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

Volume 1. October-December 1994



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Quarterly Report
for the Environmental Restoration Program**

Volume 1. October-December 1994

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

ENVIRONMENTAL SCIENCE
ORNL BUILDING 1505, RM. 113
P. O. BOX X
OAK RIDGE, TENNESSEE 37830

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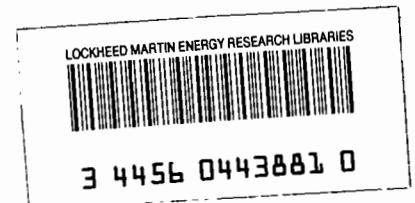
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**Prepared for the
U.S. Department of Energy
Office of Environmental Restoration and Waste Management
under budget and reporting code EW 20**

**MARTIN MARIETTA ENERGY SYSTEMS, INC.
managing the
Environmental Restoration and Waste Management Programs at
Oak Ridge K-25 Site
Oak Ridge Y-12 Plant
Oak Ridge National Laboratory
under contract DE-AC05-84OR21400**

**Paducah Gaseous Diffusion Plant
Portsmouth Gaseous Diffusion Plant
under contract DE-AC05-76OR00001**

**for the
U.S. DEPARTMENT OF ENERGY**



CONTENTS

ACRONYMS	v
1. EXECUTIVE SUMMARY	1
1.1 DOCUMENTS TRANSMITTED TO THE REGULATORS	1
1.2 DOCUMENTS PROPOSED FOR TRANSMITTAL TO THE REGULATORS	2
2. SIGNIFICANT ACCOMPLISHMENTS	3
3. TECHNICAL STATUS	6
3.1 OAK RIDGE Y-12 PLANT	6
3.1.1 Upper EFPC OU 1 (Groundwater)	7
3.1.2 Upper EFPC OU 3	9
3.1.3 Bear Creek OU 1	11
3.1.4 Bear Creek OU 2	12
3.1.5 Bear Creek OU 4 (Groundwater)	13
3.1.6 Chestnut Ridge OU 2	14
3.1.7 Reduction of Mercury in Plant Effluents (RMPE)	15
3.1.8 RCRA Closures	16
3.2 OAK RIDGE NATIONAL LABORATORY	18
3.2.1 ORNL WAG 1 Gunitite and Associated Tanks OU 1	18
3.2.2 ORNL WAG 1 Core Hole 8	19
3.2.3 ORNL WAG 1 Process Waste Treatment Plant (PWTP) Surge Capacity Upgrade	20
3.2.4 ORNL WAG 1 Surface Impoundment OU 2	21
3.2.5 ORNL WAG 1 Groundwater OU 4	22
3.2.6 Inactive Liquid Low-Level Radioactive Waste Tanks	23
3.2.7 Active Liquid Low-Level Radioactive Waste Tanks	24
3.2.8 ORNL WAG 2 (White Oak Creek Embayment/Tributaries/Soil OU 1)	25
3.2.9 ORNL WAG 4	27
3.2.10 ORNL WAG 5	28
3.2.11 ORNL WAG 6	29
3.2.12 ORNL WAG 7 In Situ Vitrification	30
3.2.13 ORNL WAG 10 Hydrofracture Wells Plugging and Abandonment OU 3	32
3.2.14 ORNL WAG 13	33
3.2.15 ORNL Area-Wide Groundwater Program	33
3.3 OAK RIDGE K-25 SITE	34
3.3.1 K-901 OU	34
3.3.2 K-1070 OU	35
3.3.3 K-1070 SW-31 Spring Project OU	36
3.3.4 K-1407 OU	37
3.3.5 Groundwater OU	38
3.3.6 Inactive Waste Sites Surveillance and Maintenance	39

3.4	OAK RIDGE RESERVATION BOUNDARY AREAS	40
3.4.1	Clinch River/Poplar Creek OU	40
3.4.2	Lower Watts Bar Reservoir OU	41
3.4.3	South Campus Facility OU	42
3.4.4	Freels Bend Study Area	43
3.4.5	Lower EFPC OU	43
3.5	TECHNICAL PROGRAMS AND TECHNICAL OVERSIGHT	45
3.5.1	Oak Ridge Environmental Information System	45
3.5.2	Remote Sensing and Special Surveys Program	47
3.5.3	Risk Assessment Program	48
3.5.4	Federal Facility Agreement and Tennessee Oversight Agreement	50
4.	REMEDIAL ACTION CONTRACTOR ASSIGNMENTS	52
4.1	OAK RIDGE Y-12 PLANT	52
4.2	OAK RIDGE NATIONAL LABORATORY	53
4.3	OAK RIDGE K-25 SITE	55
4.4	OAK RIDGE RESERVATION BOUNDARY AREAS	56
4.5	CLINCH RIVER-WATTS BAR RESERVOIR	58
4.6	ENERGY SYSTEMS ER CENTRAL DIVISION	59
4.7	JACOBS ENGINEERING	60

ACRONYMS

APO	Analytical Projects Office
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
D&D	decontamination and decommissioning
DNAPLs	dense, nonaqueous-phase liquids
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE-ORO	DOE Oak Ridge Operations Office
DQO	data quality objective
EA	environmental assessment
EFPC	East Fork Poplar Creek
EPA	Environmental Protection Agency
ER	Environmental Restoration
FFA	Federal Facility Agreement
FS	feasibility study
GWPP	Groundwater Protection Program
LDRIF	Low Dose Rate Irradiation Facility
LLLW	liquid low-level radioactive waste
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
ORAU	Oak Ridge Associated Universities
OREIS	Oak Ridge Environmental Information System
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	operable unit
PA/SI	Preliminary Assessment/Site Inspection
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RMPE	reduction of mercury in plant effluents
ROD	Record of Decision
SWSA	solid waste storage area
TDEC	Tennessee Department of Environment and Conservation
TOA	Tennessee Oversight Agreement
TVA	Tennessee Valley Authority
UST	underground storage tank
VDRIF	Variable Dose Rate Irradiation Facility
VOC	volatile organic compound
WAG	waste area grouping
WOC	White Oak Creek
WOCE	White Oak Creek Embayment
WOL	White Oak Lake

1. EXECUTIVE SUMMARY

This quarterly progress report satisfies requirements for the Environmental Restoration (ER) Program that are specified in the Oak Ridge Reservation (ORR) Federal Facility Agreement (FFA) established between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Tennessee Department of Environment and Conservation (TDEC). The reporting period covered herein is October through December 1994 (first quarter of FY 1995).

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

1.1 DOCUMENTS TRANSMITTED TO THE REGULATORS

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

- Bear Creek Valley Operable Unit (OU) Soil Sampling and Analysis Plan (DOE/OR/01-1322&D1)
- Bear Creek Valley OU 2 Feasibility Study (FS) (DOE/OR/02-1279&D1)
- Waste Area Grouping (WAG) 1 Core Hole 8 Plume Action Memorandum (DOE/OR/02-1317&D1)
- Lower East Fork Poplar Creek (EFPC) Special Study Sediment Risk Assessment (DOE/OR/01-1342&D1)
- Freels Bend No Further Investigation (NFI) Report (Remedial Site Evaluation) (no report number assigned)

Regulatory Commitment Status

Document title	Appendix E commitment date	Transmittal date
Bear Creek Valley OU Soil Sampling and Analysis Plan	11/08/94	11/07/94
Bear Creek Valley OU 2 FS	11/22/94	11/21/94
WAG 1 Core Hole 8 Plume Action Memorandum	12/09/94	11/10/94
Lower EFPC Special Study Sediment Risk Assessment	12/23/94	12/22/94
Freels Bend NFI Report (Remedial Site Evaluation)	12/29/94	12/14/94

1.2 DOCUMENTS PROPOSED FOR TRANSMITTAL TO THE REGULATORS

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

- Chestnut Ridge OU 2 Proposed Plan
- Kerr Hollow Quarry Proposed Plan
- WAG 4 Seeps Sampling and Analysis Plan
- WAG 5 Seeps Postconstruction Report
- WAG 5 Remedial Investigation (RI) Report
- Waste Evaporator Facility Engineering Evaluation/Cost Analysis (EE/CA)
- K-1070 RI Report
- South Campus Facility Proposed Plan
- Community Relations Plan

2. SIGNIFICANT ACCOMPLISHMENTS

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

- **Program Highlights**

The Region IV EPA Administrator wrote a letter of appreciation to Joe LaGrone for support provided in moving electronic data submission from the prototype phase to the production phase in Oak Ridge and in the letter cited this effort as an example that should be followed by all Region IV federal facilities. The Administrator further stated in the letter that Bear Creek Valley OU 2 data were successfully uploaded and put on line for use by the remedial project manager in less than 1 hr. This on-line availability of data would allow any stakeholder to sort through 50,000 individual records related to Bear Creek Valley that had been collected at over 100 sampling locations and over a 1-year time period. Selected records may now be compiled in a report and displayed on a map of the site in less than 3 min. The improvements cited in the letter with regard to data management and access also include substantially reduced costs for the ER Program.

Work on the Pond Waste Management Project resulted in the repackaging of all the drums on the K-1417 storage pad 4 months ahead of the Action Plan schedule. A total of 29,000 drums have now been repackaged in 5,450 21st-Century containers and are in compliant storage. The repackaging effort resulted in a cost savings of \$4.6M in FY 1994 due to continuous improvements made in the process and with equipment. The repackaging was also accomplished with great emphasis placed on adhering to safety and regulatory requirements.

An ER prioritization meeting was held in Lexington, Kentucky, with DOE, Energy Systems, state of Kentucky, state of Tennessee, state of Ohio, and EPA Region IV representatives in attendance. There were a total of 258 activities reprioritized in terms of human health and environmental risk reduction that could be accomplished, mission objectives that could be accomplished, and cost savings that could be achieved. The regulators were very complimentary and supportive of the process and commented the process should serve as a model for prioritization activities taking place at other DOE operations offices.

The ER Ecological Risk Assessment Program provided expert assistance to QA managers working in the DOE ER Division and involved in the recent Rocky Flats Data Quality Investigation. The audit team's work was aimed at helping Rocky Flat correct programmatic deficiencies and make efficient use of previously suspect ecological data.

- **Y-12 Plant**

A new strategy for the RI/FS of the Bear Creek Valley OU was developed. A Baseline Change Proposal (BCP) was submitted based on the new strategy, which calls for an evaluation of source term units, groundwater, surface water, and floodplain sediments as a single operable unit. The new strategy will involve expediting the RI/FS process because existing data will be used where possible and new data will be collected only

where significant data gaps exist. It is estimated that a savings of approximately \$1.5M will be realized over the 7-year planning period as a result of the change in strategy.

Due to effective teamwork performed by the three FFA parties, a no further action ROD was determined for EFPC OU 2 (the Abandoned Nitric Acid Pipeline). The ROD was submitted to the regulators for approval 2 months ahead of the FFA milestone date. A memorandum was issued by the EPA expressing appreciation for the efforts of all groups involved in the successful development of this ROD.

- **Oak Ridge National Laboratory**

A public information videotape on the Gunite and Associated Tanks (GAAT) Treatability Studies project was completed. The videotape is the first in a series that will be produced for educating stakeholders on who will be involved in remediation decisions for the gunite tanks. The completed videotape documents the 1994 sampling and analysis campaign; specifically, it highlights sampling activities and equipment and methodologies used.

A conceptual model was developed for the WAG 4 seeps project to guide planning for a corrective action that would significantly reduce the likelihood of radiostrontium releases from the site. Existing data were used to focus on action alternatives, and, when source-trench locations were needed with greater precision, collaboration with the intelligence community led to an independent production of a high-quality mapping of trench features, using a synthesis of several remote sensing products. Obtaining this new information will afford the opportunity of dramatically reducing the sizes of WAG 4 source areas that must be addressed and will also mean cost savings and a wider range of action alternatives that can be considered. The methods developed also have potential useful application at other DOE Oak Ridge Reservation waste sites.

Construction of the Tumulus I and II closure cap at WAG 6 was completed.

