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# Oak Ridge Reservation Federal Facility Agreement Quarterly Report for the Environmental Restoration Program

## Volume 2. January-March 1995



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**Oak Ridge Reservation Federal Facility Agreement  
Quarterly Report  
for the Environmental Restoration Program**

**Volume 2. January-March 1995**

Environmental Restoration Program  
P.O. Box 2003  
Oak Ridge, Tennessee 37831-7298

Date Issued—April 1995

Prepared for the  
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MARTIN MARIETTA ENERGY SYSTEMS, INC.  
managing the  
Environmental Restoration and Waste Management Programs at  
Oak Ridge National Laboratory  
Oak Ridge K-25 Site    Oak Ridge Y-12 Plant  
Paducah Gaseous Diffusion Plant    Portsmouth Gaseous Diffusion Plant  
under contract DE-AC05-84OR21400  
for the  
U.S. DEPARTMENT OF ENERGY

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## PREFACE

This *Oak Ridge Reservation Federal Facility Agreement Quarterly Report for the Environmental Restoration Program* was prepared to satisfy requirements for progress reporting on Environmental Restoration Program activities as specified in the Oak Ridge Reservation Federal Facility Agreement (FFA) established between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency, and the Tennessee Department of Environment and Conservation. The reporting period covered in this document is January-March 1995.

This work was performed under Work Breakdown Structure 1.4.12.2.3.04 (Activity Data Sheet 8304). Publication of this document meets an FFA milestone defined as 30 days following the end of the applicable reporting period. This document provides information about Environmental Restoration Program activities conducted on the Oak Ridge Reservation under the FFA. Specifically, it includes information on milestones scheduled for completion during the reporting period, as well as scheduled for completion during the next reporting period (quarter); accomplishments of the Environmental Restoration Program; concerns related to program work; and scheduled activities for the next quarter. It also provides a listing of the identity and assigned tasks of each of the DOE contractors performing Environmental Restoration Program work under the FFA.



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## ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	Department of Energy
DOE-ORO	DOE Oak Ridge Operations Office
DQO	data quality objectives
EFPC	East Fork Poplar Creek
EPA	Environmental Protection Agency
ER	Environmental Restoration
FFA	Federal Facility Agreement
FS	Feasibility Study
ISV	in situ vitrification
LEFPC	Lower East Fork Poplar Creek
LLLW	liquid low-level radioactive waste
LWBR	Lower Watts Bar Reservoir
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
ORAU	Oak Ridge Associated Universities
OREIS	Oak Ridge Environmental Information System
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	operable unit
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RI/FS	Remedial Investigation/Feasibility Study
RMPE	reduction of mercury in plant effluents
ROD	Record of Decision
SCF	South Campus Facility
SWSA	solid waste storage area
TDEC	Tennessee Department of Environment and Conservation
UEFPC	Upper East Fork Poplar Creek
WAG	waste area grouping
WBR	Watts Bar Reservoir
WOC	White Oak Creek
WOL	White Oak Lake



## 1. EXECUTIVE SUMMARY

This quarterly progress report satisfies requirements for the Environmental Restoration (ER) Program that are specified in the Oak Ridge Reservation (ORR) Federal Facility Agreement (FFA) established between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Tennessee Department of Environment and Conservation (TDEC). The reporting period covered herein is January through March 1995 (second quarter of FY 1995).

Sections 1.1 and 1.2 provide respectively the milestones scheduled for completion during the reporting period and a list of documents that have been proposed for transmittal during the following quarter but have not been approved as FY 1995 commitments.

### 1.1 DOCUMENTS TRANSMITTED TO THE REGULATORS

The following documents were transmitted to the regulators during the second quarter of FY 1995 and can be requested from the Information Resource Center in Oak Ridge.

- Chestnut Ridge Operable Unit (OU) 2 Proposed Plan (DOE/OR/02-1329&D1)
- Kerr Hollow Quarry Proposed Plan (DOE/OR/02-1352&D1)
- Waste Area Grouping (WAG) 5 Remedial Investigation (RI) Report (DOE/OR/01-1326&D1)
- WAG 5 Seeps Postconstruction Report (DOE/OR/01-1334&D1)
- Waste Evaporator Facility Engineering Evaluation/Cost Analysis (DOE/OR/02-1353&D1)
- Community Relations Plan (DOE/ORO-928 Rev. 1)
- South Campus Proposed Plan (DOE/OR/02-1310&D1)
- Union Valley Interim Study Remedial Site Evaluation (Y/ER-206/R1)

#### Regulatory Commitment Status

Document title	Appendix E commitment date	Transmittal date
Chestnut Ridge OU 2 Proposed Plan	02/28/95	02/28/95
Kerr Hollow Quarry Proposed Plan	02/28/95	02/27/95
WAG 5 RI Report	03/31/95	03/30/95
WAG 5 Seeps Postconstruction Report	01/13/95	01/10/95
Waste Evaporator Facility Engineering Evaluation/Cost Analysis	03/14/95	03/14/95
Community Relations Plan	03/15/95	03/14/95
South Campus Proposed Plan	03/10/95	03/10/95

## **1.2 DOCUMENTS PROPOSED FOR TRANSMITTAL TO THE REGULATORS**

The following documents have been proposed for transmittal to the regulators during the third quarter of FY 1995.

- Bear Creek OU 2 Proposed Plan
- Kerr Hollow Quarry Record of Decision (ROD)
- Surface Impoundments Remedial Investigation/Feasibility Study (RI/FS) Report
- Gunitite and Associated Tanks Treatability Study Baseline Report
- WAG 6 Annual Environmental Monitoring Plan Report
- K-25 Groundwater Data Report
- K-1070 RI Report
- Lower Watts Bar Reservoir (LWBR) ROD
- South Campus Treatability Study Report
- Watts Bar Reservoir (WBR) Monitoring & Assessment Program Monitoring Plan
- Lower East Fork Poplar Creek (LEFPC) ROD
- Active Liquid Low-Level Radioactive Waste ( ) Tanks Implementation Plan

## 2. SIGNIFICANT ACCOMPLISHMENTS

The following significant accomplishments are noted for the ER Program during the second quarter of FY 1995.

- **Oak Ridge Y-12 Plant**

A value engineering study, which defines more productive improvements on a project, was performed on the LEFPC project, and has resulted in a cost reduction of approximately \$23M over the life of the project.

- **Oak Ridge National Laboratory**

The initiation of field activities for Oak Ridge National Laboratory (ORNL) WAG 4 Seeps Phase 2 Site Investigation started 60 days after the decision was made by DOE and the regulators that the investigation would be performed. During this 60 days the sampling and analysis plan was prepared and approved, and all required documentation was completed.

A public meeting regarding the ORNL Streamlined Approach for Environmental Restoration Project was held on January 12, 1995. The WAG 1 Surface Impoundment Project is being conducted as one of four Streamlined Approach for Environmental Restoration initiatives being conducted nationwide. The Streamlined Approach for Environmental Restoration is an initiative to optimize the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) decision making process. The special breakout session discussed the status of the project and the range of possible options for remediation of the impoundments.

- **Oak Ridge K-25 Site**

The first shipment of raw Pond Waste Management Project sludge left the K-25 Site on February 24, 1995, for proof of process treatment by Nuclear Fuel Services at Erwin, TN. This shipment occurred on schedule and without incident during transport.

The K-901-A Holding Pond Remedial Site Evaluation Report preparation was initiated by using the data in OREIS. This project will be the first to produce an FFA report from data in the Oak Ridge Environmental Information System (OREIS).

A senior independent peer review panel of recognized nuclear industry experts performed an assessment of the Molten Salt Reactor Experiment Uranium Remediation Project. The panel noted that actions already taken at the facility, currently in progress, or planned for the near future have been, and will be, effective at reducing the risks at the Molten Salt Reactor Experiment. The panel also noted that the facility is in a safer condition than it was a few months ago.

- **Community Relations**

The quarterly DOE stakeholders' meeting was held on January 12, 1995, at Oak Ridge High School. Two hundred five people attended the meeting—the largest number at any stakeholder meeting to date. A presentation at the meeting updated stakeholders on the following topics:

the Molten Salt Reactor Experiment Facility, ORNL Surface Impoundments, WAG 1 Gunitite Tanks, In Situ Vitrification at ORNL, and the Pond Waste Management Project. Project personnel were on hand to answer questions.

About 175 people attended the East Fork Poplar Creek (EFPC) public meeting on January 26 at Pollard Auditorium. Following presentations, representatives from DOE, EPA, the State of Tennessee, and contractor personnel made remarks and answered questions during the question and answer/comment session. On February 11, six people participated in a tour of the six proposed remedial action sites along EFPC. As a result of the EFPC public meeting, a second tour of the creek was held on February 17. Five people participated, for a total of 11 that have now toured the creek.

Three Site Specific Advisory Board public information meetings were held this quarter. The Site Specific Advisory Board was created to get stakeholders more involved in the decision-making process for federal facilities. The Site Specific Advisory Board will advise DOE on environmental management issues and will be part of the agency's national Environmental Management Site Specific Advisory Board, which is chartered under the Federal Advisory Committee Act. The Oak Ridge Site Specific Advisory Board will focus on high-level policy issues, including recommendations for cleanup levels, technology development, and long-term waste management issues. To date, sixty requests for applications to serve on this board have been received.

Invitation letters and an educational video were mailed to schools in Roane, Anderson, Meigs, Loudon, and Rhea counties in preparation for the 1995 EnvironMENTAL Fair.

The Community Relations Plan was submitted to the regulators.

### 3. TECHNICAL STATUS

#### 3.1 OAK RIDGE Y-12 PLANT

The original mission of the Y-12 Plant, built adjacent to the city of Oak Ridge in 1943 as part of the Manhattan Project, was to separate the fissionable isotope of uranium (U235) by the electromagnetic process. Since the discontinuation of this process and until 1993 the facility evolved to support highly sophisticated manufacturing and development engineering associated with the production and fabrication of nuclear weapons components. Currently, the work force is refocusing the unique technical capabilities and expertise at the facility to provide (1) weapons dismantlement and storage, (2) enriched uranium material storage and management, (3) weapons process technology and development support, (4) renovation or decontamination and decommissioning of stand-by or shut-down buildings, (5) transfer of DOE-developed technology to enhance the competitiveness of the nation's industry in world-wide markets, and (6) maintenance and support of the National Security Program Office for DOE.

An additional facility priority is the clean-up or mitigation of environmental pollution resulting from past waste management practices on portions of the 800-acre site. The remedial action strategy integrates the numerous applicable federal and state regulations for efficient compliance and approaches both investigation and remediation efforts on a watershed basis. Three watersheds or hydrogeologic regimes have been identified at the facility: (1) Bear Creek, (2) Upper East Fork Poplar Creek (UEFPC), and (3) Chestnut Ridge.

##### 3.1.1 Upper East Fork Poplar Creek

###### *Description*

The UEFPC Characterization Area consists of both surface water and groundwater components of the UEFPC watershed and appropriate sources located within that watershed. This complex CA, which contains multiple contaminants, multiple contaminant sources, and commingled plumes, is a point of origin for both off-site surface water and groundwater contamination. The Characterization Area is bounded (in general) by the base of Pine Ridge to the north and Chestnut Ridge to the south. The boundary extends westward, where it abuts the boundary of the Bear Creek CA, and eastward to the DOE property line. The Characterization Area will also address a carbon-tetrachloride contaminated groundwater plume that extends past the DOE property line and surface water in UEFPC to where the scope of LEFPC begins.

Numerous primary sources exist within the CA. Infiltration from the S-3 Area dominates contamination in the western portion of the CA. The Salvage Yard, the S-2 Area, and the 81-10 Area are also known contaminant source areas in the CA. There are approximately 200 additional Resource Conservation and Recover Act (RCRA) Solid Waste Management Units within the boundaries of the CA. Many of these Solid Waste Management Units are of known low priority as contaminant sources to the environment; however, approximately 100 of these sites need additional evaluation.

Because of the wealth of historical data available for this CA, a streamlined RI/FS approach has been proposed and accepted by the FFA parties. This approach will use historical data to the fullest extent possible to complete the RI/FS, it will focus additional data collection efforts on FS

needs, and it will use uncertainty management techniques to bound rather than fill data deficiencies. Because the Characterization Area is underlain by an extensive storm sewer system, a subbasin approach will be used to link information from potential source areas (i.e., soil data and inventories) to historical surface water and shallow groundwater data. This approach, together with groundwater contaminant plume maps, will allow large areas of the plant (each subbasin) to be prioritized according to the relative contaminant contributions to surface water and groundwater.

In March 1994, DOE announced that elevated levels of four industrial solvents had been found in wells installed by the U.S. Geological Survey, located about 0.5 mile east of the Y-12 Plant in the Union Valley Industrial Park. Elevated levels of these same solvents, which are known as volatile organic compounds, have also been found in groundwater monitoring wells at the Y-12 Plant. As a result of this finding, DOE is taking steps to determine the extent of the contaminated groundwater plume and the direction it is moving.

### ***Accomplishments***

Concurrence from TDEC and EPA was received on a new strategy for RI efforts associated with this area. Under this strategy, wet weather sampling activities are being modified until dry weather sampling events can be fully utilized. The RI/FS DQO workshop was conducted in March 1995. Milestone dates for specific FFA deliverables will be established and presented to the FFA Project Managers for approval. The current schedule calls for a September 1995 delivery of a combined ground/surface water RI Plan. Refinements of the RI/FS strategy for this area (which would encompass the entire hydrogeologic regime) have been proposed to the regulators.

