

4163

**FERNALD PROJECT CLEANUP REPORT
FEBRUARY 1993**

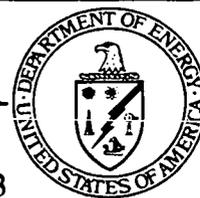
02/23/93

**DOE-FN/PUBLIC
14
FACTSHEET**

FERNALD PROJECT CLEANUP REPORT

4163

FEBRUARY 1993



FERMCO assumes cleanup responsibility

As of December 1, 1992, the Fernald Environmental Restoration Management Corporation (FERMCO) is managing all cleanup activities at Fernald. It has taken over this work from the Westinghouse Environmental Management Co. of Ohio.

FERMCO's mission is "the safe and least-cost cleanup of Fernald in compliance with all regulations, DOE Orders, and agreements." To accomplish that mission, FERMCO has built a management team from Fluor Daniel and three partner corporations including Jacobs Engineering, Inc., Halliburton NUS Environmental Services, Inc., and Nuclear Fuel Services, Inc.

Workers at Fernald have worked on several key cleanup projects since the last community meeting held on November 9, 1992. They completed a new Decontamination and Decommissioning facility; shipments of uranium metal products; a pipeline to provide an alternate water supply to an industry affected by contaminated groundwater, and a dredging project to prevent exposed material from being blown by wind at Waste Pit 5.

Progress continues on the Remedial Investigation/Feasibility

Study (RI/FS) to determine the nature and extent of contamination on and around the Fernald site. The study includes development of cleanup alternatives for five separate Operable Units, which are areas grouped according to their similarities in terms of environmental concern or likely cleanup alternatives.

The RI/FS involves extensive sampling and analysis of soil, water, and other media to measure levels of chemical or radiological contamination. Once the nature and extent of the contamination is known, alternatives for removing or immobilizing the contamination can be analyzed.

FERMCO has formally established teams to focus directly on the remedial activities associated with the operable units, from the RI/FS through remedial action to closure. The teams hold cradle-to-grave responsibility for specific segments of Fernald cleanup with support from safety and health, regulatory compliance, environmental engineering, and construction organizations.

A Record of Decision will be issued by the U.S. EPA to specify the selected final remediation alternative for each of the Operable

Units. The DOE will implement final cleanup actions as directed by the U.S. EPA in the Records of Decision.

Following is a general description of Fernald's Operable Units and the timetables set forth in the 1991 Amended Consent Agreement for the DOE to submit Draft Records of Decision to the U.S. EPA for approval:

Operable Unit 1 (Waste Pit Area) includes Waste Pits 1-6, the Burn Pit, the Clearwell, berms, liners, and soil within the Operable Unit 1 boundary. The Proposed Draft Record of Decision is due to U.S. EPA on or before December 6, 1994.

Operable Unit 2 (Other Waste Units) includes the flyash piles, other south field disposal areas, lime sludge ponds, solid waste landfill, berms, liners, and soil within the Operable Unit 2 boundary. The Proposed Draft Record of Decision is due to U.S. EPA on or before December 10, 1993.

Operable Unit 3 (Production Area) includes the production area and production-associated facilities and equipment (includes all above-

Continued on page 2

The *Fernald Project Cleanup Report* is intended to update the community on activities associated with environmental studies and cleanup efforts at the Fernald site. The report is designed as a supplement to information provided at regular community meetings and through other communication activities.

The next community meeting is scheduled for Tuesday, February 23, 1993, at the Plantation, 9660 Dry Fork Road, Harrison, Ohio,

45030. Fernald site technical personnel will be on hand at 6 p.m. to explain exhibits on various cleanup activities. The general meeting will begin at 7 p.m. and will include presentations by the Department of Energy, and statements by the U.S. and Ohio Environmental Protection Agencies, and Fernald Residents for Environment, Safety, and Health (FRESH). A question-and-answer session will follow.

This issue of *Fernald Project*

Cleanup Report offers a brief description of activities which have occurred as part of the RI/FS since the last community meeting was held on November 9, 1992. Additional information, including more detailed reports, records, and other documents, is available at the Public Environmental Information Center located in the JAMTEK Building, 10845 Hamilton-Cleves Highway, just south of the Fernald site.

Cleanup

Continued from page 1

and below-grade improvements), including all structures, equipment, utilities, drums, tanks, waste material, uranium products, thorium, pipelines, wastewater treatment facilities, fire training facilities, scrap metal piles, and coal pile. The Proposed Draft Record of Decision is due to U.S. EPA on or before May 2, 1997.