- **Oak Ridge K-25 Site**

Hydroseeding at the K-1407-C Retention Basin was completed on November 17, 1994. Remedial construction activities remaining at the pond include the completion of drainage ditches and Health Physics posting of the unit as an underground contamination area. The contouring of fill at the K-1407-B Holding Pond was also completed on November 17, 1994.

- **Community Relations**

The third annual EnvironMENTAL Fair—an event designed to increase student awareness of local and global environmental issues and to spark interest in science—was held on October 6 at the American Museum of Science and Energy in Oak Ridge. A different group of area middle-school students has been invited to each of the three fairs held thus far. The first fair hosted middle-school students (grades six through eight) from Anderson, Roane, Rhea, Meigs, and Loudon counties; from Wartburg Central Elementary; from Knoxville's Tennessee School for the Deaf; and from Vine Middle School. (The last three schools listed are included in the Martin Marietta Energy Systems, Inc., Adopt-a-School Program.) The second fair hosted sixth-graders from Knox County. This year's third fair hosted approximately 2,000 sixth-graders from 11

East Tennessee counties that are more distant from Oak Ridge than those previously in attendance at the fair. To date, nearly 8,000 students in East Tennessee have had the opportunity to learn about environmental work under way in Oak Ridge and around the country and to interact with a variety of environmental professionals.

The twelfth issue of the *ENVIRONMENTAL UPDATE* newsletter for the local community was published on December 29, with a circulation of 40,000. The newsletter had been completely redesigned for improved reader comprehension. All of the stories in this issue were related to topics that will be covered at the January 12 public meeting. Copies of this newsletter are available at the Information Resource Center in Oak Ridge (address: 105 Broadway Avenue; Oak Ridge, TN 37830; phone: 615-481-0695).

Notification was received that Assistant Secretary for Environmental Management Thomas P. Grumbly had issued a directive in December to establish in Oak Ridge an independent Site-Specific Advisory Board, which would be chartered under the Federal Advisory Committee Act.

The EFPC Citizens' Working Group met for what was probably the last time on November 16 to review the D2 version of the proposed remedial action plan for the creek and floodplain. At this meeting, DOE recommended Alternative 3 instead of Alternative 7 for remediating the sites. This change was the result of meetings that took place with the regulators, property owners, and cooperating agencies who favored a permanent solution rather than the implementation of institutional controls. The Citizens' Working Group viewed the change as a "reasonable" approach to remedying the contamination of the creek's sediments and floodplain. The Citizens' Working Group met more than a dozen times over the course of 18 months to discuss remediation plans for EFPC.

Community Relations representatives conducted four environmental restoration and waste management (ERWM)-related tours of the ORR during the first quarter of FY 1995. Included among these were tours conducted for representatives of the Oak Ridge Health Agreement Study Panel (a group of certified hazardous materials managers from around the nation) and representatives of the Oak Ridge Environmental Peace Alliance.

Five public workshops on the Common Ground Process were held during the first quarter of FY 1995 with stakeholders in Clinton, Farragut, Oak Ridge, Spring City, and Harriman. A total of approximately 100 people attended these workshops to discuss and help develop possible future land-use options for the Oak Ridge Reservation.

A public meeting was held on November 29 for the purpose of discussing the status and plans for the thousands of uranium hexafluoride (UF₆) cylinders, many of which are in deteriorating condition and are now stored in outdoor yards at the K-25 Site.

3. TECHNICAL STATUS

3.1 OAK RIDGE Y-12 PLANT

The Oak Ridge Y-12 Plant was built by the U.S. Army Corps of Engineers in 1943 as part of the Manhattan Project. The original mission of the Y-12 Plant was to separate the fissionable isotope of uranium (^{235}U) by the electromagnetic process. After World War II, the electromagnetic separation process was discontinued in favor of the more economical gaseous diffusion process.

Since the early years of the Y-12 Plant operations, the facility has developed into a highly sophisticated manufacturing and developmental engineering facility. It occupies ~800 acres and is located immediately adjacent to the city of Oak Ridge. The total work force consists of ~8000 persons, including employees of ORNL.

The Oak Ridge Y-12 Plant is located on the DOE ORR immediately adjacent to the city of Oak Ridge, Tennessee. Until 1993, the primary mission of the Y-12 Plant was the production and fabrication of nuclear weapon components. Activities associated with these functions included the production of lithium compounds, recovery of enriched uranium from scrap material, and fabrication of uranium and other materials into finished parts. Fabrication operations included vacuum casting, arc melting, powder compaction, rolling, forming, heat treating, machining, inspection, and testing.

Currently, personnel are refocusing the technical capabilities and expertise at the Y-12 Plant to better serve DOE and other DOE-approved customers. The Y-12 Plant is a key manufacturing technology center for the development and demonstration of unique materials, components, and services of importance to DOE and the nation. Specific focus areas for the Y-12 Plant in coming years will include the following: (1) weapons dismantlement and storage; (2) enriched uranium material warehousing and management; (3) the provision of nuclear weapons process technology and development support; (4) the conduct of Y-12 Plant management/landlord activities, including the renovation of stand-by or shut-down facilities by decontamination and decommissioning (D&D); (6) the provision of unique capabilities and technologies not found in the private sector on DOE-approved tasks; (7) the transfer of technology developed at DOE facilities to enhance the United States's industrial competitive edge in world-wide markets; and (8) the maintenance and support of the National Security Program Office for DOE.

An additional responsibility of the Y-12 Plant is to provide support and assistance to other government agencies whenever time or technology considerations warrant interagency agreements with DOE.

A number of areas of concern have been identified at the Y-12 Plant site resulting from past waste management practices. Many of these areas have been grouped into OUs based on priority and common assessment and remediation requirements. Numbers of areas have been grouped into prioritized study areas for additional assessment within the plant boundaries and surrounding environs.

Two OUs have been defined for groundwater and surface water contained within the Bear Creek and Upper EFPC hydrologic regimes. Groundwater will be investigated separately

because of the overlapping nature of source plumes and the observation that most plumes share a common hydrologic unit for off-site transport. Also, many releases to groundwater are historical, and the resulting plumes are no longer likely to be associated with the original source. As the groundwater plumes are defined, they will be associated with sources to the extent practical. Groundwater contamination in the Chestnut Ridge hydrologic regime is associated with each source OU.

3.1.1 Upper EFPC OU 1 (Groundwater)

Description

Upper EFPC OU 1 consists of both surface water and groundwater components of the hydrogeologic system within the Upper EFPC hydrologic regime. This coupled groundwater and surface water regime is bounded by the crests of Chestnut and Pine ridges and extends east from a topographic high near the west end of the Y-12 Plant to the point where Lake Reality discharges to Lower EFPC. This OU is concerned with the surface water, including minor amounts of sediment in the Upper EFPC channel, and groundwater pathways that have the potential for transporting contaminants to off-site receptors.

Surface Water and Groundwater. Numerous sources of contamination to both the surface water and groundwater flow systems exist within the plant area. Infiltration from the S-3 Ponds Waste Management Area dominates groundwater contamination in the western portion of the hydrologic regime. In addition to potential surface water and groundwater contamination sources identified in Upper EFPC OUs 1 and 3, the majority of the potentially contaminated units making up the Y-12 Study Area are within the Upper EFPC hydrologic regime. Potential non-mercury surface water contamination associated with the Storm Sewer System and Mercury Use Areas is of primary interest and will be addressed in this OU.

Storm Sewer System. The Storm Sewer System consists of an extensive array of storm drains that gather 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. The storm sewer network contains several miles of drainage pipes and culverts that range up to 108 in. in diameter. Upper EFPC begins near the middle of the Y-12 Plant and is fed entirely from Storm Sewer System discharges. Surface-water runoff from the Y-12 Plant production areas and groundwater seepage are additional sources of Upper EFPC flow.

Surface water and groundwater within the Upper EFPC hydrologic regime will be characterized and treated as an integrator OU distinct from source term OUs contributing contamination. This approach is warranted for the following reasons: (1) efforts to establish the horizontal and vertical extent of groundwater contaminant plumes from individual areas indicate that the plumes are significantly intermingled, making assessment and potential remedial actions of individual plumes impractical and (2) the units share a common exit pathway from the hydrologic system, which is best addressed by a comprehensive approach. Where site-specific groundwater or surface water data are needed to better identify the source or to support a screening-level risk assessment, groundwater or surface water assessment activities (e.g., installation of piezometers or definition of well points) may be conducted during the RI/FS process for the source-control OUs.

Accomplishments

Concurrence from TDEC and EPA was received on a new strategy for the RI of the OU. Work began on conducting wet weather sampling activities pending the ability to use dry weather sampling methods. After the Data Quality Objectives Workshop scheduled for March 1995 has been conducted, milestone dates for specific FFA deliverables will be established and presented to the FFA project managers for approval. The current schedule calls for a September 1995 delivery of a combined ground/surface water RI Work Plan or a delivery of an enhanced Sampling and Analysis Plan.

A modification of the RI/FS strategy for this integrator unit that would encompass the entire hydrogeologic regime was proposed to the regulators.

Sampling was completed on off-site wells to determine the extent of possible groundwater contamination in the Union Valley plume. A Union Valley Groundwater Evaluation Report was prepared that (1) addresses data from various on-site and off-site wells and from off-site seep and spring localities; (2) assesses the risks posed by the contaminants; and (3) summarizes the status of the action items identified during the March 1994 public meeting.

The dry weather sampling of surface water and the laboratory analysis of the 1400 water samples (which were part of the Phase 1 RI effort) were completed.

Concerns

Concern: There has been a slip in the schedule for validating existing data packages.
Impact: ?????? *Action:* ??????

Scheduled Activities for Next Quarter

Due to the results of the recent monitoring of the groundwater wells, which indicate a possible contaminated plume leaving the east end of the Y-12 Plant, the RI of the groundwater will be accelerated.

The definition of Data Quality Objectives will be completed.

An FFA milestone that calls for the delivery of the RI Work Plan or an enhanced Sampling and Analysis Plan to the regulators for review by September 30, 1995, will be established.

The final report on the Union Valley groundwater evaluation will issued.

Work on the FS will continue with development of an FS strategy for remediating Upper EFPC as a whole. Preliminary alternatives are being developed to support the Data Quality Objectives Workshop.

3.1.2 Upper EFPC OU 3

Description

Upper EFPC OU 3 is a source term OU comprised of seven areas in the western portion of the Y-12 Plant. For the most part, the Upper EFPC OU 3 areas serve unrelated purposes and are geographically removed from one another. The seven areas include Building 81-10, the S-2 Site, the Salvage Yard Oil Storage Tanks, the Salvage Yard Oil/Solvent Drum Storage Area, the Salvage Yard Drum Deheader, the Tank 2063-U Site, and the Salvage Yard Scrap Metal Storage Area. Three other areas (the Waste Coolant Processing Facility, the Machine Coolant Storage Tanks, and the Coal Pile Trench) were originally placed in the Upper EFPC OU 3 but have been transferred from the OU to the Upper EFPC study areas. The Coal Pile Trench was removed from the OU because it is located beneath an active coal pile; the other areas were removed because they are currently active facilities.

Building 81-10. The Building 81-10 site is within the Y-12 Plant at the northwest corner of the intersection of "G" Road and Third Street, south of Upper EFPC. Included as part of the site are two sumps. One sump (Building 9822) is on the east side of "G" Road, and the other sump is 25 ft east of the northeast corner of Building 81-10. Building 81-10 was built in 1943 as a tin shop. In 1957, Building 81-10 was converted for mercury recovery operations by physical separation or distillation by furnace. The furnace was in operation for approximately 5 years, closing in 1962. Mercury releases associated with handling during physical separation and from furnace operations have been documented. In 1984, the site was used as a storage area to stockpile mercury-contaminated soil. Use of the site to stockpile soil was discontinued, and the soil was removed; however, the date of soil removal is unknown. Initial assessments of the site indicate mercury contamination of soil surrounding the building and storage pad.