Sampling has been completed on off-site wells to determine the extent of possible groundwater contamination in Union Valley Plume.

The Union Valley Remedial Site Evaluation was issued to the regulators. The evaluation addresses data from various on-site and off-site wells and off-site seep and spring localities, an assessment of risks posed by the contaminants, and the status of the action items identified during the March 1994 public meeting.

The dry weather sampling of the Phase 1 Surface Water RI effort and laboratory analysis of the 1400 water samples is complete.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Establish the content of the FFA document produced for delivery of the RI Work Plan to regulators for review on September 29, 1995, based on DQO results.

Support public meeting scheduled in April with information documented in Union Valley Remedial Site Evaluation.

### 3.1.2 Bear Creek Valley

#### *Description*

The Bear Creek Valley comprises the following: groundwater, surface water, floodplain soils, the S-3 Ponds, the Oil Landfarm Waste Management Area, and the Burial Grounds Waste Management Area. The Oil Landfarm Waste Management Area consists of the Oil Landfarm Hazardous Waste Disposal Unit, Sanitary Landfill I, the Boneyard/Burnyard, and the Chemical Storage Area. The Burial Grounds Waste Management Area consists of Burial Grounds A, B, C, D, E, and J and Oil Retention Ponds 1 and 2. These units were used until the 1980s as the primary area for the disposal of various types of hazardous and nonhazardous wastes generated at the Y-12 Plant.

Groundwater, surface water, floodplain soils, and source units are being evaluated as a single OU to ensure that (1) a consistent approach to remediation is implemented across the valley and (2) remedial actions at specific sites are prioritized to achieve the greatest risk reduction. Groundwater, surface water, and floodplain soils in Bear Creek Valley will be characterized over an area that extends west from a topographic high near the west end of the Y-12 Plant (the S-3 Waste Management Area) to the point where Bear Creek exits the valley near State Highway 95.

The primary groundwater contaminants in the Bear Creek hydrologic regime are nitrates, volatile organic compounds, radionuclides, and, to a lesser extent, trace metals. Dense, nonaqueous-phase liquids have been discovered at a depth of 270 ft below the Bear Creek Burial Grounds. These liquids consist primarily of perchloroethylene, trichloroethylene, 1,1,1-trichloroacetic acid, and high concentrations of polychlorinated biphenyls (PCBs).

Below is a description of each of the source units in the Bear Creek Valley:

**S-3 Ponds.** The S-3 Ponds are part of the S-3 Waste Management Area. They were constructed in 1951 and consisted of four unlined surface impoundments covering an area of roughly 400 ft on each side, with a total storage capacity of about 10 million gal. During its operation, up to 5500 gal/d of effluent were pumped to the pond. Primary contaminants were nitrates and uranium, with lesser concentrations of heavy metals and organic solvents. In 1988, the S-3 Ponds were closed as a RCRA landfill. An asphalt parking lot was constructed over the cap to complete site closure.

**Oil Landfarm Hazardous Waste Disposal Unit.** The Oil Landfarm Hazardous Waste Disposal Unit was used for the land application of waste oils and coolants that contained beryllium compounds, depleted uranium, PCBs, and chlorinated organic compounds. Disposal operations were discontinued in 1982. In 1990, the site was closed as a landfill with a multilayered engineered cap.

**Sanitary Landfill I.** Sanitary Landfill I received various types of nonhazardous waste from the Y-12 Plant. Waste disposal at Sanitary Landfill I was terminated in 1982, and the site was graded, capped, and closed in 1983 in accordance with TDEC regulations for sanitary landfills.

**Boneyard/Burnyard.** The Boneyard/Burnyard consists of ~8 acres used from 1943 to 1970 as a disposal site for waste from the Y-12 Plant. Burning and disposal of debris and sanitary,

metallic, chemical, and radioactive wastes are known to have occurred. The site has been abandoned and is predominately covered with grassy vegetation.

**Chemical Storage Area.** The Chemical Storage Area overlays the southeastern portion of the Burnyard/Boneyard. The Chemical Storage Area is ~2 acres in size and was used to burn or neutralize liquid and gaseous wastes from 1975 until 1981. The Chemical Storage Area is presently covered with a RCRA-type cap.

**Burial Grounds.** Burial Grounds A, B, C, D, E, and J, located on the southern slope of Pine Ridge ~2 miles west of the Y-12 Plant, cover an area of about 5000 by 3000 ft. Each disposal unit consists of a series of trenches excavated to depths of 14 to 25 ft below grade. The trenches received a variety of hazardous and nonhazardous solid and liquid wastes. All hazardous waste disposal operations were discontinued in 1981. All trenches known to have received RCRA hazardous material have been capped as part of a RCRA closure.

**Oil Retention Ponds.** Oil Retention Ponds 1 and 2 were constructed to intercept seepage from burial trenches. Both ponds were RCRA-closed in 1990. A wide range of contaminants may have been disposed of in the Bear Creek Burial Grounds. Volatile organic compounds in soil resulting from groundwater transport are of primary concern.

The nature and extent of soil contamination within each of the listed source units and the nature and extent of groundwater, surface water, and floodplain soils contamination in Bear Creek Valley will be determined during the CERCLA investigation.

### ***Accomplishments***

Significant activity occurred in the development and engineering of alternatives for the Bear Creek Valley FS. A workshop was held with DOE and Martin Marietta Energy Systems, Inc., on January 5, 1995, to review the specific components of the alternatives. A briefing was held on January 11, 1995, to provide further detail on the technical approach for the Bear Creek Valley FS to the EPA RI Project Manager. This input was incorporated into the alternatives for a subsequent working session that took place during the monthly regulators' meeting on January 25, 1995. Several new alternatives were developed based upon these highly productive discussions. To facilitate the discussions with the regulators, an information package summarizing the findings of alternatives was submitted on February 24, 1995.

A workshop was held on March 8, 1995, to screen alternatives for the Bear Creek Valley FS. Of the 11 alternatives under evaluation, 6 were screened out based on cost implementability and effectiveness. The remaining five alternatives will be carried forward for detailed analysis in the FS.

A decision document for performing a long-term pumping test at the S-3 Pond Site was submitted for regulatory review. The recommendation was made not to implement a pumping test at this time because (1) it is uncertain that technetium and nitrates in the groundwater can be adequately treated and (2) other less costly studies can be performed to evaluate the use of pump-and-treat technology at the S-3 Site. During the meeting on March 28, 1995, EPA and TDEC agreed with DOE's recommendation.

Field sampling activities associated with the Bear Creek floodplain soils were initiated in late March.

### *Concerns*

None.

### *Scheduled Activities for Next Quarter*

Bear Creek floodplain soils field sampling activities will be completed.

Work will continue on preparation of the RI and FS reports for Bear Creek Valley.

### **3.1.3 Bear Creek OU 2**

#### *Description*

Bear Creek OU 2 consists of the Rust Spoil Area, Spoil Area 1, and the SY-200 Yard.

**Rust Spoil Area.** The Rust Spoil Area is located in Bear Creek Valley less than 0.5 mile west of the Y-12 Plant on Old Bear Creek Road. The Rust Spoil Area was used from 1975 to 1983 for the disposal of spoil material generated during various renovation, maintenance, and construction operations at the Y-12 Plant. Disposed material was periodically graded, resulting in changes in topography and in filling of part of the Bear Creek channel. Approximately 100,000 yd<sup>3</sup> of nonuranium-contaminated construction spoils were disposed of at the site. Small quantities of solvent-contaminated material and material containing asbestos, mercury, and uranium may have been disposed of in this area. Soil contamination is of primary concern.

**Spoil Area 1.** Spoil Area 1 is located near the southwest end of the Y-12 Plant, bounded by Old Bear Creek Road and West Patrol Road. Spoil Area 1 was used for the disposal of ~100,000 yd<sup>3</sup> of nonhazardous, nonradiologically contaminated construction debris. Although plant controls eliminated the disposal of hazardous and radioactive wastes, past plant practices indicate that some of the construction material may have been contaminated with trace amounts of asbestos, mercury, beryllium, thorium, and uranium.

**SY-200 Yard.** The SY-200 Yard is a 200- by 300-ft aboveground storage area located adjacent to Old Bear Creek Road. Materials from several Y-12 and ORNL divisions included PCB transformers, lead shielding plates, and radioactively contaminated materials. Soil contamination is of primary concern.

#### *Accomplishments*

Regulatory comments on the RI Report were resolved, and the final document was issued.

Regulatory comments on the FS Report were received and are being addressed.

The FFA Project Managers decided that no further action RODs would be obtained for Spoil Area 1 and the SY-200 Yard, whereas the Rust Spoil Area would be incorporated into the Bear Creek Valley FS.

**Concerns**

None.

**Scheduled Activities for Next Quarter**

Comments on the FS Report will be resolved and the document will be issued for approval.

The Proposed Plan will be issued for regulatory review.

**3.1.4 Chestnut Ridge OU 2****Description**

Chestnut Ridge OU 2 consists of the Filled Coal Ash Pond and Upper McCoy Branch. The Filled Coal Ash Pond is situated within the McCoy Branch watershed about 0.5 mile south of the Y-12 Plant. The pond was constructed in 1955 to serve as a settling basin for coal ash from the Y-12 steam plant. By 1967, the pond had filled, spilling sediments directly into McCoy Branch. From 1967 to 1989, ash was carried within McCoy Branch to Rogers Quarry, about 0.5 mile downstream of the Coal Ash Pond.

Impacts to surface water, stream sediments, and groundwater from metals, including uranium and major ions, are of concern. Biomonitoring of aquatic organisms in McCoy Branch and Rogers Quarry has shown a biological impact potentially from the ash pond operations.

**Accomplishments**

Regulatory comments on the RI, FS, and Environmental Assessment reports were received and incorporated. The final documents were issued on January 27, 1995.

The Proposed Plan was issued for regulatory review on February 28, 1995.

**Concerns**

None.

**Scheduled Activities for Next Quarter**

Preparation of the ROD will continue.

**3.1.5 Reduction of Mercury in Plant Effluents (RMPE)****Description**

The RMPE subproject has undergone a major rescoping activity to define projects required to support the Clean Water Act, National Pollutant Discharge Elimination System (NPDES) requirements. The formal Baseline Change Proposal has been submitted. The new project scope consists of the Mercury Use Building Source Elimination and the Mercury Treatment Facility.

**Mercury Use Areas.** From 1955 through 1963, a column-exchange process involving large quantities of mercury was employed to separate lithium isotopes. The Mercury Use Areas include buildings and other facilities that have been designated as possible sources of mercury contamination because of known, suspected, or presumed releases. The area of investigation includes soils surrounding and drainages associated with the following buildings and adjoining areas: 9201-2, 9201-5, 9202, 9204-4, 9733-1, 9733-2, and mercury flask storage areas and deflasking facilities.

**Mercury Use Building Source Elimination.** Mercury-contaminated storm drains and sumps in the Mercury Use Building—which consists of buildings 9201-2, 9201-4, 9201-5, and 9204-4—will be bypassed by the installation of new piping that will provide for a clean transport of water from the building. This activity will be conducted in a phased manner.

**Interim Mercury Treatment Unit.** A new on-line effluent treatment process will be installed in Building 9201-2 to remove mercury from Y-12 Plant storm water. The design is for a demonstration treatment process with associated pumps and piping to collect the contaminated sump water for treatment. Following startup and demonstration of the interim facility capabilities, technical work will focus on optimization of the system components up to and including total system replacement, if cost justified, to meet NPDES requirements.

**Central Mercury Treatment Facility.** The mercury-contaminated waters from the Mercury Use Building sumps (9201-4, 9201-5, and 9204-4) will be collected, and long-term treatment will be performed at the Central Mercury Treatment Facility. The facility will be housed at the existing Central Pollution Control Facility.

### ***Accomplishments***

The 9201-2 Interim Mercury Treatment Unit was restarted after being shut down during the Y-12 Plant general shut down in response to the Defense Nuclear Facilities Safety Board finding.

Construction of the 9201-5 Source Elimination task is 100% complete. Construction activities have started for the 9201-4 and 9204-4 Source Elimination projects.

### ***Concerns***

**Concern:** Release of the design criteria to the Architect-Engineering has been delayed by evaluation of the impact of other contaminants on the design of the Central Mercury Treatment Facility and evaluation of the technology alternatives for mercury treatment. **Impact:** The schedule for the project has been impacted. **Action:** By simplifying the mercury treatment process and determining that treatment for other contaminants is not required, the design schedule should be shortened, allowing the project to achieve the December 31, 1997, NPDES compliance date for operation.

### ***Scheduled Activities for Next Quarter***

Additional piping to allow isolation of contamination to groundwater from 9201-5 will be completed.

Title I and II design activities for the Central Mercury Treatment Facility will begin.

The construction phase of the Mercury Source Eliminations for 9201-4 and 9204-4 will be completed.

A pilot Treatability Study for Outfall 51 will begin.

### 3.1.6 Kerr Hollow Quarry

#### *Description*

Kerr Hollow Quarry was a former rock and gravel that was abandoned in the late 1940s when it filled with water. Since at least 1951, the Y-12 Plant and ORNL have used Kerr Hollow Quarry for the treatment of water-reactive materials and potentially explosive chemicals and for the disposal of empty compressed gas cylinders. Kerr Hollow Quarry was not intended for use as a hazardous waste storage or disposal facility—it was used strictly for the emergency handling of reactive, corrosive, and ignitable wastes when personnel safety was of primary concern.

