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

Volume 4. July–September 1996

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

Volume 4. July–September 1996

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

Date Issued—October 1996

Prepared for the
U.S. Department of Energy
Office of Environmental Management
under budget and reporting code EW 20

LOCKHEED MARTIN ENERGY SYSTEMS, INC.
managing the
Environmental Management Activities 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

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 (ER) 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 July–September 1996.

This work was performed under Work Breakdown Structure 1.4.12.2.3.04 (Activity Data Sheet 8300 CCADS8325). Publication of this document meets the FFA Appendix E milestone in which a quarterly activities report is required no later than 30 days following the end of the applicable reporting period. This document provides information about activities conducted on the Oak Ridge Reservation at areas of concern under the FFA. Specifically, it includes information on milestones scheduled for completion during the reporting period (quarter) as well as those scheduled for completion during the next reporting period, significant accomplishments of the ER Program, and concerns related to program work. It also provides a listing of the identity and assigned tasks of contractors performing ER Program work under the FFA.

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ABBREVIATIONS

AM	Action Memorandum
AOC	Area of Concern
CA	Characterization Area
CEM	continuous emissions monitor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
D&D	decontamination and decommissioning
DNAPL	dense nonaqueous phase liquid
DOE	U.S. Department of Energy
DOE-ORO	DOE-Oak Ridge Operations
EE/CA	Engineering Evaluation/Cost Analysis
EFPC	East Fork Poplar Creek
Energy Systems	Lockheed Martin Energy Systems, Inc.
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration (Program)
FFA	Federal Facility Agreement
FS	Feasibility Study
FY	fiscal year
GAAT	Gunitite and Associated Tanks
ISV	in situ vitrification
IWQP	Integrated Water Quality Program
LEFPC	Lower East Fork Poplar Creek
LLLW	liquid low-level (radioactive) waste
LWBR	Lower Watts Bar Reservoir
MSRE	Molten Salt Reactor Experiment
MVST	Melton Valley Storage Tanks
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NT	North Tributary
OHF	Old Hydrofracture Facility
OREIS	Oak Ridge Environmental Information System
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	Operable Unit
PCB	polychlorinated biphenyl
RA	remedial action
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RER	Remediation Effectiveness Report
RGRS	Reactive Gas Removal System
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RMPE	Reduction of Mercury in Plant Effluents
RmSE	Removal Site Evaluation Area
ROD	Record of Decision
RSE	Remedial Site Evaluation Area

S&M	surveillance and maintenance
TCE	trichloroethylene
TDEC	Tennessee Department of Environment and Conservation
TSCA	Toxic Substances Control Act
UEFPC	Upper East Fork Poplar Creek
VOC	volatile organic compound
WAG	waste area grouping
WOC	White Oak Creek

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 July through September 1996 [fourth quarter of fiscal year (FY) 1996].

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 1997 commitments.

1.1 DOCUMENTS TRANSMITTED TO THE REGULATORS

The following documents were transmitted to the regulators during the fourth quarter of FY 1996 and can be requested from the Information Resource Center in Oak Ridge, phone (423) 241-4582.

- *Action Memorandum for the Molten Salt Reactor Experiment Uranium Deposit Removal (DOE/OR/02-1488&D1)*
- *Action Memorandum for the WAG 5 Old Hydrofracture Facility (DOE/OR/02-1487&D1)*
- *Remedial Action Report for the K-1070 SW31 Spring Interim Remedial Action (DOE/OR/01-1520&D1)*
- *Phase II Remedial Action Work Plan for the Lower East Fork Poplar Creek (DOE/OR/01-1480&D1)*
- *Remediation Effectiveness Report (DOE/OR/01-1492&D1)*
- *EE/CA for the K-901-A Holding Pond and 1007-A P1 Pond (DOE/OR/02-1513&D1)*
- *Action Memorandum for the K-25 Auxiliary Area (DOE/02-1507&D1)*
- *Remedial Investigation Report for Bear Creek Valley (DOE/OR/01-1455/V1&D1—V6&D1)*
- *Gunitite and Associated Tanks Feasibility Study/Proposed Plan (DOE/OR/02-1427/V1, V2 &D1)*
- *WAG 10 New Hydrofracture Wells Remedial Site Evaluation (DOE/OR/01-1471&D1)*
- *Active LLLW Tanks Structural Integrity Assessment of Category C Tanks and Pipelines (DOE/OR/01-1512&D1)*
- *Preliminary Assessment of the Ecological Risks to Wide-ranging Wildlife Species on the Oak Ridge Reservation, 1996 Update (DOE/OR/01-1407&D1)*
- *Environmental Restoration Footprint Reduction Process—Evaluation of Scarboro/East Haw Ridge Study Area (DOE/OR/01-1496&D1)*
- *Remedial Site Evaluation Report for the K-1004-J Laboratory and Vault Area (DOE/OR/01-1489&D1)*

- *Remedial Site Evaluation for the K-1410 and K-1031 Facilities and Surrounding Area (DOE/OR/01-1412&D1)*
- *Removal Site Evaluation Report on Building 3019B at Oak Ridge National Laboratory (DOE/OR/01-1514&D1)*
- *Removal Site Evaluation Report on Building 7602 at Oak Ridge National Laboratory (DOE/OR/01-1515&D1)*
- *Removal Site Evaluation Report on the Bulk Shielding Reactor at Oak Ridge National Laboratory (DOE/OR/01-1516&D1)*
- *Removal Site Evaluation Report on the Tower Shielding Reactor at Oak Ridge National Laboratory (DOE/OR/01-1517&D1)*
- *Clinch River/Poplar Creek Proposed Plan (DOE/OR/02-1429&D1)*
- *Engineering Evaluation/Cost Analysis for Building 3001 Canal (DOE/OR/02-1502&D1)*
- *Removal Action Work Plan for the WAG 4 Seeps*
- *Building 9204-4 Exterior Process Piping Removal EE/CA (DOE/OR/02-1524&D1)*

Regulatory Commitment Status

Document title	Appendix E commitment date	Transmittal date
Action Memorandum for the Molten Salt Reactor Experiment Uranium Deposit Removal	7/8/96	6/27/96
Action Memorandum for the WAG 5 Old Hydrofracture Facility	7/31/96	7/30/96
Remedial Action Report for the K-1070 SW31 Spring	9/23/96	9/21/96
Phase II Remedial Action Work Plan for the Lower East Fork Poplar Creek	8/21/96	8/20/96
Remediation Effectiveness Report	8/30/96	8/28/96
EE/CA for the K-901-A Holding Pond and 1007-A P1 Pond	9/3/96	9/4/96
Action Memorandum for the K-25 Auxiliary Area	9/9/96	9/8/96
Remedial Investigation Report for Bear Creek Valley	9/16/96	9/14/96
Gunitite and Associated Tanks Feasibility Study/Proposed Plan	9/30/96	9/27/96
WAG 10 New Hydrofracture Wells Remedial Site Evaluation	9/30/96	9/27/96
Active LLLW Tanks Structural Integrity Assessment of Category C Tanks and Pipelines	9/30/96	9/29/96
Preliminary Assessment of the Ecological Risks to Wide-ranging Wildlife Species on the Oak Ridge Reservation	9/30/96	9/27/96
Environmental Restoration Footprint Reduction Process—Evaluation of Scarboro/East Haw Ridge Study Area	9/30/96	9/25/96

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Regulatory Commitment Status (continued)

Document title	Appendix E commitment date	Transmittal date
Remedial Site Evaluation Report for the K-1004-J Laboratory and Vault Area	9/30/96	6/28/96
Remedial Site Evaluation for the K-1410 and K-1031 Facilities and Surrounding Area	9/30/96	9/27/96
Removal Site Evaluation Report on Building 3019B at Oak Ridge National Laboratory	9/30/96	9/26/96
Removal Site Evaluation Report on Building 7602	9/30/96	9/26/96
Removal Site Evaluation Report on the Bulk Shielding Reactor at Oak Ridge National Laboratory	9/30/96	9/26/96
Removal Site Evaluation Report on the Tower Shielding Reactor at Oak Ridge National Laboratory	9/30/96	9/26/96
Clinch River/Poplar Creek Proposed Plan	8/2/96	8/1/96
WAG 1 3001 Canal EE/CA	7/30/96	7/26/96
WAG 4 Seeps RA Work Plan	7/30/96	7/26/96
Building 9404-4 Exterior Process Piping Removal EE/CA	9/27/96	9/27/96

1.2 DOCUMENTS PROPOSED FOR TRANSMITTAL TO THE REGULATORS

The following documents have been proposed for transmittal to the regulators during the first quarter of FY 1997.

- *Upper East Fork Poplar Creek Remedial Investigation Work Plan Addendum*
- *Waste Evaporator Facility Removal Action Report*
- *WAG 1 Surface Impoundments Record of Decision*
- *WAG 4 Seep Collection Removal Action Report*
- *MSRE D&D Reactive Gas Time-Critical Removal Action Report*
- *Action Memorandum for the WAG 1 3001 Canal*
- *K-1070-C/D G-Pit and Contaminated Pad ROD*
- *K-25 Site-Wide Record of Decision Remedial Investigation Work Plan*

2. SIGNIFICANT ACCOMPLISHMENTS

The following significant accomplishments are noted for the ER Program during the fourth quarter of FY 1996.

- The Record of Decision (ROD) was approved for the Bear Creek Operable Unit (OU) 2.
- The Action Memorandum (AM) for the Waste Area Grouping (WAG) 4 seep collection was approved.
- The AM for the WAG 5 Old Hydrofracture Facility (OHF) tanks was approved.
- The AM for uranium deposit removal at the Molten Salt Reactor Experiment (MSRE) was submitted ahead of schedule.
- Two new grants were signed with TDEC and one with the Tennessee Emergency Management Agency, effective for 5 years beginning September 1, 1996, through June 30, 2001. DOE/ER still retains financial responsibilities for the three grants. Funding for the state's regulatory participation in the FFA is provided in one of the TDEC grants.
- Site Specific Advisory Board meetings were held during the quarter on the following schedule: July 10—the impact of the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on the ORR was discussed; August 7 and September 11—ORR Environmental Management; September 16—Clinch River/Poplar Creek.
- A public workshop on DOE's 10-Year Cleanup Vision was held July 11, 1996, at the Oak Ridge Mall Community Room. On August 15, 1996, a public meeting was held in Oak Ridge to discuss the 10-Year Plan and ER's vision for an accelerated cleanup; this meeting was attended by approximately 140 stakeholders. The interim draft DOE–Oak Ridge Operations (DOE-ORO) Environmental Management 10-Year Plan was made available for review and comment by stakeholders beginning August 1 at the Information Resource Center, Oak Ridge, and on DOE's home page (http://www.ornl.gov/doe_oro).
- A public meeting was held on July 16 to discuss requests for three Class 2 permit modifications under the Tennessee Hazardous Waste Management Act. The 60-day public comment period ended on August 13.
- The Oak Ridge K-25 Site public tour pilot proved successful. Eighteen tours were conducted between August 1 and September 30 with 334 participants from 32 states and 4 countries. The tour program will resume in March 1997.
- A public meeting was held on August 7 to discuss the Proposed Plan for groundwater in the Union Valley area. The Proposed Plan involves establishing institutional controls that will ensure the public is aware of the potential risk associated with long-term consumption of affected groundwater.
- With the help of more than 200 contractor and DOE volunteers, a successful EnvironMENTAL Fair at the American Museum of Science and Energy was conducted on September 26. More than 3,000 sixth-grade students and teachers from Knoxville and the Cherokee Reservation in North Carolina attended the event, which drew media coverage from Knoxville television stations and front-page treatment in the *Knoxville News-Sentinel* and the *Oak Ridger*. The fair, which is designed to inform and interest students in environmental careers, this year carried a strong waste minimization theme.

- MSRE hosted the Molten Salt Panel of the Committee on Remediation of Buried and Tank Wastes (National Academy of Sciences/National Research Council Committee) on September 9 and 10, 1996. The purpose of the visit was to review fuel salt disposition alternatives.

3. TECHNICAL STATUS

This chapter provides the accomplishments of the ER Program during the fourth quarter of FY 1996 at the ORR. This quarterly report reflects the organization of Appendix C of the FFA. In this organization, Areas of Concern (AOCs) are inactive units or areas (i.e., units or areas not currently in use and for which it has been determined that no future use is planned) at which a release or threatened release of hazardous substances, pollutants, or contaminants exists. OUs are activities defined in approved decision documents, such as an AM or ROD. Characterization Areas (CAs) include AOCs that have undergone initial review or study and for which it has been determined that additional action under CERCLA is appropriate (e.g., additional study, non-time-critical removal action, etc.). Remedial Site Evaluation Areas (RSEs) include AOCs where sufficient information exists to conclude that the potential for contamination exists; however, insufficient information exists to determine if further CERCLA characterization is warranted. Removal Site Evaluation Areas (RmSEs) include AOCs that meet the criteria for evaluation under CERCLA (i.e., area is inactive, and hazardous substances may have been released), but insufficient information exists to determine if a removal or remedial action (RA) is necessary. ER Program activities conducted in the fourth quarter of FY 1996 are presented in this report relative to the category of AOCs with which they are associated and are discussed in Sects. 3.6–3.8.

Section 3.7 includes the technical status of liquid low-level (radioactive) waste (LLLW) tank systems. These tanks and tank systems are managed subject to provisions under FFA Appendix F for the Category A, B, and C active tanks and in Appendix C for the Category D inactive tanks.

3.1 SITE DESCRIPTIONS

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}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.

The K-25 Site is considered one watershed because of its location near the confluence of Poplar Creek and Clinch River and because of the large areas of cut and fill that were excavated during the construction of the plant. Specific sources or groups of sources within that watershed are the subject of environmental cleanup projects.

Oak Ridge National Laboratory

Oak Ridge National Laboratory (ORNL) occupies approximately 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.

Oak Ridge Y-12 Plant

The original mission of the Oak Ridge 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 (^{235}U) 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 (D&D) of standby 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 cleanup or mitigation of environmental pollution resulting from past waste management practices on portions of the 800-acre site. The RA 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.

Other Oak Ridge Reservation Areas

These areas are on the border of and help define the boundary of the ORR National Priorities List (NPL) area and consist of the Oak Ridge Associated Universities sites, the Clinch River/Poplar Creek area, Lower Watts Bar Reservoir (LWBR), and LEFPC.

Clinch River/Poplar Creek focuses on the portions of Poplar Creek and 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.

Watts Bar Reservoir is located on the Tennessee River just below its confluence with 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 polychlorinated biphenyls (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, through the city of Oak Ridge, and downstream to the stream's confluence with Poplar Creek. 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 originating within the Y-12 Plant.

3.2 OPERABLE UNITS STATUS

Upon completion and approval of a decision document (e.g., AM, ROD), clean-up or risk mitigation is initiated. When the decision document is signed, the action is designated as an OU in Appendix C of the FFA. Activities for an OU are governed by the terms and conditions of the decision document.

To document the effectiveness of CERCLA response actions on the ORR, the Remediation Effectiveness Report (RER) is prepared annually to monitor the effectiveness of remedial systems implemented under decision documents on the ORR.

3.2.1 Oak Ridge K-25 Site OU Status

3.2.1.1 K-1070-C/D SW-31 Seep Collection and Treatment Remedial Action

Area of Concern

K-1070-C/D Classified Burial Ground

Description

This project involves implementing an interim RA for the K-1070 Leachate Seep (SW-31) to reduce risk to human health and the environment. 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 RA chosen involves pretreatment to remove iron, air stripping the discharged water to remove volatile contaminants, then carbon filtration (polishing) to remove PCBs. Implementation of the RA took place in two phases. Phase 1 involved construction of a collection facility and transport of the spring water to the Y-12 Groundwater Treatment Facility for treatment. Phase 2 involved the modification of the K-25 Central Neutralization Facility to add unit processes enabling the treatment of organic compounds. After the completion of Phase 2, the spring water will be treated on site at the K-25 Central Neutralization Facility.

Activities completed in FY 1996 included the completion of Phase 2 modifications at the K-25 Central Neutralization Facility, with treatment at the facility commencing in July 1996, and preparation of the RA report.

Accomplishments

The D1 version of the RA report (DOE/OR/01-1520&D1) was transmitted to the regulators on September 21, 1996.

Operation of the SW31 treatment system commenced in July 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Continue project close out and transfer of SW31 collection and treatment activities to the Waste Management Division.

3.2.2 Oak Ridge National Laboratory OU Status

3.2.2.1 MSRE Reactive Gas Time-Critical Removal Action

Area of Concern

Molten Salt Reactor Experiment (MSRE) Reactor Building [Main Reactor, Reactor Cells, Radiator Stack, Blower House, and Vent House (7503)]

Description

MSRE is located in Building 7503 in WAG 8, which is situated in Melton Valley. It was part of the Atomic Energy Commission's Molten Salt Reactor Program, which was built to investigate the concept for central power station applications. The reactor first went critical on June 1, 1965, and was shut down on December 12, 1969. A surveillance and maintenance (S&M) program was initiated and continues on the shutdown facility. Elevated radiation readings indicated potential migration of radioactive contamination outside the fuel drain tank cells. Subsequent analyses and tests showed evidence of ^{233}U in the Auxiliary Charcoal Bed, located in the Charcoal Bed Cell, and reactive gases (uranium hexafluoride, UF_6 , and fluorine) in the off-gas piping system.

A time-critical removal action program was initiated in July 1994 based on the findings that radionuclides had migrated from the fuel tank drain cells. In October and November 1994, water was removed from the Auxiliary Charcoal Bed Cell, and several other stabilization measures were performed in advance of the submittal of the AM by letter, dated May 12, 1995. Stabilization measures included installation of a criticality alarm, grouting of the cell overflow line, installation of an isolation valve in the cell ventilation line, isolation of the cell drain line, installation of sealed plugs into penetrations in the cell shield plug, and inserting the cell atmosphere by filling with carbon dioxide. EPA and TDEC have acknowledged and accepted the actions. The remaining item to be performed upon approval of the AM is the implementation of a chemical trapping system for the removal of reactive gases from the off-gas system.