S-2 Site. The S-2 Site is in the southwestern portion of the main Y-12 Plant area, south of Building 9720-32 and on the southern side of Third Street at the base of Chestnut Ridge. The unit was an unlined earthen reservoir that was operated from approximately 1943 to 1951 to dispose of corrosive and toxic liquid wastes generated by the Y-12 Plant. The unit originally consisted of a 45-by-128-ft reservoir that was ~ 20 ft deep. The reservoir was back-filled, leveled, and stabilized when disposal operations ended during the 1950s. Heavy metals (including mercury in soil), volatile organic compounds (VOCs), and radioactive chemicals are contaminants of concern.

Salvage Yard Area. The Salvage Yard Area is in the northwestern area of the plant, south of Bear Creek Road and North of Second Street. The Salvage Yard Area is about 11 acres and contains five separate OU 3 areas. The following areas are contained within the Salvage Yard Area.

- Salvage Yard Oil Storage Tanks
- Salvage Yard Oil/Solvent Drum Storage Area
- Salvage Yard Drum Deheader
- Tank 2063-U Site
- Salvage Yard Scrap Metal Storage Area

Salvage Yard Oil Storage Tanks. The Salvage Yard Oil Storage Tanks consist of two tanks surrounded by a rip-rap earthen dike in the northwest corner of the Salvage Yard Area. Waste oils stored in the Salvage Yard Oil Storage Tanks were generated by various operations within the Y-12 Plant. The southern tank with a capacity of 6000 gal was put into service in 1978 and stored automotive crankcase oils, vacuum pump oils, hydraulic systems, and machining oils. The northern tank with a capacity of 5000 gal was put into service in 1980 and contained mineral oils generated from transformer oil changeout. In 1986 use of the tanks was discontinued, and their contents were emptied. The tanks are still at the site and contain bottom sludges contaminated with polychlorinated biphenyls (PCBs) and chlorinated solvents.

Salvage Yard Oil/Solvent Drum Storage Area. The Salvage Yard Oil/Solvent Drum Storage Area is in the northwest portion of the Salvage Yard and operated from 1976 to 1989. It has since been closed under RCRA. Originally, the drum storage area consisted of two compacted gravel areas on top of soil. Each area had a dike constructed of clay and gravel on the downgradient side. The combined storage area had a capacity of up to 175,000 gal of drummed waste oils and solvents. These drums rested on pallets and contained waste oils contaminated with chlorinate organics, uranium, and/or beryllium; chlorinated organic solvents; and nonchlorinated flammable solvents. In 1986 the western dike portion was closed and approved by the Tennessee Department of Health and Environment (now TDEC). No soil removal was required to satisfy closure criteria. Closure of the eastern portion began in 1988, when soil was removed to a depth of 1 to 2 ft and replaced with clean clay backfill and covered with a polyethylene membrane. The closure was approved by Tennessee Department of Health and Environment after soil and groundwater analysis data showed arsenic below ORR background levels and PCBs below the health-based criteria values. The area is included in OU 3 until completeness of closure can be determined and, if appropriate, no further action can be pursued.

Salvage Yard Drum Deheader and Tank 2063-U Site. The Salvage Yard Drum Deheader is in the northwest portion of the Salvage Yard and operated from 1959 until 1989. It was used to cut the tops off of empty drums that had contained oils and solvents. Operations of the drum deheader ceased in March 1989, and all drums have since been removed. The drum deheader and crusher were removed from the site in 1991. Residual materials present in the drums at the time of crushing were transferred to the Tank 2063-U Site. This site was used to store the liquid waste until it could be removed and treated elsewhere at the Y-12 Plant. Tank 2063-U consisted of three concrete and cinder block tanks separated by a rubber baffle for water separation. In March 1989, the tanks failed a hydrostatic hold test and were excavated under federal underground storage tank (UST) regulations in July 1989. The excavated soil was returned to the pit after a plastic geomembrane liner was installed. Possible contaminants at the drum deheader include volatiles, PCBs, and heavy metals.

Salvage Yard Scrap Metal Storage Area. The Salvage Yard Scrap Metal Storage Area has been operating in the northwestern portion of the Y-12 Plant since 1950, when it was used solely for storage of uranium-contaminated and uncontaminated scrap metal. Visual evidence of surface soil contamination has been observed on aerial photographs taken over the past few years. Soil contamination resulting from uranium-contaminated salvage materials is of primary concern at this site.

Accomplishments

During a March 16, 1994, FFA project managers' meeting, DOE recommended a deferral of Upper EFPC OU 3 activities due to the FY 1994 reprioritization of MSA funds. For this reason, a Baseline Change Proposal (BCP) was processed to revise the schedule for all OU 3 activities, starting with RI field activities, out to year 2001. The demolition of Building 81-10 (site preparation) was approved by the State Historical Preservation Office, and readiness activities are now under way. The demolition of this condemned structure will take place for safety reasons.

Concerns

None.

Scheduled Activities for Next Quarter

The Building 81-10 structure will be demolished.

3.1.3 Bear Creek OU 1

Description

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

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

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

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

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

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

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

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

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

The nature and extent of soil contamination within each of the listed units in Bear Creek OU 1 and the nature and extent of sediment and surface water contamination within each associated tributary to Bear Creek will be determined during the CERCLA investigation.

Accomplishments

Field sampling activities associated with the source term units were completed. A Sampling and Analysis Plan for the floodplain soils was submitted for review by the regulators. The Sampling and Analysis Plan addresses data gaps identified in the Bear Creek Valley Data Quality Objectives Workshop held August 1-3, 1994. These data will support the new Bear Creek remedial strategy, which considers source term units, groundwater, surface water, and floodplain soils as a single operable unit.

Concerns

None.

Scheduled Activities for Next Quarter

Laboratory analysis and data validation of samples collected at the source term units will be completed. Sampling of floodplain soils will be initiated.

3.1.4 Bear Creek OU 2

Description

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

Rust Spoil Area. The Rust Spoil Area is located in Bear Creek Valley less than 0.5 mile west of the Y-12 Plant on Old Bear Creek Road. The Rust Spoil Area was used from 1975

to 1983 for the disposal of spoil material generated during various renovation, maintenance, and construction operations at the Y-12 Plant. Disposed material was periodically graded, resulting in changes in topography and in filling of part of the Bear Creek channel. Approximately 100,000 yd³ of nonuranium-contaminated construction spoils were disposed of at the site. Small quantities of solvent-contaminated material and material containing asbestos, mercury, and uranium may have been disposed of in this area. Soil contamination is of primary concern.

Spoil Area 1. Spoil Area 1 is located near the southwest end of the Y-12 Plant, bounded by Old Bear Creek Road and West Patrol Road. Spoil Area 1 was used for the disposal of ~100,000 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.

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

Accomplishments

Comments from the regulators on the RI Report were received on November 23, 1994.

The FS Report was issued for review by the regulators on November 22, 1994.

Concerns

None.

Scheduled Activities for Next Quarter

Comments from the regulators on the RI Report will be addressed, and the revised document will be issued for approval.

3.1.5 Bear Creek OU 4 (Groundwater)

Description

The hydrologic system at the Y-12 Plant has been subdivided into three distinct hydrologic regimes based on topography, surface-water drainage, and groundwater flow. Bear Creek OU 4 addresses contamination within the coupled groundwater/surface water system and floodplain sediments. The area of interest within Bear Creek Valley extends west from a topographic high near the west end of the Y-12 Plant (the S-3 Waste Management Area) to the point where Bear Creek exits the valley near State Highway 95. Potential sources of groundwater, surface water, and sediment contamination are being addressed in Bear Creek OUs 1 and 2.

Groundwater and surface water within the Bear Creek hydrologic regime will be characterized and remediated as an integrator OU distinct from the contaminated units. This

approach is warranted because (1) efforts to establish the horizontal and vertical extent of groundwater contaminant plumes from individual sites indicate that the plumes are significantly intermingled, making assessment and remediation of individual plumes impractical and (2) the sites share a common exit pathway from the hydrologic system that is best addressed by a comprehensive approach. Where site-specific groundwater or surface water data are needed to better identify the source or to support a screening-level risk assessment, groundwater or surface water assessment activities (e.g., monitoring wells, piezometers, or well points) may be conducted during the RI/FS process for the source control OUs. The primary groundwater contaminants in the Bear Creek hydrologic regime are nitrates; VOCs; radionuclides; and, to a lesser extent, trace metals. Dense, nonaqueous-phase liquids (DNAPLs) have been discovered at a depth of 270 ft below the Bear Creek Burial Grounds. The DNAPLs consist primarily of perchloroethylene, trichloroethylene, 1,1,1-trichloroacetic acid, and high concentrations of PCBs.

Accomplishments

Task teams were established to address major action items resulting from the August 13, 1994, Data Quality Objectives Workshop. Task team topics included the following: (1) a pump and treat study proposal; (2) in-situ grouting demonstrations; (3) groundwater modeling; (4) risk assessment; and (5) a Burial Grounds inventory evaluation. Team members include DOE, Energy Systems, Jacobs, and TDEC participants.

Concerns

None.

Scheduled Activities for Next Quarter

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

3.1.6 Chestnut Ridge OU 2

Description

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

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

Accomplishments

Regulator comments on the RI and FS/EA Reports were received on November 23.

Concerns

None.

Scheduled Activities for Next Quarter

Regulator comments on the RI and FS/EA Reports will be addressed, and the revised documents will be issued for approval.

The Proposed Plan will be issued for regulator review by February 28, 1995.

3.1.7 Reduction of Mercury in Plant Effluents (RMPE)

Description

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

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

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

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

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

Accomplishments

The 9201-2 Interim Mercury Treatment Unit was restarted after having been shut down during the Y-12 Plant standdown.

Work continued on the 9201-5 Source Elimination construction; it is now 90% complete. Construction activities began on the 9201-4 and 9204-4 source elimination projects.

Revision 1 of the scope of work and design criteria for the Mercury Treatment Facility was completed.

Concerns

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

Scheduled Activities for Next Quarter

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

The construction phase of the Mercury Source Elimination will be completed.

A pilot treatment study of Outfall 51 will begin.

3.1.8 RCRA Closures

Description

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

YS-017 Building 9409-5 Diked Tank Storage Facility. The Building 9409-5 Diked Tank Storage Facility is a RCRA 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 have 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 the closure plan has been submitted. Closure plan approval is pending.

YS-019 Garage Underground Storage Tanks. The Garage USTs 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 unleaded gasoline (a 20,000-gal tank) and leaded gasoline (a 10,000-gal tank). The tanks were subsequently diverted from their initial use to the storage of waste oils containing the spent solvents perchloroethylene and Freon-113 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.

Surface soil shows evidence of spills/leaks that occurred during sampling and transfer operations. These tanks were originally gasoline storage tanks and were later converted to store the following:

Largest tank: unleaded gasoline, 1975 to 1979; waste oil, 1980 to present

Smaller tanks: gasoline, 1962 to 1979; waste oil, 1980 to present

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. The RCRA closure package—which includes closure certification by the independent Registered Professional Engineer, the closure summary report, and supporting closure documentation—has been transmitted the state regulators for review.

YS-030 Interim Drum Yard. The Interim Drum Yard west of Building 9720-32 is a RCRA outdoor tented storage facility for containerized hazardous waste. Drums are stored on wooden pallets placed on gravel lined with a plastic tarp covering native soil.

Wastes stored at the facility consist of mercury, metals, ACN, methylene chloride, organics, Freon-113, cyanide, PCBs, uranyl nitrate, penetrant solution and emulsifiers, asbestos, and sodium hypochlorite.

Soil sampling has 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 in order to prepare the site for sampling and characterization activities. Analytical results have indicated that the soil in two areas has some contamination above RCRA clean closure criteria for cadmium and mercury. Spot soil removal is proposed for these two areas and, after three attempts at overexcavation, the site would be closed with contamination in place. Any further investigatory or remedial action would be conducted according to the requirements of CERCLA.

Accomplishments

The RCRA closure package for the Garage USTs—which includes closure certification by the independent Registered Professional Engineer, the closure summary report, and supporting closure documentation—was submitted to the state regulators for review.