Kerr Hollow Quarry was a permitted facility under NPDES Permit No. TN 0002968-Outfall 301 for the treatment of certain potentially explosive chemicals or water-reactive metals. The permit required monitoring the Kerr Hollow Quarry outfall following a treatment operation, with results reported quarterly to TDEC.

The empty compressed gas cylinders, positioned on the northwest bank of the quarry, were removed from the area and returned to the Y-12 Plant for disposal. Prior to the early 1970s, however, such gas cylinders were discarded in the quarry. A RCRA closure was completed on this project, which removed the remaining cylinders from the quarry.

#### *Accomplishments*

The Proposed Plan was submitted to the regulators for their review.

#### *Concerns*

**Concern:** Several wells at the Kerr Hollow Quarry showed elevated levels of total uranium and total strontium from past sampling events. The results for each well for these analyses have been erratic. To determine whether these results constitute a release of contaminants from the facility, a special groundwater sampling event was conducted to speciate any radionuclide analyses performed; therefore, the elevated levels of total uranium and total strontium are considered natural constituents of the groundwater. **Impact:** Additional sampling may be required by TDEC. **Action:** A RCRA postclosure permit application is in preparation for the site. The application will propose an alternate statistical method to determine whether a release of contaminants has occurred at the facility. The method proposed calculates upper tolerance limits for water quality trace metals plus strontium. Volatile organic compounds and gross alpha and gross beta will also be monitored at the site.

#### *Scheduled Activities for Next Quarter*

The ROD will be submitted to the regulators for their review.

## 3.2 OAK RIDGE NATIONAL LABORATORY

ORNL occupies ~3560 acres in Melton Valley and Bethel Valley, 10 miles southwest of downtown Oak Ridge, Tennessee. ORNL's missions are to conduct applied research and engineering development in support of DOE programs in nuclear fusion and fission, energy conservation, fossil fuels, and other energy technologies and to perform basic scientific research in selected areas of the physical, life, and environmental sciences. The laboratory was built in 1943 as part of the World War II Manhattan Project. Its original mission was to produce and chemically separate the first gram quantities of plutonium as part of the national effort to produce the atomic bomb. ORNL's remediation sites are organized into WAGs based on drainage area and similar waste characteristics.

### 3.2.1 ORNL WAG 1 Gunitite and Associated Tanks

#### *Description*

This area consists of the underground steel and Gunitite tanks associated with two tank farms located in the center of the ORNL main plant area. The Gunitite and Associated Tanks area includes the tanks located in the North and South Tank Farms as well as tanks TH-4 and W-11. The Solid Waste Management Units within this area are primarily the large Gunitite tanks installed to store liquid wastes in 1943 and subsequently used as the main holding tanks for the LLLW system at ORNL. A number of steel tanks associated with the North Tank Farm are also included in this area. The strategy of this grouping is to allow those tanks that are geographically similar to be remediated as a group.

The Gunitite and Associated Tanks area is commonly referenced as three separate tank groups:

- South Tank Farm Waste Tanks W-5, W-6, W-7, W-8, W-9, and W-10;
- North Tank Farm Waste Tanks W-1, W-2, W-3, W-4, W-13, W-14, W-15, and W-1A; and
- Building 3550 Laboratory Waste Tanks TH-4 and W-11.

#### *Accomplishments*

Validation of analytical data from the Phase 1 tank sampling effort was completed and the data was submitted to OREIS.

The Phase 2 Sampling and Analysis Plan is nearing completion, with plans to begin Phase 2 sampling by the end of April. A floating boom is being tested that will deploy a clamshell-type sampler to obtain samples of sludges and debris near the tank walls. The boom will also be used to deploy a new underwater camera system that will be used to videotape inside the tanks and provide observation of conditions on the floor, walls, and dome.

Planning is under way for performing necessary maintenance of the tank Cold Test Facility at WAG 5 so it can be used for cold tests of sluicing and/or sampling equipment.

Work continued on writing the technical specification for the modified light duty utility arm. This is a robotic arm intended for use in collecting samples and moving sluicing equipment around within the tank. The vendor, SPAR Aerospace, continued with the FS for the modified light utility

arm modifications. Their preliminary report is that the arm can handle the desired 200 lb payload without major redesign.

Work continued on the Treatability Study conceptual engineering, engineering criteria, and risk model, as well as on the Treatability Study Baseline/Phase 2 Work Plan.

Notice was issued to Commerce Business Daily requesting expressions of interest from vendors for development of a robotic vehicle for use in removal of sludge and debris from the tanks.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Continue design of systems for treatability studies.

Continue study of alternative options for waste disposal.

Issue technical specifications for the modified light utility arm.

Initiate Phase 2 sampling activities.

Complete D1 draft of the Treatability Study Baseline/Phase 2 Work Plan.

### **3.2.2 ORNL WAG 1 Core Hole 8**

#### ***Description***

The Core Hole 8 plume of contaminated groundwater was discovered during investigations using a new system designed to collect, transfer, and treat contaminated groundwater from an underground stream before it enters storm sewers at ORNL. From three catch drains, the groundwater is pumped to ORNL's Process Waste Treatment Facility where contaminants are removed and the treated water is released.

The project received its name after rock and groundwater samples taken from Core Hole 8 (a sampling site in the main plant area of ORNL) were found to be contaminated with  $^{90}\text{Sr}$ —a radioactive substance. This discovery provided a key which enabled investigators to understand how groundwater contaminated with  $^{90}\text{Sr}$  was getting into ORNL storm drain systems. The plume originally flowed into the ORNL storm sewer system and from there into First Creek. First Creek empties into White Oak Creek (WOC), which in turn feeds the Clinch River near ORNL. The source of contamination in the plume is unknown, but a source is currently being investigated. The new system is expected to reduce the amount of ORNL releases of  $^{90}\text{Sr}$  into First Creek by about 50%.

### *Accomplishments*

The system design was modified to collect additional contaminated groundwater found to be seeping into a nearby steam pit being constructed for the new ORNL steam line. Additional design changes were needed because of interference from unforeseen concrete footings encountered during excavation. These changes required the addition of two small lift stations to transfer the collected groundwater to Lift Station Number 1. Strontium-contaminated groundwater infiltrating the steam pit was virtually eliminated in February with the interception of the contaminated groundwater.

Construction was completed for the Phase 1 collection and pumping system, which now comprises three small French drains, three small lift stations, and approximately 1700 lin ft of 2 in. high-density polyethylene pipe. The original schedule was met despite 35 days of delay from weather, impacts of differing site conditions.

The pumping system became operational on March 31, 1995.

### *Concerns*

None.

### *Scheduled Activities for Next Quarter*

Complete demobilization and asphalt and concrete patching.

Complete post-construction monitoring to determine success of removal action, which would determine if Phase 2 is necessary.

### **3.2.3 ORNL WAG 1 Surface Impoundments OU 2**

#### *Description*

This OU consists of five surface impoundments located in the south central portion of the Bethel Valley ORNL facilities complex. A brief description of each of the five impoundments follows.

**Basin 3513.** This unlined impoundment was constructed in 1944 to serve as a settling basin for untreated waste waters prior to their discharge into adjacent WOC. This impoundment is no longer used, but water is kept in the pond to provide shielding for radioactive sediments.

**Basin 3524.** Basin 3524, frequently referred to as the Equalization Basin, was an intermediate storage, collection, and mixing basin for the process waste treatment system located in Building 3544. Now it is only used for surge capacity for storm events.

**Basins 3539 and 3540.** ORNL Basin 3539 and Basin 3540, constructed in 1964 and frequently referred to as the 190 Ponds, were formerly used as surge ponds to receive process waste streams, primarily from the Building 4500 complex. The waste streams are split into identical, parallel basins and monitored primarily for radionuclides before discharge either to the process waste treatment system via Basin 3524 or to WOC. Currently the ponds are only used as surge capacity for the collection of storm water during peak storm events.

**Process Waste Treatment Plant Surge Capacity Upgrade.** The purpose of this project is to provide improved surge capacity for the ORNL Process Waste Treatment Plant. Effluent from certain containment dikes and above and below grade collection sumps at ORNL is pumped to the Process Waste Treatment Plant for treatment prior to release. During peak seasonal rainfall periods, the capacity of the Process Waste Treatment Plant is exceeded, so additional holding or surge capacity is needed to ensure proper treatment. Currently, surge capacity is provided by existing 350,000-gal tanks, the 3524 Equalization Basin, Process Waste Pond 3539, and Process Waste Pond 3540. The Equalization Basin and process waste ponds will be taken out of service, so construction of additional surge capacity is needed. This additional capacity will be ensured through the addition of a 1 million-gal tank with transfer pumps and a jet mixer installed in a concrete dike.

### ***Accomplishments***

A bentonite blanket was installed in early January to control the seepage from the impoundments to WOC.

A senior independent peer review panel of recognized nuclear industry experts performed an assessment of the Molten Salt Reactor Experiment Uranium Remediation Project. The panel noted that actions already taken at the facility, currently in progress, or planned for the near future have been, and will be, effective at reducing the risks at the Molten Salt Reactor Experiment. The panel also noted that the facility is in a safer condition than it was a few months ago.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Submit the focused FS to the regulators for review.

Initiate development of the Proposed Plan.

Containment basin concrete work will be essentially completed, and the 1 million-gal tank erection will begin and will be well along. Piping, structural steel, and mechanical equipment installation will also begin. Some electrical and instrumentation work will also begin.

## **3.2.4 ORNL WAG 1 Groundwater**

### ***Description***

The WAG 1 groundwater activities focus on shallow groundwater that discharges to surface streams within WAG 1. The potential exists for contaminant migration from various sources within WAG 1 through both shallow and deeper groundwater to off-WAG receptors.

***Accomplishments***

This area is entering into a period of long-term monitoring and characterization to identify any new areas that might require interim action. The first round of sampling was initiated and completed this quarter. Analytical results should be available for analysis and interpretation in the next few months.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Validation of the sampling analytical data will be completed next quarter, and the data will be available for technical analysis and interpretation to describe changing conditions over time.

**3.2.5 Inactive Liquid Low-Level Radioactive Waste Tanks*****Description***

LLLWs have been collected at ORNL since 1943 in tank systems used for the storage, transfer, and treatment of the collected LLLW. Some of the tanks are no longer in use and have been classified as removed from service. Liquids and sludges remain in many of the tanks, with several tanks receiving inleakage from groundwater and rainwater. The tanks are located in WAGs 1, 5, 8 and 9.

***Accomplishments***

Site investigation of the Batch I, Series 1 Tanks (inactive LLLW tanks 3013, 3001-B, 3004-B, and T-30) was completed.

Verbal approval was received from the regulators to proceed with removal or in-place stabilization of the Batch I, Series 1 Tanks as a maintenance activity rather than a CERCLA activity. Because the CERCLA streamlined Risk Assessment showed that the risk from these tanks is already within acceptable limits, there is no CERCLA driver. The letter documenting the decision to proceed with remediation as a maintenance action will be sent to the regulators.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Complete the site investigation for the Batch I, Series 2 and Batch I, Series 3 tanks.

Complete Maintenance Action Work Plan and initiate maintenance activity field work for removal or grouting in place of Batch I, Series 1 tanks.

### 3.2.6 Liquid Low-Level Radioactive Waste Tanks (Appendix F)

#### *Description*

LLLWs have been collected at ORNL since 1943 in tank systems used for storage, transfer, and neutralization. The stated objective of the FFA as it relates to the tank systems (Appendix F) is to ensure structural integrity, containment, detection of releases, and source control pending final remedial action at the site. The FFA requires that leaking LLLW tank systems be immediately removed from service. It also requires that LLLW tank systems that do not meet the design and performance requirements established for secondary containment and leak detection be either upgraded or replaced.

#### *Accomplishments*

**Inactive Systems:** Laboratory experiments of the chemical removal of PCBs from WC-14 sludge samples were performed using triethylamine. Preliminary results from these laboratory experiments confirm the results of the surrogate testing with respect to PCB removal efficiencies. In these experiments, the PCBs were extracted into the triethylamine, which could be subsequently separated from the supernatant. Analysis of the resulting triethylamine for metals and radioactive isotopes is under way to determine if the Toxic Substances Control Act waste acceptance criteria are met. If the Toxic Substances Control Act waste acceptance criteria are not met, further options for removing the radionuclides from the triethylamine will be investigated.

Plans have been developed for the removal of the supernatant from Tank WC-14. Although the concentration of PCBs in the supernatant is significantly below the 50 ppm regulatory limit, removal plans are on hold pending resolution of the issue of sending PCB-bearing solidified LLLW to the Nevada Test Site.

The development of a weir device for measuring small inflows through LLLW piping was completed and inserted into the inspection port in Building 3118 to help identify nonprogrammatic inflows for Tank WC-10. The device showed that approximately 50% of the flow to the tank may be coming through this branch.

The robotics decontamination equipment has been assembled and is currently undergoing testing at Building 3503 prior to being moved to the W-12 site.

The utility shelter for the W-12 decontamination shelter was received.

**Active Systems:** Replacement was completed of valves that were suspected of not closing sufficiently tight to permit leak testing of the section of LLLW pipeline in which they were installed.

The Construction Manager's designated portion of Phase 1 work on upgrading the cathodic protection of Systems 6B, 14, and 16 was completed. The funding task release was issued to the Construction Manager for Phase 2 of the cathodic protection upgrades. Construction packages were issued for System 19 and System 20. Procurement of materials required for upgrading Systems 19 and System 20 were initiated.