The removal of potentially reactive UF_6 and fluorine gases from the off-gas system will complete this removal action. A shielded chemical trapping system is proposed to collect and trap the reactive gases. Once the gases are chemically adsorbed onto reactive pellets as a solid, the fluorine can be properly managed as an aluminum trifluoride waste material, and the UF_6 will be managed as a product in a storage facility at ORNL. The stored UF_6 must be processed and converted to an uranium oxide to ensure long-term storage stability. Operation of the reactive gas collection system is expected to continue periodically until the fuel salt has been removed from the facility.

The public and employees were informed throughout the process of discovery, performance of the stabilization measures, and scoping of the removal action. A senior review board of independent, recognized nuclear industry experts assessed the MSRE removal action in February 1995 and again in October 1995. The board noted that actions already taken, currently in progress, or planned for the near future at the facility have been and will be effective in reducing the risks at MSRE.

Accomplishments

The Reactive Gas Removal System (RGRS), including the tubing, ventilation ducts, and other support hardware for removal of the reactive gases, was successfully installed in the MSRE facility.

System check-outs of RGRS identified several minor deficiencies, which were quickly resolved. These deficiencies included moisture in the helium supply and out-leakage concerns with the vacuum pumps. Moisture in the helium supply was removed by installing a zirconium sponge downstream of the helium supply. Vacuum pump deficiencies were resolved by internal design changes.

Support systems for passivation (with fluorine) and trial testing of RGRS have been installed and tested. The support systems enabled passivation of RGRS both initially and following in-leakage from the failed vacuum pumps.

Preparations have been made to perform a series of trial tests with a mixture of gases similar to the reactive gases found in MSRE, except that UF_6 with the naturally occurring isotopic composition will be used instead of the $^{233}UF_6$, which is present in the off-gas system. The results of these tests will be evaluated and used to verify readiness of equipment and personnel for initiating reactive gas removal.

Concerns

None.

Scheduled Activities for Next Quarter

Final check-out and readiness review evaluations will be performed on RGRS. Reactive gas removal from MSRE will begin as soon as practicable.

3.2.2.2 Waste Evaporator Facility

Area of Concern

Waste Evaporator Facility

Description

Building 3506 (Waste Evaporator Facility) is located adjacent to the South Tank Farm in the main plant area. Building 3506 operated as an evaporator from 1949 to 1954, and after decontamination it was used as an experimental facility to demonstrate contaminated waste incineration. The primary project objective is the demolition of the above-grade portions of the facility. This action would remove an obstacle inhibiting access in the South Tank Farm and would facilitate the continued remedial activities at the Gunite and Associated Tanks (GAAT) CA. This D&D activity is being conducted as a non-time-critical removal action under CERCLA.

Accomplishments

Removal actions have been completed.

The removal action report is being prepared.

Concerns

None.

Scheduled Activities for Next Quarter

Submit the removal action report to the regulators.

3.2.2.3 ORNL WAG 4 Seep Collection***Area of Concern***

Solid Waste Storage Area 4

Description

WAG 4 is located in Melton Valley immediately south of the main plant area through a gap in Haw Ridge. This WAG consists of three areas: (1) Solid Waste Storage Area 4, which is 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 ORNL main complex to waste pits and trenches in WAG 7. Site investigations conducted during FY 1994 and FY 1995 have identified four isolated trench areas that are believed to contribute about 70% of the ^{90}Sr exiting Solid Waste Storage Area 4. An Engineering Evaluation/Cost Analysis (EE/CA) and an AM have been prepared for this non-time-critical removal action; these documents identify the use of low-pressure grouting of the four trenches as the preferred alternative. The objective of the low-pressure grouting is to reduce the hydraulic conductivity of the source areas, thereby isolating the ^{90}Sr source material from the groundwater flow system.

Accomplishments

All site preparation activities are completed, and grouting operations are proceeding.

All sleeve pipes (grout pipes) and observation wells have been installed.

The Removal Action Work Plan was submitted to the regulators in July 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Complete grouting operations.

Prepare and submit the Removal Action Report to the regulators.

3.2.2.4 WAG 5 OHF Tank Sludge Removal Action

Area of Concern

Old Hydrofracture Facility (OHF) LLLW Tanks T-1, T-2, T-3, T-4, and T-9

Description

OHF, located in WAG 5, was used from 1964 to 1979 for permanent disposal of liquid radioactive waste in shale formations at depths between 780 and 950 ft. More than 2 million gal of LLLW and grout mixture containing several hundred thousand curies of beta-gamma radionuclides—primarily ^{137}Cs , ^{90}Sr , and ^{60}Co , with lesser amounts of ^{233}U , ^{239}Pu , ^{244}Cm , and ^{241}Am —were injected. The OHF facility contains five carbon-steel, underground storage tanks that ranged in volume from 13,000 to 25,000 gal. These tanks were used for storage of LLLW before mixing with grout for injection. At cessation of OHF operations in 1979, radioactive sludges accumulated in the tanks as particles settled out of the liquid in the tanks. A non-time-critical removal action was initiated in 1995 to remove the sludges from the five LLLW tanks at the OHF area.

Accomplishments

The D2 AM was given DOE approval (regulator approval on the D2 was not required). The remedy listed in the AM is to sluice and pump the OHF tanks contents to the Melton Valley Storage Tanks (MVST).

Installation of ten tank risers on the OHF tanks was completed. Also, all site preparation work was completed in anticipation of the transfer of the OHF tank material to MVST.

Concerns

None.

Scheduled Activities for Next Quarter

Submit the approved D2 AM to the regulators.

Perform a modification to the existing valve box at the OHF site. This will allow transfer of the OHF tanks' contents to MVST via an underground pipeline.

3.2.3 Oak Ridge Y-12 Plant OU Status

3.2.3.1 Bear Creek Cap Maintenance Remedial Action

Area of Concern

Spoil Area 1, SY-200 Yard

Description

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 approximately 100,000 yd³ 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.

The SY-200 Yard was a 200- by 300-ft aboveground storage area located adjacent to Old Bear Creek Road. Materials received from several Y-12 Plant and ORNL divisions included PCB transformers, lead shielding plates, and radioactively contaminated materials.

Both sites have clean soil covers (clay caps) placed on top of the original debris or contaminated soils. Because of the lack of exposure pathways and the lack of groundwater contamination from these sites, a Proposed Plan and a ROD have been submitted, with the preferred alternative being maintenance of the existing caps.

Accomplishments

The D2 version of the ROD (DOE/OR/02-1435&D2) was issued on July 12, 1996. The ROD was approved by TDEC and EPA on July 26, 1996, and September 4, 1996, respectively. The signature version was signed by DOE and TDEC on September 13, 1996, and sent to EPA for final signature. The project has become an OU and has been moved from the CA category to the OU category in Appendix C of the FFA.

Concerns

None.

Scheduled Activities for Next Quarter

The Y-12 RA S&M Program will implement any needed maintenance actions for the soil covers.

The Bear Creek Cap Maintenance RA will not be reported in future FFA Quarterly Reports due to the completion of the RAs for the site. Any future maintenance actions or monitoring results will be reported in the RER.

3.2.3.2 Filled Coal Ash Pond Stabilization Remedial Action

Area of Concern

Filled Coal Ash Pond, Upper McCoy Branch

Description

The Filled Coal Ash Pond Stabilization RA consists of activities at the Filled Coal Ash Pond and Upper McCoy Branch. The Filled Coal Ash Pond is situated within the McCoy Branch watershed approximately 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, approximately 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 potential biological impact from the ash pond operations; however, conditions have improved in recent years with the cessation of ash disposal in this watershed.

A Proposed Plan and a ROD have been approved for this site. The preferred alternative is stabilization of the dam and relocation of a wetlands at the base of the dam, which will be disrupted as a result of construction. An accelerated schedule for implementation of the preferred alternative has been approved by the FFA parties. This acceleration will result in savings relative to the baseline schedule and in a cost savings estimated at more than \$800,000 over 3 years.

A letter and attached schedule were issued to EPA and TDEC in December 1995 in lieu of submittal of a Remedial Design Work Plan. The Remedial Design Report was submitted to EPA and TDEC in March 1996; the Remedial Action Work Plan (RAWP) was issued in May 1996. The final Remedial Design Report was approved by EPA and TDEC.

Accomplishments

The RAWP was approved by the regulators on July 24, 1996.

The construction contract award for the RA was protested, and issuance of the contract was delayed. There was a concern that if this issue were not resolved, the construction season would pass and the project be delayed a year. However, DOE worked with the U. S. Small Business Administration to expedite the ruling on the dispute, and construction has commenced.

RA field construction activities commenced on August 5, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Construction activities will continue. RA field activities are scheduled for completion in January 1997.

3.2.4 Other Oak Ridge Reservation Areas OU Status

3.2.4.1 Lower East Fork Poplar Creek Soil Removal Remedial Action

Area of Concern

LEFPC

Description

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. More than 20 tributaries and treated effluent from the Oak Ridge Sewage Treatment Plant flow into the 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 108,000–212,000 kg (239,000–470,000 lb) of mercury into East Fork Poplar Creek (EFPC) between 1953 and 1983. 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 between 10 to 15 g/day, down from 100 g/day in 1985. Releases are regulated under the Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit for the Y-12 Plant. Portions of the sewers were relined in 1986–1987 to reduce mercury contamination. Efforts continue to further reduce mercury discharges [e.g., D&D, Reduction of Mercury in Plant Effluents (RMPE), and remediation of mercury-use areas]. Overall, the pace of mercury activities at the Y-12 Plant is ahead of the compliance schedules in the NPDES permit, and new opportunities are being recognized for achieving additional mercury reductions. These opportunities were not felt to be achievable several years ago.

In addition to the creek and floodplain, the Sewer Line Beltway was constructed 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.

Access agreements were negotiated with adjacent landowners to facilitate the RAs. As a result of protracted negotiations, agreements were reached for access to the Bruner site and the National Oceanic and Atmospheric Administration facility.

The cleanup objective for the site is to prevent current and future user exposure to mercury-contaminated soils. With significant community input and participation, a proposed mercury action level of 180 ppm was raised to 400 ppm, and excavation of floodplain soils above this action limit received regulatory approval in an August 1995 ROD. An *Explanation of Significant Differences for the LEFPC Record of Decision* was submitted to EPA and TDEC in the third quarter of FY 1996. This request documented two primary changes in the ROD: an increase in the estimated volume of sediment to be excavated (from 10,000 to 27,000 cu yd) and the addition of a package water treatment system to treat storm water runoff generated during the RA. Phase I of the RA began June 8, 1996.

Accomplishments

Field activities associated with the Phase I RA were completed on September 14, 1996. Independent verification indicated that all mercury above 400 ppm was removed during the Phase I RA.

The D2 version of the *Explanation of Significant Differences for the LEFPC Record of Decision* (DOE/OR/02-1443&D2) was issued to the regulators. EPA approval of the D1 version was received on June 26, 1996.

The *Remedial Action Work Plan for Phase II of the Lower East For Poplar Creek* (DOE/OR/01-1480&D1) was issued on August 2, 1996, approximately 3 weeks ahead of schedule.

The D2 version of the Phase II Remedial Design Report (DOE/OR/01-1449&D2) was transmitted to the regulators on July 30, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Issue the Phase I RA independent verification report.

Receive regulator approval for the Explanation of Significant Differences.

Receive regulator approval for the Phase II Remedial Design Report.

3.3 CHARACTERIZATION AREA STATUS

Remedial Investigation/Feasibility Studies (RI/FSs) are required by Section XI of the FFA to be conducted at AOCs where additional information is required to determine the need for CERCLA remediation. The CA category of Appendix C of the FFA includes AOCs where additional CERCLA actions (e.g., RI/FS activities, non-time-critical removal actions, etc.) have been deemed appropriate.

3.3.1 Oak Ridge K-25 Site CA Status**3.3.1.1 K-1070-A Contaminated Burial Ground****Area of Concern**

K-1070-A Contaminated Burial Ground

Description

The K-1070-A 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 approximately 35,575 ft³ of uranium-contaminated material and 2430 ft³ of thorium-contaminated material. Other material includes UF₆ cylinders, beryllium chips, boron, radioactive NaF, oil, rags, etc. Prior to FY 1996, the project has consisted of a field investigation to determine the nature and extent of groundwater contamination. The results have shown that the burial ground site is atop a highly developed karstic system. Discovery of the karst system has necessitated a re-evaluation of the assumptions and site conceptual model on which the project was originally based. Work scheduled for FY 1996 has been developed to test the new assumptions and conceptual model.

Accomplishments

Demobilization activities for the Remedial Investigation (RI) field work were completed.

Water level measurements were collected in selected drive point wells.

Preparation of the RI/FS report continued.

The final Dye Tracer Summary Report was submitted to TDEC on May 28, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Continue preparation of the RI/FS report.

3.3.1.2 K-1070-C/D G-Pit and Contaminated Pad**Area of Concern**

K-1070-C/D Classified Burial Ground (K-1070 and K-1071 Concrete Pads; K-1070 Pits; and K-1070 D1, D2, and D3 Storage Dikes)

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 land farm, 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 land farm is a road onto 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 RA was initiated in January 1994 for the SW 31 Leachate Seep, which is located immediately west of the site and may have been contaminated by the burial ground.

The results of a recently completed RI/FS have shown the need for remediation of two sites in the K-1070-C/D Classified Burial Ground: the K-1071 concrete pad and the K-1070-G pit. Remediation of these two units will be initiated upon approval of the scheduled ROD for the K-1070-C/D Burial Ground.

Accomplishments

Preparation of the ROD continued.

Concerns

Concern: DOE has not funded this project for FY 1997. **Impact:** The schedule for completion of the ROD has been delayed. **Action:** Pursue funding as program priorities allow.

Scheduled Activities for Next Quarter

Discontinue the project.

3.3.1.3 K-25 Auxiliary Facilities Demolition Project

Area of Concern

K-1410 Plating Facility, K-1031-A Building, K-725 Beryllium Building, K-724 Storage Building, K-1131 Building

Description

Two separate projects for (1) K-1131/K-1410 Area Demolition and (2) K-725 Beryllium Building Removal have been combined into one project for management purposes. The five facilities included in these two projects (K-725, K-724, K-1131, K-1410, and K-1031) are now the Group 1 facilities under the K-25 Auxiliary Facilities Assessments. One EE/CA is currently being prepared for these five facilities in accordance with milestones contained in the FFA Appendix E. A brief description of the facilities is as follows:

K-725 is a small (21,600-ft²) building in the powerhouse area for which there are limited access controls. This building, along with the nearby K-724 Warehouse Building (8,600 ft²), was originally part of the S-50 thermal diffusion process for enriching uranium. The buildings were later used in the Nuclear Energy Propulsion for Aircraft project. Both facilities were constructed in the mid-1940s and are known to be contaminated with beryllium and radioactivity in excess of release limits. Both the K-724 and K-725 buildings are structurally deteriorated and have leaky roofs.

The K-1031, K-1131, and K-1410 facilities were built in the mid-1940s and are all shutdown facilities located adjacent to Poplar Creek. K-1131 (55,700 ft²) was used to support the gaseous diffusion process (UF₆ production, HF handling, UF feed vaporization, and depleted UF tails withdrawal). K-1131 contains high levels of radioactive contamination that exceed release limits, and part of its roof has failed, allowing rainwater inflow to the building contents. K-1410 (9,000 ft²) was originally used for decontaminating equipment with uranium contamination and later for nickel plating metal parts of uranium enrichment equipment. This facility also contains high levels of radioactive contamination that exceed release limits and is in a deteriorated condition from roof leaks. K-1031 (2,900 ft²) was a maintenance and storage facility in support of the decontamination operations in nearby K-1410. This facility contains radioactive contamination exceeding release limits.

D&D of these facilities will be performed as CERCLA non-time-critical removal actions, as established in the May 22, 1995, joint DOE and EPA "Policy on Decommissioning of Department of Energy Facilities under CERCLA." An EE/CA has been prepared and transmitted to the regulators and offered for public comment. No comments were received during the public comment period.

Accomplishments

The AM (DOE/02-1507&D1) was submitted to the regulators on September 8, 1996.

Concerns

Concern: The project is not currently funded for FY 1997. **Impact:** Completion of the project will be delayed until funding is available. **Action:** Seek priority for funding in future budgets.

Scheduled Activities for Next Quarter

Receive regulator comments on the D1 AM and submit the D2 version.

3.3.1.4 K-901-A Holding Pond/K-1007-P1 Pond

Area of Concern

K-901-A Holding Pond and K-1007-P1 Pond

Description

The K-901-A Holding Pond received chromated cooling tower water blowdown and a variety of other wastes from cylinders released ballistically over the pond in the late 1950s. Three previous investigations at the K-901-A Holding Pond concluded that there is sediment contamination, unacceptable risk to human health, and potential risk to ecological receptors. The result of the sediment investigation conducted in 1986 indicated elevated levels of contamination existed from chromium, selenium, and zinc. The results of the K-901-A Holding Pond ecological risk assessment, conducted in 1994, indicated that contaminant levels in the fish presented a risk to piscivorous predators. In 1994, an RSE was conducted, which determined that an unacceptable human health risk existed from the ingestion of PCB-contaminated fish and that a potential risk to ecological receptors, such as herons, mink, and kingfisher, existed (depending on the percentage of diet received from the pond). The site evaluation also confirmed the existence of sediment contamination.

The K-1007 P1 Pond, formerly known as the K-1007-B Pond, is located outside Portal 2 on the southwestern boundary of the K-25 Site. The K-1007-P1 Pond has historically received discharges from the laboratory complex and from process building storm drains around the K-25 Site. The pond currently receives discharges from five storm drains. Previous sampling activities in the late 1980s and the 1990s revealed high levels of PCBs in largemouth bass in the K-1007-P1 Pond and in sediment. If ingested, the levels of PCB in the fish present an unacceptable human health risk. As a result of the elevated levels of PCBs found in the fish, warning signs were placed around the boundary of the pond, and guard patrols were increased.