Operable Unit 4 (Silos 1-4) includes: K-65 silos 1 and 2, which contain radium-bearing radioactive wastes; Silo 3, which contains dried uranium-bearing wastes; Silo 4, which is empty; and berms, decant tank system, and soil within the Operable Unit 4 boundary. The Proposed Draft Record of Decision is due to U.S. EPA on or before June 10, 1994.

Operable Unit 5 (Environmental Media) includes groundwater, surface water, soil not included in the definition of Operable Units 1-4, sediments, vegetation and wildlife. The Proposed Draft Record of Decision is due to U.S. EPA on or before August 2, 1995.

Comprehensive Site-Wide Operable Unit: Following U.S. EPA issuance of Records of Decision for the five Operable Units, an evaluation of remedies selected for Operable Units 1-5, including

Remedial Actions and Removal Actions, will be conducted to ensure that they are protective of human health and the environment on a sitewide basis as required by CERCLA, the National Contingency Plan and applicable U.S. EPA policy and guidance.

The 1991 Amended Consent Agreement requires an annual review of the need for Removal Actions, which are near term actions designed to reduce risk. They are done in advance of or as part of remedial actions, which are final remedies. A total of 30 Removal Actions are presently identified under the terms of the 1991 Amended Consent Agreement. The Removal Actions are:

- 1) Contaminated Water Beneath FEMP Buildings
- 2) Taste Pit Area Runoff Control (completed)
- 3) South Groundwater Contamination Plume
- 4) Silos 1 and 2 (completed)
- 5) K-65 Decant Sump Tank (completed)
- 6) Waste Pit 6 Residues (completed)
- 7) Plant 1 Pad Continuing Release
- 8) Inactive Flyash Pile Control (completed)
- 9) Removal of Waste Inventories
- 10) Active Flyash Pile Controls (completed)
- 11) Pit 5 Experimental Treatment Facility (completed)
- 12) Safe Shutdown
- 13) Plant 1 Ore Silos
- 14) Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator
- 15) Scrap Metal Piles
- 16) Collect Uncontrolled Production Area Runoff (Northeast)
- 17) Improved Storage of Soil and Debris
- 18) Control Exposed Material in Pit 5 (completed)
- 19) Plant 7 Dismantling
- 20) Stabilization of Uranyl Nitrate Inventories
- 21) Expedited Silo 3 Dust Collector (completed)
- 22) Waste Pit Area Containment Improvement
- 23) Inactive Flyash Pile (completed)
- 24) Pilot Plant Sump
- 25) Nitric Acid Tank Car and Area
- 26) Asbestos Removals (Asbestos Program)
- 27) Management of Contaminated Structures at the FEMP
- 28) Fire Training Facility
- 29) Temporary Nitrate Storage Tanks
- 30) Sewage Treatment Plant Incinerator

Operable Unit 1 - Waste Pit Area

RI/FS Activities

Waste Characterization and Treatability: Chemical and radiological analyses of Operable Unit 1 is complete. This information is required to complete the study on Operable Unit 1.

All samples were analyzed at U.S. EPA-approved laboratories to determine the concentration of radiological and chemical constituents in Operable Unit 1. Some data collected prior to beginning the study must still be validated. That is expected to be completed in March 1993.

Data validation is a process in which a team of chemists, radiochemists, statisticians, quality assurance and other technical personnel, systematically review all aspects of data collection and laboratory analyses against an established set of criteria. Data validation is used to judge the quality of the field and analytical data.

Materials from the pits are being used to test waste treatment technologies (called treatability studies). Solidification (stabilizing the waste with cement or polyethylene) and vitrification

(transforming the waste into glass) are being tested.

The U.S. EPA's Guidance for Conducting Treatability Studies outlines a three-tiered approach to conducting treatability studies: 1) Remedy Screening; 2) Remedy Selection, and 3) Remedy Design.

Composite samples (blended samples that represent the average properties of the waste units) are being used during the initial Remedy Screening phase of the treatability program to provide a

Continued on page 3

Operable Unit 1

Continued from page 2

timely decision on whether a technology can be applied at Fernald. Following this decision, Remedy Selection studies proceed using strata samples (samples collected from specific locations within the waste unit) to provide valuable process information, including the relative ability of the technology to treat the range of waste types and forms in a particular pit.

Cement Stabilization: Cement stabilization tests involve mixing quantities of waste pit materials with differing amounts of cement and cement additives. Remedy Screening studies have been completed. They show that the waste is suitable for cementation.

The Remedy Selection portion of the test is now in progress and is expected to be completed in July 1993.

As part of these tests, each of the cement mixtures is subjected to a series of physical and chemical tests, such as leaching the waste in acid, to determine which cement mix design has the best ability to retain its physical form and stabilize the waste.