Monthly leak testing of tanks (ten tanks less than 3000 gallon capacity and three tanks greater than 3000 gallon capacity) was completed. Leak testing on six piping systems was completed.

A draft detailed work plan for installation of a valve in Building 3517 was prepared. The value will permit gas pressure decay testing of a single-walled section of LLLW pipe between Building 3517 and Valve Box 2A.

**Alternative Planning:** A method was selected for source treatment of radioactive waste at the Irradiated Materials Examination and Testing facilities at Building 3025. The method, which uses an ion-exchange material for selectively removing radioactive  $^{60}\text{Co}$  is undergoing further testing, and plans are being made for a demonstration using actual waste.

**Assessments:** A contract to provide certification of the structural integrity assessments for the LLLW Category C Tank Systems was signed in March. The subcontractor was on site to witness three volume-balancing leak tests and one gas pressure decay leak test conducted on singly contained pipelines.

**Technical Support and Documentation:** A meeting of the FFA Technical Advisory Group was held January 24-25, 1995. Presentations and discussions of issues involving active and inactive LLLW tanks were conducted. The Technical Advisory Group has submitted several recommendations that are being evaluated and implemented as appropriate.

The following revised documents were submitted to the regulators:

- *Design Demonstrations for Category B Tank Systems Piping at Oak Ridge National Laboratory, Oak Ridge, Tennessee*
- *Design Demonstrations for the Remaining 19 Category B Tanks Systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee*
- *Detailed Leak Detection Test Plan and Schedule for Oak Ridge National Laboratory Liquid Low-Level Waste Active Tanks*
- *Design/Installation and Structural Integrity Assessment of Bethel Valley Low-Level Waste Collection and Transfer System Upgrade for Building 2649 (Transported Waste Receiving Facility) at Oak Ridge National Laboratory*
- *Design/Installation and Structural Integrity Assessment of Bethel Valley Low-Level Waste Collection and Transfer System Upgrade for Building 3092 (Central Off-Gas Scrubber Facility) at Oak Ridge National Laboratory*

#### **Concerns**

None.

#### **Scheduled Activities for Next Quarter**

**Inactive Systems:** PCB removal experiments are expected to be completed during this quarter, with options evaluated for implementing this process on the sludge in WC-14. The acceptability of sending solidified LLLW containing trace amounts of PCBs to the Nevada Test Site will be determined.

Further development of the weir device will be completed and eight additional entries into the isotope area will be made.

Further development of additional LLLW system testing methods for water inflows will be made.

Title I and Title II design of the isolation of LLLW tank systems LA-104, 2026A, and WC-14 will be completed.

The robotics decontamination equipment testing will be completed, and the equipment will be moved to the W-12 site when the utility shelter is installed.

**Active Systems:** The Construction Manager's portion of Phase 2 work on upgrading the cathodic protection of System 19 and System 20 will be initiated. A subcontractor will be mobilized to complete inspection of the Phase 1 cathodic protection upgrades. The design packages for upgrading the cathodic protection for System 9 and System 21 will be completed.

Monthly leak testing of the Category C LLLW tanks (nine tanks less than 3000-gal capacity, three tanks greater than 3000-gal capacity, and one Category B tank less than 3000-gal capacity) will continue.

Revision 1 of Subcontract Technical Directive 4 and Subcontract Technical Directive 5 for subcontractor support of leak testing will be issued.

Leak testing of pipelines for the second annual assessment period (September 1995 to September 1996) will be initiated.

**Alternative Planning:** Pilot scale and hot cell evaluation of Radiochemical Engineering Development Center waste treatment methods will continue to collect additional data for design of the waste treatment module to be installed in Hot Cell 7 at the Radiochemical Engineering Development Center.

A demonstration of the source treatment method developed for the Irradiated Materials Examination and Test Facility (Building 3025) is planned for the third quarter. Additional laboratory testing will also be performed to evaluate the effectiveness of the method for variations in waste composition.

Design of the remotely handled LLLW cask will begin. Investigators will begin evaluating cask characteristics such as liquid capacity, shielding requirements, and containment features. The need for facility modifications for accommodating the new cask will also be evaluated.

**Assessments:** Assessments of the Category C tanks' leak testing results will be prepared and submitted for review. These 14 leak testing assessments will be incorporated into separate structural integrity assessments that will be submitted for review by June 30, 1995.

### 3.2.7 ORNL WAG 2

#### *Description*

ORNL WAG 2 includes two sites. The first site consists of the area encompassed by the stream channels of WOC and Melton Branch; the second site includes White Oak Lake (WOL), White Oak Dam, and the White Oak Creek Embayment prior to confluence with the Clinch River. WOC, WOL, and its tributaries represent the major drainage system for ORNL and the surrounding facilities.

WOC and its tributaries are located in Melton and Bethel valleys. WOC flows into the Clinch River at River Mile 20.8, about 1.5 miles north of the junction of Interstate 40 and State Highway 95. WOL is located upstream of WOL Dam and just south of the ORNL main complex. White Oak Creek Embayment encompasses the area downstream of WOL Dam to the confluence of WOC with the Clinch River (0.6 miles). WOL is a surface impoundment that serves as a final settling basin for particle-reactive contaminants from ORNL operations and waste storage areas. Contaminants of concern identified to date are  $^{90}\text{Sr}$ ;  $^{137}\text{Cs}$ ;  $^{60}\text{Co}$ ; thorium; uranium; transuranics; metals (mercury, zinc, and chromium); and some organic compounds (including PCBs) located primarily in bottom sediments.

Site-wide surface water assessment activities will continue under this Activity Data Sheet as the ORNL Area Surface Water Program. Groundwater assessment activities will continue as the ORNL Area Groundwater Program under a separate Activity Data Sheet (3315). By drawing together data collection and assessment activities, the Surface Water and Groundwater programs will provide ER the management tools needed for timely decision making to conduct remedial actions with maximum efficiency and cost effectiveness.

#### *Accomplishments*

The revised WAG 2 RI FY 1995 Work Plan was delivered to the regulators for their approval on January 13, 1995.

A second round of baseflow samples from Melton Branch just upstream and downstream from Seep Area C and Seep Area D in WAG 5 was completed. The samples will be analyzed principally for  $^{90}\text{Sr}$ . Results will be used to determine the overall effectiveness of the removal actions in reducing the  $^{90}\text{Sr}$  flux from the two seep areas.

Hydrologic modeling of the WOC system and compilation of data for simulation of floods with 50-year return frequency estimates were completed. This work was performed to quantify the potential of extreme storm events for transporting radioactively contaminated sediment into the Clinch River and thus potentially exposing the off-site public to unacceptable health risk.

Investigation of alternate technologies for restoration of the main weirs in WAG 2 was completed. The conclusions reached were that DOE should proceed with conventional dredging and clean out operations in Melton Branch and WOC as already proposed and initiate the regulatory permitting and approval process.

Field work was completed (including running transect lines and taking depth measurements) in the WOL bathymetry subtask. Data will be used to scope subsequent lake bottom sediment

coring. It will also be used to provide the baseline for assessing the fill-up rate of the lake and determining how long the lake can potentially function as a retention area for sediment transport prior to going off site.

Groundwater piezometer well sampling was completed. Data will supplement the groundwater database in the area of potential for off-site flux of contaminants and provide data for assessing potential to off-site receptors of human health risk.

Work in floodplain soil characterization, WOL bathymetry, erosion rates, and Intermediate Holding Pond radiological inventory was completed. Constituent reports on activities that are to be part of the Phase 1 RI Report will be completed in FY 1995. Data from this work will be used in evaluating the potential for off-site transport of contaminated sediment and for uptake of contamination by biota.

Mink and kingfisher sampling was completed to provide information and data to conduct the ecological risk assessment directed by regulators at the June 1994 DQO workshop.

Assessment of seeps, tributary, and groundwater data was initiated. Constituent reports in these areas will become part of the Phase 1 RI Report. Using the constituent report concept will produce a more efficient and less costly RI final report because analyses in these several task areas can be optimized with respect to availability of resources.

Data assessment was initiated to determine vertical and lateral distributions of radioactive and nonradioactive contaminants in the floodplain. This data in turn will be used to determine the potential human health risks that would be created by off-site transport of significant quantities of contaminated soil and sediment during extreme storm events.

Six seep sites were upgraded, and flow measurement instrumentation was installed in support of the WAG 4 Engineering Projects Information Center project. Samples from base flow and one storm were collected for analysis. The results will identify sources contributing most to downstream  $^{90}\text{Sr}$  fluxes, thus pinpointing source trenches for subsequent corrective action.

Samples were collected for three wet-season storms in support of the WAG 4 source characterization activity. Indicator analyses were run to identify samples for subsequent complete analysis for  $^{90}\text{Sr}$ ,  $^3\text{H}$ , and gamma activity, thus producing significant cost savings by avoiding excessive analyses. The results will establish baseline conditions against which post-construction fluxes will be measured to establish the efficiency of corrective actions.

Five potential sampling sites on Bearden and Raccoon creeks were surveyed for radioactivity in preparation for screening of new sources. Wet and dry-season samples will be collected and analyzed to evaluate whether WAGs draining into these unmonitored streams may potentially contribute to off-site contaminant fluxes.

### ***Concerns***

None.

***Scheduled Activities for Next Quarter***

Complete development of preliminary data packages for assessment of radionuclide distributions and inventory in WAG 2.

Complete preparation of documentation for clean out of the main weirs on WOC and Melton Branch (to be conducted during the summer of 1995).

**3.2.8 ORNL WAG 4 Seeps Collection and Treatment**

WAG 4 is located in Melton Valley immediately south of the main plant area through a gap in Haw Ridge. This WAG is comprised of three areas: (1) a shallow land burial ground containing radioactive and hazardous wastes, (2) two pilot-scale LLLW waste seepage trenches, and (3) an underground pipeline used for transferring liquid radioactive wastes from the main plant area to waste pits and trenches (WAG 7).

***Accomplishments***

Additional field investigation activities were initiated.

This project changed from a removal action to an interim remedial action, and an additional phase of field investigation was added to fully delineate the trench boundaries and decrease the total remediation cost. This additional field work will permit a better alternative to be chosen and a smaller area to be treated. This should also allow a single-phased design and construction approach to be used.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Complete Phase 2 site investigation field work.

Start preparation of the Characterization Summary Report outlining technical findings from Phase 1 and Phase 2 site investigations.

**3.2.9 ORNL WAG 5*****Description***

ORNL WAG 5 comprises 16 remediation sites, including LLLW transfer lines and leak sites, hydrofracture surface facilities, waste storage tanks, a sludge basin and a holding pond, and a shallow land burial ground containing radioactive and hazardous wastes [Solid Waste Storage Area (SWSA) 5]. The major contaminants detected in shallow groundwater are  $^{90}\text{Sr}$  and  $^3\text{H}$ .

Two separate projects are under way in this WAG at this time. The WAG 5 RI is collecting, analyzing, and reporting data for use in remediation planning. A second project was initiated to

collect and treat water from two contaminated seeps into Melton Branch that were contributing significant amounts of  $^{90}\text{Sr}$  to WOC.

### ***Accomplishments***

Preliminary  $^{90}\text{Sr}$  sample results were assessed for Melton Branch Stream samples collected in late January and early February in support of the performance assessment of WAG 5 Seep C and Seep D corrective actions. Sampling will be continued on a weekly basis to rapidly establish the effectiveness of the units in reducing  $^{90}\text{Sr}$  fluxes to Melton Branch.

#### **WAG 5 RI:**

Work continued on preparation of the electronic deliverable for transfer of WAG 5 data to OREIS.

The RI Report was issued to TDEC and EPA on March 30, 1995.

#### **WAG 5 Seeps Collection and Treatment:**

**Seep C:** Several challenges were encountered with the Seep C collection system that resulted in lower than expected collection efficiencies. During January it was found that the Seep C system was not collecting as much contaminated water as expected and that the water level in the French drain had risen allowing water to bypass the treatment system. Iron oxides were found to be forming in the system due to the presence of oxygen, and these were clogging the zeolite drums. A 0.5-in. layer of iron oxides were removed from the top of drums allowing the French drain to empty. This action solved the bypass problem. Nitrogen was added to the system to eliminate the future formation of iron oxides. The nitrogen is effectively treating the problem as evidenced by a lack of rise in water level in the French drain and the absence oxides present in the collected samples.

A second challenge was the recontamination of water treated by the Seep C system as it flowed across the contaminated floodplain to the creek. Prior to installation of the treatment system, contaminated seepage had contaminated the floodplain soils with  $^{90}\text{Sr}$ . Following the installation of the treatment system, clean water flowing across the contaminated floodplain soils was being recontaminated. A pipe was installed to divert the discharge of the treated water around the contaminated area. The amount of  $^{90}\text{Sr}$  seen in Melton Branch decreased significantly afterward.

The Seep C treatment system captured 38 mCi of  $^{90}\text{Sr}$  during the month of January and 31 mCi in February, which resulted in a 13% reduction at White Oak Dam for January and 17% for February.

**Seep D:** An initial concern was the inadvertent collection of creek water by the Seep D collection system. The Seep D collection system does not appear to be collecting any significant quantity of water from Melton Branch. Collection rates are somewhat higher than expected, but this additional flow is related to the input of clean local ground water and the seasonal rise of the water table.