Field sampling was completed for the Interim Drum Yard and the Diked Tank Storage Facility, and site characterization summaries were prepared for both.

Based on the results of verification sampling, the draft closure plan for the Interim Drum Yard was rewritten and is now in the review process.

Concerns

Concern: Activities associated with the restart of Y-12 facilities that were shut down following the Defense Nuclear Facilities Safety Board audit have limited the progress on these activities. ***Impact:*** ?????? ***Action:*** ??????

Scheduled Activities for Next Quarter

A Professional Engineer review of closure will be conducted for the purpose of gaining assistance with the amendment of the closure plan for the Diked Tank Storage Facility and rewriting the closure plan for the Interim Drum Yard.

3.2 OAK RIDGE NATIONAL LABORATORY

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

3.2.1 ORNL WAG 1 Gunitite and Associated Tanks OU 1

Description

OU 1 consists of the underground steel and gunitite tanks associated with the tank farms located in the center of the ORNL main plant area. The Gunitite and Associated Tanks (GAAT) OU includes the tanks located in the North and South Tank Farms as well as Tanks TH-4 and W-11. The solid waste management units within this OU are primarily the large gunitite tanks installed to store liquid wastes in 1943 and subsequently used as the main holding tanks for the low-level liquid radioactive waste system at ORNL. A number of steel tanks associated with the North Tank Farm are also included in this OU. The strategy of this grouping is to allow those tanks that are geographically similar to be remediated as a group.

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

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

Accomplishments

The current status of work and plans for the Treatability Study were presented to the regulators on November 15; the regulators concurred with the proposed strategy for conducting project work.

Comments were received from EPA and TDEC on the Treatability Study Work Plan, and responses are being prepared.

The revised version of the RI/Baseline Risk Assessment for the Gunitite and Associated Tanks was submitted to the regulators for approval.

The first phase of the sampling and analysis of the Gunitite Tanks was completed. An in-progress review of the sampling and analysis effort was presented to the regulators. The Chemical and Analytical Sciences Division (2026 Lab) released, on schedule, the results of the first phase of sample data collected. Work is under way on a Phase 2 Sampling and Analysis Plan that will be discussed with the regulators in the January working group meeting.

A four-day values engineering study was conducted for determining application to the treatability study; there was participation from Energy Systems, DOE, Hanford, INEL, and industry representatives.

The functional requirements document was completed for the modified Light Duty Utility Arm, and the FS for modifying the arm was initiated by SPAR Aerospace.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.2.2 ORNL WAG 1 Core Hole 8

Description

Core Hole 8 is a location where a core sample has revealed significant contamination in groundwater traversing WAG 1. The removal action for the Core Hole 8 plume will involve two phases of construction. Phase 1 will consist of the construction of three small, localized french drains to intercept groundwater seeping into the storm water collection system and a lift station to pump the collected groundwater to the process waste treatment plant. If Phase 1 activities do not adequately reduce ⁹⁰Sr contamination at the First Creek weir, then the second phase of activities will be initiated. Phase 2 will consist of construction and operation of an extensive drain system across the full Core Hole 8 plume for collecting contaminated groundwater prior to its entering First Creek.

Accomplishments

A Phase 1 Action Memorandum that received DOE approval was submitted to the regulators for information purposes only.

The Phase 1 design package was issued certified for construction. The design package was forwarded to MK-Ferguson for use in preparing the Phase 1 construction estimate.

Initial preconstruction baseline monitoring was conducted for the purpose of evaluating the effectiveness of the removal action.

Phase 1 construction began on schedule.

Concerns

Concern: Due to reprioritization, funding for this project was reduced. Reduced funding was to be made available for the initiation of Phase 2 design activities if the Phase 1 construction did not adequately reduce contamination levels. *Impact:* Current available funding will not allow for the initiation of Phase 2 activities this fiscal year. *Action:* Phase 2 activities will be reprioritized to determine funding availability.

Concern: Due to utility system interference not shown on Atlas drawings, pipeline trench excavation has proven to be more labor intensive than anticipated. Procedures require that excavation within 5 feet of utilities be accomplished by hand rather than by automated equipment. *Impact:* These procedural requirements may result in a cost overrun due to the additional labor that will be required to complete the excavation. *Action:* None.

Concern: Due to a newly discovered source of contamination, Phase 1 design plans will need to be modified to include this new source. The modified design is expected to further reduce contamination at the First Creek weir, but Phase 1 design and construction costs will increase. *Impact:* A cost overrun could result due to increased cost for Phase 1 design and construction activities. *Action:* None.

Scheduled Activities for Next Quarter

Phase 1 construction will be completed.

3.2.3 ORNL WAG 1 Process Waste Treatment Plant (PWTP) Surge Capacity Upgrade

Description

The purpose of this project is to provide improved surge capacity for the Process Waste Treatment Plant (PWTP). Effluent from certain containment dikes, above and below grade collection sumps at ORNL, is pumped to the PWTP for treatment prior to release. During peak seasonal rainfall periods, the capacity of the PWTP is exceeded, so additional holding or surge capacity is needed to ensure proper treatment. Currently, surge capacity is provided by existing 350,000-gal tanks, the 3524 Equalization Basin, and the 190 Process Waste Ponds. The Equalization Basin and Process Waste Ponds will be taken out of service by the Surface Impoundment Operable Unit of WAG 1, so construction of additional surge capacity is needed. This additional capacity will be ensured through the addition of a 1,000,000-gal tank

with transfer pumps and a jet mixer installed in a concrete dike. A FY 1995 construction completion must be realized in order to meet a DOE commitment to TDEC regarding this installation.

Accomplishments

The site was prepared for initial concrete pours pursuant to completion of the dike. The contractor mobilized, installed reinforcing steel, and has planned the initial concrete pour for early January 1995.

Concerns

Concern: The recent moratorium on hoisting and rigging has impacted the construction schedule. *Impact:* Continued delays in lifting the moratorium may have significant impact on the completion schedule. *Action:* None.

Scheduled Activities for Next Quarter

None.

3.2.4 ORNL WAG 1 Surface Impoundment OU 2

Description

The following is a brief description of each of the four surface impoundments included in OU 2:

Basin 3513. This unlined impoundment was constructed in 1944 to serve as a settling basin for untreated waste waters prior to their discharge into adjacent WOC. The impoundment basically was constructed by excavating into the clay soil overlying the limestone bedrock at the site, and no lining was added.

Basin 3524. Basin 3524 is one of four holding basins located in the south central portion of the Bethel Valley ORNL facilities complex. Basin 3524, frequently referred to as the equalization basin, was an intermediate storage, collection, and mixing basin for the process waste treatment system located in Building 3544. Now it is only used for surge capacity for storm events.

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

Accomplishments

A new alternative to building a consolidation cell off the OU but still on the ORR to facilitate remediation of other ORNL impoundments was developed.

Concerns

None.

Scheduled Activities for Next Quarter

The work plan for the engineering support study will be completed.

Work will continue on the RI/FS Report.

The identification of potentially applicable ARARs will be completed.

The Surface Impoundment strategy document will be completed.

3.2.5 ORNL WAG 1 Groundwater OU 4***Description***

The Groundwater OU includes the shallow groundwater beneath the WAG that discharges to surface streams within WAG 1. The potential exists for contaminant migration from various sources within WAG 1 through both shallow and deeper groundwater to off-WAG receptors.

Accomplishments

Support documentation was prepared, and the Readiness Review for the Monitoring Program was conducted. CDM Federal Corporation also completed their Readiness Review in preparation for the first round of monitoring to be completed in January 1995. A decision was made and plans were initiated for consolidating continuous groundwater data collection under the ORNL Groundwater OU with one performing organization (a small business) to improve overall data consistency.

Concerns

Concern: A decision was made not to proceed with characterization activities this fiscal year due to funding constraints. ***Impact:*** No characterization activities will mean insufficient data for identifying potential contaminant sources and their migratory pathway. ***Action:*** Characterization activities will be rescheduled based on the availability of funds.

Scheduled Activities for Next Quarter

Monthly groundwater level monitoring and the first round of groundwater sampling will be initiated in January 1995.

3.2.6 Inactive Liquid Low-Level Radioactive Waste Tanks

Description

Liquid low-level radioactive wastes (LLLW) have been collected at ORNL since 1943 in tank systems used for the storage, transfer, and treatment of the collected LLLW. Some of the tanks are no longer in use and have been classified as removed from service. The majority of these tanks are owned by ER and are in the CERCLA remediation process. However, a few of these tanks are owned by Waste Management and LLLW generators. These remaining tanks are in the process of being transferred to ER. Liquids and sludges remain in many of the tanks, with several tanks receiving inleakage from groundwater and rainwater. The tanks are located in WAGs 1, 5, 8, and 9.

Accomplishments

Received regulator approval to pursue a new strategy for remediating FFA, Category D, tank systems. This strategy will involve an accelerated, streamlined approach that combines the CERCLA Site Investigation, RI, FS, and Proposed Plan documents into a single unified Proposed Plan document written to include several inactive tanks, termed batches, at ORNL. Task negotiations began with H&R Technical Associates on the preparation of (1) a document that describes the approved strategy and (2) the unified Proposed Plan documents that deal with the first batch of eight inactive tanks that will be remediated through the use of this streamlined CERCLA process.

Field investigation activities began on the first series (Series 1) of Batch 1 inactive LLLW tanks: 3001-B, 3004-B, 3013, and T-30. After the completion of a Health Physics survey, each tank found to contain liquids (and its vault), will be sampled and videotaped to determine the condition of the tank and document the configuration. ER will be able to use existing ES&H and other required documentation already in existence, which will result in a significant savings in the site investigation. Field investigation activities on the remaining tanks (Batch 1, Series 2 and 3, tanks H-209, WC-1, W-19, and W-20) will follow early in the second quarter of FY 1995.

Concerns

None.

Scheduled Activities for Next Quarter

The Inactive Tank Strategy Document will be issued for information purposes only.

The unified CERCLA Proposed Plan for the Batch 1, Series 1, tanks will be issued for internal review.

The Site Investigation for the Batch 1, Series 2 and 3, tanks will be completed.

3.2.7 Active Liquid Low-Level Radioactive Waste Tanks

Description

Although the FFA addresses the entire ORR, specific requirements are set forth for the LLLW tanks at ORNL. Liquid low-level radioactive wastes 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 is to ensure structural integrity, containment, detection of releases, and source control pending final remedial action at the site. The FFA requires that leaking LLLW tank systems be immediately removed from service. It also requires that LLLW tank systems that do not meet the design and performance requirements established for secondary containment and leak detection be either upgraded or replaced.

Accomplishments

Routine leak testing on the ten tanks with capacities less than 3000 gal was performed. In October and December, nine of those tanks yielded passing results. In November, all ten tanks yielded passing results.

Volume balancing leak tests were conducted on the gravity-fed pipeline connecting Building 7930 to Tank B-2-T and the gravity-fed pipeline connecting Building 3525 to Tank F-501. Both pipelines passed the leak tests.

Cathodic protection work began on system 6A at valve box 3A including installation of anodes and cabling at valve box 3A. The installation of anodes and cabling on system 16 began and was 50% complete by the end of the quarter.

The following reports were submitted to the regulators for comment:

Design/Installation and Structural Integrity Assessment Under the FFA for the Bethel Valley LLW Collection and Transfer System Upgrade for Building 2026 and Building 2099 at ORNL

Design/Installation and Structural Integrity Assessment of the Bethel Valley LLW Waste Collection and Transfer System Upgrade for Building 2649 at ORNL

Design/Installation and Structural Integrity Assessment of the Bethel Valley LLW Collection and Transfer System Upgrade for Building 3092 at ORNL

Risk Evaluation of Embedded, Single-Walled LLLW Piping at ORNL

The following revised reports were submitted to the regulators for their approval:

Design/Assessment for the Melton Valley LLLW Collection and Transfer System Upgrade Project at ORNL

Design Demonstrations for Category B Tank Systems at ORNL

Design Installation and Structural Integrity Assessment Under the FFA for the Bethel Valley LLW Collection and Transfer System Upgrade for Building 2026 and Building 2099 at ORNL

Leak Testing Plan for the ORNL LLLW System (Active Tanks)

Concerns

None.