Vitrification studies: Vitrification tests involve mixing samples from each of the waste units with a

range of materials, including fly ash, and heating them in furnaces to form glass. The Remedy Screening portions of vitrification tests are complete. They show the waste is suitable for vitrification. The study will find the best mix design.

Initial results indicate that vitrification can be economically competitive. From a life cycle or overall cost standpoint, it will provide a final waste form that significantly reduces waste volumes while also reducing the mobility and toxicity of the hazardous constituents.

The Remedy Selection portion of the tests is now in progress and is expected to be completed in June 1993.

Laboratory-scale Remedy Design treatability testing is progressing at GTS Duratek and Catholic University of America with the operation of a 100 kilograms/per day glass melter located on the campus of Catholic University.

Encapsulation studies: A relatively new encapsulation technology, polymer encapsulation, is being investigated by FERMCO. This technique uses commonly available non-toxic plastics such as polyethylene (the same material used in milk and food containers) to securely surround and bind together particles of dried waste material. The bound and stable

waste is then either pressed or extruded into solid forms prior to disposal.

Some of the characteristics that make this technology attractive are: 1) its use of inexpensive, recycled, readily available non-toxic materials; 2) its safe and impact resistant form for shipping; 3) it can be made in any size and shape according to shipping and disposal requirements, and 4) it appears to be tolerant of a large range of waste composition.

The resulting waste form is lighter than many other waste forms which are more dense; however, this reduced density corresponds to an increase in waste volume.

Reports: The compilation of Operable Unit 1 Remedial Investigation and Feasibility Study reports is proceeding consistent with the schedules set forth in the 1991 Amended Consent Agreement. Validated analytical data has been received and development of the Baseline Risk Assessment is in progress. This risk assessment characterizes existing and potential threats to human health and the environment from Operable Unit 1 waste facilities. Information from the risk assessment will be incorporated into the Remedial Investigation (RI) report for Operable Unit 1, which is due to U.S. EPA in October 1993.

Removal Actions

Control Exposed Material in Pit 5 (Removal Action No. 18): The objective of this Removal Action was to eliminate the possibility of airborne contamination resulting from exposed materials in the pit. Exposed waste materials were repositioned within the pit so they would be covered by water. This prevents them from being blown by the wind. Dredging was completed December 16, 1992. Other field activities, including patching separations in the pit liner, were completed in January 1993, ahead

of the scheduled completion date of February 3, 1993.

Waste Pit Area Containment Improvement (Removal Action No. 22): This Removal Action is designed to reduce the potential for wind or water erosion of contaminated materials from access roads and exposed surfaces in the Operable Unit 1 area. The work plan was approved with comments by the U.S. EPA December 4, 1992. U.S. EPA comments have been incorporated

into the final work plan. Ohio EPA approval was received December 7, 1992. The south berm of Pit 4 will be stabilized. Drainage ditches along Pits 3, 4, 5, and 6 will be regraded. Roads between Pits 3, 4, 5, and 6 will be resurfaced. The pit area has been reseeded for erosion control. Some existing stormwater ditches in the waste pit area are being regraded to promote drainage. This Removal Action is on schedule for completion by August 1993.

Continued on page 4

Operable Unit 1

Continued from page 3

Other Activities

Minimum Additive Waste

Stabilization: The DOE continues to conduct a Minimum Additive Waste Stabilization (MAWS) program at Fernald in conjunction with Argonne National Labs, GTS Duratek, Lockheed Environmental Systems, and The Catholic University of America. The MAWS program combines vitrification, water treatment, and soil washing processes to reduce waste volume and cost. The purpose of the program is to demonstrate that the MAWS program as applied to vitrification may be an economical treatment alternative for the large

volumes of low-level radioactive and mixed wastes present at Fernald.

The MAWS program blends waste with contaminated soils and melts them into a stable glass form. Vitrification significantly reduces the volume of waste requiring permanent storage. Laboratory tests have shown that wastes from some of Fernald's waste pits do not have all the components necessary to make glass. However, when these pit wastes are blended with contaminated soils in correct proportions, tests have shown that a good, stable glass can be made.

Construction activities are in progress to house MAWS equipment in Plant 9 at Fernald. Installation of MAWS equipment is on schedule for completion in April 1993.

Following approval of the safety, health and work plans, bench-scale work will begin to process glass from Pit 5 waste blended with contaminated soils. U.S. and Ohio EPA comments have been incorporated into the work plan. Final approval of the work plan from the U.S. EPA and Ohio EPA is expected in April 1993.