The Seep D treatment system captured 17 mCi of  $^{90}\text{Sr}$  during the month of January and 14 mCi in February, which resulted in a 6% reduction at White Oak Dam for January and 8% for February.

The WAG 5 Seeps Postconstruction Report was submitted to TDEC and EPA. In addition, a performance assessment for the WAG 5 Seep C and Seep D removal action was also submitted to TDEC and EPA.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Continue Seep C and Seep D sampling and monitoring.

## **3.2.10 ORNL WAG 6**

### ***Description***

ORNL WAG 6 consists of SWSA 6, the Emergency Waste Basin, and the Explosives Detonation Trench. SWSA 6 is located northwest of WOC near White Oak Dam and State Highway 95. This 68-acre site is still in operation as a waste burial ground for solid low-level radioactive waste. Contaminants of concern include radionuclides and hazardous chemicals.

The Emergency Waste Basin is located north of SWSA 6. It is a 2-acre basin constructed as an LLLW or process-waste holding basin for use when ORNL might be unable to release wastes to WOC. The basin has never been used, and no releases have been detected in the stream leaving the basin; however, surface contamination has been found in the basin.

The Explosives Detonation Trench is located in the northern part of SWSA 6. It was used to detonate explosives and shock-sensitive chemicals requiring disposal. Explosive wastes were laid in the bottom of the trench and detonated with a small plastic explosive charge. No releases are believed to have occurred.

### ***Accomplishments***

Comments have been received from EPA and TDEC on the Environmental Monitoring Plan, and responses have been incorporated. Comments from TDEC Solid Waste Office are expected.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Continue baseline sampling of groundwater monitoring wells and surface water devices.

Complete the Environmental Monitoring Plan Annual Report by June 30, 1995, for submittal to the regulators.

### 3.2.11 ORNL WAG 7 In Situ Vitrification

#### *Description*

In situ vitrification (ISV) has been selected as the baseline closure technology for several pits and trenches at WAG 7. The ISV activity will continue in FY 1995 with a field-scale demonstration of two adjacent melts in Pit 1 whereby contaminated soil particles will be melted into a glass matrix. A Treatability Study will provide necessary information regarding the design, implementation, and performance of ISV for Pit 1 and other sites with known similar soil contamination. Pit 1 was selected for the demonstration because of its limited size (30,000 ft<sup>3</sup>) and radionuclide inventory (87 Ci of mixed fission products). The major objectives of ISV-related work in FY 1995 include completing design and fabrication of the ISV off-gas filter system and collection hood; completing the Pit 1 site characterization; completing all environmental, safety, and health documents; and obtaining approval for performing the TS. The technical objectives to be accomplished for ISV-related work are the following:

- attaining the required depth for incorporating source contamination,
- demonstrating field procedures for overlapping at least two melts,
- demonstrating off-gas handling techniques for any volatilized <sup>137</sup>Cs,
- demonstrating adequate site characterization techniques, and
- promoting stakeholder acceptance.

Recent findings have indicated that some radionuclides can be readily volatilized from soil during thermal treatments. In some cases, volatilization of the radionuclide is preferable to retention in an ISV melt. The thermal soil decomposition studies initiated in FY 1994 for <sup>137</sup>Cs, <sup>90</sup>Sr, <sup>99</sup>Tc, and radioactive U contaminants will be summarized in a technical report in FY 1995. These data will constitute a valuable adjunct in the evaluation of ISV as a closure technology.

#### *Accomplishments*

**ISV Off-Gas Hood Design and Fabrication:** Design of the gas hood neared 95% completion. Preliminary bids were also received for the ISV off-gas prefilter system consisting of (1) the piping and control valves and (2) the HEPA prefilter housings.

**Pit 1 Site Characterization:** Elemental analyses of lithium borate fusions of core samples of dense weathered rock underlying Pit 1 were completed. Additional plastic tarps were received and added for greater coverage, which is anticipated to aid in preventing recharge of the pit's perched water table during the winter. Two new shallow wells were installed. Two slug tests were completed to determine the hydraulic conductivity of Pit 1 soil fill above the maximally contaminated depth to evaluate the potential for dewatering the pit. Calculated conductivities proved too low for significant dewatering of Pit 1.

**Pit 1 ISV Run Preparation:** The site grading plan was completed. ISV site preparation and transportation plans for large-scale ISV system trailers continued. Work continues on the

preparation of the site specific run plan for Pit 1 ISV operations and on preparations for the engineering-scale Cs test.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Complete site grading.

Set up ISV trailers and equipment.

Complete readiness review, site health and safety, waste management, quality assurance project, and run plans.

Complete site preparations, including grading, filling with gravel, covering site gravel, and excavating two start-up trenches.

Complete off-gas hood design and fabrication.

Initiate ISV melt operations.

Complete plutonium and uranium analyses of maximally contaminated soil from Pit 1.

**3.2.12 ORNL WAG 10 Hydrofracture Wells Plugging and Abandonment**

***Description***

The objective of this work is to plug and abandon WAG 10 injection wells, deep observation and monitoring wells, and deep boreholes that are not suitable for recompletion and use as groundwater monitoring wells.

***Accomplishments***

The WAG 10 Site Characterization Summary Report associated with 21 Old Hydrofracture HF3 wells and two HF2 wells was completed.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Wellhead tapping and sampling of approximately 14 wells associated with the New Hydrofracture Facility and 7 deep monitoring wells will be initiated.

Characterization work regarding New Hydrofracture Facility and deep monitoring wells should begin in early May and be completed this fiscal year. The objective of this work is to

provide chemical, radiological, and geophysical information required to identify high priority wells for subsequent plugging and abandonment.

### **3.2.13 ORNL Area-Wide Groundwater Program**

#### ***Description***

Groundwater flowpaths and restoration activities are not constrained by WAG boundaries. Therefore, groundwater activities associated with individual contaminant/WAG source OUs have been integrated over a larger geographic area. The area-wide groundwater OU underlying of Melton Valley and Bethel Valley has been established and will be the focus of multi-year, long-term characterization and monitoring activities. Focused remedial actions will be implemented as required.

#### ***Accomplishments***

There were no major accomplishments during this reporting period. Ongoing activities include monthly water level measurements and groundwater sampling at 14 hydrostatic head monitoring stations and continuation of the fracture flow/matrix diffusion field tracer task.

#### ***Concerns***

None.

#### ***Scheduled Activities for Next Quarter***

No new activities will be initiated due to funding limitations. Ongoing activities (Hydrostatic Head Monitoring Station Program sampling and water level measurements, and the fracture flow/matrix diffusion task) will continue.

### **3.3 OAK RIDGE K-25 SITE**

The K-25 Site was built as part of the Manhattan Project during World War II to supply enriched uranium for nuclear weapons production. Construction of the K-25 Site started in 1943, and Building K-25, the first diffusion facility for large-scale separation of  $^{235}\text{U}$ , was fully operable by August 1945. Additional buildings involved in the enrichment process were operable by 1956. In response to the national postwar nuclear emphasis, plant operations were modified to include the production of uranium compatible with reactors used to generate electric power. Because of the declining demand for enriched uranium, the enrichment process was placed on standby in 1985 and shut down in 1987. The K-25 Site now has a multipurpose mission that includes serving as the location of many contractor central staff functions, operating waste treatment facilities, serving as a center for applied technology, and supporting the development of the Advanced Vapor Laser Isotope Separation uranium enrichment technology.

### 3.3.1 K-901 Area

#### *Description*

The K-901 area consists of a contaminated burial ground, landfarm, holding pond, and two construction waste disposal areas. The area is located northwest of the main plant.

K-1070-A Old Contaminated Burial Ground, northwest of Building K-33, was used for the disposal of several types of material from the 1940s to 1976. The burial ground contains ~35,575 ft<sup>3</sup> of uranium-contaminated material and 2430<sup>3</sup> ft of thorium-contaminated material. Other material includes UF<sub>6</sub> cylinders, beryllium chips, boron, radioactive NaF, oil, rags, etc. The K-1070-A Landfarm received ~5000 ft<sup>3</sup> of fuller's earth between 1979 and 1985. The fuller's earth was laden with concentrated acids, sludges, and other degradation products from uranium enrichment cascade oil.

The K-901-A Holding Pond received chromated, cooling-tower water blowdown and a variety of other wastes from barrels drained into the pond in the late 1950s. The K-901 Waste Disposal Area and K-901-A Sanitary Disposal areas each received construction wastes beginning in the 1940s. Small pockets of radioactive contamination have been found at the K-901-A Sanitary Disposal Area.

#### *Accomplishments*

A conduct of operations was performed and the Conduct of Operations Assessment Report and Corrective Action Plan were produced. These documents addressed the program-level concerns identified during the conduct of operations assessment. A drilling restart review was conducted on February 10, and the stop-work order on drilling was lifted February 13.

The K-901-A Holding Pond Remedial Site Evaluation Report preparation was initiated by using the data in OREIS. This project will be the first to produce an FFA report from data in OREIS.

Drilling and geophysical logging at the K-1070-A Burial Ground continued. Five bedrock and seven unconsolidated wells have been completed to date.

Technical evaluation meetings were conducted to reassess the conceptual model and DQO. Remedial action objectives were revised from containment and plume control to removal action. Additional data needs were identified and will be collected during the current phase of field work.

#### *Concerns*

None.

#### *Scheduled Activities for Next Quarter*

Field activities (drilling, sampling, and a die-tracer test) will continue.

### **3.3.2 K-1070**

#### ***Description***

The K-1070 area consists of the K-1070-C/D Classified Burial Ground, located on a hill at the eastern edge of the K-25 Site. The burial ground is composed of several disposal areas: large trenches, small pits, three earthen dike areas, a landfarm, and a concrete pad. Both low-level radioactive and nonradioactive, nonhazardous waste materials and equipment were buried in the large trenches. The small pits were used to empty drums of hazardous waste. The dikes, which received RCRA closure approval from the State of Tennessee, were used for surface storage of drummed wastes. The landfarm is a road on to which potentially contaminated oils were sprayed for dust suppression. The concrete pad was used for compaction of metal drums before burial. Contaminants of concern at the burial ground are volatile and semivolatile organics, uranium-contaminated scrap metal, uranium compounds, lead, and other metals. An interim corrective action was initiated in January 1994 for the SW 31 Leachate Seep, which is located immediately west of the site and has been likely contaminated by the burial ground.

#### ***Accomplishments***

Regulators approved the request to reschedule the March 15 FFA Appendix E milestone date to a new date of June 30 to incorporate a focused FS into the report. This change, while delaying submittal of the RI report, will accelerate the total RI/FS process by 130 days.

#### ***Concerns***

None.

#### ***Scheduled Activities for Next Quarter***

Issue the RI/FS Report to regulators for review by June 30, 1995.

### **3.3.3 K-1070 SW-31 Spring Project OU**

#### ***Description***

This project work involves implementing an interim remedial action for the K-1070 Leachate seep (SW-31) to reduce risk to human health and the environment and to achieve compliance with a proposed permit modification. The seep appeared after an attempted reclamation of the area bordering the west end of the K-1070-C/D Burial Ground, which was swampy and had an unpleasant smell. The K-1070-C/D Classified Burial Ground was used to dispose of a variety of equipment and waste, including solvents and hazardous chemicals. The remedial action chosen involves air stripping the discharged water to remove volatile contaminants after pretreatment to remove iron, followed by carbon filtration (polishing) to remove PCBs. The Central Neutralization Facility will be upgraded by adding unit processes during a second phase of construction.

#### ***Accomplishments***

None.

**Concerns**

None.

**Scheduled Activities for the Next Quarter**

Construction start on K-1070 Spring Phase 2 is scheduled for May 19, 1995.

**3.3.4 K-1407 Area****Description**

The K-1407 area contains seven solid waste management units: the K-1407-A Neutralization Pit, the K-1407-B Holding Pond, the K-1407-C Retention Basin, K-1407-C and K-1417 Soil, the K-1070-B Old Classified Burial Ground, the K-1700 Stream (Mitchell Branch), and the K-1202 Hazardous Waste Storage Tanks. The K-1407 area is located east of the K-25 building at the northern edge of the K-25 Site.

The K-1407-A Neutralization Pit is a 33,000-gal reaction pit where sulfuric acid and calcium hydroxide are added to neutralize corrosive waste streams. The neutralization pit has processed various cleaning solutions and has received heavy metals.

The K-1407-B Holding Pond received neutralized cleaning solutions from the cleaning of nickel-plated steel pipes. The pond also received a variety of organic and radioactive wastes from other sources. The K-1407-C Retention Basin was used for storing sludges from the B Pond. Since sludge removal during 1987 and 1988, radionuclides are the only remaining contaminants. Both ponds are RCRA Interim Status Units and are scheduled for closure during the first quarter of FY 1995.

K-1407-C and K-1417 Soil is located north of the K-1407-C Pond. Uranium is the only suspected contaminant in this soil.

Buried at the K-1070-B Old Classified Burial Ground is a collection of materials, equipment, and scrap taken from the S-50 thermal diffusion plant; K-1131 feed plant; and K-25, K-27, and K-29 diffusion buildings. Contaminants include lead, uranium, and other metals.

The K-1700 Stream (Mitchell Branch) has received wastes from a variety of sources, including the K-1407-B Holding Pond and several area underground storm drain systems.

The K-1202 Hazardous Waste Storage Tanks consist of two elevated storage tanks of 15,000-gal capacity each. The tanks originally contained processing equipment lubricant oils, but in recent years the tanks have been used for the interim storage of mixed wastes.

