies during incineration are 99.99 percent for hazardous organic constituents and 99.9999 percent for PCBs.

The TSCA Incinerator 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. The incinerator is scheduled to close at the end of FY 2006.



*TSCA Incinerator*

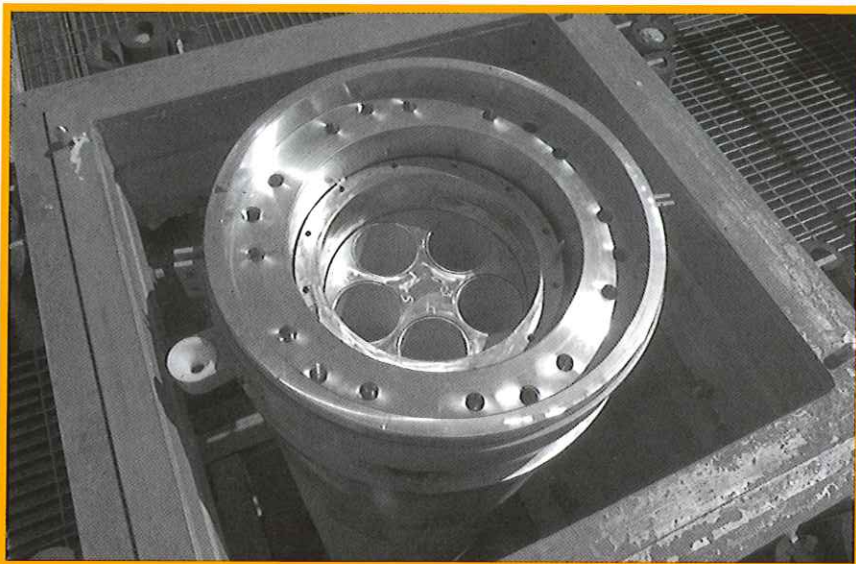


# Spent Nuclear Fuel Shipment Completed

The shipping of spent nuclear fuel (SNF) stored at ORNL was completed in FY 2004. The material was consolidated with other SNF in storage at the Idaho National Engineering and Environmental Laboratory (INEEL).

Research and development programs related to nuclear fuel historically have been a part of ORNL's mission. Many of these programs involved research on spent fuels from various types of reactors. After these programs were completed, the remaining spent fuels were collected and placed into on-site storage facilities, primarily during the 1960s and 1970s. In 1995, DOE issued a Programmatic Environmental Impact Statement ROD for SNF. The ROD directed DOE sites with smaller inventories of the material, like Oak Ridge, to prepare and ship specific spent fuels to the Savannah River Site in South Carolina and to Idaho.

Three of the five planned shipments to INEEL were completed in FY 2003. The last two shipments of SNF to INEEL were completed in December 2003. These five shipments transferred 62 SNF canisters and 9 intact Peach Bottom Reactor fuel assemblies with a total of 0.22 metric tons of heavy metal from Oak Ridge to INEEL. These shipments also completed the removal of more than 100,000 curies of radionuclides from the ORR.



*SNF container with the lid removed, showing view of internal basket*



*SNF leaving Oak Ridge*



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

More than 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 approximately 10 to 14 tons of depleted UF<sub>6</sub>. They are stored in storage yards in aisles and are stacked two high. More than 1,800 of these cylinders were shipped in FY 2004.

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.

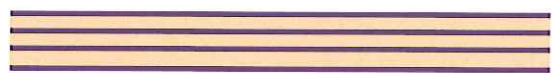
A total of 429 empty and near-empty cylinders containing residual uranium compounds other than depleted UF<sub>6</sub> have been disposed of at the NTS, completing that phase of the project.