Operable Unit 2 - Other Waste Units

RI/FS Activities

Sampling: DOE has requested U.S. EPA approval of modifications to the Amended Consent Agreement for the completion of Operable Unit 2 RI/FS activities. The request was made February 2, 1993, following U.S. EPA's disapproval of the Remedial Investigation (RI) Report because of the need for additional field sampling and laboratory analysis to characterize the nature and extent of contamination.

In its review comments to DOE in December 1992, the U.S. EPA concluded that data contained in the RI report for Operable Unit 2 do not adequately support the risk assessment and other activities necessary for the Record of Decision (ROD), the document which determines the final remediation requirements for Operable Unit 2. U.S. EPA and Ohio EPA comments reflect a general concern regarding the adequacy of the available data to support the decision process. The U.S. EPA concluded that available data does not appropriately describe the nature or extent of contamination associated with the

Operable Unit 2 waste units and may be insufficient to support the evaluation of remedial alternatives.

The potential need for additional field investigation was discovered during post-Remedial Investigation sampling and analysis. During the summer of 1992, three trenches were dug in the Solid Waste Landfill and radioactive and volatile organic contaminants were detected at levels considerably higher than expected, based on previous sampling. In addition, analysis of perched groundwater samples taken from a monitoring well last summer in the South Field area found uranium concentrations at levels higher than those encountered during previous sampling activities.

The DOE has proposed that additional field sampling and analysis be performed to ensure that the data available provides a high confidence level for the evaluation and recommendation of remedial alternatives.

In a letter to U.S. EPA and Ohio EPA dated February 2, 1993, the DOE proposed that Operable Unit

2 waste units be managed in two groups. Group 1 would consist of the above-grade flyash component of the Active Flyash Pile and the Lime Sludge Ponds. Group 2 would consist of the below-grade component of the Active Flyash Pile, Inactive Flyash Pile, South Field area, and Solid Waste Landfill.

The DOE has proposed that the current Record of Decision date of December 10, 1993, be extended to March 1, 1995, for the below-grade component of the Active Flyash Pile, Inactive Flyash Pile, South Field area, and Solid Waste Landfill. The current December 1993 Record of Decision date in the Amended Consent Agreement would be retained as an Interim Record of Decision for the proposed Group 1 portions, since they require significantly less additional field data than do the waste units in the proposed Group 2.

In parallel, DOE has proposed that the submittal of primary Operable Unit 2 documents to U.S.

Continued on page 5

Operable Unit 2

Continued from page 4

EPA, including the Revised RI Report, Feasibility Study Report and Proposed Plan, be extended accordingly.

In a letter to the DOE dated February 9, 1993, the U.S. EPA disapproved the schedule extension request. The U.S. EPA stated that the additional work suggested could not be evaluated without more information pertaining to the proposal. DOE and U.S. EPA were to meet February 17, 1993, to discuss the proposed Operable Unit 2 work scope and schedule.

DOE's letter to the U.S. EPA and Ohio EPA requesting the schedule extension, and U.S. EPA's response letter to DOE, are available for public review at the Fernald site's Administrative Record located in the Public Environmental Information Center.

Reports: Treatability studies to establish whether identified waste treatment technologies are effective have been completed for Operable Unit 2. Data included in the study will be used to support Operable Unit 2 treatment technology selection and remedy implementation. A Treatability Study Report for Operable Unit 2 has been approved with comments by the U.S. EPA. Those comments are presently being addressed.

Operable Unit 2 treatability investigations were focused on the application of cement-based solidification to Operable Unit 2 waste material. A three-stage treatability study was completed at the IT Environmental Technology Development Center in April 1992. The final stage of treatability involved leachate analysis and permeability testing of select waste-cement mix designs.

Remedial Design: Conceptual design engineering was initiated for Operable Unit 2 for purposes of establishing preliminary design parameters and cost estimates. Conceptual engineering is proceeding based upon adapting representative remedial action alternatives for each of the Operable Unit 2 waste facilities as identified in available RI/FS documents. Conceptual design for the containment alternatives is complete for the Active Flyash Pile, Solid Waste Landfill, and Lime Sludge Ponds. Conceptual engineering is proceeding in parallel with the RI/FS to properly position Operable Unit 2 waste facilities for the prompt implementation of remedial action following issuance of the Record of Decision for Operable Unit 2.

Operable Unit 3 - Production Area

RI/FS Activities

RI/FS Work Plan Addendum: The scope of Operable Unit 3 was modified by the Amended Consent Agreement to include all former process buildings, structures and equipment, and inventoried materials.

The Work Plan Addendum contains an evaluation of available site characterization data and process knowledge, and identifies the need for additional data to evaluate risks and remedial alternatives. The Addendum also includes discussions of various RI/FS tasks required, and schedules for conducting those activities.