Accomplishments

The D1 EE/CA (DOE/OR/02-1513&D1) was transmitted to the regulators on September 5, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Receive comments, and submit the D2 EE/CA to the regulators.

After completion of the EE/CA, no further activities on this project are funded by DOE.

3.3.2 Oak Ridge National Laboratory CA Status

3.3.2.1 White Oak Creek Watershed ROD

Area of Concern

All AOCs listed in Appendix C of the FFA for the Melton Valley area of ORNL

Description

A project has been initiated to prepare an RI/FS for the Melton Valley portion of the White Oak Creek (WOC) watershed at ORNL. The project will use existing data, supplemented by a small amount of new data, to prepare an RI/FS for the Melton Valley area of ORNL. Selection of the preferred alternative for the remediation of the Melton Valley area of ORNL will lead to the establishment of remediation goals and identification of the sequence of actions to be taken during remediation of the watershed.

Groundwater, surface water, floodplain soils, and source units in the WOC watershed are being evaluated as a single entity (i.e., watershed) to ensure that (1) a consistent approach to remediation is implemented across the valley and (2) RAs at specific sites are prioritized to achieve the greatest risk reduction. This watershed encompasses essentially all of the contaminated areas within the Melton Valley area of ORNL.

Accomplishments

Work on the RI report continued during this quarter.

Preparation of the baseline risk assessment and the fate and transport sections of the RI report were completed.

Preparation of the Feasibility Study (FS) continued during this quarter.

Concerns

None.

Scheduled Activities for Next Quarter

Receive analytical data from the soil sampling tasks.

Continue preparation of the RI and FS reports.

3.3.2.2 Gunitite and Associated Tanks (GAAT)

Area of Concern

Inactive LLLW Collection/Storage Tanks W-1, W-2, W-3, W-4, W-5, W-6, W-7, W-8, W-9, W-10, W-11, W-13, W-14, W-15, W-1A, and TH-4

Description

GAAT consists of the underground steel and Gunitite tanks associated with two tank farms located in the center of the ORNL main plant area. The GAAT area includes the tanks located in the North Tank Farm and the South Tank Farm as well as Tanks TH-4 and W-11. This area includes the large Gunitite tanks installed in 1943 to store liquid wastes 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 have similar characteristics to be remediated as a group and also to complete the remediation of all of the Gunitite tanks at ORNL.

Based on contaminant loading, GAAT is composed of three separate tank groups:

- Group 1 tanks: W-1, W-1a, W-2, W-11, W-13, W-14, and W-15;
- Group 2 tanks: W-3, W-4, and TH-4; and
- Group 3 tanks: W-5, W-6, W-7, W-8, W-9, and W-10.

The GAAT project is currently conducting treatability studies to determine the most effective way to remediate sludges remaining in the tanks. The studies include testing methods for removing and/or treating sludges from the tanks. The accomplishments and concerns identified herein are common to all of the three tank groups.

Accomplishments

The *Gunitite and Associated Tanks Feasibility Study/Proposed Plan* (DOE/OR/02-1427/V1, V2&D1) for Group 2 Tanks (W-3, W-4, and TH-4) was transmitted to the regulators on September 27, 1996.

The waste dislodging, conveyance system, and robotic vehicle were delivered.

The results of the treatability study and the proposed scope of work for the first FS were discussed at the September FFA Project Manager's Meeting.

Cold testing of the confined sluicing end effector and flow control box was initiated.

Tank W-5 was removed from the Group 2 tanks because of differences in the selected remedy for this tank versus the other Group 2 tanks. Tank W-5 was moved to the Group 3 tanks.

Concerns

None.

Scheduled Activities for Next Quarter

Reschedule the FS/Proposed Plan public meeting upon notice by the regulators.

The modified light duty utility arm will be delivered and installed.

The North Tank Farm utility and high-efficiency particulate air (filter) system installation will be completed.

Integrated waste removal system cold testing will be initiated.

Comments on the D1 FS/Proposed Plan will be received, and the D2 version will be issued.

3.3.2.3 Main Plant Surface Impoundments

Area of Concern

Waste Holding Basin 3513, Equalization Basin 3524, Process Waste Ponds 3539 and 3540

Description

The Main Plant Surface Impoundments consists of four surface impoundments located in the south-central portion of the ORNL main plant area. A brief description of each of the four impoundments follows.

Basin 3513. This unlined impoundment was constructed in 1944 in natural clays to serve as a settling basin for untreated waste waters before their discharge into the adjacent WOC. This impoundment is no longer used, but water levels are maintained to provide shielding for radioactive sediments.

Basin 3524. This unlined impoundment was constructed in 1943 in natural clays to serve as an intermediate storage, collection, and mixing basin for the process waste treatment system located in Building 3544. This impoundment is no longer intentionally used. However, some ground water enters the pond during peak storm events due to inadequate pumping capacity in one part of the existing process waste collection system.

Ponds 3539 and 3540. These clay-lined impoundments were constructed in 1964 to serve as surge capacity for process waste streams, primarily from the Building 4500 complex. The ponds are no longer used.

Accomplishments

Evaluation of a new alternative, 5B (proposed by TDEC and previously identified as Alternative 7), was completed and incorporated into the Proposed Plan. Alternative 5B removes sediments from impoundments and disposes of them at the proposed ORR (Y-12) consolidation cell.

The *Proposed Plan for the Surface Impoundments Operable Unit at WAG 1* (DOE/OR/02-1427&D2) was submitted to the regulators on August 23, 1996, with Alternative 3 (on-site consolidation cell) identified as the preferred alternative. A summary table of the cost

estimates for all seven alternatives was prepared and transmitted to the regulators for their information in reviewing the Proposed Plan.

The engineering support studies were completed during this quarter, including added work to support Alternative 5B. Dewatering tests show the sediments dewater easily and will not require additives to remove free water, supporting the technical viability of Alternative 3. Composite sampling indicates the sediments are not RCRA wastes. Solidification studies indicate fly ash and cement can be used successfully for solidification. These results support the technical viability of Alternative 5B.

Preparation of the ROD began.

Concerns

Concern: TDEC does not agree that DOE's preferred Alternative 3—consolidate the sediments on site—is the best available remedy. However, TDEC concurs with release of the Proposed Plan for public comment with their letter attached indicating a differing preference for the alternative to be selected. EPA concurs with release of the Proposed Plan with Alternative 3 as the DOE preferred alternative for public review and comment. TDEC and EPA indicate that the public hearing should address issues such as final land use, consolidation of all environmental restoration wastes, the need for a central waste disposal facility, and the impact of the 10-year plan. There is a strong desire to obtain public comments on these issues, many of which have been discussed by the three parties for years. **Impact:** This approach will result in delays to the Main Plant Surface Impoundments schedule. This approach will hopefully expedite CERCLA decisions for future projects. **Actions:** Prepare a fact sheet explaining the decision issues for distribution to the public, and hold a public meeting to obtain public input and resolve issues.

Scheduled Activities for Next Quarter

Schedule and conduct the public meeting for the Proposed Plan.

Begin preliminary engineering tasks for the preparation of a performance specification package for bidding of remediation design and construction activities.

3.3.2.4 ORNL WAG 1 Groundwater

Area of Concern

WAG 1 groundwater plume discharging to surface water

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. This project is entering into a period of monitoring and characterization to identify contaminant sources and their migration pathways, with the objective of identifying potential locations for early actions.

Accomplishments

The evaluation and interpretation of drive point analytical data indicates that a high likelihood exists that the area in the immediate vicinity of tank W-1A in the north tank farm is the source of the Core Hole 8 plume. Additional data are being collected and reviewed to reduce the uncertainty of that interpretation.

Work associated with the installation of five wells in the central portion of ORNL near Building 3019, the 3001 canal, and the north tank farm was completed. Dry season semi-annual sampling was completed.

Monthly and continuous water level monitoring continued.

Concerns

None.

Scheduled Activities for Next Quarter

As a result of the development of an integrated monitoring program to support ER activities throughout the ORR, ORNL WAG 1 Groundwater activities will be incorporated into the ORR Integrated Water Quality Program (IWQP), which is described in Sect. 3.6.6 of this report. The ORR IWQP will be implemented in FY 1997.

3.3.2.5 ORNL Surface Water Program

Area of Concern

All AOCs at ORNL

Description

The Surface Water Program proposes to conduct a series of monitoring, characterization, and data assessment tasks to meet three primary objectives:

- determine the effectiveness of ongoing response actions in reducing contaminant releases into and from the WOC watershed;
- provide information to develop baseline contaminant conditions in the WOC, Raccoon Creek, and Bearden Creek watersheds to be used primarily as part of the WOC watershed RI/FS initiative; and
- provide information to help evaluate future response actions in the WOC watershed.

Activities focus primarily on the WOC watershed, which is the surface water drainage for the main plant area and major WAGs at ORNL. Some characterization activities will take place in Raccoon Creek and Bearden Creek to baseline the contaminant release conditions in these two drainages.

Much of the focus of the program will be on evaluating the effectiveness of recent and planned response actions, including WAG 5 Seeps C and D, Core Hole 8 plume collection system, and WAG 4

seeps. The general approach for evaluating WAG 5 seeps and Core Hole 8 will be to determine the effectiveness of the treatment system and the effectiveness of the response action on reducing contamination in the watershed by sampling at major weirs and White Oak Dam.

Accomplishments

Sampling and analysis of surface water was completed, as described in the FY 1996 Surface Water Project Plan (ORNL/ER-323). Collection of hydrogeological and meteorological data continued at existing monitoring stations.

Concerns

None.

Scheduled Activities for Next Quarter

None. As a result of the development of an integrated monitoring program to support ER activities throughout the ORR, ORNL Surface water Project activities will be incorporated into the ORR IWQP, which is described in Sect. 3.6.6 of this report. The ORR IWQP will be implemented in FY 1997.

3.3.2.6 ORNL WAG 2 (White Oak Creek Embayment and Tributaries)

Area of Concern

WOC and tributaries, White Oak Lake and embayment

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, White Oak Dam, and the WOC Embayment prior to its confluence with Clinch River. WOC/White Oak Lake 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 Clinch River at River Mile 20.8, about 1.5 miles north of the junction of Interstate 40 and State Highway 95. White Oak Lake is located upstream of White Oak Dam and just south of the ORNL main complex. WOC Embayment encompasses the area downstream of White Oak Dam to the confluence of WOC with Clinch River (0.6 mile). White Oak Lake 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}Sr , ^{137}Cs , ^{60}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 are conducted as the ORNL Area Surface Water Program. Groundwater assessment activities are conducted as the ORNL Area Groundwater Program. 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 RAs with maximum efficiency and cost-effectiveness.

An RI was initiated on WAG 2. Sample collection is complete, and laboratory analysis data have been validated. The results of the WAG 2 RI will not be published in an RI report. Instead, the data was published in five separate information assessment reports. The task areas covered by the individual reports included seep and tributary assessment, human health risk, ecological risk assessment, and sediment transport modeling in WAG 2.

Accomplishments

Data were reviewed and verified for incorporation into the Oak Ridge Environmental Information System (OREIS).

Project records, files, and administrative requirements were completed.

Concerns

None.

Scheduled Activities for Next Quarter

Continue task team efforts focusing on data review and verification for incorporation into OREIS, and complete project records, files, and administrative requirements.

Note: This project will not be mentioned in future FFA Quarterly Reports; instead, it will be summarized in Sect. 3.6.6—IWQP.

3.3.2.7 ORNL Area-Wide Groundwater Program

Area of Concern

Area bounded on the north by Pine Ridge, on the south by Copper Ridge, on the west by Clinch River, and on the east by Bearden Creek

Description

Groundwater flow paths 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 Melton and Bethel valleys has been established and will be the focus of multi-year, long-term characterization and monitoring activities. Focused RAs will be implemented as required.

Accomplishments

Water level information has been collected from existing groundwater monitoring wells. Information collected under this effort will be used as input to the conceptual groundwater/contaminant flow path model.

Groundwater sampling and analysis activities continued under the groundwater characterization and modeling task.

Concerns

None.

Scheduled Activities for Next Quarter

None. As a result of the development of an integrated monitoring program to support ER activities through the ORR, ORNL Area-Wide Groundwater Program activities will be incorporated into the ORR IWQP, which is contained in Sect. 3.6.6 of this report. The ORR IWQP will be implemented in FY 1997.

3.3.2.8 ORNL WAG 7 Pit 1 In Situ Vitrification

Area of Concern

Pit 1

Description

In situ vitrification (ISV) is being evaluated as the baseline closure technology for several pits and trenches at WAG 7. The ISV activity will continue in FY 1997 with field-scale demonstrations at two adjacent melts in Pit 1 where contaminated soil particles will be melted into a glass matrix. A treatability study will provide necessary information for 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 ft³) and radionuclide inventory (87 Ci of mixed fission products).

The first melt at Pit 1 was initiated on April 3, 1996, and a pressure surge event occurred on April 21, 1996, resulting in a partial melt expulsion. The melt expulsion caused some minor damage to the testing hardware and delayed completion of the Pit 1 demonstration. Radiological surveys were conducted of the area to ensure that any radiological releases were monitored. The release associated with the melt expulsion was insignificant. A technical evaluation and independent investigation of the melt expulsion has been completed and issued to the public. Impacts of the event continue to be reviewed for changes to procedures, equipment, and instrumentation.

The major objectives of ISV-related work in FY 1997 include completing repairs to the ISV off-gas filter system and collection hood and completing the Pit 1 demonstration. 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 ¹³⁷Cs,
- 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 ¹³⁷Cs, ⁹⁰Sr, ⁹⁹Tc, and radioactive

uranium contaminants will be summarized in a technical report in FY 1997. These data will constitute a valuable adjunct in the evaluation of ISV as a closure technology.

Accomplishments

A technical evaluation and independent investigation of the melt expulsion has been completed and issued to the public on July 22, 1996. It was determined that the environmental effects of the melt expulsion were minor and that the ISV process could be configured to prepare for an event such as melt expulsion. The effects of the presence of free water in the melt zone and the resulting melt expulsion have provided data critical to the full-scale implementation of ISV.

Concerns

Concern: The removal of free water from the melt zone is required prior to resuming the melt.
Impact: The evaluations needed to facilitate free water removal may impact the project schedule.
Action: Groundwater wells are being installed adjacent to Pit 1 to evaluate whether groundwater recovery will effectively dewater the melt zone. Activities are proceeding as quickly as practicable to minimize schedule impact.

Scheduled Activities for Next Quarter

Establish contracts to repair and modify damaged equipment, and make appropriate procedural changes to minimize damages to the ISV system and prevent injury to personnel in the event of a future melt expulsion.

Install groundwater wells adjacent to Pit 1 to evaluate the feasibility of dewatering the melt zone.

3.3.2.9 MSRE D&D Uranium Deposit Removal

Area of Concern

MSRE Reactor Building [Main Reactor, Reactor Cells, Radiator Stack, Blower House, and Vent House (7503)]

Description

MSRE is located in Building 7503 in WAG 8, which is situated in Melton Valley. It was part of the Atomic Energy Commission's Molten Salt Reactor Program, which was built to investigate the concept for central power station applications. The reactor first went critical on June 1, 1965, and was shut down on December 12, 1969. An S&M program was initiated and continues on the shutdown facility. Elevated radiation readings indicated potential migration of radioactive contamination outside the fuel drain tank cells. Subsequent analyses and tests showed evidence of ^{233}U in the Auxiliary Charcoal Bed, located in the Charcoal Bed Cell, and reactive gases (uranium hexafluoride, UF_6 , and fluorine) in the off-gas piping system.

This non-time-critical removal action comprises the recovery of potentially reactive UF_6 from the Auxiliary Charcoal Bed. Once the gases are removed from the off-gas system and conditions around the Auxiliary Charcoal Bed and the Charcoal Bed Cell are stabilized, the removal of the fissile uranium can be completed.

Accomplishments

The Action Memorandum for the Molten Salt Reactor Experiment Uranium Deposit Removal (DOE/OR/O2-1488&D1) was transmitted to the regulators on August 9, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Title II design activities for the Uranium Deposit Removal equipment is scheduled to commence.

Procurement and mock-up testing of prototype, remotely operated components and systems will begin by mid-quarter. Mock-up testing activities will continue through FY 1997. Information obtained from the mock-up testing will provide valuable design input for the final configuration of components and systems.

3.3.2.10 MSRE D&D Fuel Salt Remedial Action

Area of Concern

MSRE Reactor Building (7503)

Description

MSRE is located in Building 7503 in WAG 8, which is situated in Melton Valley. It was part of the Atomic Energy Commission's Molten Salt Reactor Program, which was built to investigate the concept for central power station applications. The reactor first went critical on June 1, 1965, and was shut down on December 12, 1969. An S&M program was initiated and continues on the shutdown facility. Elevated radiation readings indicated potential migration of radioactive contamination outside the fuel drain tank cells. Subsequent analyses and tests showed evidence of ^{233}U in the Auxiliary Charcoal Bed, located in the Charcoal Bed Cell, and reactive gases (uranium hexafluoride, UF_6 , and fluorine) in the off-gas piping system.

This interim RA includes the stabilization or removal and disposition of the fuel and flush salts from the MSRE facility.

Accomplishments

Report ORNL/ER-380, *Identification and Evaluation of Alternatives for the Disposition of Fluoride Fuel and Flush Salts from the Molten Salt Reactor Experiment at Oak Ridge National Laboratory*, was issued to the public on August 7, 1996. This report documents the identification of potential endpoints; the screening of removal, processing, and stabilization technologies; the identification of alternatives; the evaluation of alternatives; and the recommended preferred method.

MSRE hosted the Molten Salt Panel of the Committee on Remediation of Buried and Tank Wastes (National Academy of Sciences/National Research Council Committee) on September 9 and 10, 1996. The purpose of the visit was to review fuel salt disposition alternatives.