Another site, K-1407 contaminated debris, was discovered during closure operations and added to Category 2 of Appendix C in the FFA. This site consists of buried radioactively contaminated solid wastes and is located on the south side of the K-1407-C Retention Basin. A preliminary assessment was prepared for this site. Apparent risks posed by this buried debris do not warrant any remedial actions at this time.

The radionuclide contamination not addressed in the RCRA closure of the K-1407-B and -C units will be addressed in the future by CERCLA actions. Current plans are to combine the future remediation of the K-1407-B and K-1407-C units as CERCLA source OUs and as RCRA Interim Status Units. Because the CERCLA actions at both the K-1407-B and K-1407-C units will be the same, one set of CERCLA documents will be produced that will address both units.

### ***Accomplishments***

Construction on remedial action of the K-1407-B Holding Pond and K-1407-C Retention Basin was completed. Final activities included placement of a culvert at K-1407-C, demolition and disposal of concrete block at K-1407-C, and placement of straw. Contaminated tracks were replaced on a D8 dozer, and it was released from K-1417.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

None.

## **3.3.5 K-25 Groundwater**

### ***Description***

The K-25 Groundwater Program provides for the assessment and remediation of groundwater at the 1500-acre K-25 Site.

The K-25 Groundwater Program includes several data-gathering activities that have been designed to characterize the subsurface characteristics and flow regime of the site, provide information on whether or not any contamination may be migrating off-site, and establish the relationship of groundwater to surface water. The contaminants in the groundwater at the K-25 Site are radionuclides, principally  $^{238}\text{U}$ ; organic compounds; and heavy metals, including principally Pb (lead) and Hg (mercury).

### ***Accomplishments***

Sampling activities for groundwater seep locations at the Contractor's Spoil Area north of the K-25 Site were coordinated with TDEC and DOE-Oak Ridge Operations Office (ORO). Samples for analysis were collected from two seep locations. TDEC and DOE-ORO split sampled one seep location for analysis by their contract laboratory.

Four characterization activities were initiated for sitewide groundwater. These include (1) second round (wet weather) site-wide groundwater sampling using micropurge/low-flow sampling techniques, (2) continuous water level monitoring, (3) placement of continuous recording stage gages along Poplar Creek and the Clinch River, and (4) a microgravity survey of several potential karst areas. These activities are 70% complete at the end of the quarter and are ahead of schedule.

The U. S. Geological Survey has completed the second high base seepage run portion of the spring and seep survey of the K-25 Site. The two high base surveys, in conjunction with the previously completed low base seepage run and site-wide inventory, completes the field data collection activities for this task.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

The Groundwater Data Report will be submitted to the regulators.

**3.3.6 Inactive Waste Sites Surveillance and Maintenance**

***Description***

This activity includes those tasks necessary to manage the Inactive Wastes Sites Surveillance and Maintenance Program and to ensure adequate containment and site control at inactive wastes sites and other contaminated areas prior to final remediation. The major tasks consist of program and project management, routine surveillance and maintenance, and special activities.

The inactive sites include areas such as classified and/or contaminated burial grounds, scrap yards, switchyards, cooling tower basins, landfills, soil piles, and the grounds around inactive facilities. The level of effort involved is expected to remain relatively constant for the near term, with a decrease in activities as the site characterizations and remediations are implemented. There is the potential for a subsequent increase in effort in the long term if surveillance and maintenance is required as part of the final site remediation.

The area that surveillance and maintenance encompasses consists of designated inactive wastes sites around the K-25 Site. Contaminants found within the surveillance and maintenance sites include radionuclides, including principally  $^{238}\text{U}$ ; organic compounds; heavy metals, including principally Pb (lead) and Hg (mercury); PCBs; and asbestos.

***Accomplishments***

Installation of radiation signs was coordinated for all fenced inactive waste sites. Installation began the week of March 20 and is now complete.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Routine maintenance activities will continue.

### 3.4 OAK RIDGE RESERVATION BOUNDARY AREAS

The ORR Boundary Areas consist of the Clinch River and LWBR, LEFPC, Oak Ridge Associated Universities (ORAU) South Campus Facility (SCF), and Freels Bend Area.

Clinch River focuses on portions of the Clinch and Tennessee rivers that may have been adversely affected by contaminants released from ORR from the mid-1940s to the present. Melton Hill Reservoir and Clinch River, downstream from Melton Hill Dam, form the southern and eastern boundaries of the reservation.

WBR is located on the Tennessee River just below its confluence with the Clinch River and is the first impoundment downstream of ORR. Contaminants released from the reservation into these water systems include a variety of radionuclides, metals, and organic compounds, with PCBs and cesium being of particular concern. The PCBs are identified as a concern through fish ingestion, and the cesium is a risk only if deep-channel sediments are dredged and the spoils placed on land.

LEFPC extends from the outfall of Lake Reality at the Y-12 Plant boundary downstream to the stream's confluence with Poplar Creek. Originating within the Y-12 Plant, it consists of a 23-km stream and associated 550-acre floodplain. LEFPC became contaminated with mercury and trace levels of other metals, organics, and radionuclides.

ORAU SCF is located within the city limits of Oak Ridge and is bounded by Bethel Road, State Highway 62, Hall Ridge, and Clinch River. SCF was originally established in 1945 to study the accidental irradiation of cattle that occurred during the test of the first atomic bomb over Alamogordo, New Mexico. Soon its scope included studies on the introduction and migration of radioisotopes in the food chain. After investigation, the primary contaminant of concern was a small trichloroethane plume located on the site.

The Freels Bend Area was used to support research conducted on SCF. Controlled herds of some animals were maintained on pasture land there with ancillary barns and out buildings. In addition, a Low-Dose Rate Facility and a Variable-Dose Rate Facility were located on the site, along with three reported animal burial sites.

#### 3.4.1 Lower Watts Bar Reservoir OU

##### *Description*

WBR is the first Tennessee River impoundment located downstream of the ORR. The Tennessee Valley Authority's Watts Bar Dam, completed in 1942, is situated at Tennessee River Kilometer 853.6 (River Mile 530.5). The reservoir receives inflow from both the Tennessee and the Clinch rivers. This WAG/OU/study area consists of that portion of the reservoir that extends from Tennessee River Kilometer 913.1 (River Mile 567.5; mouth of the Clinch River at Kingston) to Watts Bar Dam.

The source of ORR contaminants in this OU is the Clinch River. Because the dam was completed prior to the start of operations at ORR, and also because the reservoir acts as an efficient trap for sediments and any associated particle-reactive contaminants, much of these contaminants have accumulated in the bottom of WBR over the years. The contaminants of concern

and exposure pathways are the same as for the Clinch River OU, with PCBs in fish posing the greatest risk. TDEC has issued a fish consumption advisory for WBR. A fish consumption advisory is also in effect for Fort Loudon and Tellico reservoirs, located upstream of WBR and ORR. Sediment contaminant concentrations, because of dilution by the Tennessee River and the greater spatial extent of the reservoir as compared to the Clinch River, are generally lower in WBR than in the Clinch River. Screening-level human health risk analyses indicate that contaminants in sediment pose a risk only if deep channel sediments are dredged and the dredged spoil is used for agriculture.

### ***Accomplishments***

Approval was received from TDEC on the RI/FS for LWBR.

Approval was received from TDEC and EPA on the Proposed Plan for LWBR.

A DQO meeting was held with TDEC and EPA to identify objectives for the Monitoring and Assessment Program for WBR.

The IAG for LWBR sediment controls was drafted.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

The public comment period and the public meetings on the Proposed Plan will be held in April.

The LWBR ROD is due to the regulators for their review.

The Monitoring and Assessment Plan is due to regulators for their review in June 1995.

## **3.4.2 South Campus Facility OU**

### ***Description***

The South Campus Facility OU is located within the city limits of Oak Ridge, Tennessee. It is bounded by Bethel Valley Road to the north, State Highway 62 to the east, Haw Ridge and the Clinch River to the south, and the western section of Bethel Valley to the west.

A research facility operated by ORAU, SCF was originally established in 1945 to study the accidental irradiation of cattle that occurred during the testing of the first atomic bomb near Alamogordo, New Mexico. The scope of research soon included studies on the introduction and migration of radioisotopes in the food chain as well as various other agricultural problems.

The boundaries of SCF encompass ~25 buildings and 130 acres of pasture land, but there is no enclosing fence. Access to the SCF property is generally unrestricted. Although several signs are posted to limit access, no fences or barriers exist to preclude access.

No documented evidence is available as to waste composition or quantity that may have been released to the environment at this location. Limited data exist, however, that identify potential hazardous waste sources and pathways. In addition, previous analytical data and the results of an inspection at this site indicate the presence of target compound list organics in the groundwater.

An RI at SCF was conducted in FY 1993. SCF areas included in the RI are the wastewater treatment plant, ponds, various laboratories, and animal containment facilities. The RI determined that the primary contaminant of concern is trichloroethane, which is present in a small plume in the unconsolidated zone.

### ***Accomplishments***

The revised RI/FS for SCF was submitted to the regulators on February 24, 1995. Approval was given by the regulators on March 17, 1995.

The Proposed Plan was submitted for regulatory review on March 10, 1995, which was a milestone date extension approved by the regulators.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

The revised Proposed Plan will be prepared and distributed for regulatory review and comment.

A status report on the findings of the wetlands Treatability Study will be submitted to the regulators.

## **3.4.3 Freels Bend Study Area**

### ***Description***

The Freels Bend Study Area was used to support research conducted at the ORAU SCF. This area is located southwest of the SCF and is bounded on three sides by the Clinch River. Control herds of some animals were maintained on pasture land here with ancillary barns and outbuildings. The research facilities included the Low Dose Rate Irradiation Facility and the Variable Dose Rate Irradiation Facility. Each of these facilities was used to expose and irradiate test animals that were subsequently observed over a period of time for exposure effects. The sources were removed from the Low Dose Rate Irradiation Facility; however, six sealed <sup>60</sup>Co sources still remain stored at the Variable Dose Rate Irradiation Facility.

There are three reported disposal areas for animal carcasses and miscellaneous wastes in the Freels Bend Area. These areas have been termed Animal Burial Sites I, II, and III. Access to the 70 acres of the Freels Bend Area is restricted and not open to the general public, although the area is not fenced. The entrance to the access road is blocked with a locked bar gate.

A Site Investigation was performed at Freels Bend Area in FY 1993. The regions investigated included those associated with the irradiation facilities, animal burial locations, and three small impoundments used in the care of control herds maintained at the Freels Bend Area. Contaminants of concern included radionuclides, organics, and metals. The findings of the Site Investigation were presented to the regulators in November 1993, at which time the regulators agreed that DOE should submit a No Further Investigation petition for the Freels Bend Study Area.

### ***Accomplishments***

A No Further Investigation petition was submitted to the regulators last quarter. Comments are expected back from the regulators following completion of the maintenance action at the Variable Dose Rate Irradiation Facility initiated this quarter.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Complete the maintenance action at the Variable Dose Rate Irradiation Facility.

Low Dose Rate Irradiation Facility maintenance action is scheduled for March and April.

### **3.4.4 Lower East Fork Poplar Creek OU**

The LEFPC OU extends from the outfall at Lake Reality at the Y-12 Plant boundary downstream to the stream's confluence with Poplar Creek. The LEFPC site consists of the 23-km stream and an associated 550-acre floodplain.

Beginning in 1952, the Y-12 Plant began production-scale separation of lithium isotopes, which required the use of millions of kilograms of mercury. This process resulted in the release of 108,000 to 212,000 kg (239,000 to 470,000 lb) of mercury into EFPC between 1953 and 1983. More than 20 tributaries and treated effluent from the Oak Ridge Sewage Treatment Plant flow into the creek. Although the primary mercury discharges from the Y-12 Plant were eliminated in 1963, mercury continues to be released in EFPC from the Y-12 Plant and secondary sources (e.g., building drain systems, sewers, and connecting lines). The current release is approximately 20 g/day (0.7 oz/day) down from 100 g/day (3.5 oz/day) in 1985. Portions of the sewers were relined in 1986-87 to reduce mercury contamination. Efforts continue to further reduce mercury discharges (e.g., decontamination and decommissioning, RMPE, and remediation of mercury-use areas). The Y-12 ER Program has responsibility for the surface water in EFPC. Releases are regulated under the Clean Water Act NPDES permit for the Y-12 Plant.

Also, the Sewer Line Beltway was constructed near LEFPC by the city of Oak Ridge during 1982 and 1983 and contains over 10 miles of sanitary interceptor sewers and force mains. In certain instances, EFPC floodplain soils were used to provide topsoil. No records were kept to document the backfill procedures and locations.

The cleanup objective for the site is to prevent current and future user exposure to mercury-contaminated soils. Currently, risk levels are unacceptable in the EFPC-Sewer Line Beltway soils.

DOE encourages public input to ensure that the remedy selected for the EFPC-Sewer Line Beltway meets the needs of the local community and is an effective solution to the problem.

### ***Accomplishments***

The Proposed Plan was approved by the regulators.

About 175 people attended the EFPC public meeting on January 26 at Pollard Auditorium. Following presentations, representatives from DOE, EPA, the State of Tennessee, and contractor personnel made remarks and answered questions during the question and answer/comment session. On February 11, six people participated in a tour of the six proposed remedial action sites along EFPC. As a result of the EFPC public meeting, a second tour of the creek was held on February 17. Five people participated, for a total of 11 that have now toured the creek.