The Work Plan Addendum also contains a recommended approach to be used in data collection, a proposed sampling and analysis plan, preliminary remedial action objectives, and remedial action alternatives. Field sampling procedures unique to Operable Unit 3, and a program to train the field sampling personnel are now being developed.

The RI/FS and Work Plan for Operable Unit 3 have been clarified based on U.S. EPA comments. The revised Work Plan Addendum incorporating U.S. EPA comments was submitted to the U.S. EPA in December 1992, for review.

Schedule Modification Request: The DOE has proposed to U.S. EPA to accelerate the decontamination and decommissioning of former production buildings for this work to begin earlier than agreed to in the September 1991 Amended Consent Agreement. The Amended Consent Agreement schedule calls for a Record of Decision (ROD) date of May 2, 1997, for the decontamination and decommissioning of former production facilities and the disposition of waste from that area. The original May 1997 ROD date would be retained for the waste disposition issues in Operable Unit 3.

Removal Actions

Plant 1 Pad Continuing Release (Removal Action No. 7): The purpose of this Removal Action is to protect surface soils and

regional groundwater from continuing releases of hazardous materials resulting from waste management activities on the

eight-acre Plant 1 storage pad. This Removal Action is being conducted in three phases.

Continued on page 6

Operable Unit 3

Continued from page 5

Phase I, the implementation of run-on and run-off control measures and the installation of underground utilities, is complete.

Phase II, the installation of a new covered concrete storage pad (80,000 square feet) adjacent to the existing Plant 1 storage pad, was completed December 4, 1992. Remaining drums of low-level radioactive waste in outdoor storage on the Plant 1 Pad are being moved into the two new covered storage structures which are equipped with containment facilities for spill control, drainage, and stormwater run-off/run-on control.

Phase III involves activities to upgrade the existing Plant 1 storage pad, including the installation of a polyethylene membrane and epoxy coating over the pad surface to minimize contaminant migration to the environment. Phase III is on schedule for completion by February 19, 1995.

Removal of Waste Inventories (Removal Action No. 9): This Removal Action involves the characterization, overpacking, and disposition of low-level radioactive waste materials. The removal of waste inventories is ongoing at Fernald.

The Fernald site has approval from the DOE Nevada Field Office to dispose of five general waste streams at the Nevada Test Site (NTS), including: process area scrap wastes (scrap metal and wood); construction and Removal Action waste (demolition debris); residues and thorium waste (refinery feed and oxides); and baled trash. The approval includes all backlog and currently generated wastes at Fernald, which can be shipped to NTS for disposal contingent upon meeting all NTS Waste Acceptance Criteria.

The Fernald Field Office is

presently seeking approval from the Nevada Field Office to ship additional low-level thorium waste to NTS. Previous shipments of thorium oxide material from the dismantled Plant 8 silo and bin were completed in September 1992.

Fernald shipped more than 100,000 drum equivalents (DEs) of low-level radioactive waste to NTS in Fiscal Year 1992. This included 37,000 DEs of metal, 34,249 DEs of wood, 21,323 DEs of construction rubble, 6,010 DEs of baled trash, and 1,621 DEs of thorium oxide.

The low-level radioactive waste shipping goal for the first nine months of Fiscal Year 1993 (through June 30, 1993) is 117,000 DEs. This goal includes currently generated waste from construction and restoration activities (30,000 DEs), characterized backlog waste (30,000 DEs), scrap metal (40,000 DEs to eliminate the scrap metal and scrap copper bulk storage areas), and process area scrap metal (17,000 DEs). These accelerated waste shipping activities are proceeding on schedule. Waste shipping schedules for the last three months of Fiscal Year 1993 (July 1 through September 30) are being developed.

Stabilization of Uranyl Nitrate Inventories (Removal Action No. 20): The processing of uranyl nitrate inventories was initiated in September 1992. In November 1992, after the initial 20,000 gallon batch had been processed as part of a systems operability test, the system was placed on hold to allow for an evaluation of systems. Processing of uranyl nitrate inventories will resume in early 1993. The Removal Action is expected to be completed in late 1993.

Uranyl nitrate is an intermediate product in the former uranium recovery process at Fernald. There are approximately 230,000 gallons

of acidic uranyl nitrate stored in 21 tanks in or near the Plant 2/3 Refinery.

A 1991 inspection of the tanks revealed that small leaks had developed in the piping system associated with the tanks. This Removal Action is designed to process the uranyl nitrate to a stable form. The uranyl nitrate inventory will be neutralized and converted to a solid form which can be drummed and properly stored in warehouses pending final disposition.