Scheduled Activities for Next Quarter

A Waste Characterization and a Risk Characterization Report for Tank LA-104 will be submitted to the regulators for review.

The design demonstration for the remaining Category B tank systems will be submitted to the regulators for review.

3.2.8 ORNL WAG 2 (White Oak Creek Embayment/Tributaries/Soil OU 1)**Description**

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

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

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

Accomplishments

Approval was received from TDEC and EPA, Region IV, of the FY 1995 WAG 2 RI Work Plan. No changes to the plan were recommended. The final Phase 1 RI Report will be a FY 1996 deliverable.

Sediment core sampling at the Intermediate Pond Site was completed. The results of analyses of these samples will be used to determine horizontal and vertical contaminant distributions and the potential risk to human health attributable to off-site sediment transport during extreme storm events.

An interim report on surface water hydrology for the period April–June 1994 was completed and distributed. This quarterly data summary provides for rapid dissemination of provisional hydrologic data to users throughout the ER Program for their use in interpreting surface and groundwater contaminant fluxes and evaluating and selecting most appropriate treatment options.

An initial reconnaissance of the Bearden Creek drainage area was conducted to determine optimal sampling locations for the New Source Investigation task being performed as part of the Surface Water Program. This task will evaluate potential off-site transport of contaminants in surface water pathways that have not yet been characterized.

Work on upgrading the sodium iodide gamma activity quantitation system at the Environmental Sciences Division's Radioanalytical Laboratory (ESDRL) began with a PC-based software system being used to determine radioactivity in sediment and water samples. The upgrade will significantly increase sample processing efficiency and reduce turnaround time, with accompanying cost efficiencies.

Sampling of the influent and effluent of Seeps C and D ion-exchange units began on the WAG 5 seeps interception project.

Tritium analyses of all surface water samples collected during FY 1994 as part of the Seeps and Tributary Assessment tasks began. The data will be assessed to evaluate the relative contributions to human health risks of discrete and nondiscrete sources throughout the WAGs, during both baseflow and stormflow conditions in wet and dry seasons. The data will provide guidance for future seep and tributary sampling efforts conducted in the SWP to evaluate changes in source strengths and, thus, will provide a basis for prioritizing corrective actions.

Sampling began in Melton Branch to determine the overall performance of the WAG 5 Seep C and D removal actions.

Concerns

None.

Scheduled Activities for Next Quarter

The bathymetric study of White Oak Lake will be completed. The results of the study will guide sediment core collection for characterizing contaminants and will provide a baseline for evaluating potential scouring of White Oak Lake sediments during extreme storm events and completing the WAG 2 Phase 1 RI.

Preliminary data packages for assessing radionuclide distributions and inventory in WAG 2 will be completed.

Project handbooks for the WAG 2 RI and the seeps will be prepared to provide concise summaries of objectives, rationales, controls, and management plans for both projects.

The first quarter FY 1995 report on hydrologic data will be prepared for use in evaluating hydrologic pathways and contaminant fluxes throughout ORNL ER waste areas.

Documentation required for the cleanup of the main weirs on White Oak Creek and Melton Branch (which will be conducted during the summer of 1995) will be prepared.

3.2.9 ORNL WAG 4

Description

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

Accomplishments

Work began on the WAG 4 Environmental Management Program Integrating Contractor (EPIC) proposal.

At the last regulator working group meeting, consensus was achieved on the site conceptual hydrologic model. This model will be used in the Site Investigation and work on the RI/FS/Proposed Plan.

The Phase 2 Site Investigation Sampling and Analysis Plan for WAG 4 was submitted to the regulators on December 16, 2½ weeks ahead of the FFA milestone date of January 5. The expeditious review and approval of the plan by the regulators will allow the Phase 2 Site Investigation to begin in mid-January 1995.

Concerns

Concern: The results of the geophysical survey were not conclusive enough to allow the trench boundaries to be fully delineated. Also, there could be a change in the direction of work for the WAG 4 seeps project; the project has been identified as a non-time-critical project but could become a time-critical or interim remedial action project. *Impact:* There could be schedule delays due to the lack of necessary information and indecision on the most appropriate approach to the seeps project work. *Action:* Ground penetrating radar has been used to fully explore the trench boundaries for suspected ⁹⁰Sr seeps. Additional drive points and surface water samples are being planned to help better characterize the trenches. The proper approach to work on the seeps project was discussed and agreed upon at the November DQO Workshop.

Scheduled Activities for Next Quarter

The EPIC proposal for WAG 4 work will be submitted before January 20.

Field characterization work (weir installation, drive point installation, and sampling and analysis) will begin.

3.2.10 ORNL WAG 5

Description

ORNL WAG 5 is comprised of 16 remediation sites, including LLLW transfer lines and leak sites, hydrofracture surface facilities, waste storage tanks, a sludge basin and a holding pond, and a shallow land burial ground containing radioactive and hazardous wastes (SWSA 5). The major contaminants detected in shallow groundwater are ^{90}Sr and ^3H .

Accomplishments

Work on reevaluating historical waste characterization data and compiling waste inventory data and transuranic information continued; the results of this effort were incorporated in the RI Report's technical appendix that documents the integration of historical data in the WAG 5 RI.

Technical Bulletins on the WAG 5 worms investigation; the drilling, installation, and completion of Westbay multizone well systems; and the nonintrusive field characterization surveys at WAG 5 were issued.

Work involving surface water modeling at WAG 5 and documenting the deviation of contaminant flux contributions using the Hydrologic Simulation Program—FORTRAN code was completed.

The data quality summary that provides an overview of data validation, compares off-site and on-site data, and documents conformance with the DQOs for the WAG 5 RI was completed.

The WAG 5 Baseline Risk Assessment was completed.

The preliminary results of analyses performed on samples collected at the Seep C and Seep D collection and treatment units were received. The preliminary data indicate greater than 99% removal of ^{90}Sr from the seep water collected at both Seep C and D during the first 3 weeks of operation.

Concerns

None.

Scheduled Activities for Next Quarter

The RI Report on the WAG 5 OU will be submitted to the regulators for comment.

The Postconstruction Report on the WAG 5 seeps will be issued to the regulators.

3.2.11 ORNL WAG 6

Description

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

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

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

Accomplishments

Comments were received from EPA and TDEC, DOE Oversight, on the Environmental Monitoring Plan, and responses to the comments have been incorporated in the plan. Comments from TDEC's Solid Waste Office are expected and are overdue.

Construction of the Tumulus I and II closure cap was completed in October.

Instrumentation was installed at WAG 6. Monitoring Stations Numbers 1 and 3 are now fully operational.

A meeting was held of all FFA parties to resolve the March 1992 November Notice of Violation (NOV) that was issued for failure to submit a postclosure permit application. The regulators agreed to integrate CERCLA considerations in the RCRA permit. The permit is being prepared and is scheduled for completion in the Summer 1995.

Concerns

None.

Scheduled Activities for Next Quarter

Construction work at Monitoring Stations 1 and 3 will be completed.

Work will continue on the baseline sampling of groundwater monitoring wells.

3.2.12 ORNL WAG 7 In Situ Vitrification

Description

In Situ Vitrification (ISV) has been selected as the baseline closure technology for several pits and trenches at WAG 7. The ISV activity will continue in FY 1995 with a field-scale demonstration of two adjacent melts in Pit 1 whereby contaminated soil particles will be melted into a glass matrix. A treatability study will provide necessary information regarding the design, implementation, and performance of ISV for Pit 1 and other sites with known similar soil contamination. Pit 1 was selected for the demonstration because of its limited size (30,000 ft³) and radionuclide inventory (87 Ci of mixed fission products). The major objectives of ISV-related work in FY 1995 include completing design and fabrication of the ISV off-gas filter system and collection hood; completing the Pit 1 site characterization; completing all environmental, safety, and health documents; and obtaining approval for performing the treatability study. 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
- 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 U contaminants will be summarized in a technical report in FY 1995. These data will constitute a valuable adjunct in the evaluation of ISV as a closure technology.

Accomplishments

Work began on the groundwater sampling of the new piezometers and 15 other nearby wells, the civil survey of the new wells, and the preparation of documents describing these activities. Several wells (new and existing) do not contain water and will not be sampled.

Water level measurements were collected. Only two of the three scheduled measurement cycles will be completed because of lack of responsiveness in the aquifer.

Testing of the large-scale ISV equipment was completed in preparation for the equipment's shipment to Oak Ridge for the Pit 1 ISV demonstration. The testing of Pit 1 source-contaminated soil has indicated that there was no significant volatilization of ¹³⁷Cs during melting tests in laboratory crucibles. Leaching tests of the "before" contaminated soil were initiated for the purpose of making comparisons with the final ISV product.

The fuel migration investigation was completed in an expedient manner in response to concerns raised about spent reactor fuel migration from the Homogeneous Reactor

Experiment. This investigation was conducted to determine the extent, if any, of fuel movement from the original disposal auger holes for HRE. [Results?]

Approval was obtained to buy a new ISV off-gas hood and an off-gas roughing filter system.

Strength measurements for pit 1 soil fill were completed and indicate adequate shear strength for safe startup of trench excavation. Strontium-90 analyses of maximally contaminated soil from pit 1 showed that this radionuclide is present at less than 1% of the activity of ^{137}Cs ; the ^{90}Sr contamination was also found in the same narrow depth interval as the ^{137}Cs activity.

Samples of the maximally contaminated soil from three cores within the ISV target depths of pit 1 were subjected to lithium borate fusion and dissolution. Elemental analyses will be completed on selected samples and assays for uranium and plutonium isotopes.

In an effort to minimize the amount of water that must be boiled off during ISV operations, the site was covered with two plastic sheets to minimize normal recharge of pit 1 perched water during the wet winter months ahead. Fence posts and all protruding monitoring well pipe and rod, except four groundwater monitoring wells, were removed prior to covering. Three additional plastic sheets were ordered to complete the site cover in adjacent areas.

A report entitled *Radionuclide Soil Decontamination by Salt Amendment and High Temperature Treatment* was completed.

Groundwater sampling was completed on wells containing water.

Final water level measurements were collected. Only two of the three scheduled measurement cycles were completed due to lack of responsiveness in the aquifer.

Groundwater samples were sent to an off-site laboratory for isotopic alpha analysis.

The refurbishing of the large-scale ISV system trailers was completed. All instruments were calibrated, and equipment components were repaired or replaced as necessary.

Concerns

Concern: Groundwater sampling has been delayed 2 weeks because of a slip in the field schedule caused by limited resources and a conflict with ongoing WAG 1 activities. In turn, the off-site laboratory advised that the 30-day sample turnaround time would not be possible before the end of the calendar year. *Cause:* Bids for the fabrication of a new ISV off-gas hood were approximately one million dollars over the planned budget for this phase of project work. A request for additional funds or reauthorization of existing funds has been submitted to DOE-ORO, along with a justification for the request. *Impact:* Even with the assumption that this modification is acceptable, the melts at Pit 1 cannot be started before mid-June 1995 because of the 6 months required for completing the fabrication of the off-gas hood. *Action:* Partial funding has been received.

Scheduled Activities for Next Quarter

Site grading will begin prior to the placement of the ISV trailers and equipment. The target completion date for the site grading is April 1, 1995.

Review and approval of the Safe Operating Procedure for the large-scale ISV system will hopefully be completed during the second quarter of FY 1995.

Work will continue on the preparation of the Test Plan for pit 1 ISV operations and on the performance of support calculations related to occupational dose and accidental release scenarios. In addition, work will continue on the preparation of a site Health and Safety Plan, QA Plan, Waste Management Plan, and Readiness Review Plan. The Operational Readiness Review is scheduled for March 1995.