*A depleted UF<sub>6</sub> cylinder that was stored at ETPP is being unloaded at the Portsmouth Site.*





# Public



# Involvement

DOE/OR/01-2163&01



## PUBLIC INVOLVEMENT PLAN *for* CERCLA Activities at the U.S. Department of Energy Oak Ridge Reservation

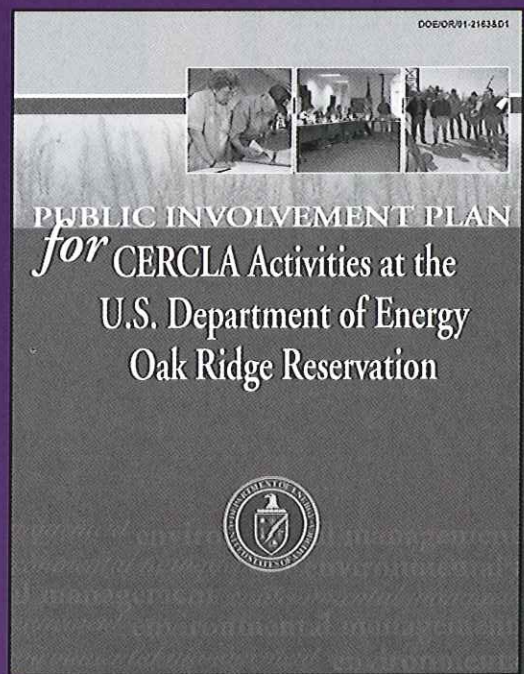




# Public Involvement Plays Key Role in Environmental Management

**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 2004 on a variety of initiatives, including the following:

- Oak Ridge Reservation Groundwater Strategy document, which provides a framework for identifying decision boundaries, phases, goals, and technology needs for making cleanup decisions for contaminated groundwater.
- Draft Risk-Based End State for the Oak Ridge Reservation document, which presents DOE's vision for focusing remediation efforts at its sites on clearly defined risk-based end states.
- Draft Environmental Impact Statements for Depleted Uranium Hexafluoride Conversion Facilities, proposed for Paducah, Kentucky, and Portsmouth, Ohio.
- Covenant Deferral Request package for the transfer of five office buildings at ETPP to the Community Reuse Organization of East Tennessee.
- The document *Public Involvement Plan for CERCLA Activities at the U.S. Department of Energy Oak Ridge Reservation*, which describes opportunities for public involvement on the Oak Ridge Reservation. In addition to releasing the document for public review, a team of stakeholders was assembled to help craft the document.
- Proposed Plan to change the treatment remedy for Melton Valley Seepage Trenches 5 and 7.
- ETPP Zone 2 Proposed Plan, which addresses remediation of the fenced area of ETPP.
- Environmental Assessment evaluating the potential environmental impacts of processing Uranium-233-bearing material at ORNL.
- Proposed haul road to transport waste from ETPP to EMWMF.



Mobilization for the cleanup of the David Witherspoon, Inc. Superfund site in South Knoxville prompted several initiatives aimed at informing and involving affected stakeholders. A focused communications plan was developed in the spring of 2004 and included a brochure mailed to a list of residential and commercial neighbors within a one-mile radius of the site. Subsequently, DOE contractor Bechtel Jacobs Company opened an on-site visitor information office, which is open every Thursday. Also, prior to startup, the Local Oversight Committee, along with the Tennessee Department of Environment and Conservation, sponsored two public meetings attended by local residents. By working closely with local elected officials, community groups, neighbors, and local media, DOE's cleanup of the Witherspoon site has proceeded quickly and safely.



DOE was also involved in a number of other public involvement initiatives. A surplus trailer at ETPP was donated to the Roane County Humane Society, which will use it as a spay/neutering facility. Special events were held to commemorate significant accomplishments for the Reservation, including the donation of a gaseous diffusion plant converter to the American Museum of Science and Energy and the shipment of sludge from the West End Treatment Facility.



DOE, Bechtel Jacobs Company, and the Community Reuse Organization of East Tennessee transferred ownership of an excess trailer in 2004 to the Roane County Humane Society, which is using it as a spay/neutering facility. Pictured are representatives of the three organizations along with Humane Society members and a few four-legged friends.

## Public Involvement News

### Public Meetings

**Special Session on Proposed Final Plan at the Special Advisory Board Meeting**  
The Oak Ridge Site Specific Advisory Board (ORSSAB) will meet at 2 p.m. on Wednesday, September 8, at the DOE Information Center. The meeting presentation will feature discussion of a proposed final plan to transport waste from Oak Ridge Reservation during progress to the Environmental Management Waste Management Facility in the Oak Ridge Reservation. Construction of the final plan will include the site of transporting waste from the West Valley and the East Tennessee Technology Park (ETTP) to the Waste Management Facility without involving the public. The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov). The presentation of the final plan will be held at the Oak Ridge site, dated 12:15 p.m. to 2:00 p.m. on September 13.