Safe Shutdown (Removal Action No. 12): This Removal Action was initiated to ensure the safe and permanent shutdown of production facilities including the removal of uranium and other process/raw materials from equipment and lines in the former production area. Disposition of uranium products and recoverable residues is an integral part of Safe Shutdown activities.

Preliminary assessments of the scope of actions required to achieve a safe shutdown configuration of buildings and equipment are continuing for each major process area.

An annual update of Fernald site procedures to ensure that appropriate documentation of Safe Shutdown activities is entered into the Administrative Record is due to the U.S. EPA June 30, 1993.

Since the production mission ended in July 1989, 11.1 million pounds of uranium products have been transferred from Fernald under the Safe Shutdown program through December 31, 1992.

Plant 1 Ore Silos (Removal Action No. 13): This Removal Action will involve the dismantling of the Plant 1 Ore Silos and their support structures. Due to deteriorated valves, materials leaked from the silos onto an elevated concrete pad

Continued on page 7

Operable Unit 3

Continued from page 6

in February 1991. The material, known as cold raffinate, is the waste residue from the processing of uranium ore after uranium is removed. Remaining material in the silos will be removed, containerized and placed in safe storage pending final disposition. All 14 silos and support structures will be dismantled under this Removal Action.

The company to perform the work has incorporated comments into a revised detailed work plan. The revised plan was resubmitted on January 22, 1993. Work is tentatively scheduled to begin in February 1993. This Removal Action is scheduled for completion by December 18, 1994.

Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator (Removal Action No. 14):

The scope of this Removal Action includes the isolation or removal and disposition of contaminated soils with elevated levels of uranium in the vicinity of an out-of-service solid waste incinerator at the sewage treatment plant. The project is designed to mitigate the potential for contaminant migration. Current activities include characterization, removal, containerization, storage and disposal of materials.

The first phase of the Removal Action (characterization) discovered a larger area of contamination than previous sampling had indicated. Contaminated soils from subsequent excavation activities that took place in October 1992 were placed in 187 white metal boxes to await a decision on disposal of the material.

A Work Plan Addendum detailing the need for additional excavations based on recent analytical results was submitted to the U.S. EPA January 6, 1993, for review. The submitted Work Plan

Addendum contains a new schedule. Additional excavation activities specified in the Work Plan Addendum are planned for completion by May 15, 1993.

Scrap Metal Piles (Removal Action No. 15): This Removal Action will address the stabilization and disposition of low-level radioactive waste scrap metal currently stockpiled outdoors at Fernald. The project is designed to eliminate the potential threat of material releases to the environment due to wind or rain from 1,300 tons of scrap copper and about 2,210 tons of recoverable ferrous scrap metals.

Containerization of the scrap copper pile, including scrap copper ingots, was started ahead of schedule on October 26, 1992. Containerization is scheduled for completion by April 1, 1993.

A Request for Proposal has been initiated for the off-site processing of the scrap copper pile. The contract emphasizes recycling or other beneficial reuse.

A contract has been awarded for the final disposition of 2,210 tons of ferrous scrap metal at Fernald. Field activities associated with the scrap metal piles were initiated in November 1992. The U.S. EPA has approved the work plan. The contract emphasizes recycling or other beneficial reuse. Most of the 2,210 tons will be reused.

Non-recoverable scrap metal at Fernald is presently being packaged into appropriate containers and shipped off site for disposal under Removal Action No. 9 (Removal of Waste Inventories).

Improved Storage of Soil and Debris (Removal Action No. 17):

This Removal Action provides for the improved storage and management of contaminated soil and debris generated as a result of performing cleanup at Fernald. Activities under this Removal Action will include characterization, interim storage,

and management of contaminated soils and debris until their final remediation under Operable Unit 3.

The U.S. EPA has granted approval of the work plan, and DOE is preparing the final revision of the work plan.

Detailed design of the above-ground structures and facilities has been initiated to support this Removal Action. Tension Support Structures, similar to those currently being used to provide indoor storage for drummed waste on the Fernald site's Plant 1 Pad, will be used to provide improved storage of soil and debris and to mitigate the potential spread of contamination.

Plant 7 Dismantling (Removal Action No. 19):

The work plan for this Removal Action is due to the U.S. EPA by April 20, 1993. Plant 7 was originally built to convert uranium hexafluoride (UF₆) to uranium tetrafluoride (UF₄). Plant 7 has been idle since the mid-1950s. All process equipment was removed from Plant 7 in the late 1950s. Plant 7 is presently being used to store approximately 5,000 drums of UF₄, as well as empty cans and drums. Activities under this Removal Action will include characterization, decontamination, removal, containerization and disposal or reuse of materials in the building, and decontamination and dismantling of the building itself.