Concerns

None.

Scheduled Activities for Next Quarter

Continue preparation of the FS.

3.3.2.11 3001 Canal*Area of Concern*

Building 3001 Canal

Description

The Building 3001 Canal is an underground, concrete-walled storage canal that runs under a parking lot from beneath the Graphite Reactor in Building 3001 to a receiving bay in Building 3019. Buildings 3001 and 3019 are located in WAG 1 within the ORNL main plant area. The 3001 canal was used initially to transport irradiated fuel from the Graphite Reactor. After the reactor was closed, various slightly radioactive materials were temporarily stored in the canal. Although the stored material has been removed, and the canal is now inactive, it is contaminated with residual radioactive materials.

To shield workers from radiation emitted from the residual contamination, the canal is filled with demineralized water. The quantity of water in the canal is maintained automatically at about 234,670 L (62,000 gal) by replacement of 1,514 L (400 gal) of demineralized water per day. It is presumed that 400 gal per day of demineralized water is leaking into the ground, which may be transporting small amounts of contamination to soil beneath the canal. Current analysis of the demineralized water indicates ^{137}Cs content of 100 Bq/L and ^{90}Sr content of 80 Bq/L. The level of radionuclides in the water is presently maintained by a demineralizer, which removes the contaminants.

Between 1991 and 1995, two studies were conducted to develop and evaluate alternatives for stabilizing the 3001 Canal. A composite plan was developed to replace the canal water with a controlled, low-strength material, which is a specialized grout for stable shielding. The controlled, low-strength material would be introduced through a hose at the bottom of the canal and the overlying water removed at the same rate that the controlled, low-strength material fills the canal. The canal would be filled to a level 10 cm (4 in.) above the former water level. Once dewatered, the controlled, low-strength material surface would be painted to prevent surface deterioration or development of a surface dust film.

In 1996 a non-time-critical removal action was initiated. The objective of the removal action is to replace the canal water with a more stable radiation-shielding material that has the capacity to seal potential leaks in the canal wall. This action will reduce or eliminate the risk of further release of radioactively contaminated water from the canal.

Accomplishments

The *Engineering Evaluation/Cost Analysis for Building 3001* (DOE/OR/02-1502&D1) was issued to the regulators on July 26, 1996. Comments were received, and the D2 version is being prepared.

TDEC concurrence to proceed with public review was received on September 24, 1996. The public comment period started September 16, 1996 (instead of September 9, 1996, as originally planned), and concludes on October 15, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Submit the D2 EE/CA.

Prepare and submit the AM.

3.3.3 Oak Ridge Y-12 Plant CA Status

3.3.3.1 UEFPC Watershed ROD

Area of Concern

Sites listed in Appendix C of the FFA under the UEFPC Watershed ROD

Description

The UEFPC Watershed ROD consists of both surface water and groundwater components of the UEFPC watershed and appropriate sources located within that watershed. This complex watershed area, 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 watershed 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 Valley Watershed, and eastward to the DOE property line. The CA will also address a carbon-tetrachloride-contaminated groundwater plume that extends past the DOE property line and surface water in UEFPC extending to where the scope of LEFPC begins.

Numerous primary sources exist within the watershed. Infiltration from the S-3 Area dominates contamination in the western portion of the watershed. Contaminated soils in the Salvage Yard, the S-2 Area, and the 81-10 Area are also known contaminant source areas in the watershed. There are approximately 58 additional FFA-identified release sites within the boundaries of the watershed. Many of these sites are of known low priority as contaminant sources to the environment; however, many may need additional evaluation.

An extensive array of storm drains that mimic the original natural drainage patterns in the UEFPC watershed gathers runoff from the main plant area in catch basins located across the plant. In addition, this drainage system, which was once connected to process equipment, discharged untreated waste

streams. No untreated waste streams are currently discharged into the storm sewer system, but remnant contamination may be retained in sediments in the drainage system. The storm sewer network contains several miles of drainage pipes and culverts that range up to 108 in. in diameter. UEFPC begins near the middle of the Y-12 Plant and, according to water balances for the plant, is fed primarily from the storm sewer system. Groundwater infiltration into the storm sewer system and groundwater discharge directly into the creek are significant additional sources of UEFPC flow.

Because of the wealth of historical data available for this watershed, 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 watershed 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.

The RI Work Plan (DOE/OR/01-1396&D1) was issued in September 1995 and serves as the plan for implementing the subbasin characterization.

Accomplishments

The D2 version of the RI Work Plan was approved by the regulators.

Significant progress was made in the refinement of the scope of the watershed RI/FS through completion of data quality objective workshops for soils, source areas, groundwater, and surface water. Each workshop focused on the historical environmental data for each medium, culminating in the identification of data gaps and potential early actions. The ROD watershed strategy was also agreed upon with EPA and TDEC in subsequent data quality objective workshops.

Concerns

Concern: Despite the tremendous progress made in RMPE, the NPDES permit requires UEFPC to be at state water quality standards for mercury on the last day of the permit. This is unattainable with current technology. **Impact:** Without technology advancements, the NPDES requirements will not be met. **Action:** An appeal to the NPDES permit is on file. A site-specific criterion is being developed for the mercury discharge and is being discussed with the regulators.

Scheduled Activities for Next Quarter

Sampling and analysis plans will be prepared to address data gaps.

The RI Work Plan addendum will be issued.

Screening of technologies and development of preliminary FS alternatives will continue. The FS is currently focusing on the development of RA objectives and corresponding actions.

3.3.3.2 Union Valley

Area of Concern

Fifty-eight sites listed in Appendix C of the FFA under the UEFPC CA

Description

The Union Valley area is located in the UEFPC Watershed ROD and is located about 0.5 mile east of the Y-12 Plant in the Union Valley Industrial Park. 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 (VOCs), have also been found in groundwater monitoring wells at the Y-12 Plant. An RSE report (Y/ER-206, R1) for Union Valley has been issued and summarizes on-site and off-site information associated with this site. This report indicated that no usage of contaminated groundwater is currently occurring in Union Valley. In addition, DOE is pursuing an interim ROD to ensure that contaminated groundwater in Union Valley is not used in the future until the problems in the area can be better investigated. Regulatory comments have been received on the Union Valley report, and a comment resolution document has been prepared. Because the Union Valley report was not an FFA deliverable, a modified document will not be issued.

The D1 Interim Proposed Plan (DOE/OR/01-1452&D1) was submitted on an accelerated schedule. EPA and TDEC comments were incorporated, and a D2 version was issued on June 18, 1996.

Accomplishments

The D2 version of the Interim Proposed Plan was approved by the regulators.

The public comment period for the Interim Proposed Plan was held between July 17 and August 15, 1996. A public meeting was held on August 7, 1996. Several comments were received from the Site Specific Advisory Board, the Oak Ridge Environmental Peace Alliance, and other stakeholders. Resolution of all comments will be addressed in the ROD Responsiveness Summary.

Concerns

None.

Scheduled Activities for Next Quarter

Preparation of the ROD will begin, with a tentative issuance date of March 26, 1997.

3.3.3.3 Bear Creek Valley Watershed ROD

Area of Concern

Bear Creek Burial Grounds; Hazardous Chemical Disposal Area Boneyard/Burnyard; Sanitary Landfill 1; Rust Spoil Area; Contaminated Construction Pile; Groundwater, Surface Water, Creek Sediment, and Floodplain Soil; S-3 Ponds and Treatment Facility; Oil Retention Ponds 1 and 2; Oil Land Farm and Soils Contaminant Pad; Disposal Area RA Solids Storage Facility

Description

The Bear Creek Valley Watershed ROD comprises the following release sites: the S-3 Ponds; the Oil Land Farm; Sanitary Landfill 1; the Boneyard/Burnyard; the Hazardous Chemical Storage Area; the Bear Creek Burial Grounds (A, B, C, D, E, and J); Oil Retention Ponds 1 and 2; the Rust Spoil Area; the Contaminated Construction Spoil Pile; the Disposal Area RA and Oil Land Farm Soil Storage Facilities; Bear Creek and its associated floodplain soils; and the groundwater in this watershed CA. Many of these units were used until the 1980s as the primary area of disposal of various types for hazardous and nonhazardous wastes generated at the Y-12 Plant. Many of these units were RCRA closed (with waste in place). TDEC issued the final RCRA postclosure permit for the Bear Creek hydrogeologic regime in September 1995.

Groundwater, surface water, floodplain soils, and source units are being evaluated as a single entity (i.e., watershed) to ensure that (1) a consistent approach to remediation is implemented across the valley and (2) RAs at specific sites are prioritized to achieve the greatest risk reduction. The boundaries of this CA extends west from a topographic high near the west end of the Y-12 Plant to the point where Bear Creek exits the valley near State Highway 95.

For this watershed in total, field activities for surface water and source term units were completed in March 1995, and floodplain soil sampling was completed in June 1995. Additional groundwater sampling for radionuclide analysis to support the human health risk assessment was completed in August 1995. A data quality assessment report in support of the Bear Creek RI report was completed. The purpose of this report was to provide an evaluation of the quality assurance and quality control results for the Bear Creek data set. Over 75,000 soil, sediment, groundwater, and surface water analyses were accumulated for use in the Bear Creek RI report. The assessment report indicates that less than 1% of these analyses are unacceptable for use because of data quality problems. In addition, a work plan for *Comprehensive Elemental Analysis of Selected Waters and Soils from Bear Creek Valley* has been prepared. This document was prepared to identify the potential presence of classified contaminants in this watershed. The results of the sampling and analysis will be incorporated into the assessment for the watershed. Preparation of the RI and FS reports for this characterization continues.

Phase I of an in situ surface water treatability study is presently underway. The study will be conducted in three phases. Iron filings, sorptive media, wetlands, and phytoremediation technologies are being evaluated. The demonstration will be used to evaluate the cost-effectiveness and technical feasibility of passive treatment of uranium- and nitrate-contaminated surface water in this watershed.

A technical evaluation has been performed to evaluate the effects of the injection of a chemical solution into the acidic S-3 groundwater plume to reduce uranium migration toward Bear Creek and its tributaries. Predictive analyses of dense, nonaqueous-phase liquid plumes and comparative analyses of on-site versus off-site disposal were also completed. These efforts, along with preliminary design

efforts for water treatment, will support the alternative development and technology screening in the FS process.

Accomplishments

The *Remedial Investigation Report for Bear Creek Valley* (DOE/OR/01-1455V1&D1 - V6&D1) was transmitted to the regulators on September 16, 1996, ahead of schedule.

Concerns

None.

Scheduled Activities for Next Quarter

Preparation of the FS report will continue.

A Phase II treatability study plan for the treatment of uranium and nitrate in Bear Creek will be issued.

3.3.3.4 Y-12 Decommissioning Surveillance and Maintenance

Area of Concern

Building 9201-4

Description

Building 9201-4 is part of the Mercury-Use Area AOC and is the only official component of the Y-12 Decommissioning S&M Program located at the Y-12 Plant. Numerous asbestos and hazard abatement activities have already been realized in the Y-12 D&D S&M project and will continue in FY 1996.

Efforts to reduce mercury vapor levels in Building 9201-4 have been successful. The efforts have been focused on the tray rooms in the building as a maintenance activity under the Y-12 S&M Program. To date, tray rooms in Zones 17 and 18 have been completed. The objectives of this cleanup were twofold: (1) to reduce the personal protective equipment needed for personnel in the building, thereby reducing risk and S&M costs and waste; and (2) to maximize the amount of recyclable mercury and other metals. From one tray room subproject, 750 lb of elemental mercury, 100,000 lb of copper, and 65,000 lb of carbon steel have been recovered, with a corresponding 150 lb of waste. Monitoring of mercury vapor in Building 9201-4 has shown significant improvements in air quality, well below the Occupational Safety and Health Act threshold limit value.

Continuing activities at Building 9201-4 include the evaluation and elimination of source areas and the design of recovery and treatment systems for plant waste streams.

Accomplishments

Recovery of visible mercury in Zone 17 tray room was completed. Approximately 400 lb of mercury was recovered and prepared for flasking. A total of approximately 1,300 lb of visible mercury was recovered from the two tray rooms completed in FY 1996.

Approximately 12,000 gal of the approximately 26,000 gal of LiOH solution has been processed through September 30, 1996. From the 12,000 gal, approximately 11,200 gal of clean condensate was produced and transferred to the West End Treatment Facility for discharge through the NPDES-permitted outfall, and approximately 800 gal of concentrated LiCl was produced for processing through Phase II. Bench-scale testing of the Phase II process is 90% complete. Minor modifications to the existing equipment will be required. All components for the stage two treatment scheme are off-the-shelf items and require no development.

Decontamination of all second and third floor walking surfaces was completed. Decontamination of all first floor areas was completed in August 1996.

Repairs to all supply and exhaust fans that could be made operational without major overhaul or component replacement have been completed. Ventilation is critical to maintaining the mercury vapor levels below the threshold limit value in the spring, summer, and fall months. After the supply fans in the "H" wind tunnel were repaired and placed in operation, the mercury vapor readings in Zone 1 dropped by 50% and have not been above the threshold limit value. Observations made in other areas of the building also show mercury vapor levels consistently below the threshold limit value after the fans were repaired.

Approximately 9,000 lb of mercury was recovered from process piping. Of the total 10,300 lb of mercury recovered during this reporting period (including the 1,300 lb recovered during the tray room cleanup), 10,174 lb were flasked.

The *Building 9204-4 Exterior Process Piping Removal EE/CA* (DOE/OR/02-1524&D1) was prepared and submitted to the regulators on September 27, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Receive comments on the D1 EE/CA, and prepare the D2 EE/CA and the AM.

Complete tray room mercury recovery activities.

Complete treatment of the LiOH solution, and clean out the inside of the tank.

3.3.4 Other Oak Ridge Reservation Areas CA Status

3.3.4.1 Clinch River/Poplar Creek

Area of Concern

Clinch River/Poplar Creek

Description

This project includes Poplar Creek, Melton Hill Reservoir, and Clinch River from Melton Hill Dam to Kingston and focuses on portions 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 ORR. Poplar Creek receives inflow from EFPC, drains the K-25 Site, and then enters Clinch River. Clinch River enters the Tennessee river system of multipurpose impoundments near Kingston, Tennessee, 34 km downstream from the Oak Ridge complex.

The contaminants released from ORR originate from research, industrial, and waste disposal activities conducted at ORNL, the Y-12 Plant, and the K-25 Site. The contaminants released from these facilities include a variety of radionuclides, metals, and organic compounds. Some liquid wastes were discharged to streams on the ORR, which drain into Clinch River; however, much of the water-borne contamination is derived from seepage into the shallow groundwater from old waste-storage pits and trenches. The contaminants of concern in the river/reservoir system were determined by preliminary human-health risk screening using a variety of exposure pathways and nonconservative screening. PCBs were identified as contaminants of concern through fish ingestion. TDEC has a fish consumption advisory in effect for Melton Hill Reservoir, the Clinch River arm of Watts Bar Reservoir, and other area reservoirs. Poplar Creek is posted by TDEC, advising against fish consumption and water contact because of mercury, metals, and organic chemical contamination. Arsenic, chromium, mercury, selenium, zinc, ^{137}Cs , and ^{60}Co are a risk only if deep-channel sediments are dredged and the dredge spoil is used for agriculture.

Accomplishments

The D3 version of the RI/FS report was issued to EPA and TDEC on July 1, 1996.

The *Clinch River/Poplar Creek Proposed Plan* (DOE/OR/02-1429&D1) was transmitted to the regulators on August 1, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Receive comments and submit the D2 version of the Proposed Plan to the regulators.

Issue public notice for the public comment period.

Receive approval for the RI/FS report.

3.4 REMEDIAL SITE EVALUATION AREA STATUS

RSEs are required by Section X of the FFA to be conducted at the ORR at all AOCs where CERCLA action may be necessary. In essence, the purpose of an RSE is to determine whether hazardous substances, pollutants, or contaminants have, in fact, been released or that the threat of a release exists and to determine whether CERCLA action, in the form of a RA or a non-time-critical removal action, is needed to mitigate the impacts of the release.

3.4.1 Oak Ridge K-25 Site RSE Status

3.4.1.1 K-25 Site Groundwater Remedial Site Evaluation

Area of Concern

K-25 Site Groundwater

Description

The K-25 Groundwater Program provides for the assessment and remediation of groundwater at the 1500-acre K-25 Site. The 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}U ; organic compounds; and heavy metals, including, principally, lead and mercury.

Most of the approximately 220 groundwater monitoring wells across the K-25 Site were not sampled with any regularity, and very little hydrologic characterization efforts were completed prior to FY 1994. Additionally, very little source area investigation had been completed; and of those that were completed, groundwater decisions were deferred to a site-wide evaluation of groundwater concerns. For these reasons, several hydrologic characterization activities were planned and initiated to gather sufficient data necessary to support the development of a groundwater RSE report. The report is being developed to support future remediation decisions at the K-25 Site.

Accomplishments

Comments have been received on the D1 RSE report, and the D2 version is being prepared.

Concerns

None.

Scheduled Activities for Next Quarter

The data quality objectives session is scheduled for October 1996.

3.4.2 Oak Ridge National Laboratory RSE Status

3.4.2.1 WAG 10 Hydrofracture Wells Remedial Site Evaluation Area

Area of Concern

New Hydrofracture Facility Monitoring Wells

Description

The objective of this project is to characterize observation and monitoring wells associated with the New Hydrofracture Facility to determine which wells are suitable for recompletion and use as groundwater monitoring wells and which wells require plugging and abandonment in the near term. Results of the characterization will be reported in an RSE.

Accomplishments

The *WAG 10 New Hydrofracture Wells Remedial Site Evaluation* (DOE/OR/01-1471&D1) documenting the activities and recommendations for plugging and abandonment or continued monitoring of the New Hydrofracture Facility wells was transmitted to the regulators on September 27, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Incorporate comments from the regulators on the D1 RSE, and submit the D2 version to the regulators.