**Comment on the Plan** (10/13/04)  
ORSSAB Request Office (10/13/04)  
Document: <http://www.doe.gov>

**ATSDR to Hold Public Meeting September 14**  
The Agency for Toxic Substances and Hazardous Waste Registry (ATSDR) will hold a meeting of the Oak Ridge Reservation Health Effects Information (OEI) on September 14, 2004, from 9:00 a.m. to 5:00 p.m. on Tuesday, September 14, at the Regional Meeting Room at Oak Ridge. The OEI is a Web site that provides information on the health effects of hazardous waste and environmental contamination from the Oak Ridge Reservation. The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov). The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov). The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov).

**Hearing Planned on Corrective Action Plan**  
The Environmental Department of Environmental and Governmental Affairs (EDA) will hold a public hearing on the Oak Ridge Reservation Corrective Action Plan (CAP) on September 14, 2004, from 9:00 a.m. to 5:00 p.m. on Tuesday, September 14, at the Regional Meeting Room at Oak Ridge. The CAP is a Web site that provides information on the health effects of hazardous waste and environmental contamination from the Oak Ridge Reservation. The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov). The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov). The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov).

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**Announcements**  
U-235 Environmental Assessment Available  
DOE is seeking public comment on a U-235 Environmental Assessment (EA) for a plan to transport waste from Oak Ridge Reservation during progress to the Environmental Management Waste Management Facility in the Oak Ridge Reservation. Construction of the final plan will include the site of transporting waste from the West Valley and the East Tennessee Technology Park (ETTP) to the Waste Management Facility without involving the public. The meeting agenda is available on the Web site: [www.doe.gov](http://www.doe.gov). The presentation of the final plan will be held at the Oak Ridge site, dated 12:15 p.m. to 2:00 p.m. on September 13.

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DOE continued distributing its monthly stakeholder newsletter, *Public Involvement News*, to the community and elected officials. Several EM project fact sheets were also revised and combined into three main fact sheets: ETPP, Melton Valley, and Balance of Reservation.



A model of a gaseous diffusion plant converter was unveiled in 2004 at the American Museum of Science and Energy following a community dedication. Participants in the event included Oak Ridge Mayor David Bradshaw, Museum Director Steve Stow, DOE Chief Operating Officer Robert Brown, BNFL General Manager Jeff Stevens, Congressman Zach Wamp, and BNFL President Philip Strawbridge. The converter represents one of more than 1,500 converters that made the gaseous diffusion process possible at the East Tennessee Technology Park site.

# ORSSAB Provides Public Input to EM Program Activities

The ORSSAB posted several accomplishments this year in its mission to provide informed advice and recommendations to DOE on its Oak Ridge EM Program and to involve the public in environmental decision-making. ORSSAB is an independent, volunteer, federally appointed citizens' panel formed in 1995.



The board generated nine recommendations this year on a variety of EM topics, including:

- recommendations on the PP for the Amendment of the ROD for Interim Actions for the Melton Valley Watershed: Revised Remedial Action for Seepage Trenches 5 & 7;
- comments on the ORR Risk-Based End State Vision, Revision D1;
- recommendations on the ORR Groundwater Strategy;
- comments on the Draft Environmental Impact Statements for Depleted UF<sub>6</sub> Conversion Facilities; and
- comments on the Public Involvement Plan for CERCLA Activities at the DOE ORR.

Other significant FY 2004 accomplishments are detailed in the following sections.

### Annotated Outline for a Long-Term Stewardship Implementation Plan

Stewardship of contaminated areas of the ORR following cleanup has long been an ORSSAB priority. So when DOE signed the *Long-Term Stewardship Strategic Plan for the Oak Ridge Reservation* in March

2004, the board's Stewardship Committee took the next logical step by producing an *Annotated Outline for a Long-Term Stewardship Implementation Plan*.

The outline is specifically tailored to the known contaminated areas of the Reservation with the hope that this approach will result in an implementation plan that provides detailed functional specifications. A solid implementation plan will enable the design and execution of an ORR-specific stewardship system that meets both current and future needs and also has the acceptance of local stakeholders.