3.2.13 ORNL WAG 10 Hydrofracture Wells Plugging and Abandonment OU 3

Description

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

Accomplishments

Work continued on developing a revised conceptual model for WAG 10 that has been identified necessary based on a review of pressure, radiological, and specific conductance data compiled as a result of the sampling of wells associated with the Old Hydrofracture Facility. Preliminary data indicate that three of these wells are under artesian pressure and may be providing a pathway for contaminated deep groundwater to reach zones overlying the waste injection zone. Additional data will be collected from these wells to aid in the estimation of flow volumes rising in the Old Hydrofracture wells.

Work began on preparing the Site Characterization Summary Report for the WAG 10 wells that are associated with the Old Hydrofracture Facility.

An additional activity was initiated for similar sampling and evaluation of wells and boreholes associated with past waste disposal operations conducted at the New Hydrofracture Facility.

Concerns

None.

Scheduled Activities for Next Quarter

Work will begin on wellhead tapping and the sampling of approximately 25 wells associated with the New Hydrofracture Facility.

Work will continue on preparing the Site Characterization Summary Report and the Well Plugging and Abandonment Plan for the wells associated with the Old Hydrofracture Facility.

3.2.14 ORNL WAG 13

Description

ORNL WAG 13 consists of the Cesium-137 Contaminated Field and the Cesium-137 Erosion/Runoff Study Area. The contaminated field is located ~330 ft north of the Clinch River at Clinch River Mile 20.5. The 50-acre area was set aside for studying the ecological effects of simulated fallout of ^{137}Cs , which would occur in the event of a nuclear war. The contaminant consisted of ^{137}Cs fused at high temperature to silica particles. After ~20 years (since contamination), about 5.2 Ci of activity remains.

Accomplishments

None.

Concerns

None.

Scheduled Activities for Next Quarter

Characterization activities will be conducted to determine the full extent of contamination so that the Preliminary Assessment/Site Investigation NFI petition can be written.

3.2.15 ORNL Area-Wide Groundwater Program

Description

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

Accomplishments

The Health and Safety Plan was completed on the Hydrostatic Head Monitoring Stations; the issue of this document will now allow the retrofit of Westbay equipment into existing Hydrostatic Head Monitoring Stations.

The field tracer test that is a part of the Fracture Flow and Matrix Diffusion/ Groundwater Modeling activity was initiated. These tests, when completed, will provide data critical to the evaluation of source control measures and groundwater remedial measures.

Concerns

None.

Scheduled Activities for Next Quarter

Geophysical surveys aimed at obtaining subsurface lithological and structural information relevant to groundwater flow pathways will begin.

The premonitoring phase of seeps and springs sampling will begin. Grab samples will be collected from a number of seeps and springs in an effort to identify likely exit pathways for contaminant plumes.

3.3 OAK RIDGE K-25 SITE

The Oak Ridge 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 being the location of many contractor central staff functions, operating waste treatment facilities, serving as a center for applied technology, and supporting the development of the Advanced Vapor Laser Isotope Separation uranium enrichment technology.

3.3.1 K-901 OU

Description

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

K-1070-A Old Contaminated Burial Ground, northwest of Building K-33, was used for the disposal of several types of material from the 1940s to 1976. The burial ground contains ~35,575 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. The K-1070-A landfarm received ~5000 ft³ of fuller's earth between 1979 and 1985. The fuller's earth was laden with concentrated acids, sludges, and other degradation products from uranium enrichment cascade oil.

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

Accomplishments

The seep/spring water sampling of the K-901 OU was completed, and organic/inorganic radiological analyses began. The preliminary radiological results indicate no radiological hits.

The toxicity analyses of the water and sediment samples from the K-901A Holding Pond were completed; the final surface water and sediment toxicity reports from ORNL/ESD were received.

The benthic macroinvertebrate survey of the K-901-A Holding Pond was completed; the report on this activity was received on December 5.

The microgravity survey in the area of the K-1070-A Burial Ground was completed; the final microgravity report was received the week of December 23.

The small mammal trapping for the ecological risk screening effort was completed on November 9. The terrestrial invertebrate sampling at the K-1070-A Burial Ground was completed, and the earthworm samples were shipped to the organic/inorganic laboratory on November 7.

Five bedrock wells and two unconsolidated wells at various stages of completion were drilled. Results to date substantiate the surface trough from the K-1070-A Burial Ground to the K-901-A Holding Pond and the existence of cavernous/karstic subsurface terrain in the area of the K-1070-A Old Contaminated Burial Ground.

Concerns

None.

Scheduled Activities for Next Quarter

Field activities will continue.

3.3.2 K-1070 OU

Description

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

Accomplishments

None.

Concerns

None.

Scheduled Activities for Next Quarter

The RI Report will be issued to the regulators for review in March 1995.

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

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

Accomplishments

The Phase 2 Remedial Action Work Plan for the K-1070 SW-31 Spring was issued to and approved by the regulators in December 1994.

The Phase 2 Certified-for-Construction design package for the SW-31 Spring (the Central Neutralization Facility upgrade) remedial action was finalized. A readiness review for this work was held by MK-Ferguson, and clarification of the technical scope for the direct-hire and fixed-price subcontract portions of the Phase 2 remedial action was provided by the project engineering team.

Concerns

None.

Scheduled Activities for the Next Quarter

The Phase 2 construction bid and award will be completed in March 1995.

3.3.4 K-1407 OU

Description

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

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

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

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

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

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

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

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

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

Accomplishments

The placement of rock fill and contouring fill at the K-1407-B Holding Pond will be completed.

Concerns

None.

Scheduled Activities for Next Quarter

Construction work at the K-1407-B and -C Ponds will be completed.

3.3.5 Groundwater OU***Description***

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

This area is divided into two components: K-25 Groundwater Compliance and the K-25 Groundwater Operable Unit. 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 K-25 are radionuclides, principally ²³⁸U; organic compounds; and heavy metals, including principally Pb (lead) and Hg (mercury).

Accomplishments

The sitewide groundwater sampling task was completed. Approximately 200 wells were sampled using micropurging and low-flow sampling techniques. Over 50 percent of the analyses have been completed, and data validation has been completed on over 30 percent of these.

U.S. Geological Survey health and safety upgrades were completed at stage gage stations along Poplar Creek and the Clinch River. Data recording has been ongoing since instrumentation of the stations early this fall.

Groundwater data for the years 1985–1993 were delivered for entry in the Oak Ridge Environmental Information System (OREIS). This delivery consisted of over 300,000 records and will nearly double the number of records residing in OREIS.

Concerns

None.

Scheduled Activities for Next Quarter

Continuous water level measurements will be initiated for select wells to establish the relationship with groundwater levels to that of Poplar Creek and the Clinch River.

Sampling of a total of 214 monitoring wells will begin throughout the plant.

Work will begin on geophysical survey activities and will involve (1) determining seismic reflections and the location of the K-25 Fault and other geological structural features and (2) conducting microgravity surveys to locate subsurface caverns and troughs.

The sampling of approximately 20 seeps and springs will begin throughout the plant.

3.3.6 Inactive Waste Sites Surveillance and Maintenance

Description

This activity includes those tasks necessary to manage the Inactive Waste Sites Surveillance and Maintenance (S&M) Program and to ensure adequate containment and site control at inactive wastes sites and other contaminated areas prior to final remediation. The major tasks consist of Program/Project Management, Routine S&M, and Special Activities.

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

The area that S&M encompasses is designated inactive wastes sites around the K-25 Site. Contaminants found within the S&M Sites include radionuclides, including principally ^{238}U ; organic compounds; heavy metals, including principally Pb (lead) and Hg (mercury); PCBs; and asbestos.

Accomplishments

Fieldwork related to the radiological characterization of the inactive waste sites was completed. A total of approximately 257 acres were characterized.

The fencing project for the K-901 North Waste Disposal Area was completed. A fence was erected there to protect the public and employees from radiological contamination.

Radioactive soil samples were shipped to the Lockheed Laboratory for analysis. Soil sampling and survey results for the K-901 and K-1070-A areas were sent to Health Physics to aid in making health and safety decisions for the RI personnel.

The walkdown assessment of 53 RCW value vaults was completed. Deficiencies noted will be corrected.

The annual summary report on the S&M Program for remedial action inactive waste sites at the Oak Ridge K-25 Site was issued.

Concerns

None.

Scheduled Activities for Next Quarter

Routine maintenance activities will continue.

3.4 OAK RIDGE RESERVATION BOUNDARY AREAS

3.4.1 Clinch River/Poplar Creek OU

Description

The Clinch River RI focuses on the portions of the Poplar Creek and the Clinch and Tennessee Rivers that may have been adversely affected by contaminants released from the mid-1940s to the present from the DOE ORR. The Melton Hill Reservoir and the Clinch River, downstream from Melton Hill Dam, form the eastern and southern boundaries of the ORR. Poplar Creek drains from the K-25 Site and receives inflow from EFPC. The Clinch River enters the Tennessee River system of multipurpose impoundments near Kingston, Tennessee, 34 km downstream from the Oak Ridge complex. This WAG/OU/study area includes Poplar Creek, the Melton Hill Reservoir, and the Clinch River from Melton Hill Dam to Kingston.

The contaminants released from the ORR have originated as a result of research, industrial, and waste disposal activities conducted at the Y-12 Plant, ORNL, and the K-25 Site. The contaminants released from these facilities include a variety of radionuclides, metals, and organic compounds. Some liquid wastes have been discharged to streams on the ORR, which drain into the 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. The TDEC has a fish consumption advisory in effect for Melton Hill Reservoir and the Clinch River arm of Watts Bar Reservoir as well as other area reservoirs. Poplar Creek has signs posted by TDEC advising against fish consumption and water contact due to mercury, metal, and organic chemical contamination. Arsenic, chromium, mercury, selenium, zinc, ^{137}Cs , and ^{60}Co constitute a risk only if deep-channel sediments are dredged and dredge spoil is used for agriculture.

Accomplishments

The Fall 1994 fish community survey of Poplar Creek and the Clinch River was completed.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.4.2 Lower Watts Bar Reservoir OU***Description***

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

The source of ORR contaminants in this OU is the Clinch River. Because the dam was completed prior to the start of operations at ORR, and also because the reservoir acts as an efficient trap for sediments and any associated particle-reactive contaminants, much of these contaminants have accumulated in the bottom of the Watts Bar Reservoir over the years. The contaminants of concern and exposure pathways are the same as for the Clinch River OU, with PCBs in fish posing the greatest risk. TDEC has issued a fish consumption advisory for Watts Bar Reservoir. A fish consumption advisory is also in effect for Fort Loudoun and Tellico Reservoirs, located upstream of Watts Bar Reservoir and the ORR. Sediment contaminant concentrations, because of dilution by the Tennessee River and the greater spatial extent of the reservoir as compared to the Clinch River, are generally lower in Watts Bar Reservoir than in the Clinch River. Screening-level human-health risk analyses indicate that contaminants in sediment pose a risk only if deep channel sediments are dredged and the dredge spoil is used for agriculture.

Accomplishments

The RI Report and Proposed Plan for the Lower Watts Bar RI were discussed with the FFA parties, and their concerns and review comments were resolved. The Proposed Plan is scheduled to be approved in January 1995. A comment resolution meeting was held on November 28.

Concerns

None.

Scheduled Activities for Next Quarter

The revised versions of the RI Report and Proposed Plan for the Lower Watts Bar Reservoir OU will be submitted to TDEC and EPA for approval.

3.4.3 South Campus Facility OU

Description

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

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

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

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

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

Accomplishments

Comments were received from the regulators on the RI/FS Report, and the response to comments was initiated.

A groundwater monitoring program was initiated and the first round of samples was collected.

The fall-intensive testing period was completed for the wetlands treatability study.

Concerns

None.

Scheduled Activities for Next Quarter

The revised RI/FS Report will be prepared and submitted to the regulators for approval.

The Proposed Plan will be prepared and submitted to the regulators for review.

Winter-intensive testing of the wetlands treatability study will be performed.

The second round of quarterly groundwater samples will be collected.