Pilot Plant Sump (Removal Action No. 24):

This Removal Action was initiated to address contaminated liquids and sludges remaining in an out-of-service sump at the Pilot Plant. The below-grade sump is a stainless steel cylinder approximately two feet in diameter and 10 feet deep. The sump was installed to remove liquids from the floor drains of the Pilot Plant during the renovation of the Pilot Plant in 1969.

Continued on page 8

Operable Unit 3

Continued from page 7

Analyses of the sludges and liquids from the sump show high concentrations of metals (lead, copper, chromium, and nickel), as well as thorium and volatile organic compounds.

Accumulated liquids have been pumped out of the tank on a monthly basis, and this activity will continue until the removal of the sump is initiated. Under this Removal Action, the stainless steel sump will be removed and its associated piping will be disconnected. The drain piping integrity will be checked and the drain system plugged. Adjacent soils will be cleaned up as required.

The U.S. EPA granted conditional approval of the revised draft work plan November 24, 1992. The DOE has submitted responses to U.S. EPA comments and is now waiting for U.S. EPA approval.

Nitric Acid Tank Car and Area (Removal Action No. 25): This Removal Action was initiated to remove the residual contents of a Nitric Acid Railroad Tank Car, decontaminate and dispose of the tank car itself, and address potentially contaminated surrounding soils related to the tank car. The high-grade stainless steel tank car stored nitric acid from 1952 until 1989 for use in the former production process at Fernald. The tank car has a capacity of 100,000 gallons and now contains approximately 100 gallons of dilute nitric acid. The work plan for this Removal Action was submitted to the U.S. and Ohio EPAs October 30, 1992. The U.S. EPA disapproved the work plan December 9, 1992. A 20-day extension was requested to adequately address RCRA/CERCLA integration of the work plan with closure issues and technical concerns, and to obtain results from recent sampling of the tank car contents. The revised work

plan was submitted to the U.S. EPA January 28, 1993, for review.

Asbestos Removals (Asbestos Program) (Removal Action No. 26):

This Removal Action documents ongoing asbestos abatement activities at the FEMP to mitigate the potential for contaminant release and migration. Abatement activities within the existing Asbestos Program include repairs, encasement, encapsulation or removal of asbestos-bearing materials which exist in many buildings on the Fernald site. Field activities in support of asbestos identification and abatement are in progress. Specifications for large-scale asbestos removal projects are being submitted to the U.S. EPA prior to the start of field work.

Management of Contaminated Structures at the FEMP (Removal Action No. 27):

This Removal Action was initiated to provide a mechanism to perform accelerated cleanup actions to mitigate any potential threat to human health and the environment associated with select contaminated structures at Fernald. An Engineering Evaluation/Cost Analysis (EE/CA) to support proposed Removal Actions for managing contaminated structures at Fernald pending implementation of final remedial actions under Operable Unit 3, was submitted to the U.S. EPA December 14, 1992, for review. The U.S. EPA conditionally approved the EE/CA January 18, 1993.

Fire Training Facility (Removal Action No. 28):

This Removal Action has been initiated to address an area historically used to simulate fire and emergency response conditions for training purposes. The Fire Training Facility is located just north of the former production area on the old North Access Road. Work will include removal, decontamination, and

disposal, treatment or storage of all buildings, structures, tanks, and equipment. U.S. EPA concurrence to initiate this Removal Action was received February 8, 1993. The work plan is due to the U.S. EPA by June 30, 1993.

Temporary Nitrate Storage Tanks (Removal Action No. 29):

This Removal Action has been initiated to address two out-of-service tanks used as temporary treatment units for nitrate wastewaters while the biodenitrification surge lagoon was being built in the waste storage area. The tanks will be emptied and cleaned. Water from the tanks will be characterized and treated through Fernald's existing water treatment facilities. Sludges from the tanks will be characterized, drummed, and dispositioned appropriately. U.S. EPA concurrence to initiate this Removal Action was received February 8, 1993. The work plan is due to U.S. EPA by July 15, 1993.

Sewage Treatment Plant Incinerator (Removal Action No. 30):

This Removal Action has been initiated to address an incinerator formerly used to incinerate a variety of site wastes including motor oils, hydraulic oils, and possibly other spent solvents or oils including uranium contaminated materials. The incinerator has been out of service since 1979. It is located on the eastern edge of the Fernald site. The Removal Action will involve decontamination and dismantling of the incinerator, characterization and disposition of associated wastes, and containerization of equipment for shipping. U.S. EPA concurrence to initiate this Removal Action was received February 8, 1993. The work plan is due to U.S. EPA by July 30, 1993.