DOE representatives have responded favorably to the outline, noting that it provides a firm framework for the implementation plan, which is tentatively slated for publication in Spring 2005. The Annotated Outline is available on the board's web site at [www.oakridge.doe.gov/em/ssab/recommendations/FY2004/R7-14-04.8.pdf](http://www.oakridge.doe.gov/em/ssab/recommendations/FY2004/R7-14-04.8.pdf).

### Student Summary of ORR Stakeholder Report on Stewardship

ORSSAB published the second volume of its two-volume *Oak Ridge Reservation Stakeholder Report on Stewardship* in 1999. As time passed, though, it became apparent that the report was too detailed for some audiences—notably the high school students the board was trying to reach through its public outreach program.

To address the problem, the ORSSAB Stewardship Committee asked advance placement science classes at Oak Ridge and Roane County high schools to summarize the report. The resulting *Student Summary of the Oak Ridge Reservation Stakeholder Report on Stewardship* was published in May 2004 and does an outstanding job of distilling the original reports into language easily understood by high school students.

The student summary was widely distributed to local schools and libraries to help ensure long-term awareness and understanding of the community's responsibility for stewardship of contamination that will remain on the Reservation following cleanup. The summary is available on the ORSSAB web site at [www.oakridge.doe.gov/em/ssab/Publications/StudentSummary.pdf](http://www.oakridge.doe.gov/em/ssab/Publications/StudentSummary.pdf).



## Trenches 5 and 7 Schedule

In Spring 2004, DOE proposed a change in the Melton Valley ROD to alter the planned remedial action for Seepage Trenches 5 and 7 in the Melton Valley area of ORNL. The proposal was to switch from ISV of the trenches to in situ grouting.

ORSSAB supported the change and recommended that DOE amend the ROD through the ESD process, which would expedite the amendment procedure. EPA, however, required that the change be made through the ROD amendment process, which requires a more rigorous and typically more lengthy amendment procedure.

Because of the board's involvement, though, the schedule for the ROD amendment was compressed to match that of the shorter ESD process. This allowed approximately one year to be shaved off the schedule, saving both time and money on the project.

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



*FY 2005 ORSSAB members, ex officios, and student representatives. Standing, left to right: Steve McCracken (Deputy Designated Federal Officer), Dave Adler (DOE Ex Officio), Kerry Trammell (Chair), John Kennerly, Christopher Smith, Zach Ludwig (student representative), Luther Gibson, John Million, Ben Adams, Donna Campbell, Rhonda Bogard (Secretary), Bob McLeod (Vice Chair), Connie Jones (EPA Ex Officio), John Owsley (TDEC Ex Officio), and Dick Berry. Seated, left to right: Pat Halsey (DOE Coordinator), Heather Cothron, Luis Revilla, Dave Mosby, Norman Mulvenon, Katie Meersman (student representative), Linda Murawski, and Jake Alexander. Not pictured: Amy DeMint, Pat Hill, Stephanie Jernigan (student representative), and Tim Myrick.*



# Information Resources

## DOE Information Center

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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

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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  
Oak Ridge Office:  
(865) 220-0295

## Internet Sites

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DOE Main Web Site

[www.energy.gov](http://www.energy.gov)

DOE-ORO Home Page

[www.oakridge.doe.gov](http://www.oakridge.doe.gov)

DOE-ORO Environmental Management Program

[www.oakridge.doe.gov/em](http://www.oakridge.doe.gov/em)

Oak Ridge Site Specific Advisory Board

[www.oakridge.doe.gov/em/ssab](http://www.oakridge.doe.gov/em/ssab)

Oak Ridge Accelerated Cleanup

[www.bechteljacobs.com/doeclean/](http://www.bechteljacobs.com/doeclean/)

Agency for Toxic Substances and Disease Registry

[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)

U.S. Environmental Protection Agency

[www.epa.gov/region4/](http://www.epa.gov/region4/)

Tennessee Department of Environment  
and Conservation

[www.state.tn.us/environment/doe](http://www.state.tn.us/environment/doe)

DOE Information Center

[www.oakridge.doe.gov/info\\_cntr](http://www.oakridge.doe.gov/info_cntr)