### ***Concerns***

***Concern:*** Obtaining access agreements from property owners is of concern. ***Impact:*** Sampling activities may be delayed. ***Action:*** Submit requests for access agreements.

### ***Scheduled Activities for Next Quarter***

Submit the ROD to the regulators for review and comment.

Conduct an ecological problem-solving workshop with DOE-ORO and its contractors, the U.S. Fish Wildlife Service, EPA Region IV, TDEC, and the Corps of Engineers.

## **3.5 TECHNICAL PROGRAMS AND TECHNICAL OVERSIGHT**

### **3.5.1 Oak Ridge Environmental Information System**

#### ***Description***

OREIS is a centralized, standardized, quality-assured, and configuration-controlled environmental data management system. It is composed of hardware, commercial software, customized integration software, a tabular data base, a geographic data base, and support documentation, including procedures. OREIS fulfills DOE-ORO's environmental information management obligations under an enforceable FFA [Docket No. 89-04-FF under Sect. 120 of CERCLA and Sections 3008(h) and 6001 of RCRA]. The OREIS project was initiated in September 1990, and the baseline production version of the system (OREIS V2.1) was released in June 1994.

The basic mission of OREIS is efficient retrievability and long-term (> 3 years) retention of DOE-ORO environmental data. Its primary users include DOE and its contractors and subcontractors who perform environmental restoration, compliance, and surveillance activities. Other users include EPA, TDEC, other agencies, and the public.

The scope of OREIS includes the consolidation of data supporting environmental restoration, compliance, and surveillance activities. The types of environmental data incorporated in the OREIS

computer system include known quality measurement and spatial data from the following environmental media: groundwater, surface water, sediment, soil, air, and biota. In addition to environmental measurement data, the OREIS data base contains descriptive and qualifier metadata to help document data quality and to enable end users to analyze the appropriateness of the data for secondary uses. The scope does not include performing project-specific activities (e.g., sample tracking, field results data entry, maintenance of equipment calibration records) or serving as project control tools (e.g., cost accounting or milestone tracking) that are available through other computer systems (e.g., the National Sample Tracking System and Progress Tracking System).

### ***Accomplishments***

A meeting was held with personnel from TDEC and DOE to discuss alternatives and costs associated with TDEC accessing OREIS data via a network connection to OREIS and to determine a plan for implementation. Orders for networking equipment have been placed. Network access will be available approximately one month after TDEC arranges for work to be completed by South Central Bell.

Loading of data from NPDES began in January.

Phase 1 of the K-901 Rapid Sample Turnaround Pilot Project to test a shorter and more frequent timetable for data transmissions from ER projects was completed. A meeting was held in March to discuss the lessons learned from Phase 1 of the project and to plan for Phase 2.

Data modeling sessions began for the inclusion of selected well construction data in OREIS, and a document to be presented to DOE and TDEC next month was drafted for review.

Data modeling and technical specifications for transferring ambient air monitoring data to OREIS were completed.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Continue to load data, provide training, work with user groups, update OREIS components and user documentation, and support environmental information management activities.

Load data from the Ambient Air Program (scheduled to begin loading in May 1995).

Conduct surveillance on GIS activities within OREIS.

Present document on well construction data in OREIS to DOE and TDEC for review.

Begin putting OREIS user documentation and help information on World Wide Web.

### **3.5.2 Remote Sensing and Special Surveys Program**

#### ***Description***

Remote sensing technologies provide efficient means for acquiring data for site identification and characterization, change detection, regional and local monitoring, and acquiring updated information to support geographic data bases (e.g., facility data, land cover, topography). The objectives of the Remote Sensing Program are to promote and manage routine examinations of the ORR and associated off-site areas and to process and analyze remotely sensed data that can be used in ER site characterization and cleanup activities. Surveys occur on a biannual basis with selected remote sensing surveys as needed during other times of the year for use in site-specific studies. The biannual approach provides an effective means for early detection of environmental problems that could develop as waste containment vessels degrade, and it also aids in monitoring improvements gained from restoration efforts and cleanup activities.

#### ***Accomplishments***

Gamma radiation survey data for the ORR, Clinch River, Portsmouth, and Paducah have been submitted to the OREIS Program for review and inclusion in the OREIS database.

Ninety-eight image files were transferred to the OREIS Program for review and inclusion in the OREIS database. Digital photography of the five main DOE-ORO ER facilities (K-25, Paducah, Portsmouth, X-10, and Y-12) were included along with photographs of many of the ER Program WAGs and OUs.

A low-altitude photograph captured by model airplane of a portion of WAG 5 to Tennessee State Plane (NAD83) coordinates was rectified. Two rectifications employed monitoring well locations, basemap ortho-photographs, and Global Positioning System points for ground control.

Digitization of revisions to ORR sensitive areas system was completed.

An update of the ORR rare plant list was completed. As a result of work completed with the Tennessee Heritage Program, the list now includes 21 state and federally listed plant species recorded from the ORR.

Overlay maps of wetland vegetation records were created from recent wetland and hydrologic surveys.

#### ***Concerns***

None.

#### ***Scheduled Activities for Next Quarter***

Submit selected color infrared aerial photography to the OREIS Program for review and inclusion in the OREIS database.

Complete and issue the Remote Sensing and Special Surveys Program quality assurance plan.

Continue to conduct threatened and endangered plant and animal species surveys of the ORR.

### **3.5.3 Risk Assessment Program**

#### ***Description***

A risk assessment, as defined in the DOE-ORO *Interim Policy Guidance on Environmental Restoration Risk Assessment Initiation, Implementation, and Interaction*, is the process of identifying, defining, and characterizing the adverse consequences of exposure to hazardous and radioactive materials. Under the ER Division, risk assessment includes the performance of a baseline risk assessment, refinement of preliminary remediation goals, and risk evaluation of remedial alternatives. Risk assessment may have both a human health risk assessment component and an environmental risk assessment component, whereby the human health risk assessment identifies, analyzes, and characterizes adverse health effects in human receptors and the environmental risk assessment identifies, analyzes, and characterizes adverse impacts on other environmental receptors (i.e., local flora and fauna, etc.).

The Risk Assessment Council was established to ensure consistent implementation of established methodology and technical defensibility of all risk assessments produced as part of the remedial activities on the ORR and for the other DOE-ORO facilities: Paducah and Portsmouth. The Risk Assessment Council is a multidisciplinary team of site risk assessment team leaders and other Energy Systems personnel with expertise in the following areas: human health risk, ecological risk, toxicology information and data bases, risk model validation, sensitivity/uncertainty analyses, and risk assessment project implementation. As outlined in the DOE-ORO interim policy guidance, the Risk Assessment Council is responsible for the following:

- providing advice and guidance on appropriate risk assessment methodology and procedures;
- developing appropriate methods, procedures, models, and/or data needed to fulfill risk assessment needs of the site programs;
- providing appropriate review of site programs' risk assessment implementation to ensure consistent application and interpretation of risk assessment guidance and methodology; and
- supporting ER Division risk assessment needs through the research and development of information to correct critical risk assessment data gaps.

#### ***Accomplishments***

The latest revision of *Defining the Role of Risk Assessment in the CERCLA RI Process at the DOE-OR* was submitted. This revision was produced to address a comment from EPA concerning the application of agricultural land use that had not been resolved at the time of the prior version of the document (October). With this revision, all EPA and TDEC comments have been addressed; however, this document should be considered a living document.

Results of the Human Health Risk Evaluation of Groundwater and Spring/Surface Water for Union Valley were presented in the March 1, 1995 regulators' meeting.

The Baseline Human Health and Ecological Risk Assessment Strategy Summary for Bear Creek Valley was presented at the regulators' meeting held February 16, 1995.

The human health risk-based preliminary remediation goals contained in ES/ER/TM-106 were presented for review. These values were developed by the ER Risk Assessment Program in a effort to standardize, coordinate, and eliminate duplication of risk activities. Additionally, this document was developed to fulfill an agreement between EPA, TDEC, and DOE to conduct a screening analysis against agricultural preliminary remediation goals for each baseline risk assessment.

The Human Health Risk Assessment Strategy for the UEFPC Watershed Characterization Area was presented in the UEFPC DQO workshop with DOE, TDEC, EPA Region IV, Martin Marietta Energy Systems, Inc., and Jacobs Engineering held on March 28–30, 1995.

### ***Concerns***

None.

### ***Scheduled Activities for Next Quarter***

Issue the maintenance action document for the ORNL Inactive Tanks Remediation Program, Batch I Series 1, to the regulators.

Issue the revised WAG 5 Baseline Human Health Risk Assessment to the regulators as part of the RI Report.

Issue the Clinch River Baseline Human Health and Ecological Risk Assessment to the regulators as part of the RI Report.

## **3.5.4 Federal Facility Agreement and Tennessee Oversight Agreement**

### ***Description***

Section 120 of CERCLA requires federal facilities listed on the National Priorities List to enter into an FFA with the EPA. The ORR was added to the National Priorities List in the fall of 1990. Subsequently DOE, EPA, and TDEC entered into this agreement. The primary purpose of the FFA is to establish a procedural framework and schedule for investigating and remediating contaminant releases at a site (the ORR) that pose a threat to human health and the environment.

The Tennessee Oversight Agreement obligates Tennessee to pursue a “program of independent monitoring and oversight,” primarily related to DOE compliance with environmental laws, DOE radiation protection programs, and joint Tennessee-DOE emergency preparedness and response activities. The Tennessee Oversight Agreement obligates DOE to provide technical and financial support for Tennessee's oversight of and participation in the FFA, in addition to establishing and maintaining compliance programs.

### ***Accomplishments***

The proposed revision of the FFA Appendix C was submitted to the FFA Project Managers for their approval. The appendix was reworked and separated into four sections: OUs, Characterization Areas, Remedial Site Evaluations, and Removal Site Evaluations.

The FY 95 +1 and +2 prioritized work milestones were submitted to the regulators for their review. The information was provided in two formats (1) the proposed FFA deliverables during this time frame and (2) the work activities planned for the two years and the funding associated with the project phase.

An ORR Site Management Plan update on recommended changes was presented to the regulators at the February 15, 1995, FFA Project Managers' meeting. The FFA Project Managers agreed that the revision should go even further to provide DOE's land use strategy at the ORR. This significant increase in scope suggests that the June 30, 1995 milestone will need to be changed.

The Tennessee Oversight Agreement DOE Steering Committee held a meeting discussing the renegotiation of the agreement. The current Tennessee Oversight Agreement expires on May 13, 1996. Renegotiation is scheduled to begin on May 13, 1995. The renegotiation team is currently being identified.

***Concerns***

None.

***Scheduled Activities for Next Quarter***

Renegotiation of the Tennessee Oversight Agreement will begin.

## 4. REMEDIAL ACTION CONTRACTOR ASSIGNMENTS

Each FFA quarterly report includes a listing of the identity and assigned tasks of each of the DOE contractors performing work under the FFA. The primary contractors—Energy Systems, ENSERCH, Jacobs Engineering, and MK-Ferguson—will be performing work at all locations within the ORR. The following is included to satisfy this requirement.

### 4.1 OAK RIDGE Y-12 PLANT

**ATI**—Project management plans for UEFPC OU 1; conduct of operations compliance support for multiple programs.

**Camber**—Health and safety plans for UEFPC RMPE.

**CDM Federal**—Development of an RI work plan for UEFPC OU 1. Development of a Union Valley interim study remedial site evaluation for UEFPC OU 1.

**CH2M Hill**—Provision of comments on previous RI plans for the Filled Coal Ash Pond. *[Closed]*

**Colorado State University**—Consulting concerning the DNAPLs in the Bear Creek Burial Ground. *[Closed]*

**The Earth Technology Corporation**—Development of the RI plan and RI of the S-2, Coal Pile Trench, Salvage Yard, and Building 81-10 sites. Sub-subcontractors include *Singleton Labs and A. L. Clark* for drilling, *IT Corporation* for analytical support, *H&R Technical* for data management and health and safety support, and *International Waste Management Systems* for engineering support. *[Closed]*

**ETE Consulting Engineering Inc.**—Provision of professional services.

**Geraghty & Miller, Inc.**—Support in preparation of all post closure permit applications and preparation of Bear Creek Valley OU 4 RI plan.

**Highland Drilling Company**—Characterization well drilling.

**PAI**—Technical support for UEFPC RMPE project development.

**Queen's University**—The use of alcohol flooding to remediate sites contaminated by DNAPL; progress report submitted 5/31/94.

**SAIC**—Field sampling in Bear Creek Valley, development of an RI Report for Bear Creek Valley OU 2 and Bear Creek Valley OU, data management support, support for ER strategic plan development and field mobilization.

**SONSUB**—Subcontract for the closure of Kerr Hollow Quarry. *[Closed]*

**University of Kansas**—Support for geophysical studies concerning DNAPL migration. *[Closed]*

**University of Tennessee**—Hydrogeological support planned for RMPE as subcontractor to PAI.

**University of Waterloo**—Consulting concerning the DNAPLs in the Bear Creek Burial Ground and PCB experiments. *[Closed]*

## 4.2 OAK RIDGE NATIONAL LABORATORY

**Advanced Sciences, Inc. (ASI)**—Administrative support, field coordination, and technical integration.

**Advanced Systems Technology**—Waste characterization processing and transportation assistance.

**Analysas**—Administrative support.

**ATI**—Structural integrity assessments for active LLLW tanks.

**Automated Sciences Group**—Biological data analysis, support for management, and analysis and interpretation of biological data from laboratory and field studies.