3.4.4 Freels Bend Study Area

Description

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

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

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

Accomplishments

A No Further Investigation petition was submitted to the regulators in December.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.4.5 Lower EFPC OU

Description

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

Beginning in 1952, Y-12 began production-scale separation of lithium isotopes, which required the use of millions of kilograms of mercury. This process resulted in the release of 108,000 to 212,000 kg (239,000 to 470,000 lb) of mercury into EFPC between 1953 and 1983. More than 20 tributaries and treated effluent from the Oak Ridge Sewage Treatment Plant flow into the creek. Although the primary mercury discharges from Y-12 were eliminated in 1963, mercury continues to be released in EFPC from Y-12 and secondary sources (e.g., building drain systems, sewers, and connecting lines). The current release is approximately 20 g/day (0.7 oz/day) down from 100 g/day (3.5 oz/day) in 1985. Portions of the sewers were relined during 1986 and 1987 to reduce mercury contamination. Efforts continue to further reduce mercury discharges (e.g., decontamination and decommissioning, reduction of mercury in plant effluents, and remediation of mercury-use areas). The Y-12 Plant ER Program has responsibility for the surface water in EFPC. Releases are regulated under the Clean Water Act, National Pollutant Discharge Elimination System, permit for Y-12.

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

The cleanup objective for the site is to prevent current and future user exposure to mercury-contaminated soils. Currently, risk levels are unacceptable in the EFPC-Sewer Line Beltway soils. DOE encourages public input to ensure that the remedy selected for the EFPC-Sewer Line Beltway meets the needs of the local community and is an effective solution to the problem.

Accomplishments

A value engineering assessment was performed to support enhancement of the Life-Cycle Baseline for the proposed remedial alternative.

The FS was approved by the regulators.

The revised Proposed Plan was issued to the regulators for approval.

Concerns

None.

Scheduled Activities for Next Quarter

None.

3.5 TECHNICAL PROGRAMS AND TECHNICAL OVERSIGHT

3.5.1 Oak Ridge Environmental Information System

Description

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

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

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

Accomplishments

DOE-ORO and OREIS received commendations from John Hankinson, Regional Administrator, EPA Region IV, in a letter to Joe LaGrone, DOE-ORO Director, for electronic data transfer efforts. The letter states that "The Oak Ridge staff and management have been a most cooperative partner in the quest to utilize EDM technology to improve the environmental restoration program at Oak Ridge . . . Using the Oak Ridge example, my staff is prepared to move electronic data submission from the prototype phase to the production phase for all Region IV Federal Facilities."

An OREIS milestone was met with the completion of the FY 1994 annual summary of data base contents of both the environmental measurements and geographic data bases in OREIS. The total number of data records in OREIS as of December 31, 1994, was 428,616.

The OREIS configuration change control process was established, and associated procedures and instructions were drafted. Efforts were begun to establish the configuration control board per guidelines in the OREIS charter.

OREIS staff contributed to a plan for geospatial metadata per Executive Order 12906, and made presentations to the Clean Air Task Team, ORNL Compliance staff, and the ORNL ER Technical Integration Working Group.

Forty-four users participated in training sessions held this quarter. Training topics included OREIS Orientation, View Manager, SAS/ASSIST, Macro Manager, and ArcView.

Concerns

Concern: A significantly shorter and more frequent timetable for transferring data from ER projects to OREIS to accessibility by the regulators and other users is needed. ***Impact:*** A different timetable for data transfer will require the revision of the process developed for loading data into OREIS. Additional effort will be required for evaluating and revising the process. The revision of the data transfer schedule has the potential for significantly improving the "clarity" of the OREIS data, if the schedule is developed properly. More timely data access will benefit the regulators. ***Action:*** OREIS data management staff are participating in a pilot project that involves using a revised data transfer schedule. Staff associated with the site project and subcontractors also are participating.

Concern: Although the development of additional site or project data management systems is no longer being supported, the ER Program continues to operate numerous project and site data management systems. Staff time required to coordinate and support these independent systems remains significant. ***Impact:*** Staff time needs to be devoted to identifying common solutions and common systems. ***Action:*** The adoption of a consistently documented and standardized approach currently is under study. OREIS staff are participating in discussions and analyses of a standardized approach to data management and data management systems. OREIS supports options that will lead to standardized and documented data management processes.

Scheduled Activities for Next Quarter

Electronic data that are associated with reports identified in Appendix E of the FFA and that are scheduled for December 1994 through February 1995 will be made available through OREIS.

Additional OREIS user training sessions will be provided.

An updated version of the OREIS QA Plan will be published.

The results of the user evaluation process will be published.

Work aimed at establishing a configuration control board to support the OREIS charter will be completed, and the first board meeting will be held. The board will include representatives from the different site programs, DOE, EPA, and TDEC.

Meetings will be held with targeted user groups for the purpose of better defining user services.

Data transmitted to OREIS from ER projects will be loaded; NPDES and ambient air data will also be loaded.

Additional geographic data obtained from existing map data, data on new base map activities, and data from aerial survey programs will be made available to OREIS users.

Work will continue on coordinating data management and system development activities across the ER Program.

3.5.2 Remote Sensing and Special Surveys Program

Description

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

Accomplishments

A meeting was held with TDEC geologists to discuss the high resolution aerial geophysical survey data collected over the Union Valley area. TDEC has requested map products for this area.

Initial processing and review of two of the three multispectral scanner survey (MSS) tapes from the March 1994 multispectral survey of the Oak Ridge Reservation were completed. A preliminary landcover classification of a part of K-25 was created from this 2000-foot altitude MSS data using a mix of supervised and unsupervised techniques.

Remote sensing support was provided for the Y-12 Groundwater Program. Several initial color-enhanced thermal hardcopy products were provided of the Scarboro/Union Valley areas just east of Y-12 and of the Grassy Creek/Clinch River intersection to the southwest. An annotated ortho-photographic mosaic of Y-12 and Bear Creek Valley was also prepared for use in the Bear Creek Monitoring Program.

Remote sensing support was provided to the Y-12 ER Program. Airborne geophysical data were supplied to help guide a ground-based geophysical survey already in progress at the Bear Creek Burial Grounds.

Examples of remote sensing data for the Oak Ridge Reservation were provided at the groundwater coordinators' quarterly meeting. Examples of data types were shown, and a list of data contact names was provided so attendees would have direct access to remote sensing information for the Oak Ridge Reservation.

Aviation reporting requirements for FY 1994 that were identified earlier this year during the DOE-HQ aviation assessment of DOE-ORO were satisfied.

A preliminary map of currently known locations of federal and state-listed plant species on the Oak Ridge Reservation was compiled to facilitate work with the Tennessee Nature Conservancy under the "Common Ground" initiative. Information on threatened and endangered species and sensitive habitat background information were also provided to the Tennessee Nature Conservancy for use in the "Common Ground" initiative.

Verification and validation exercises were performed for approximately 1000 plant taxa on the Oak Ridge Reservation flora list against the 2785 taxa listed in the "Checklist of Vascular Plants of Tennessee" for the purpose of updating the nomenclature, identifying errors, and possibly identifying overlooked species.

Concerns

None.

Scheduled Activities for Next Quarter

The QA Plan for the Remote Sensing and Special Surveys Program will be issued.

EG&G aerial gamma spectrometer radiological data will be submitted to OREIS. Data for the Portsmouth Gaseous Diffusion Plant (surveys conducted in 1990 and 1993); for the Paducah Gaseous Diffusion Plant (survey conducted in 1990); and for portions of the Clinch River, Oak Ridge, Tennessee (survey conducted in 1992) will be added to the gamma data already available via OREIS for the ORR (survey conducted in 1992).

Selected natural color aerial photographs of the ORR (surveys conducted in 1992 and 1994) will be submitted to OREIS.

Additional herbarium records discovered in December and the family names, common names, and frequency status for all ORR vascular plant species will be compiled and entered into the ORR vascular flora spreadsheet. This spreadsheet will then be used to draft a preliminary checklist of the vascular flora found on the ORR.

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

A spreadsheet of significant (>20 acres) hardwood forest tracts remaining on the ORR (including component stand types and areas) will be created.

Work on digitizing forestry compartment surveys and creating a preliminary map of field surveys will continue.

Work will continue on the threatened and endangered plant and animal field surveys.

3.5.3 Risk Assessment Program

Description

A risk assessment, as defined in the DOE-ORO *Interim Policy Guidance on Environmental Restoration Risk Assessment Initiation, Implementation, and Interaction*, is the

process of identifying, defining, and characterizing the adverse consequences of exposure to hazardous and radioactive materials. Under the ER Division, risk assessment includes the performance of a baseline risk assessment, refinement of preliminary remediation goals, and risk evaluation of remedial alternatives. Risk assessment may have both a human health risk assessment component and an environmental risk assessment component whereby the human health risk assessment identifies, analyzes, and characterizes adverse health effects in human receptors and the environmental risk assessment identifies, analyzes, and characterizes adverse impacts on other environmental receptors (i.e., local flora and fauna, etc.).

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

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

Accomplishments

The final version of the strategy document for performing a Human Health Risk Assessment entitled *Defining the Role of Risk Assessment in the CERCLA Remedial Investigation Process at the DOE-OR* was delivered to the regulators on October 27. This document incorporated the latest comments received from both the EPA and TDEC.

Risk Assessment Program staff attended a meeting with Y-12 ER Program and TDEC representatives to discuss TDEC's recent data acquired from the sampling of the UT Arboretum spring (SS-7.8); VOAs had been detected slightly above the detection limit but far below MCLs. TDEC believes these VOAs are related to historical disposals in the Chestnut Ridge Security Pits; TDEC is proposing that another dye-tracer test be performed on Chestnut Ridge to substantiate or refute this hypothesis.

Risk Assessment Program staff attended the monthly regulator meeting during which the strategy and preliminary results of the Y-12 Background Groundwater Study were presented and updates on the progress of the Union Valley efforts and the Bear Creek Valley modeling effort were given. BCV FS alternatives were also discussed in some detail.

The procedure entitled “Background Comparison for Human Health Risk Assessment” was presented to EPA and TDEC for review. This procedure defines a consistent approach to making background comparisons that will ultimately accelerate the decision-making process at the site level.

Risk Assessment Program staff attended the meeting on waste inventories at the Bear Creek Valley Burial Ground with representatives from DOE, Energy Systems, and TDEC. Staff summarized available information reported in the inventory documents and proposed a strategy for the presentation of this information in the RI Report (and in the Human Health Risk Assessment).

Concerns

None.

Scheduled Activities for Next Quarter

The WAG 5 Baseline Human Health Risk Assessment was delivered to the regulators as part of the RI Report.

3.5.4 Federal Facility Agreement and Tennessee Oversight Agreement

Description

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

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

Accomplishments

A kickoff meeting was held for updating the ORR Site Management Plan for the ER Program. This document is due to the regulators on June 15, 1995.

Several groundwater strategy meetings were held to better explain the approach to groundwater work on the ORR.

A revised list of solid waste management units that contains three additional units at the Y-12 Plant was submitted to the regulators.

Approval was received on the document scheduling and review protocol that has been defined for the ORR.

Meetings were held to discuss incorporating, in the FFA, operating instructions for scheduling and revising FY 1995, 1996, and 1997 milestones. Problems with the current schedule logic were identified for preparing future baseline change proposals. These problems were resolved, and a formal list was transmitted to the regulators for approval.

An FFA project managers' meeting was held on December 13 and 14 during which the FY 1995 Appendixes C and E were approved. There was also a modification approved to change the FFA text referring to a Postconstruction Report. This report will now be called a Remedial Action Report.

Concerns

None.

Scheduled Activities for Next Quarter

The FY 1995 +1 and +2 prioritized work will be submitted to the regulators for approval.

4. REMEDIAL ACTION CONTRACTOR ASSIGNMENTS

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

4.1 OAK RIDGE Y-12 PLANT

CDM Federal—Development of an RI Work Plan for Upper EFPC OU 1. Development of an RI Report for Chestnut Ridge OU 2. Development of a Union Valley Groundwater Evaluation Report for Upper EFPC OU 1.