3.4.3 Oak Ridge Y-12 Plant RSE Status

No AOCs have been identified at the Y-12 Plant.

3.4.4 Other Oak Ridge Reservation Areas RSE Status

No AOCs have been identified in these areas.

3.5 REMOVAL SITE EVALUATION AREA STATUS

RmSEs are required by Section X of the FFA to be conducted at the ORR on all newly discovered AOCs and on AOCs that have been listed in the RmSE category of Appendix C of the FFA. The primary objectives of RmSEs are to (1) determine the source and nature of a release or threatened release of hazardous substances, pollutants or contaminants; (2) determine the apparent risk posed to human health or the environment from the release; and (3) qualitatively establish the apparent magnitude of the risk.

RmSEs are defined in 40 *CFR* 300.410 and are undertaken by the lead agency for a possible CERCLA response. The RmSE includes a Removal Preliminary Assessment and, if warranted, a Removal Site Inspection.

A Removal Preliminary Assessment is based on available information and may include (1) identification of the source and nature of the release or threat of release, (2) evaluation of the threat to the public health and the magnitude of the threat, and (3) determination if a removal is required. If more information is needed, a Removal Site Inspection may be performed from the perimeter or on site, if necessary. The results of the RmSE must be documented.

3.5.1 Oak Ridge K-25 Site RmSE Status

No AOCs have been identified at the K-25 Site.

3.5.2 Oak Ridge National Laboratory RmSE Status

3.5.2.1 Nuclear Material and Facility Stabilization Program

Area of Concern

- Bulk Shielding Reactor (3010)
- High Radiation Level Analytical Facility (3019-B)
- Krypton-85 Enrichment Facility (3026-C)
- Metal Segmenting Facility (3026-D)
- Alpha Powder Facility (3028)
- Source Development Laboratory (3029)
- Radioisotope Production Laboratory C (3030)
- Radioisotope Production Laboratory D (3031)
- Radioisotope Production Laboratory E (3032)
- Radioactive Gas Processing Facility (3033)
- Radioactive Production Laboratory Annex (3033-A)
- Radioisotope Services Building (3034)
- Alpha Handling Facility (3038-AHF)
- Isotope Material Laboratory (3038-E)
- Radioactive Packaging and Shipping Facility (3038-M)
- Radioisotopes Development Laboratory (3047)
- Krypton Storage Cubicle (3093)
- Storage Pad (3099)
- Radioisotope Production Laboratory H (3118)
- Fission Product Development Laboratory (3517)
- Tritium Target Preparation Facility (7025)

Integrated Process Demonstration Facility (7602)
Tower Shielding Facility

Description

Building 3010—Bulk Shielding Reactor: Located in an industrial area of ORNL, Building 3010 is a two-story, steel-framed structure housing the Bulk Shielding Reactor. The immediate area surrounding Building 3010 is mostly paved, with some grassy areas to the south. The building contains a 130,000-gal reactor pool containing the Bulk Shielding Reactor, the Pool Critical Assembly, and the Low Temperature Neutron Irradiation Facility. The building also contains offices, instrument rooms, equipment rooms, experiment rooms, and a small shop. Building support systems that are currently operational include steam, ventilation, fire protection, electrical, safety, and alarm.

Historically the facility has been used for irradiation shielding experiments on isotope production materials. The facility was originally constructed in 1951 to test the radiation shielding properties of various materials in support of the Aircraft Nuclear Propulsion Project. In 1960, the Low Temperature Irradiation Facility was installed in the building and the focus of operations shifted from shielding studies to experiments examining the effects of radiation on metals and other materials at low temperatures, including insulators and epoxies necessary for building superconducting magnets for fusion generators. Two liquid helium crystals were used over the life of the Low Temperature Irradiation Facility. In 1985, the Low Temperature Irradiation Facility was replaced by a third cryostat, the Low Temperature Neutron Irradiation Facility, which remains in place in the reactor pool. Operations ceased in 1987.

As a result of past operations, low levels of residual, fixed radiologic surface contamination exist in areas of the facility. The contamination is associated primarily with process equipment (vessels, piping, ventilation ducts, etc.) and accumulated from activities over the years involving a variety of materials. The contamination, therefore, cannot be attributed to a single release episode. The presence of this contamination is not considered a significant hazard in its current state. Additional radiation sources in the facility include spent fuel, radioactive source material, and heavy water (D_2O) contaminated with tritium. The interior of the building is in fair to good condition. Asbestos-containing materials and radioactive hazard areas are posted and/or labeled where appropriate.

Building 3019-B—High Radiation Level Analytical Facility: The High Radiation Level Analytical Facility is part of the Radiochemical Development Facility, otherwise known as the Building 3019 Complex. The High Radiation Level Analytical Facility is a concrete and masonry block building containing a hot cell bank with seven cells equipped with master-slave manipulators and a central storage cell from and to which materials were transferred for storage. Building 3019-B was constructed in 1952 and was operating until its mission ended in 1984. The High Radiation Level Analytical Facility was used for separating, processing, and analyzing highly radioactive samples from many ORNL programs, including all those operated in Building 3019-A. Samples handled in Building 3019B included fission products, activation products, uranium, plutonium, and other transuranic materials. Building 3019-B is accessed from and shares a wall and some utilities with Building 3019-A, while it shares a wall but not utilities with Building 3135 in the Radiochemical Development Facility complex. All three buildings are located inside the ORNL security area on the northern end of Third Avenue where it intersects with Hillside Avenue.

After the mission of Building 3019-B ended, some improvements were made to ensure that the safety envelope remained intact and decrease the surveillance required in the facility. In 1994, all

equipment in the cells was transferred to a solid waste storage area, leaving the work tables and any debris that may have been under the tables in place. All cell viewing windows (except one) were drained of their zinc bromide shielding liquid, and lead shields were placed over the windows.

Building 3026-C—Krypton-85 Enrichment Facility: Building 3026-C is a two-story wooden structure (22 ft high) located on Central Avenue to the west of the Isotopes Circle facilities. Ancillary facilities consist of offices, low- and high-level radioactivity laboratories, and a counting room. The facility shares a common wall and utilities with the adjacent Building 3026-D, the Segmenting Hot Cell Facility. The two facilities are operationally independent.

A tritium facility at the northwest corner of Building 3026-C is constructed of reinforced concrete. The small laboratories, counting room, and cell banks are also of reinforced concrete. With the exception of these concrete structures, the partitions and ceilings throughout Building 3026-C are wooden.

The krypton sales program operations in Building 3026-C were discontinued in 1991. Krypton loading equipment in Building 3026-C is still functional and will be used in the final disposal of all residual ^{85}Kr as part of the Isotopes Facilities Deactivation Project-planned activity.

Building 3026-D—Metal Segmenting Facility: Building 3026-D, east of and adjacent to 3026-C, is a three-story wooden structure. The principal structure within the building is a two-story, 5-ft-thick concrete cell block, which is divided into two connecting radioactive material-handling cells (hot cells) located in a north-south direction. The west face of the cell block is equipped with manipulators and Zn-Br_2 -filled viewing windows. To the west of the cell block, located at floor level, is a high-level radioactivity storage facility. This is connected to the south hot cell via a tunnel below the floor for transfer purposes.

The building also houses a Chemical Separation Laboratory in addition to the Segmenting Hot Cells Facility. Historically the Chemical Separations Laboratory has served as a facility for the production and separation of numerous fission products. The Segmenting Hot Cells Facility was originally used to isolate large quantities of fission-produced ^{140}Ba for criticality testing purposes. The cells in the Segmenting Hot Cells Facility were greatly modified since the discontinuance of the earlier ^{140}Ba process to provide facilities for the segmenting, examination, and assembly of irradiated metallurgical specimens. There are no ongoing operations in Building 3026-D other than the storage of irradiated metal specimens.

Building 3028—Alpha Powder Facility: Building 3028 was constructed to separate ^{131}I and later modified to separate ^{133}Xe and other short-lived fission products from uranium-aluminum targets. The building was later expanded to include curium processing cells. A steel-frame structure covered by metal siding, Building 3028 is located in the northwest area of Isotopes Circle, directly west of Building 3047.

The building has a four-story central section with one-story cell operating areas on the east and west sides. Cells 1, 2, 3, and 4 are manipulator cells, with one observation window each. Cells 2 and 3 have back windows with glove ports. Cell 5 is a manipulator cell.

The building was constructed about 1950 as part of the Isotopes Program. It originally housed the ^{131}I processing facility (now the Short-Lived Fission Product Cells) and the separation facility (a four-story ion-exchange column) for ^{147}Pm . The ^{131}I facility was converted to manipulator cells in the early 1960s and expanded to the Short-Lived Fission Product Facility. The ^{133}Xe facility was added

at about that time. Products and processes developed for sale included ^{133}Xe , ^{131}I , and ^{99}Mo . The ^{133}Xe operation continued through 1980, and the Short-Lived Fission Product Program was discontinued in 1985.

Building 3029—Source Development Laboratory: Building 3029 is located in the west-central area of the Isotopes Circle, southwest of Building 3047. The building is a single-story, steel-frame structure covered by corrugated metal siding. The floor area is 3,000 ft². Building 3029 was constructed in 1952 and originally contained a system of remotely operated barricades and a small manipulator cell (now called Cell 4). The facility was built as part of and has always been used in the Isotopes Program. Isotopes originally handled in the facility were ^{192}Ir (source fabrication) and small ^{60}Co sources. Major building operations included ^{60}Co , ^{137}Cs , ^{90}Sr , and ^{192}Ir source fabrication.

The operating area contains four manipulator-type hot cells. Cells 1, 2, and 3 were used to process high-level beta/gamma sources; Cell 4 was used for short-lived materials and ^{192}Ir monitoring. The cell access area contains a ^{60}Co storage and irradiation area known as the ^{60}Co garden. The ^{60}Co garden has been emptied and is part of the isotopes facilities deactivation.

Buildings 3030/3031/3118—Radioisotope Production Laboratories C, D, and H: Buildings 3030 and 3031, the Radioisotopes Production Laboratories, were designed for limited production and development processing of reactor-produced beta/gamma-emitting radioisotopes for industrial, medical, and research applications. Building 3118 was constructed by enclosing the space between Buildings 3030 and 3031 and covers the access doors to the cells in these buildings. These buildings are located in the west-central area of the Isotopes Circle and north of Building 3038.

Chemical processing of a wide variety of radioisotopes has been carried out in the single hot cell of Building 3030. Primarily, these were irradiated targets from the High-Flux Isotope Reactor, the Oak Ridge Reactor facilities, and the 86-in. cyclotron.

Building 3030 was being prepared for a proposed ^{90}Y facility when the shutdown decision was made. Prior to that, the building had been used for processing ^{153}Gd , a medical radioisotope.

Building 3118 is a steel-frame structure covered with corrugated aluminum siding that was erected by roofing and enclosing the space between Buildings 3030 and 3031. Building 3118 provides access to the rear entry doors for the hot cells in Buildings 3030 and 3031, cask storage of some old radioactive sources, and temporary holding of contaminated waste.

Building 3032—Radioisotope Production Laboratory E and Building 3099 Storage Pad: Radioisotope Production Laboratory E is housed in Building 3032, which is located in the central area of the Isotopes Circle, east of Building 3031. An ancillary facility, the Building 3099 storage pad, is adjacent to the east side of Building 3032.

The building is a steel-frame structure covered with aluminum siding. The floor space is about 1200 ft², with a total volume of about 20,000 ft³. The facility has a laboratory containing five hoods on the north side of the building and an office area on the south side of the building.

Building 3033—Radioactive Gas Processing Facility: The tritium and krypton production facility is housed in Building 3033, which is located in the central area of the Isotopes Circle, northeast of Building 3038. This building contains two separate radioisotopes processing systems for handling gaseous ^3H and ^{35}Kr . An ancillary facility, the Building 3093 Krypton Storage Cubicle, is adjacent to the west side of Building 3033.

The krypton process cell consists of a composite-shielded enclosure made of steel plate overlaid with lead and supported by a concrete wall at the bottom. Part of the enclosure houses the in-process storage tanks.

Building 3033-A—Radioactive Production Laboratory Annex: Building 3033-A (Annex) was used to house and contain the facilities for the production, loading, welding, and decontamination of neutron dosimeter materials as well as the weighing and packaging of milligram to gram quantities of auctioned materials for research applications. The building does not contain a hot cell and was used only for low-level radioactive operations in glove boxes and one hood. The glove boxes and hood have been removed from the building. Building 3033-A is located in the central portion of the Isotopes Circle, south of Building 3047. It is a metal structure erected by bridging the space between Buildings 3033 and 3034 and using their walls for support.

Building 3033-A, which was constructed around 1960, included two operating areas: a small one for ^{14}C production at the south end of the building, operated by the Radioisotopes Department, and the larger, main operating area for research materials preparations performed by Isotopes Research Materials Laboratory personnel. In the early 1980s, Isotopes Research Materials Laboratory personnel decontaminated and decommissioned the ^{14}C facility, including removal of the underground dissolver tank, and converted this area for storage.

Building 3034—Radioisotope Services Building: The Radioisotope Area Service facility is housed in Building 3034, which is located in the east end of the Isotopes Circle, adjacent to Building 3033-A. This facility was used as a field shop for the Plant and Equipment Division in supporting past isotope production operations in other facilities. No handling of radioactive materials has occurred in this building.

Building 3038—Alpha Handling Facility, Isotopes Materials Laboratory, and Radioactive Packaging and Shipping Facility: Recent uses of Building 3038 include the study of transuranic elements, fabrication of alpha- and neutron-emitting targets and sources, shipment of radioisotopes, and production of ^{90}Y for medical uses. The building, which is located on the southwest corner of Isotopes Circle, is a masonry and steel-frame structure. It is divided by concrete block interior walls into three separate facilities: 3038-AHF, 3038-E, and 3038-M.

The section of the building called 3038-M has always been the radioactive shipping operation for ORNL. Most of the shipments were for the isotopes sales program, but shipments of radioactive materials from other ORNL groups were also handled here. The radioactive shipping operations have now been relocated to another ORNL facility.

The analytical chemistry laboratories supporting isotopes sales were located in the east end until 1976. When the analytical function was transferred to other ORNL facilities, the east end was converted into an isotopes production and development facility.

Building 3047—Radioisotopes Development Laboratory: The Radioisotopes Development Laboratory, Building 3047, is a three-story, steel-frame building with concrete block exterior and interior walls. It is located in the north-central area of Isotopes Circle. Building 3047 is joined to the Isotopes Technology Building, Building 3047-A. Because they have individual ventilation systems and are separated by at least two sets of double doors, they are considered separate buildings. (Building 3047-A, which contains administrative offices, is not part of the deactivation plan).

The Radioisotopes Development Laboratory houses four high-level beta-gamma cells, one alpha hot cell, seven laboratories for handling low-level materials, a decontamination room, offices, and service areas.

Building 3093—Krypton Storage Cubicle: Building 3093 is a small, permanent krypton concrete storage enclosure that houses three empty krypton storage tanks and is located adjacent to the northwest corner of Building 3033. Radiation hazard areas and asbestos containing materials within the facility are marked and isolated as necessary to ensure worker safety and inadvertent release. A combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Building 3093 is in an inactive standby mode awaiting entry into the D&D program.

Building 3517—Fission Product Development Laboratory: Building 3517, the Fission Product Development Laboratory, was constructed to (1) recover long-lived fission products (e.g., ^{90}Sr , ^{137}Cs , and ^{144}Ce) from aqueous wastes generated in reprocessing irradiated reactor fuel elements; (2) purify feed materials from other DOE sites; and (3) prepare radioactive sources. Building 3517 is located in the central ORNL site, southwest of the Isotopes Circle facilities.

The Fission Product Development Laboratory contains manipulator and process cells for producing radioactive sources and associated operating, service, office, and personnel access areas.

Building 7025—Tritium Target Preparation Facility: Building 7025 is located about 1.4 miles northeast of the central ORNL site. It is within the perimeter fence of the ORNL 7000 area but isolated from other buildings.

The building was used to fabricate titanium tritide targets, prepare metallurgical samples for helium embrittlement studies, and prepare oxide thin films.

Building 7602—Integrated Process Demonstration Facility: Building 7602, the Integrated Process Demonstration Facility, is attached to Building 7603, the Remote Operations and Maintenance Demonstration, which is active. The two buildings are separated only by a block wall, which does not extend completely to the ceiling of the high bay area.

Building 7602 is a 15,841 ft² concrete block and steel-frame building. The building has three floors. Three pits for collecting liquid leaks are included as part of Building 7602. Those pits are the F14 pit, the solvent extraction pit, and the dissolver pit. The F14 pit is on the mezzanine level of the building and contains tanks for collecting liquids flowing from drains. The solvent extraction pit was once used for special equipment tests and extends downward from the main floor to the basement level. The dissolver pit is the largest feature in the building and is visible just at the left of the building entrance on the main floor.

Tower Shielding Facility: The Tower Shielding Facility was built at ORNL in 1953 to enable studies of asymmetric shield configurations for the Aircraft Nuclear Propulsion Project. Operations began in 1954. This research required that the reactor radiation source be located in a region free from ground or structure scattering. Four reactors have been used at the Tower Shielding Facility. These include TSR-I, TSR-II, the Aircraft Shield Test Reactor, and the Space Nuclear Auxiliary Power reactor. The Tower Shielding Facility is located 2.35 miles south-southeast of the main ORNL complex. The facility is situated on a hill with an elevation of 1069 feet. Access to the site is provided by two roads, one leading northeast to the Health Physics Research Reactor, the other leading west to Highway 95.

Accomplishments

The *Removal Site Evaluation Report on Building 3019B at Oak Ridge National Laboratory* (DOE/OR/01-1514&D1), the *Removal Site Evaluation Report on Building 7602 at Oak Ridge National Laboratory* (DOE/OR/01-1515&D1), the *Removal Site Evaluation Report on the Bulk Shielding Reactor at Oak Ridge National Laboratory* (DOE/OR/01-1516&D1), and the *Removal Site Evaluation Report on the Tower Shielding Reactor at Oak Ridge National Laboratory* (DOE/OR/01-1517&D1) were submitted to the regulators on September 26, 1996.