**Battelle Pacific Northwest Laboratory**—Design and fabrication services for an in situ vitrification off-gas hood and filtration system.

**Bechtel National, Inc. (Team members also include CH2M Hill; PEER; ERC, Inc.; and IT Corporation)**—RI activities for WAGs 1, 5, 6, and 10. Assessments will also be conducted of the inactive tanks as required by the FFA.

**CDM Federal Programs**—Preparation of a regulatory review and sampling and analysis plan for the WAG 6 performance monitoring activity.

**CER**—Assistance in preparing the WAG 6 well plugging and abandonment plan.

**ChemRad Inc.**—Walkover survey. *[Closed]*

**Colorado Logging COLOG**—Logging and ambient and stress testing of wells at WAG 5.

**Dr. David Daniel**—Assistance in evaluating the suitability of soil for caps.

**Drevel University**—Provision of technical personnel and knowledge. *[Closed]*

**ECOTECH**—Assistance in the analysis of surface water.

**EDGE, Inc.**—Groundwater monitoring of wells.

**Environmental Consulting Engineers**—Preparation of remediation and postremediation monitoring plans for WAG 6 and monitoring in WAG 2 and WAG 5 removal action investigation.

**ERC, Edge**—Geotechnical tests.

**ETE Consulting Engineers**—Survey services.

**Foster Wheeler**—Remedial design activities.

**Geotek Drilling**—Drilling services.

**Gilbert Commonwealth**—Assistance with preparing cost account plans and project documentation such as project management plans, health and safety plans, waste management plans, current year work plans, and configuration control support documents. Valve replacement for active LLLW tanks.

**Harco**—Cathodic protection for active LLLW tanks.

**H. Kent Hepworth, PE. Ph D.**—Technical assistance with remedial actions in support of the WAG 6 facility manager.

- Highland Drilling Company**—Construction and well plugging and abandonment services.
- H&R Technical Associates, Inc.**—Technical and administrative support in assembling reports, preparing minutes of meetings, and reviewing reports.
- Hydrocomp**—Expert review of field monitoring and modeling of contaminated sediment transport in WOC. *[Closed]*
- IT Corp.**—Final closure certification on the 3001 Storage Canal RCRA Interim Closure. *[Closed]*
- Jacobs ER Team**—Preparation of integrated RCRA/CERCLA/National Environmental Policy Act (NEPA) decision documents, including FSs, Proposed Plans, RODs, EAs, Environmental Impact Statements, documents for interim actions, and cost estimates associated with these documents. Provision of technical support for the performance of RIs, assessments and investigations of off-site locations, and remedial action verification; support for DOE and Energy Systems community relations activities; and support for the adherence to requirements associated with the Administrative Record and performance of risk assessments.
- JAYCOR**—Sampling and analysis support for benthic macroinvertebrate samples from WOC and its tributaries (*no longer supporting benthic macroinvertebrate samples*).
- JBF Associates**—Technical Advisory Group support and appraisal of the Underground Storage Tank Program.
- Kansas Geological Survey**—Collection of seismic reflection data for WAG 10.
- Knoxville College**—Data base support and technical support for sample collections.
- Lockheed**—Analytical services.
- MAC Tech**—Implementation of Data Quality Objectives for the Safer Program.
- Midwest Technical, Inc.**—Assistance in budgeting, planning, and cost tracking and provision of laboratory and field technical support.
- MK-Ferguson**—Construction management. Valve replacement/cathodic protection for active low-level radioactive waste tanks.
- North Carolina State University**—Assistance in biological monitoring and abatement tasks.
- Northern Arizona University**—Technical direction for surveillance and maintenance and WAG 5 cryogenic.
- Oak Ridge Associated Universities**—Field services coordination.
- OGDEN**—Geotechnical services as required to support the remedial design architect-engineer and the Performance Assessment Program.
- Peer Consultants**—Administrative support (team member of SAIC).
- Performance Development Corporation**—Technical and administrative support for active low-level radioactive waste tanks.
- Radian**—Preparation of environmental assessments and CERCLA decision documents. *[Closed]*
- SAIC**—Monitoring coordination, performance assessments, and hydrologic modeling for the WAG 6 Performance Assessment Program.

**Scientific Ecology Group SEG**—Field demonstration on waste stabilization in burial trenches.

**Solutions To Environmental Problems**—Provided trailer and parking installation support.

**Southwest Research**—Outside laboratory services.

**S. M. Stoller Corporation**—Administrative support.

**Temp Systems**—Assistance with administrative functions and surface water monitoring.

**Tennessee Valley Authority Interagency Agreement**—Technical supervision of FY 1992 drilling activities, including drilling three core holes and instrumenting them with multiport measuring systems (Westbay systems) and selecting monitoring intervals using core data, geophysical logs, and flowmeter data via the agreement.

**TMA Eberline**—Outside laboratory analytical services.

**University of California**—Assistance in biological monitoring and abatement tasks.

**University of California Davis**—Histopathological analyses of fish tissues.

**University of Mississippi**—Development of a special sensor for monitoring soil moisture and contaminant leaching.

**University of Tennessee**—Assistance in performing data collection; data compilation; development of performance criteria, maintenance programs, and quality assurance plans; and oversight of surface-water monitoring station upgrade activities.

**U.S. Geological Service**—Assistance in performing surface water monitoring.

**Vista Research, Inc.**—LLLW tank system leak testing methodology development.

#### **4.3 OAK RIDGE K-25 SITE**

**Adams Craft Hertz Walker**—Site surveying (for the Pond Waste Management Project).

**Advanced Sciences, Inc.**—Data validation.

**Analysas Corporation**—Records management (for the Pond Waste Management Project).

**Battelle, Columbus Laboratories**—Preparation of a simplified environmental assessment (for the Pond Waste Management Project).

**Brooks Rand Laboratory**—Mercury speciation analyses.

**CDM Federal Programs**—Preliminary Assessment/Site Inspection and RCRA Facility Investigation Work Plan preparation.

**Chemrad Tennessee Corporation**—Ultrasonic Ranging and Data System support.

**CompuChem Laboratories**—Chemical/radiological analyses.

**COR, Inc.**—Inventory Management Information System prototype development support (for the Pond Waste Management Project).

**Dennis Weiter Assoc.**—Study of available filter press operations (for the Pond Waste Management Project).

**Enterprise Advisory Services, Inc.**—Management systems support.

**ESE Biosciences Group**—Bioremediation of a former underground storage tank site. *[Closed]*

**ETE Consulting Engineers**—Surveying.

**Geraghty and Miller**—Technical support (for the K-25 Site Groundwater Protection Program). *[Closed]*

**GH Cofer**—Professional services.

**Gilbert Commonwealth**—Estimating support.

**Highland Drilling**—Characterization well drilling and drilling services for the K-25 Site Groundwater Protection Program. *[Closed]*

**HSW Environmental Consultants, Inc.**—Technical support (for the K-25 Site Groundwater Protection Program).

**Jacobs ER Team**—Preparation of integrated RCRA/CERCLA/NEPA decision documents, including FSs, Proposed Plans, RODs, EAs, Environmental Impact Statements, documents for interim actions, and cost estimates associated with these documents. Provision of technical support for the performance of RIs, assessments and investigations of off-site locations, and remedial action verification; support for DOE and Energy Systems community relations activities; and support for the adherence to requirements associated with the Administrative Record and performance of risk assessments.

**Labat-Anderson**—Assistance for Radian Corporation in the environmental assessment of the K-1407-B and -C Ponds. *[Closed]*

**Lockwood Greene**—On-site project engineering support and Title II design (for the Pond Waste Management Project).

**A. L. Lotts**—Operational Readiness Review Board support (is an independent member) (for the Pond Waste Management Project).

**PAI**—Technical consulting and generation of a project management plan and operational oversight management plan (for the Pond Waste Management Project).

**SAIC**—RI subcontract services for the K-770 and K-1070 OUs.

**Tenera**—Technical consulting and assistance in conduct of operations (for the Pond Waste Management Project).

**University of Tennessee, Industrial Engineering Department**—Assistance in planning for storage layout and warehousing (for the Pond Waste Management Project).

#### **4.4 ORR BOUNDARY AREAS**

**Advanced Sciences, Inc. (ASD)**—Laboratory and field support.

**Analytical Projects Office at Martin Marietta Energy Systems, Oak Ridge**—Processing of all contracts for the analysis of samples collected. The Analytical Projects Office and Energy Systems Procurement determine which labs will perform analyses.

- Army Corps of Engineers**—Hydroacoustic study of the Clinch River arm of WBR to determine the water depth and the distribution, thickness, and type of bottom sediments.
- Automated Sciences Group (ASG)**—Support for various tasks in the management, collection, analysis, and interpretation of biota, water, and sediment samples. Also, provides program management assistance for the Clinch River ER Program.
- Battelle/Pacific Northwest Laboratories (PNL)**—Support for water, sediment, and contaminant modeling tasks.
- Enserch**—Baseline planning support for ORAU.
- Foster Wheeler**—Design and estimating services as the prime contractor for LEFPC.
- Gilbert/Commonwealth**—Scheduling for LEFPC.
- Jacobs ER Team**—Preparation of integrated RCRA/CERCLA/NEPA decision documents, including FSs, Proposed Plans, RODs, EAs, Environmental Impact Statements, documents for interim actions, and cost estimates associated with these documents. Provision of technical support for RIs, assessments and investigations of off-site locations, and remedial action verification; support for DOE and Energy Systems community relations activities; and support for the adherence to requirements associated with the Administrative Record and performance of risk assessments. Prepares the decision documents (FS and ROD) in support of the new LWBR OU. Is the prime contractor for the Proposed Plan and ROD for LEFPC.
- JAYCOR**—Data management activities and document maintenance in the production of risk assessment documents for the Clinch River ER Program.
- Michigan State University**—Breeding and raising of mink in conjunction with the Clinch River ER Program's study of reproductive effects of ingesting fish from the Clinch River-WBR System.
- Midwest Technical, Inc.**—Support of data management activities and document maintenance in the production of risk assessment documents for the Clinch River ER Program.
- MK-Ferguson**—Baseline planning support for ORAU. Is the construction contractor for LEFPC.
- Oak Ridge Associated Universities**—Radioanalytical support for Phase 1 of the RI.
- Oak Ridge Institute of Science and Energy (ORISE)**—Risk assessment and contaminant transport modeling support.
- ORACLE**—Support in the design and implementation of ORACLE-based data bases and applications.
- PEER Consultants**—Computer programming and bar coding support for the Clinch River ER Program.
- Science Applications International Corporation (SAIC)**—Support in the compilation of data packages; validation and verification of data packages; and coordination of analytical services. Provides support preparation of ROD for LEFPC.
- SENES, Oak Ridge**—Support for human health risk assessments.
- Southern Illinois University**—Assistance in biological data collection and sample design.
- Tennessee Valley Authority (via an interagency agreement)**—Support for the following tasks:  
(1) cross sections of sedimentation ranges; (2) aerial photography and topographic mapping

of White Oak Creek Embayment; (3) numerical modeling of water, sediment, and contaminant transport in Clinch River/WBR; (4) sampling and analysis of water and sediment from potential sources of contaminants; (5) review of Tennessee Valley Authority sediment-disturbing activities; (6) sampling and contaminant analysis of key fish species in the Tennessee River System; (7) sediment and water toxicity studies; and (8) benthic macroinvertebrate community study of monitoring stations within the Clinch River and Poplar Creek. *[Tasks 1, 2, and 5 are closed.]*

**University of California-Davis**—Quantitative histopathological analysis of target organs of fish.

**University of Tennessee**—Assistance in data collection; data compilation; data base development and management; development of procedures and maintenance/coordination of training; coordination of the Clinch River/WAG 2 document management center with the other DMCs at Energy Systems in Oak Ridge; study of pollutant material transport, distribution, and characterization; and program management.

#### **4.5 ENERGY SYSTEMS ER CENTRAL DIVISION**

**CDM Federal Programs**—Regulatory compliance support and waste analysis support on the Portsmouth project.

**Ecotect Laboratory Services, Inc.**—Laboratory sample analysis.

**Ekotek Laboratory Services, Inc.**—Radiological/analytical data analysis.

**H&R Technical Associates, Inc.**—Consultation on cost/schedule control systems and groundwater data base management.

**Lietzke Soil Services**—Soil consulting services.

**Lockheed Analytical Services**—Chemical/analytical data analysis.

**Lockheed Engineering and Sciences Company**—Laboratory sample analysis.

**Maxima Corporation**—Project management.

**Micro-Frame Technologies**—Off-site training and professional training support.

**SAIC**—Site-specific plan support for the development of OREIS; training support; activity data sheet support; cost/schedule control system training; scheduling and technical support; waste management treatment, storage, and disposal analysis; analytical needs assessment; support services for preparation of the five-year plan; and data management support.

**University of Tennessee**—Soil characterization, hydrogeology, and data base management support.

**University of Waterloo (Canada)**—Groundwater modeling.

#### **4.6 JACOBS ENGINEERING**

**Geraghty & Miller**—Environmental sciences and groundwater support for the production of integrated decision documents.

**Lockwood Greene**—Environmental engineering support for the production of integrated decision documents.

**PAI Corporation**—Support for the production of integrated decision documents.

**STEP**—Support for the production of integrated decision documents.

**The University of Tennessee**—Training and other support for the production of integrated decision documents.

**United Science Industries**—Support for the production of integrated decision documents.