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

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

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

ETE Consulting Engineering Inc.—Provision of professional services.

Geraghty & Miller, Inc.—Support for the preparation of all Postclosure Permit Applications and preparation of the Bear Creek Valley OU 4 RI Work Plan.

Highland Drilling Company—Characterization well drilling.

Queen's University—Alcohol flooding services for remediating sites contaminated by DNAPLs; progress report submitted 5/31/94.

SAIC—Field sampling at Bear Creek Valley OU 4, development of an RI Report for Bear Creek Valley OU 2, data management support, support for ER strategic plan development and field mobilization.

SONSUB—Underwater surveying of Rogers Quarry. Subcontract work for the closure of Kerr Hollow Quarry. *[Closed]*

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

University of Tennessee—Hydrogeological support planned for RMPE.

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

4.2 OAK RIDGE NATIONAL LABORATORY

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

Analysas—Administrative support.

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

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

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

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

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

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

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

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

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

ECOTECH—Assistance in the analysis of surface water.

EDGE, Inc.—Groundwater monitoring of wells.

ENSERCH Environmental Corporation—Remedial design activities.

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

ERC, Edge—Geotechnical tests.

ETE Consulting Engineers—Survey services.

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.

H. Kent Hepworth, P.E., PhD.—Technical assistance with remedial actions in support of the WAG 6 facility manager.

Highland Drilling Company—Construction and well plugging and abandonment services.

H&R Technical Associates, Inc.—Technical and administrative support in assembling reports, preparing minutes of meetings, and reviewing reports.

Hydrocomp—Expert review of field monitoring and modeling of contaminated sediment transport in WOC. *[Closed]*

IT Corp.—Final closure certification on the 3001 Storage Canal RCRA Interim Closure.
[Closed]

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

JAYCOR—Sampling and analysis support for benthic macroinvertebrate samples from WOC and its tributaries (*no longer supporting benthic macroinvertebrate samples*).

JBF Associates—Technical Advisory Group support and appraisal of the Underground Storage Tank Program.

Kansas Geological Survey—Collection of seismic reflection data for WAG 10.

Knoxville College—Data base support and technical support for sample collections.

Lockheed—Analytical services.

MAC Tech—Implementation of Data Quality Objectives for the Safer Program.

Midwest Technical, Inc.—Assistance in budgeting, planning, and cost tracking and provision of laboratory and field technical support.

MK-Ferguson—Construction management.

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.

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

Radian—Preparation of environmental assessments and CERCLA decision documents.
[Closed]

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

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

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 coreholes and instrumenting them with multipoint measuring systems (Westbay systems) and selecting monitoring intervals using core data, geophysical logs, and flowmeter data via the agreement.

TMA Eberline—Outside laboratory analytical services.

- University of California**—Assistance in biological monitoring and abatement tasks.
- University of California, Davis**—Histopathological analyses of fish tissues.
- University of Mississippi**—Development of a special sensor for monitoring soil moisture and contaminant leaching.
- University of Tennessee**—Assistance in performing data collection; data compilation; development of performance criteria, maintenance programs, and quality assurance plans; and oversight of surface-water monitoring station upgrade activities.
- U.S. Geological Service**—Assistance in performing surface water monitoring tasks.
- Vista Research, Inc.**—LLLW tank system leak testing methodology development.

4.3 OAK RIDGE K-25 SITE

- Adams Craft Hertz Walker**—Site surveying (for the Pond Waste Management Project).
- Advanced Sciences, Inc.**—Data validation.
- Analysas Corporation**—Records management (for the Pond Waste Management Project).
- Battelle, Columbus Laboratories**—Preparation of a simplified EA (for the Pond Waste Management Project).
- Brooks Rand Laboratory**—Mercury speciation analyses.
- CDM Federal Programs**—PA/SI and RCRA Facility Investigation Work Plan preparation.
- Chemrad Tennessee Corporation**—Ultrasonic Ranging and Data System support.
- CompuChem Laboratories**—Chemical/radiological analyses.
- COR, Inc.**—Inventory Management Information System prototype development support (for the Pond Waste Management Project).
- Dennis Weiter Assoc.**—Study of available filter press operations (for the Pond Waste Management Project).
- Enterprise Advisory Services, Inc.**—Management systems support.
- ESE Biosciences Group**—Bioremediation of a former UST site. *[Closed]*
- ETE Consulting Engineers**—Surveying.
- Geraghty and Miller**—Technical support [for the K-25 Site Groundwater Protection Program (GWPP)]. *[Closed]*
- GH Cofer**—Professional services.
- Gilbert Commonwealth**—Estimating support.
- Highland Drilling**—Characterization well drilling and drilling services for the K-25 Site GWPP. *[Closed]*
- HSW Environmental Consultants, Inc.**—Technical support (for the K-25 Site GWPP).
- Jacobs ER Team**—Preparation of integrated RCRA/CERCLA/NEPA decision documents, including FSs, Proposed Plans, RODs, EAs, Environmental Impact Statements, documents for interim actions, and cost estimates associated with these documents.

Provision of technical support for the performance of RIs, assessments and investigations of off-site locations, and remedial action verification; support for DOE and Energy Systems community relations activities; and support for the adherence to requirements associated with the Administrative Record and performance of risk assessments.

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

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

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

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

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

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

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

4.4 OAK RIDGE RESERVATION BOUNDARY AREAS

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

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

Army Corps of Engineers—Hydro-acoustic study of the Clinch River arm of Watts Bar Reservoir to determine the water depth and the distribution, thickness, and type of bottom sediments.

Automated Sciences Group (ASG)—Support for various tasks in the management, collection, analysis, and interpretation of biota, water, and sediment samples. Also, provides program management assistance for the Clinch River ER Program.

Battelle/Pacific Northwest Laboratories (PNL)—Support for water, sediment, and contaminant modeling tasks.

Enserch—Baseline planning support for ORAU.

Foster Wheeler—Design and estimating services as the prime contractor for Lower EFPC.

Gilbert/Commonwealth—Scheduling for Lower EFPC.

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

documents (FS and ROD) in support of the new Lower Watts Bar Reservoir OU. Is the prime contractor for the Proposed Plan and ROD for ??????

JAYCOR—Data management activities and document maintenance in the production of risk assessment documents for the Clinch River ER Program.

Michigan State University—Breeding and raising of mink in conjunction with the Clinch River ER Program's study of reproductive effects of ingesting fish from the Clinch River-Watts Bar Reservoir System.

Midwest Technical, Inc.—Support of data management activities and document maintenance in the production of risk assessment documents for the Clinch River ER Program.

MK-Ferguson—Baseline planning support for ORAU. Is the construction contractor for Lower EFPC.

Oak Ridge Associated Universities (ORAU)—Radioanalytical support for Phase 1 of the RI.

Oak Ridge Institute of Science and Energy (ORISE)—Risk assessment and contaminant transport modeling support.

ORACLE—Support in the design and implementation of ORACLE-based data bases and applications.

PEER Consultants—Computer programming and bar coding support for the Clinch River ER Program.

Science Applications International Corporation (SAIC)—Support in the compilation of data packages; validation and verification of data packages; and coordination of analytical services. Provides ecological risk assessments of sediment for Lower EFPC.

SENES, Oak Ridge—Support for human health risk assessments.

Southern Illinois University—Assistance in biological data collection and sample design.

Tennessee Valley Authority (via an Interagency Agreement)—Support for the following tasks: (1) cross-sections of sedimentation ranges; (2) aerial photography and topographic mapping of White Oak Creek Embayment; (3) numerical modeling of water, sediment, and contaminant transport in Clinch River/Watts Bar Reservoir; (4) sampling and analysis of water and sediment from potential sources of contaminants; (5) review of TVA sediment-disturbing activities; (6) sampling and contaminant analysis of key fish species in the Tennessee River System; (7) sediment and water toxicity studies; and (8) benthic macroinvertebrate community study of monitoring stations within the Clinch River and Poplar Creek. *[Tasks 1, 2, and 5 are closed.]*

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

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

4.5 CLINCH RIVER-WATTS BAR RESERVOIR

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

Analytical Projects Office (APO) at Martin Marietta Energy Systems, Oak Ridge—Processing of all contracts for analyses of samples collected. The APO determines which labs will perform the analyses.

Army Corps of Engineers—Hydro-acoustic studies of the Clinch River arm of the Watts Bar Reservoir to determine the distribution, thickness, and type of bottom sediments.

Atlan-tech, Inc.—Procedure writing support for the low-level radiological laboratory being used to analyze Phase 2 samples. *[Closed]*

Automated Sciences Group—Support for various tasks in the management, collection, analysis, and interpretation of biota, water, and sediment samples; also program management assistance.

Battelle Pacific Northwest Laboratory—Technical support with water, sediment, and contaminant modeling tasks.

CDM Federal Programs—Regulatory compliance support on the WOCE time-critical CERCLA removal action. *[Closed]*

Gilbert Commonwealth—Assistance, through a subcontract with Central Engineering, in the publishing of the first Lifecycle Baseline document. *[Closed]*

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

JAYCOR—Data management activities and document maintenance in the production of risk assessment documents.

Michigan State University—Breeding and raising of mink in conjunction with the Clinch River ER Program's study of the reproductive effects of ingesting fish from the Clinch River-Watts Bar Reservoir System.

Midwest Technical, Inc.—Data management activities and document maintenance in the production of risk assessment documents. *[Closed]*

Oak Ridge Institute of Science and Energy—Support for risk assessments and contaminant transport modeling.

ORACLE—Support in the design and implementation of ORACLE-based data bases and applications.

ORAU—Radioanalytical support for Phase 1 of the RI. *[Closed]*

PEER Consultants—Computer programming and bar coding support.

SAIC—Technical support and assistance in the compilation of data packages, validation and verification of data packages, and analytical services coordination.

SENES, Oak Ridge—Support for human health risk assessments.

Skidaway Institute of Oceanography, University of Georgia—Analysis of speciation of arsenic.
[Closed]

Southern Illinois University—Assistance in biological data collection and sample design.

Tennessee Valley Authority—Support for the following tasks: (1) preparation of cross-sections of sedimentation ranges; (2) provision of aerial photography and topographic mapping of WOCE; (3) numerical modeling of water, sediment, and contaminant transport in Clinch River–Watts Bar Reservoir; (4) sampling and analysis of water and sediment from potential sources of contamination; (5) review of TVA sediment-disturbing activities; (6) sampling and contaminant analysis of key fish species in the Tennessee River System; (7) performance of sediment and water toxicity studies; and (8) performance of a benthic macroinvertebrate community study of monitoring stations within the Clinch River and Poplar Creek. *[Tasks 1, 2, and 5 are closed.]*

University of California, Davis—Quantitative histopathological analyses of target organs of fish.

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

4.6 ENERGY SYSTEMS ER CENTRAL DIVISION

Analysas—Technical integration support and DOE Model Conference support. *[Closed]*

Authorization Systems, Inc.—Subcontract support to Wye Technologies for support of the Intelligent Document Control System for the FFA. *[Closed]*

Automated Compliance Systems, Inc.—Analysis of sample management and data handling. *[Closed]*

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

Dr. Stanley N. Davis—Groundwater consulting at Paducah. *[Closed]*

Ecotect Laboratory Services, Inc.—Laboratory sample analysis.

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

ERC, Inc.—Support for an FS.

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

Lietzke Soil Services—Soil consulting services.

Lockheed Analytical Services—Chemical/analytical data analysis.

Lockheed Engineering and Sciences Company—Laboratory sample analysis.

Maxima Corporation—Project management.

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

ORAU—Five-year plan review. *[Closed]*

Penn Accord—Facilitation training. [Closed]

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.

S. M. Stoller Corporation—Video preparation. [Closed]

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

University of Waterloo (Canada)—Groundwater modeling.

Dr. William B. White—Consulting for karst hydrogeology on the ORR. [Closed]

4.7 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.

ENVIRONMENTAL SCIENCE
ORNL BUILDING 1502
P. O. BOX X
OAK RIDGE, TENNESSEE 37830