Concerns

None.

Scheduled Activities for the Next Quarter

Comments to RmSE reports will be incorporated as received from the regulators.

3.5.3 Oak Ridge Y-12 Plant RmSE Status

No AOCs have been identified at the Y-12 Plant.

3.5.4 Other Oak Ridge Reservation Areas RmSE Status

No AOCs have been identified in these areas.

3.6 ER PROGRAMMATIC ACTIVITIES

The CERCLA process at the ORR is dynamic in nature, and DOE is continually improving the process by modifying strategies, plans, and procedures to incorporate new ideas and new information. These activities are conducted in addition to the investigatory and cleanup actions taken at specific AOCs on the ORR.

3.6.1 Oak Ridge Environmental Information System

Description

OREIS is a standardized, quality-assured, and configuration-controlled environmental information management system created to support DOE-ORO environmental programs. It is composed of hardware and commercial and customized software providing a user interface and analytical tools, a relational data base for environmental measurements data, a geographic data base for geospatial data, and supporting documentation. OREIS fulfills DOE-ORO's environmental information management obligations under an enforceable FFA. The basic mission of OREIS is efficient retrievability and long-term (greater than 3 years) retention of DOE-ORO environmental data. Its primary users include DOE, TDEC, EPA, and their contractors and subcontractors. Data in OREIS are available to other agencies and the public.

The OREIS project was initiated in September 1990, and the baseline production version of the system (OREIS V2.1) was released in June 1994. Since that time, OREIS has amassed approximately 1,500,000 records of environmental measurements data and contains available remote sensing and

base map data. The types of environmental data incorporated in OREIS include known-quality measurements data from the following environmental media: groundwater, well construction, surface water, sediment, soil, air, and biota. Types of available remote sensing data include gamma contour, predawn thermal, natural color, color infrared, and multispectral scanner for various areas. Site composites of the new base map data prepared from recent flyovers of DOE-ORO sites and surrounding areas contain such coverages as roads, buildings, utilities, water drainage, and contours.

The scope of OREIS includes consolidating data derived from or used to support environmental restoration, compliance, and surveillance activities at Oak Ridge, Tennessee, Portsmouth, Ohio, and Paducah, Kentucky. Additionally, it includes providing the analytical tools and user interface needed to access and analyze the data. The OREIS data bases also contain metadata on data quality, which enable end users to analyze the appropriateness of the data for secondary uses. The scope of OREIS does not include providing the functionality to perform project-specific activities, such as sample tracking, data entry of field results, or maintaining records on calibration of equipment; nor does the scope include providing project control capabilities, such as cost accounting or milestone tracking. These functions are provided by other computer systems.

Accomplishments

Three on-site training sessions were conducted on the World Wide Web-based user interface for approximately 10–12 TDEC personnel.

Concerns

None.

Scheduled Activities for Next Quarter

Continue to load data, provide training and other customer services, assist user groups, and support environmental information management activities.

Provide electronic data, as required under the FFA, for FFA deliverables.

3.6.2 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 process and analyze remotely sensed data for assisting in environmental restoration site characterization and cleanup. Surveys will occur on a biannual basis, with selected remote sensing surveys as needed during other times of the year for site-specific studies. The biannual approach provides an effective means for early detection of environmental problems that may develop as waste containment vessels degrade, and it also aids in monitoring improvements gained from restoration efforts and cleanup activities.

Accomplishments

The report, *Analysis and Interpretation of Airborne Geophysical Data Acquired over the Melton Valley Waste Groupings and Adjacent Areas, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, by J. E. Nyquist and W. E. Doll (ES/ER/TM-208) was issued.

Concerns

None.

Scheduled Activities for Next Quarter

Begin loading, formatting, documenting, and providing quality assurance information for the Thermal Imaging Multispectral Scanner imagery acquired in June 1996.

Begin loading, formatting, documenting, and providing quality assurance information for the Daedalus 1268 Multispectral Scanner imagery acquired in June 1996.

3.6.3 Risk Assessment

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. At ORR, 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.).

Accomplishments

Preliminary Assessment of the Ecological Risks to Wide-ranging Wildlife Species on the Oak Ridge Reservation, 1996 Update, (DOE/OR/01-1407&D1), was transmitted to fulfill a September 30, 1996 FFA milestone. This report provides a preliminary evaluation of the ecological risks to selected wide-ranging species from contaminants on the ORR. The results will enhance the understanding of the magnitude of ecological risks to populations at larger spatial scales and will assist in the prioritization of source OUs for investigation and remediation.

The results of the screening risk evaluation of the historical UEFPC Watershed ROD soils data were presented at the FFA Project Manager's Meeting on July 10, 1996.

The draft results of the human health risk evaluation/screening of UEFPC groundwater were presented to the regulators at the UEFPC Groundwater Workshop/August Regulator Meeting (August 7, 1996).

A draft/update UEFPC groundwater risk evaluation results/data package (for nonradiological site-related contaminants) was transmitted to the regulators.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.6.4 Federal Facility Agreement Implementation**Description**

Section 120 of CERCLA requires federal facilities listed on the NPL to enter into an FFA with EPA. The ORR was added to the NPL 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.

Accomplishments

Support was supplied for the FFA Project Manager's Meetings on July 11, 1996, and September 10-11, 1996. The FFA Project Manager's Meeting Action Items, Deliverable Status Report, and the ORR Manager's List were prepared for use in these meetings.

The RER was submitted to the regulators on August 30, 1996.

Revisions to the FFA were distributed to all FFA controlled copyholders. The revisions addressed:

- FFA-PM/96-016—Appendix C Operating Instructions,
- FFA-PM/96-017—Deletion of Force Majuere Subsection A.7,
- FFA-PM/96-018—Page 42 Primary Document List Addition: RER,
- FFA-PM/96-019—Appendix F, and
- FFA-PM/96-003—Appendix I: Document Scheduling Operating Instructions.

The FFA Quarterly Report for the period April–June 1996 was submitted to the regulators on July 29, 1996.

A revised list of solid waste management units, which included one newly identified solid waste management unit at ORNL, was transmitted to EPA-RCRA.

The revised FFA Appendix C was prepared.

A draft of the proposed RCRA Hazardous and Solid Waste Amendments permit renewal appendices for the list of solid waste management units was submitted to EPA-RCRA.

The update of the Project Manager's Handbook, Volume 2, was completed. The update included the references to the current ER program strategies and references to the Site Management Plan.

Major modification language for the FFA concerning rolling enforceable milestone negotiations, funding coordination, and prioritization was agreed to by the FFA parties, and a 30-day public review period was initiated.

Concerns

None.

Scheduled Activities for Next Quarter

Submit the FFA Quarterly Report for the period July–September 1996.

Support the FFA Project Manager's Meeting in October 1996.

Provide the action items and agreements from the October FFA Project Manager's Meeting to the regulators.

Issue a revision to FFA Appendix C.

Submit the proposed FFA FYs 1997, 1998, and 1999 milestones to the regulators for their approval.

Issue five ER Program annotated document outlines: AM, EE/CA, Heath and Safety Plan, Remedial/Removal Action Report, and RER.

Resolve public comments on the major modification language, and obtain final approval of the language.

3.6.5 NPL Footprint Reduction Program

Area of Concern

ORR

Description

DOE is identifying lands and buildings on the ORR for which it can be determined (to the satisfaction of EPA and TDEC) that no action at these lands and buildings is required and that the lands and buildings can therefore be conditionally released from CERCLA requirements. This activity is called the "footprint reduction" task in reference to the goal of reducing the size and configuration of the area of the ORR designated as part of the NPL site.

A review process will be developed and conducted with the participation of TDEC and EPA for the purpose of identifying areas on the ORR that have no indication of previous waste disposal activities and that are not otherwise known or suspected of being contaminated. The process will use information from previous, ongoing, and future site evaluations; historic and current aerial photographs and specialized surveys; other historic and current records; personal recollections; and ground verification. Information gathered in the review process will be used to identify areas and facilities with no present or future funded use by DOE and that may qualify for removal from the NPL.

Candidate sites are evaluated for deletion using the CERCLA review process described in Sect. 120(4)(A) of the CERCLA statutes. The goals for the program are the deletion of 6,000–8,000 acres in FY 1996, 10,000–12,000 acres in FY 1997, and 4,000–6,000 acres in FY 1998.

Accomplishments

The Environmental Restoration Footprint Reduction Process—Evaluation of Scarboro/East Haw Ridge Study Area (DOE/OR/01-1496&D1) was transmitted to the regulators on September 25, 1996.

Documentation for six areas totaling 6000 acres was submitted to the regulators in FY 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Six additional areas will be the subject of activities conducted in FY 1997. The total area to be evaluated in FY 1997 is 6000–8000 acres.

3.6.6 Integrated Water Quality Program

Area of Concern

K-1407 B/C Ponds, WAG 5 Seeps C and D, Core Hole 8, ORNL WAG 1 Groundwater, ORNL WAG 1 Groundwater, ORNL Surface Water Program, ORNL Area-Wide Groundwater Program, WAG 4 Seep Collection, United Nuclear Landfill, LEFPC, Kerr Hollow Quarry, Oak Ridge Associated Universities South Campus Facility, LWBR

Description

The ER Program has established the Integrated Water Quality Program (IWQP) as a comprehensive approach to addressing the requirements for groundwater, surface water, and biological monitoring programs on the ORR. Preparation of IWQP was substantially completed in FY 1996 and will be implemented in FY 1997 and later years. The purpose of IWQP is to develop a consistent and watershed-based approach that will support watershed management decisions.

IWQP is responsible for implementing watershed monitoring programs and coordinating ER monitoring with individual facility compliance organizations. When fully implemented, IWQP will evaluate trends in water quality on a regional scale (on the ORR and surrounding surface water bodies) and on a two-tiered watershed scale within the ORR. IWQP will address any concerns with contaminant migration, serve as the data source for risk evaluations, and evaluate the effects of CERCLA response actions on the ORR. IWQP produces two annual reports: the IWQP Annual Monitoring Report and the RER.

Accomplishments

The RER was submitted to the regulators on August 30, 1996.

Work on the IWQP program plan began.

Concerns

None.

Scheduled Activities for Next Quarter

Receive regulator comments on the RER.

Complete the IWQP plan.

Transition existing water quality monitoring programs to IWQP.

Begin implementation of the ORR-wide IWQP.

3.7 LIQUID LOW-LEVEL WASTE TANK STATUS

Although the FFA addresses the entire ORR, specific requirements are set forth for the LLLW tanks at ORNL. 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 RA 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. Out of service tanks will be remediated.

3.7.1 Active LLLW Tanks**Area of Concern**

Active LLLW Tanks (FFA Appendix F)

Description

Activities for Category A, B, and C tanks are reported in this section.

Accomplishments

Field testing of the cathodic protection equipment was conducted on several piping systems, including 12 (Drainage Tank for 3127); 14 (7830 to South Parking Lot Valve Box, inside the Melton Valley controlled area); 15 (Bethel Valley LLLW collection header); 19 (LLLW Drain 7830 to 7860); 32 (2099 MCS to Valve Box 1A); 33 (LLLW 3092 to Valve Box 2); and 34 (LLLW Transported Waste Receiving Facility 2649 to Valve Box 3A). Deficiencies were identified on all systems except 15 and 19; actions have been initiated to correct them.

Monthly leak testing on 10 active, Category C LLLW tanks at ORNL continued.

Three pipelines were tested using the gas pressure decay leak test method.

Work on the PCB removal study continued, which included engineering design of a PCB extraction system using triethylamine. A process description for the WC-14 tank and the remediation conceptual design was received from the subcontractor and is under review.

Methods for removing sludge from the Category C and Category D Group 6 tanks have been evaluated by SGN Corporation. They have selected four base cases: a horizontal tank inside a vault, a horizontal tank with no vault, a vertical tank inside a vault, a vertical tank with no vault. The following SGN Corporation reports are going through technical review and comment phase: Information on French Casks Report; Presentation of French Experience in Sludge Retrieval; Basic Data for Waste Tanks and Selection of Case Studies; Sludge Mobilization, Removal and Transport Study, Part II.

The design assessment for the Building 3544 portion of the Bethel Valley LLLW collection and treatment system upgrade project was completed. The assessment has been certified by the professional engineer and was received on September 27. Design assessments for all portions of the Bethel Valley LLLW collection and treatment line item project have now been completed and certified.

The *1996 Structural Integrity Assessments for the Category C Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, (DOE/OR/01-1512&D1) was submitted to the regulators in September, satisfying an FFA Appendix E milestone.

Concerns

None.

Scheduled Activities for Next Quarter

Issue the D2 version of the *Implementation Plan for Liquid Low-Level Radioactive Waste Systems Under the FFA for Fiscal Years 1996 and 1997 at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, (DOE/OR/01-1473&D2).

Issue the FY 1996 annual status report on FFA compliance for ORNL LLLW tank systems.

Issue the D2 version of the *1996 Structural Integrity Assessments for the Category C Liquid Low-Level Waste Tank Systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee*.

Issue the D1 version of the *Design Assessment for Building 3044*.

3.7.2 Inactive LLLW Tanks

Area of Concern

Inactive LLLW Tanks (FFA Appendix F)

Description

Activities for Category D tanks are reported in this section.

Accomplishments

Activities to isolate and remediate inactive LLLW Tank 4501-P were completed. Isolation was accomplished at the end of July by cutting and capping utility connections. The remediation phase of the activity was accomplished on August 12 when the tank and connected inlet and discharge piping were filled with flowable fill. Cleanup and demobilization at the site was completed August 16. This tank is the third inactive LLLW tank that has been isolated and remediated this fiscal year.

The design package for the isolation and remediation of inactive LLLW Tanks WC-5, WC-6, and WC-8 was approved and issued. These tanks are located adjacent to each other and are being worked as a single project.

Final cleanup and disposal of all waste materials and the sealing of the asphalt were completed for the Tank WC-10 Inflow Project.

Coordination of the characterization, sampling, and analysis of the inactive waste tanks continued. Analyses have been completed for the Tank 3002A liquid sample, and work is in progress on the sludge dissolution scoping tests for the Tank WC-4 sludge sample.

Concerns

None.

Scheduled Activities for Next Quarter

Isolate tanks WC-5, WC-6, and WC-8.

3.8 TECHNOLOGY DEMONSTRATIONS AND TREATABILITY EVALUATIONS

This section describes technology development projects and treatability evaluations being performed at DOE-ORO facilities. The purpose for performing technology and treatability is to facilitate the effective management of chemical and radiological wastes and affected media on the ORR and across the DOE complex. The objective of performing technology and treatability demonstrations on the ORR is to reduce environmental response costs, increase worker and public safety, and improve effectiveness of environmental cleanup activities. Technology demonstration projects described in Sect. 3.8.1–3.8.4 are those funded at least partially by the DOE Office of Science and Technology (EM-50); treatability evaluations are described in Sect. 3.8.5 and are funded by the DOE Office of Environmental Restoration (EM-40).

3.8.1 Subsurface Contamination Technologies

3.8.1.1 Recirculating Well Treatment of Trichloroethylene and Technetium in Groundwater

Target Contaminant

Radionuclide and VOC-contaminated in groundwater (Portsmouth)

Description

Recirculation systems, coupled with below-ground treatment modules, are being developed and demonstrated for the in situ removal of both VOCs and radionuclides from contaminated groundwater. The objectives of the project are to (1) evaluate the effectiveness of horizontal wells for inducing groundwater recirculation, (2) develop below-ground treatment modules that can be coupled with horizontal as well as vertical recirculation systems for the simultaneous removal of VOCs and radionuclides, and (3) conduct a field-scale demonstration of the horizontal-recirculation treatment concept at a DOE site where both VOCs and radionuclides are present in the groundwater.

Accomplishments

After successful pilot testing of horizontal recirculation at the clean site and the treatment approach in the laboratory, horizontal wells were installed at the contaminated site. Pumping and recovery tests were performed in July. The treatment facility has been assembled, tested, and mobilized to the contamination site.

Concerns

None.

Scheduled Activities for Next Quarter

Field activities for the recirculating well demonstration are scheduled for completion on October 31, 1996. The final report will be issued by the end of the quarter.

3.8.1.2. Monitoring of Remediation Technologies Development Forum Projects

Target Contaminant

VOC-contaminated soil and groundwater

Description

The application of advanced techniques for monitoring bioremediation activities is presently being employed at Dover Air Force Base sites chosen by the Remediation Technologies Development Forum Bioremediation of Chlorinated Solvents work group. Technologies developed as part of the former VOC Nonarid Integrated Demonstration, such as deoxyribonucleic acid and ribonucleic acid targets and polymerase chain reaction techniques, are being applied to monitor specific groups of degradative organisms. Types of bacteria to be targeted include aromatic-degrading pseudomonades, anaerobes, and methanotrophs. The presence of inducers for trichloroethylene (TCE) degradation are

being examined by using lux biosensors. Microbial populations are being evaluated through conventional techniques.

Accomplishments

Samples are being processed from June sampling. Analysis for TCE mineralization of degradation products is ongoing. An abstract on the results was submitted for presentation at the 1997 In Situ and On-Site Bioremediation Meeting, and other results were prepared for presentation at an American Chemical Society meeting, "Emerging Technologies in Hazardous Waste Management VIII."

Concerns

None.

Scheduled Activities for Next Quarter

Analysis for TCE mineralization and degradation products will continue.

3.8.1.3. Remediation of Dense Nonaqueous Phase Liquids in Low-Permeability Media

Target Contaminant

Dense Nonaqueous Phase Liquid (DNAPL) contamination in soil and groundwater (Portsmouth)

Description

In situ remediation technologies are being tested and evaluated for both source control and mass removal of DNAPL compounds in low-permeability media. The effort is focused on chlorinated solvents in the vadose and saturated zones of low permeability, such as surface zones or interbedded lenses of silts and clays. The project includes technology evaluation, screening analysis, and field testing at both clean and contaminated sites in the United States and Canada. Activities focus on test sites at three locations: Sarnia, Canada; Aber Road near Cincinnati, Ohio; and Portsmouth Gaseous Diffusion Plant near Piketon, Ohio.

Accomplishments

Field-scale testing of fracture-enhanced remediation was begun at Portsmouth in July. Five test cells were installed at the southeast corner of the X231A site. Hydraulically emplaced fractures at depths of from 4 to 18 ft below ground surface were installed at four of five test cells in August. The fifth cell, which involves collaboration with EPA and the LASAGNA project, employs hydraulic fracturing for thermally enhanced mass recovery and in situ barrier destruction. The demonstration site was characterized and the process operation begun in September.

Nonfield activities were also conducted, including laboratory column experiments for residual contaminant mobility studies and fabrication of thermocouple probes, redox electrodes, and other monitoring devices required for the X231A demonstration.

Mobility measurement studies were completed September 30, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

A draft final research report is due to be completed October 31, 1996.

3.8.1.4 In Situ Chemical Oxidation of Contaminated Soils***Target Contaminant***

VOC- and PCB-contaminated soils and sediments (Kansas City)

Description

A chemical oxidation technology is being developed and demonstrated for the rapid, cost-effective, in situ treatment of soils and sediments contaminated with VOCs. The chemical oxidants being evaluated include dilute hydrogen peroxide (H_2O_2) solutions and saturated potassium permanganate ($KMnO_4$) solutions. The oxidants are being used to remediate clay or sandy soils contaminated with volatile or semivolatile organic compounds. A field demonstration is being conducted at DOE's Kansas City Plant. A second demonstration at a contaminated site with high permeability is also planned.

The work performed to date has demonstrated that $KMnO_4$ and H_2O_2 , if applied in sufficient loadings, can effectively oxidize commonly-encountered DNAPLs, TCE, and tetrachloroethylene. During the first years of this project, numerous laboratory experiments were conducted to measure treatment effectiveness as affected by various process and soil conditions such as oxidant loading, solution-to-soil ratios, temperature, soil pH, and organic content.

The current year's activities have been directed toward (1) a field demonstration at the Kansas City Plant where deep soil mixing will be used as the oxidant delivery mechanism; (2) identifying other delivery methods, particularly for high-permeability soils; (3) identifying a second demonstration site for DNAPL contamination in high-permeability soils; (4) laboratory experiments on the transport of oxidants through soil columns; and (5) investigating whether chemical oxidants can degrade PCBs in environmental media.

Accomplishments

All laboratory work (microbial analyses, pH, moisture, and carbon and manganese content, etc.) and the final report were completed for the chemical oxidation field demonstration conducted July 13–16, 1996, at DOE's Kansas City Plant.

The site for a second demonstration was selected.

A permit to continue work on the PCB study was granted by EPA, and experiments were completed.

Concerns

None.

Scheduled Activities for Next Quarter

Planning for a field demonstration in FY 1997 is underway.

3.8.1.5 Adsorption/Desorption Relative to the Bioremediation of Dense Nonaqueous Phase Liquids***Target Contaminant***

DNAPLs in soil and groundwater (Kansas City)

Description

Enhanced biological technologies are being developed for the remediation of hazardous waste sites. Researchers are studying the use of surfactants and enhanced microbial cultures to accelerate rates of in situ biological remediation of DNAPLs. The work includes isolating TCE-degrading bacteria and evaluating biodegradable surfactants (biological and synthetic) that improve contaminant bioavailability.

Accomplishments

The field demonstration bioremediation of TCE in clay using deep soil mixing was completed in July. The postfield demonstration laboratory experiments and analyses have been completed.

The interim report was completed on deep soil mixing involving the injection of hot air and vacuum extraction.

The draft report on treatability experiments was completed and submitted.

A draft final report of the field demonstration at Kansas City for FY 1995 was completed.

Concerns

None.

Scheduled Activities for Next Quarter

A go/no go decision on the next phase of activity is planned by November 11, 1996.

3.8.1.6 In Situ Remediation of Soil by Electro-osmosis

Target Contaminant

Uranium in Soil (K-25 Site, Portsmouth, Paducah, Fernald)

Description

Electro-osmotic technology is being tested for the removal of TCE from low-permeability soil (e.g., clay and silty clay) prevalent at DOE sites in Oak Ridge, Tennessee; Portsmouth, Ohio; Paducah, Kentucky; and Fernald, Ohio. In situ remediation of TCE-contaminated soil by electro-osmosis is accomplished with the use of a direct current electric field.

Accomplishments

The LASAGNA electrokinetic remediation system was energized for the Phase IIa demonstration on August 13, 1996. The electrical system will continue to operate uninterrupted for 3 months, after which time power will be shut off, and the gathered data will be evaluated to determine the success of Phase IIa. If the demonstration meets performance and cost criteria established with the DOE-Paducah ER representatives, then Phase IIb, the first application of the technology to remedy the site, will begin under management of DOE-Paducah.

The installation of the water recycle system was completed and the first series of water samples taken.

The year-end report on LASAGNA implementation activities was completed September 30, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

A go/no go decision is scheduled to be made in December after at least 3 months of conducting the demonstration.

3.8.1.7 Application/Demonstration of Cryocell Technology

Target Contaminant

Contaminated groundwater (ORNL)

Description

Soil freeze barrier technology is being applied, via private industry, to an actual waste site to demonstrate its effectiveness in containing a waste plume. The technology artificially induces freezing of a soil/groundwater column, thereby reducing the hydraulic conductivity and holding the plume inside the boundaries of the freeze. The technology, which works with most contaminants, is best

suited for plume containment in nonarid media and generates no secondary waste. The technology is being applied to an actual waste area to contain the release of tritium in WAG 9 at ORNL.

3.8.2 Mixed Waste Characterization, Treatment, and Disposal

3.8.2.1 Transportable Vitrification System

Target Contaminant

Mixed wastes sludges (K-25 Site)

Description

Logistical and facility support is being provided to the Savannah River Technical Center for the field demonstration of an enhanced mixed waste vitrification system at the K-25 Site. The demonstration involves the procurement and operation of a large, reusable melter and off-gas system for the treatment of actual wastes currently in storage at the K-25 Site. The system, which uses the Reactive Additive Stabilization Process, provides the first large-scale system for vitrification of low-level, mixed wastes and can potentially stabilize a significant amount of waste currently in storage at DOE sites.

Accomplishments

Assemblies and hook-ups were completed in July.

Waste-handling activities were begun in August.

A temporary authorization request was submitted to TDEC on August 8, 1996, to process 80,000 kg of mixed waste sludges.

Project start-up began in September. Based on surrogate work completed at Clemson, the system will take approximately 32 days to process 5 melter volumes of mixed waste.

Concerns

None.

Scheduled Activities for Next Quarter

RCRA permitting delays and problems identified during setup and shakedown delayed completion of the field-scale demonstration during FY 1996. Completion of the field-scale demonstration on the first waste stream is projected for this quarter.

3.8.2.2 Plasma Hearth Process for Air Pollution Control

Target Contaminant

Off-gas from waste vitrification reactors

Description

Under a contract managed by Energy Systems, Science Applications International Corporation is designing a nonradioactive, fixed Plasma Hearth Process demonstration. An air pollution control system is being developed to treat the off-gas from the vitrification reactor before release. The air pollution control system consists of a full-quench, acid gas scrubber; activated carbon bed; a pre-high-efficiency particulate air filter; and a high-efficiency particulate air filter prior to release. Continuous off-gas sampling is being performed to quantify particulate carryover and volatility trends of heavy metals and radionuclides.

Accomplishments

Installation and testing of the air pollution control system was completed on July 28, 1996.

Nonradioactive pilot scale testing commenced in August. Two drums containing soil and steel were processed in the melter system, resulting in the first successful pour of approximately 725 lb of slag. All subsystems functioned as expected.

Concerns

None.

Scheduled Activities for Next Quarter

The plasma process demonstration portion of this project has been canceled. Completion of data analysis and preparation of a final test and waste disposal report are expected this quarter.

3.8.2.3 Toxic Substances Control Act (TSCA) Incinerator Test Bed for Continuous Emissions Monitors (CEMs)

Target Contaminant

TSCA incinerator emissions (K-25 Site)

Description

A national test bed is being established at the TSCA incinerator in Oak Ridge to evaluate promising CEM technologies. The TSCA incinerator—a continuously operated, full-scale, mixed waste treatment facility—is being used to conduct field tests of laboratory-proven CEMs in a real-world operating environment. This test bed facilitates passing CEM technology from the engineering development phase to the demonstration phase. Testing of CEMs is also assisting in gaining public and regulatory acceptance of thermal treatment technologies for treatment of DOE mixed wastes.

Accomplishments

Two multimetals CEMs were selected in July for initial testing and demonstration. Two multimetals demonstrations were begun in August.

Installation and shakedown of the test bed was completed September 15, 1996.

Concerns

None.

Scheduled Activities for Next Quarter

Commence evaluation of testing results.

3.8.3 High-Level Waste Tank Remediation Technologies**3.8.3.1 Mobile Evaporator Demonstration*****Target Contaminant***

High-level radioactive waste tank sludges (ORNL)

Description

A skid-mounted, subatmospheric evaporator for processing radioactive, high-salt-content waste from underground storage tanks at ORNL is being demonstrated. The objective is to evaporate 25,000 gal of liquid, low-level waste supernate stored in the ORNL MVST to a level approaching, but not exceeding, supersaturation of the dissolved salts.

Accomplishments

Secondary waste disposal continues.

Concerns

None.

Scheduled Activities for Next Quarter

Continue disposal of secondary wastes.

3.8.3.2 Cesium Removal Demonstration

Target Contaminant

High-level radioactive waste tank sludges (ORNL)

Description

A modular, mobile ion exchange system for removing radioactive cesium from contaminated high-salt-content waste from underground storage tanks at ORNL is being demonstrated. The technology is needed to selectively remove radioactive cesium from wastes and concentrate it into a small-volume, stable waste form. The demonstration system is being used to remove cesium from up to 25,000 gal of MVST supernate.

Accomplishments

The Cesium Removal Demonstration system was delivered in July and installed in August. Water testing was completed.

Bench-scale tests to determine if the loaded sorbent was hazardous were completed. The sorbent was found not to be hazardous.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.8.3.3 Sludge Treatment Studies

Target Contaminant

High-level radioactive waste tank sludges (ORNL)

Description

Actual wastes from the ORNL MVST and Hanford, Washington, tanks are being used for experimental studies on sludge washing and dissolution in both acidic and basic solutions. Modeling efforts are directed toward understanding MVST sludge as well as Hanford tank sludge. Both acidic and caustic leaching studies are being carried out in close coordination with complementary studies at Pacific Northwest National Laboratory.

Accomplishments

Enhanced Sludge Washing tests on sludge from Hanford underground storage tanks C-105, C-107, C-108, and SX-113 all resulted in the formation of solids in leachates and wash solutions. This is the first time that solid formation has been reported in Enhanced Sludge Washing of any sludge other than material from T-104. Sludge from six Hanford tanks has been examined for solid formation

during Enhanced Sludge Washing, and material from S-104 was the only one that failed to produce solids in process solutions.

MVST processing began in September.

Concerns

None.

Scheduled Activities for Next Quarter

Continue MVST processing.

3.8.3.4 Partitioning of Sludge Components by Caustic Leaching

Target Contaminant

High-level radioactive waste tank sludges (Hanford)

Description

This task addresses the potential for removing aluminum and other amphoteric materials in sludge by extraction with a very caustic solution, thereby reducing the amount of sludge that must undergo acid digestion or disposal as high-level waste. The dissolution behavior of constituents in sludges and actual sludge samples in 1–6 *M* sodium hydroxide solutions are being determined. The feasibility of recovering leached materials from the caustic solutions is also being considered.

Accomplishments

Two additional caustic leaching tests on sludges from Hanford tanks C-105 and C-107 were completed. Samples of the leachates were provided to the Sludge Treatment Studies program for turbidity and gel formation studies.

Concerns

None.

Scheduled Activities for Next Quarter

Continue caustic leaching tests. Preparation of summary reports.

3.8.3.5 Solid/Liquid Separation for Gunite Tanks

Area of Concern

High-level radioactive waste tank sludges (ORNL)

Description

A variety of filtration methods are being evaluated for the solid/liquid separation of wastes in underground storage tanks at ORNL and throughout the DOE complex. The ORNL GAAT system, which contains residual liquids and sludges from past radiochemical separations operations, is being used to demonstrate treatment alternatives. To remediate this tank system, the liquids and sludges are being processed into a stable form for long-term disposal. The most appropriate solid/liquid separation methods for the GAAT system are being determined as a result of this task and are being demonstrated using actual tank wastes.

Accomplishments

Cross-flow filtration tests and settling tests with GAAT W-3/W-4 sludge composite were completed.

The solid/liquid separation demonstration plan was completed. A vendor was selected to perform the detailed design and fabrication of the solid/liquid separation demonstration system.

Concerns

None.

Scheduled Activities for Next Quarter

Continue design and fabrication of the solid/liquid separation demonstration system.

3.8.3.6 Light-Duty Utility Arm Development and Demonstration

Target Contaminant

Underground storage tanks containing waste materials (ORNL)

Description

Robotics and sensing technologies are being developed and demonstrated for the characterization and remediation of underground storage tanks. The emphasis is on a multilaboratory effort to develop and demonstrate the use of the light-duty utility arm as the primary end-effector positioning system. Specifically, this task addresses development and demonstration of a topographical mapping system and transfer of light-duty utility arm system technology to support waste retrieval demonstrations in the ORNL North and South Gunite Tank Farms.

Accomplishments

The light-duty utility arm was installed at the Tanks Technology Cold Test Facility at ORNL in July.

Concerns

None.

Scheduled Activities for Next Quarter

Shipment of the modified light-duty utility arm from the vendor to ORNL is scheduled this quarter.

3.8.4 Facility Transitioning, Decommissioning, and Final Disposition Technologies**3.8.4.1 Gas-Phase Decontamination System*****Technology***

Gaseous diffusion cascade equipment (K-25 Site, Portsmouth)

Description

The effectiveness of the long-term, low-temperature decontamination technique is being demonstrated by performing a full-scale test on a permanently shut down X-25 cell at the Portsmouth Gaseous Diffusion Plant. If proven effective, this technique could be applied to the decontamination of diffusion cascade equipment across the DOE complex. Laboratory-scale testing of long-term, low-temperature cell decontamination at the K-25 Site has produced promising results. Solid uranium deposit material was successfully removed from copper, nickel barrier, and cast aluminum substrates to surface contamination levels less than the release limits specified in regulations.

Accomplishments

The full-scale test gas exposure period began on July 25, 1996, and will run for 105 days. Information from analytical instruments indicates that recovery of test cell uranium deposits is taking place.

Concerns

None.

Scheduled Activities for Next Quarter

The full-scale test gas exposure period will be completed on November 6, 1996. A status letter will then be prepared.

3.8.4.2 Decontamination and Decommissioning

Area of Concern

Building decontamination (ORNL, Argonne National Laboratory)

Description

Oak Ridge is leading the D&D robotics effort by coordinating multisite activities. The major activities are (1) S&M risk and cost reduction evaluation methodologies; (2) characterization, mapping, and inspection systems; (3) Selective Equipment Removal System; (4) full-scale testing; and (5) Houdini debris removal system. Within the characterization, mapping, and inspection systems task, an automated floor characterization system is being completed, and development of a mobile facility mapper system is being initiated. In the development of the Selective Equipment Removal System, Oak Ridge is leading the integration and testing of a dual-arm work module on a mobile vehicle, modifying and evaluating task space scene analysis technologies, and demonstrating dismantlement technologies within the CP-5 reactor at Argonne National Laboratory. Oak Ridge is also working closely with the Morgantown Energy Technology Center in support of the Houdini debris removal system for operation in hazardous environments.

Accomplishments

The Mobile Mapping System prototype was completed August 1, 1996. A demonstration of the system was held in the Robotics Technology Assessment Facility at ORNL on August 28, 1996, for participants, including personnel from numerous research universities.

Under the Selective Equipment Removal System task, the dual-arm work platform/dual-arm work module platform shipment arrived from Idaho National Engineering Laboratory. Project staff reassembled the hardware at ORNL.

High-density concrete was poured in the small shield plug section that will be used for water jet cutting tests.

Design has begun on the lower annular shield seal plate mock-up.

Concerns

None.

Scheduled Activities for Next Quarter

Continue design on the lower annular shield seal plate mock-up.

3.8.4.3 Robotics

Technology

Remotely operated devices for facility waste management

Description

Robotics technologies that are broadly applicable to the environmental restoration and waste management needs of DOE are being developed. The major activities supported by Oak Ridge are (1) robotic controls and enabling system software, (2) virtual collaborative environment (dual-arm work module), and (3) system analysis for cost/benefit studies and component testing. Specifically, Oak Ridge will develop and test control algorithms for the control of long-reach flexible manipulator systems; integrate cost/benefit analyses with hardware test and stimulation efforts; develop and demonstrate multi-arm control algorithms; and extend simulation capabilities to support design, test, and evaluation of robotic system applications to environmental restoration and waste management tasks.

Accomplishments

The prototype Mobile Mapper was completed and demonstrated in August.

Experiments were completed in support of cost/benefit studies for the Cross-Cutting and Advanced Technology task. The experiments were aimed at determining time and "telepresence" for an unbolting task for eventual input into models of system processes. The final cost/benefit report was completed on August 1, 1996.

A report detailing ORNL's accomplishments in hydraulic manipulator research was completed. The report includes information on hydraulic monitoring, thermal response testing, and the flexible/prismatic test bed.

Assembly of the control console for the CP-5 Dual Arm System was completed.

The full model of the Gunit tank clean-up manipulator was developed and underwent initial operator simulation demonstration July 25, 1996.

The position and orientation tracking system was installed at RedZone Robotics and integration was completed July 31, 1996. The system was operated and demonstrated with the Houdini vehicle.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.8.4.4 Tank Waste Retrieval

Area of Concern

Underground high-level radioactive waste tanks (ORNL)

Description

Oak Ridge is leading the DOE effort to develop, test, and demonstrate robotics technology for the characterization and remediation of underground storage tanks. The emphasis is on the development and demonstration of tank waste retrieval technologies based on the use of the modified light-duty utility arm as the primary end-effector positioning system. The system is being used for the remediation of GAAT at ORNL.

Accomplishments

A platform extension for the Houdini Tether Management and Deployment System was designed for the Tanks Technology Cold Test Facility at ORNL. The extension will allow deployment of the Houdini vehicle system simultaneously with the modified light-duty utility arm.

An on-line review of the 20% draft Houdini Remotely Operated Vehicle Test Plan was completed August 26, 1996. All testing conducted at the Tanks Technology Cold Test Facility will be performed according to this document.

Concerns

None.

Scheduled Activities for Next Quarter

Continue preparation of the Houdini Remotely Operated Vehicle Test Plan.

3.8.5 Treatability Evaluations

3.8.5.1 Bear Creek Valley Watershed ROD Treatability Evaluation

Area of Concern

S-3 Ponds and other source areas in Bear Creek Valley

Description

A treatability evaluation is being performed to investigate the feasibility of using passive, in situ treatment systems to remove contaminants from the Bear Creek watershed. The objective of the evaluation is to explore the application of inexpensive technologies and actions for treating contaminated groundwater.

The evaluation is being conducted in the area between the S-3 Ponds and the main stem of Bear Creek and North Tributary (NT) 1. A subsurface collection is proposed for collecting and treating groundwater by passing it through a train of individual treatment media that together are capable of

removing some or all of the targeted contaminants. The groundwater capture and treatment trench may be supplemented by any of three bioremediation technologies: constructed wetlands, algal mats, or phytoremediation systems. The treatment goal is to meet regulatory standards in the tributaries and/or groundwater downstream of the tributaries. However, if this goal is not technologically feasible, the technology may still be considered viable if a significant reduction of target contaminants can be made at the surface water and groundwater exit pathways. The results of the treatability evaluation will be used to determine whether all parts of this integrated treatment system should be considered as a base action for the Bear Creek watershed.

The treatability evaluation is being conducted in three phases:

- Phase 1: Site Characterization and Preliminary Investigation of Treatment Technologies. The objectives of Phase 1 are to characterize possible demonstration sites (which receive groundwater discharge from the S-3 ponds) near NT-1 and NT-2, test and select effective treatment media, and conduct initial wetlands and phytoremediation testing.
- Phase 2: Field Evaluations. The objective of Phase 2 is to determine efficient treatment trains for site-specific water by conducting long-term column testing of select media, assess whether the treatment train should be above or below ground, develop optimization data for pilot-scale wetlands and phytoremediation design, and evaluate hydraulics and flow rate controls for the trench.
- Phase 3: Pilot-Scale Implementation (Early Action). The objective of Phase 3 is to install and evaluate the effectiveness of a pilot-scale groundwater capture trench coupled with in situ or ex situ treatment systems and, if appropriate, operate the system(s) in conjunction with the constructed wetlands or phytoremediation system. The system will reduce the flux of contaminants out of the S-3 Ponds and be of sufficient scale to be considered an early action for the Bear Creek watershed.

Accomplishments

An Action Plan for the treatability evaluation was issued in July 1996 and a briefing was given to the FFA Managers at the September 10-11, 1996, meeting. Phase 1 of the evaluation has been completed; the following results and conclusions were discussed:

- Iron oxide, peat moss, and Dowex resins appear to be the most promising media for sorption of uranium and some other inorganic constituents. Zero valent iron has demonstrated effectiveness in establishing reducing conditions in the subsurface.
- It is possible to reduce nitrate, uranium, and some other inorganics using wetlands. Providing a food source for the nitrate-reducing bacteria may be required to make this technology effective.
- The field characterization work has shown that there may be two distinct shallow flow paths for uranium to the main stem of Bear Creek. Trenches constructed in these areas will be the subject of activities performed in FY 1997.
- Zero valent iron is very promising under low flow conditions for setting up reducing conditions in the subsurface for the removal of uranium and other inorganics and the destruction of VOCs. Master Builder Iron is the most effective type of iron tested to date.
- The media (iron oxides, peat moss, Dowex resin, and zero valent iron) that will be carried into the Phase 2 work have been selected. Wetlands will continue to be evaluated as an in-stream polishing technique.

Concerns

None.

Scheduled Activities for Next Quarter

Long-term field column tests to evaluate breakthrough curves will commence in the next quarter.

Work on the Phase 1 summary report and Phase 2 work plan will continue.

4. OTHER REGULATED ACTIVITIES

These activities are regulated under a requirement other than the FFA, however, they are reported here to inform the reader of activities at AOCs under the FFA.

4.1 K-25 SITE RCRA CLOSURES

Area of Concern

K-1417 Drum Storage Yard, K-1419 Sludge Fixation Facility

Description

This project consists of the removal of above- and below-ground structures associated with two former waste management facilities. The RCRA closure is being performed under the guidance of the *RCRA Closure Plan for the K-1417 Concrete Block Casting and Storage Yard and K-1419 Sludge Fixation Facility on the Oak Ridge K-25 Site* (DOE/OR/01-1076&D1) and the *Pond Waste Management Project K-1417 Drum Storage Yard and K-1419 Sludge Fixation Facility Equipment and Facilities Removal Plan* (KIPW-33&D3). Closure of the K-1419 Sludge Fixation Facility will occur over the period from FY 1996 to FY 1997 and encompasses the decontamination of hazardous waste materials (where necessary) and the removal of equipment and above-grade structures (except storage tanks F-4030 and F-4170). The K-1417 Drum Storage Yard closure has been divided into two tasks: the "A" section of the Drum Storage Yard will be closed during FYs 1996-1997, and the "B" portion will be closed by March 1999.

Field activities are presently underway and being performed in accordance with the K-1419 Sludge Fixation Facility and the K-1417-A Drum Storage Yard Demolition/RCRA Closure Project Performance Specification, July 1995.

Accomplishments

Approximately 90% of the K-1419 facility has been demolished. RCRA cleaning and closure of the K-1417 and K-1419 facilities continued.

Concerns

None.

Scheduled Activities for Next Quarter

Closure activities at the two facilities will be completed by December 7, 1996. The closure report will be issued by February 7, 1997.

4.2 Y-12 PLANT RCRA CLOSURES

Area of Concern

Garage Underground Storage Tanks, Interim Drum Yard, Diked Tank Storage Facility

Description

This subproject consists of three release sites: (1) the Garage Underground Storage Tanks, (2) the Interim Drum Yard, and (3) the Building 9409-5 Diked Tank Storage Facility.

The Garage Underground Storage Tanks were part of an on-site facility for servicing motor vehicles. This facility included a gas station with associated underground fuel tanks, underground piping, dispensing pumps, a building, and ancillary fixtures. Two tanks were previously used to store gasoline: a 20,000-gal unleaded gasoline tank and a 10,000-gal leaded gasoline tank. The tanks were subsequently diverted from their initial use to the storage of waste oils containing the spent solvents perchloroethylene and ¹¹³Freon and measurable quantities of PCB and uranium. A third, empty tank in the same dirt emplacement with the two RCRA tanks contained waste oil that was not hazardous as defined by current regulations.

Clean closure of the tanks began in 1988 with the excavation, decontamination, and removal of the tanks; the sampling of surrounding soil; and the removal of contaminated soil. As a subproject, the three contaminated tanks were cleaned and removed in early 1994. The RCRA closure package—which includes closure certification by the independent registered professional engineer, the closure summary report, and supporting closure documentation—has been prepared and issued, and clean closure of this site has been approved by the state regulators.

The Interim Drum Yard, west of Building 9720-32, was a RCRA, outdoor, tented storage facility for containerized hazardous waste. Drums were stored on wooden pallets placed on gravel lined with a plastic tarp covering native soil. Wastes stored at the facility consisted of mercury, metals, acrylonitrile, methylene chloride, organics, ¹¹³Freon, cyanide, PCBs, uranyl nitrate, penetrant solution and emulsifiers, asbestos, and sodium hypochlorite.

Soil sampling indicated that the underlying surface soil and gravel were contaminated. All waste stored at this site was shipped off site for final disposal or transferred to a RCRA-permitted storage facility on the ORR. The tent structures and diking were also removed to prepare the site for sampling and characterization activities. Analytical results indicated that the soil in two areas had some contamination above RCRA clean closure criteria for cadmium and mercury. Excavation of these two areas is the focus of the work plan.

The Building 9409-5 Diked Tank Storage Facility was a RCRA-permitted, outdoor, concrete, diked area with a capacity of approximately 238,000 gal. This facility was constructed in 1942 as a four-cell cooling tower basin, but it was modified in 1980 for use as a secondary containment facility for tanks and drums of liquid waste. These tanks and drums contained, at various times, liquid waste coolant, solvents, and waste oils—all of which may have contained PCBs. Some of the waste liquids stored in this facility were known to have contained uranium and beryllium. Chromium may be present as a result of the water treatments used during cooling tower operations. All tanks have been removed from the facility, and a closure plan revised according to state regulatory comments has been approved.

The RCRA closure work plans for the Interim Drum Yard and the Diked Tank Storage Facility were approved. Completion of these projects according to these work plans will result in clean closures of these AOCs. Closure activities at the Interim Drum Yard and the Diked Tank Storage Facility began in January 1996.

Accomplishments

A certification of closure package for the Diked Tank Storage Facility was submitted and accepted by TDEC in August 1996.

A certification of closure package for the Interim Drum Yard has been submitted to TDEC.

Concerns

None.

Scheduled Activities for Next Quarter

Receive approval for the closure certification package for the Interim Drum Yard.

4.3 REDUCTION OF MERCURY IN PLANT EFFLUENTS

Area of Concern

UEFPC, LEFPC, Mercury Use Areas

Description

From 1955 through 1963 at the Y-12 Plant, a column-exchange process involving large quantities of mercury was employed in many of the major process buildings to separate lithium isotopes. Since that time, Mercury Use Areas, including buildings and surrounding contaminated soils, have been designated as possible sources of mercury contamination because of known, suspected, or presumed releases. These areas are the focus of RMPE, which is a cooperative effort between the Clean Water Act and CERCLA compliance organizations. 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. Subprojects in RMPE are described below.

Mercury-Use Buildings Source Eliminations—Encouraging reductions of mercury loading to the creek have been realized in the past from sewer upgrades and pipe reroutes. Additional pipe reroutes, where mercury-contaminated storm drains and sumps have been bypassed by the installation of new piping, provide for clean transport of water from the building. For example, sampling of Outfall 47/48 shows that mercury loading from this outfall has fallen below the action level as a result of the Building 9202 sanitary sewer rerouting job. Source elimination work has been completed in Buildings 9204-4, 9201-2, 9201-5, and 9201-4. In addition, source elimination work in Building 9201-5 has been completed to consolidate sump water from 9201-5 and 9201-4 into an existing underground tank. The routing of this sump water to the tank provided isolation of the sumps and allows monitoring of the remaining discharges from these buildings and verification of the pipe rerouting and replacement effort. The tank will serve as the interface point for the Central Mercury Treatment System to pick up the sump water for treatment when it becomes operational. Source

elimination in Buildings 9201-4 and 9204-4 was also completed in October and November 1995, well ahead of the NPDES compliance schedule.

East End Mercury Treatment Facility—The upgrade of the Interim Mercury Treatment System has been completed, and the finished treatment system is now called the East End Mercury Treatment Facility. This facility began operation on May 9, 1996. The operation of this unit in conjunction with the source elimination work in Building 9201-2 has resulted in a reduction of mercury loading from 9201-2 to UEFPC from 3.25 g/d to less than 0.5 g/d. The source elimination work in 9201-2 resulted in the total removal of water discharging through Outfall 49.

Central Mercury Treatment System—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 System. The system will be housed in the existing Central Pollution Control Facility. Demolition at the Central Pollution Control Facility to make room for the Mercury Treatment Facility is underway. Construction and procurement activities are also underway.

Mercury Air Stripping Test Facility at Outfall 51—This facility is a pilot operation designed to investigate the potential for removal of mercury from contaminated groundwater. Outfall 51 is a spring discharging to UEFPC south of Building 9201-2. A portion of the flow from this outfall is being collected, flowed through an air stripper, filtered, and discharged to UEFPC. The facility began operation in August 1995, and investigative efforts are planned to continue for 3–6 months.

Accomplishments

Construction of an experimental bypass of the Lake Reality discharge is underway. This action will be used to evaluate the effect of Lake Reality on the mercury loading at Station 17.

The mercury activities are ahead of the compliance schedules in the NPDES permit, and new opportunities are being recognized for achieving additional mercury reductions.

A test plan for the Mercury Air Stripping Test Facility was prepared and implemented. The pilot test was performed to ensure that adequate data were collected to validate the process and allow scale up to a full treatment system. The pilot test was completed successfully, and the project team is using the results in a life cycle cost analysis to choose the most cost-effective path.

Concerns

Concern: Despite the tremendous progress made in RMPE, the NPDES permit requires UEFPC to be at state water quality standards for mercury on the last day of the permit. This is unattainable with current technology. **Impact:** Without technology advancements, the NPDES requirements will not be met. **Action:** An appeal to the NPDES permit is on file. A site-specific criterion is being developed for the mercury discharge and is being discussed with the regulators.

Scheduled Activities for Next Quarter

Continue operation of the RMPE treatment facilities.

The Central Mercury Treatment System will come on line.

The Lake Reality Bypass will begin operating for a 6-month test.

5. 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 and Jacobs Engineering—will be performing work at all locations within the ORR. The following is included to satisfy this requirement.

5.1 OAK RIDGE Y-12 PLANT

American Technologies, Inc.—Quality assurance and assessment support for the UEFPC Watershed ROD.

CACI:ASG—Project control support.

CDM Federal Programs Corp.—Technical support and integration for the RI/FS phase of UEFPC Watershed ROD.

CKY, Inc.—Technical support with sediment sampling and risk assessment for UEFPC.

DASKR LTD, Inc. - risk assessment support.

Highland Drilling, Co. - monitor well maintenance.

Parallax, Inc. - project control support.

Technics Development Corp.—Technical support for LEFPC.

TN & Associates - technical support for the UEFPC.

University of Tennessee - soil and water studies for Bear Creek and multiport well sampling.

Foster Wheeler Environmental Corp.—Design contractor for multiple projects.

Gram, Inc.—General site characterization and preremedial design support to the UEFPC and Bear Creek Valley Watershed RODs.

Jacobs Engineering (DOE prime contractor)—Preparation of decision documents.

MK-Ferguson—Construction management and support services.

Pacific Western Technologies, Ltd.—Project control support.

PAI—Project control support.

ParaMax, Inc.—Project control and support for UEFPC Watershed ROD.

Science Applications International Corp.—Technical support and integration for the RI/FS phase of the Bear Creek Valley Watershed ROD.

5.2 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.

ATG—D&D of the Waste Evaporator Facility.

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 ISV 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.

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.

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 RAs 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 for active LLLW tanks.

Jacobs ER Team—Preparation of integrated RCRA/CERCLA/National Environmental Policy Act decision documents, including FSS, Proposed Plans, RODs, Environmental Assessments, 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 RA 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 S&M 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.

Operational Technologies—Preremedial design support.

Pacific Western Technologies—Project control support.

Parallax—Project control support.

Peer Consultants—Administrative support (team member of SAIC).

Performance Development Corporation—Technical and administrative support for active LLLW tanks.

Pragmatics—Nuclear criticality safety reviews for MSRE.

SAIC—Monitoring coordination, performance assessments, and hydrologic modeling for the WAG 6 Performance Assessment Program.

SGN - Evaluating removal of sludges from various active LLLW Tanks.

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

Solutions To Environmental Problems—Health and safety planning.

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.

TN & Associates—Operation and maintenance of the Close Support Lab and Field Operations Facility.

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.

Westinghouse Hanford Company—Procurement and delivery of a modified light duty utility arm for GAAT.

XL—Planning support for GAAT innovative technology development, testing, and development.

5.3 OAK RIDGE K-25 SITE

Barge Waggoner Sumner & Cannon—Subcontractor to Engineering Department for site surveying.

Environmental Consulting Engineers—Continuous water level monitoring for the Groundwater Program.

Foster Wheeler Environmental—Home office Title III support and preparation of the Integrated System Test Plan and systems narrative and vendor manual document for the SW31 Spring Project.

Informatics—Project management support for the Groundwater Program.

Jacobs Engineering—Assistance in project scoping and work on the EE/CA, FS, Proposed RA Plan, and ROD for K-1070.

Kansas Geological Survey—Seismic reflection study for the Groundwater Program.

MK-Ferguson—Construction management of the Phase 2 Central Neutralization Facility upgrades.

Science Applications International Corp.—RI technical support, including field investigation, lab analysis, data validation, and preparation of the RI report. RSE support and preparation for the Groundwater Program. RI for K-1070.

U.S. Geological Survey—Stage gauge measurements and seepage runs along Mitchell Branch for the Groundwater Program 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.

5.4 OTHER OAK RIDGE RESERVATION AREAS

Energy Systems—Business management, project management, and technical support for Freels Bend Area, South Campus Facility, LEFPC, Clinch River/Poplar Creek, and LWBR.

Jacobs Engineering—Project management and technical support for LWBR.

SENES Oak Ridge, Inc. - risk assessment and uncertainty analysis support for Clinch River/Poplar Creek.

University of Tennessee Energy Environment and Resources Center—Technical leadership for RI activities for Clinch River/Poplar Creek.

5.5 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.

Lagos & Associates, Inc.—FFA implementation support.

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; FFA implementation support.

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

University of Waterloo (Canada)—Groundwater modeling.

5.6 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.