Operable Unit 4 - Silos 1-4

RI/FS Activities

Site Characterization: All initial site characterization activities associated with the Operable Unit 4 RI/FS have been completed. Data from the analyses of collected samples has been received and validated. The data has been compiled for use in the Remedial Investigation and Feasibility Study reports. Field activities included the completion of borings in the berms surrounding the silos, the soils beneath the silos, and the contents of the concrete structures. While collecting samples from the soils beneath the silos, perched groundwater was encountered. Additional field activities west of the K-65 silos include further characterization of the perched groundwater in the Operable Unit 4 area. This work was initiated February 8, 1993.

Reports: The Remedial Investigation (RI) Report for Operable Unit 4, including all validated analytical data from sampling activities, is presently being reviewed by DOE and contractor personnel at Fernald. The RI Report is on schedule for submittal to U.S. EPA by April 19, 1993. The RI Report will provide details about the nature and extent of contamination in Operable Unit 4 and establish remedial action objectives. The report also will include a Baseline Risk Assessment for Operable Unit 4. This Baseline Risk Assessment evaluates the pathways of exposure and the extent of exposure for existing conditions prior to any remedial activities in Operable Unit 4.

The compilation of the Feasibility Study (FS) Report is in progress. The FS is scheduled to be submitted to the U.S. EPA by September 10, 1993. In support of the FS development, two treatability study programs have been initiated. A Treatability Work Plan has been approved by the U.S.

EPA for the evaluation of cementation and chemical extraction technologies for Operable Unit 4 wastes. This Treatability Work Plan describes a five-stage process for evaluating the applicability of these technologies.

The cementation study being conducted under this work plan involves the evaluation of different cement and additive formulations, focused on producing the optimal mix design which retards contaminant migration and provides acceptable physical properties such as volume and strength. Testing for durability, radon emanation, and radon leaching, is also in progress. Data from completed tests are being evaluated. Preliminary results indicate that cementation is a viable alternative; however, the resulting waste volume is as much as triple its original volume.

The chemical extraction portion of the study is focused specifically on the potential for removing certain radionuclides and heavy metals from the K-65 residues through acid/solvent digestion and extraction techniques. Testing for radon emanation and radon leaching of the vitrified waste stream, which contains the bulk of the radionuclides and heavy metals, is in progress. The remaining waste stream will require treatment prior to final disposition, due to the presence of elevated levels of radionuclides and heavy metals.

The Operable Unit 4 Treatability Study Report examining cementation and chemical extraction is on schedule to be submitted to the U.S. EPA in May 1993.

The second Operable Unit 4 Treatability Study Work Plan examining vitrification has been approved by the U.S. EPA. This plan specifically examines the technical feasibility of removing the

waste materials from Silos 1, 2, and 3 and transforming them to glass in a high-temperature furnace. Samples of materials in the silos have been transferred to the DOE Pacific Northwest Laboratory in Richland, Washington, to perform the tests.

Preliminary results from this study have been received, and evaluation of this data is in progress. Preliminary results appear to be favorable in achieving significant waste volume reduction and retarded contaminant migration. A report documenting the results and data evaluation is also in progress. This Operable Unit 4 Treatability Study Report examining vitrification is on schedule to be submitted to the U.S. EPA in May 1993. Optimization testing has been initiated at Pacific Northwest Laboratory to identify an optimal range of additive-to-waste mixes for pilot testing.

These technologies are being tested to provide valuable information to support the determination of which technology provides the most environmentally-sound, cost effective and implementable method for treating the wastes prior to final disposal.

Remedial Design: Conceptual design engineering has been initiated for Operable Unit 4 for purposes of establishing preliminary design parameters and cost estimates. Conceptual engineering is proceeding based upon adapting representative remedial action alternatives for Silos 1, 2, and 3, as identified in available RI/FS documents. Conceptual engineering is proceeding in parallel with the RI/FS to allow for the prompt implementation of remedial action following issuance of the Record of Decision for Operable Unit 4.

Continued on page 10

Operable Unit 4

Continued from page 9

Removal Actions

Silos 1 and 2 (Removal Action No. 4): This Removal Action was completed in December 1991 with the installation of bentonite clay over radium-bearing radioactive waste material in the K-65 silos.

Covering the silo contents with a layer of bentonite clay accomplished two key objectives. It substantially reduces the accumulation of radon in the silo headspace—between the surface of the residues and the dome—

thereby reducing radon emissions to the environment. Secondly, it provides protection from potential releases to the environment in the event of a silo dome collapse.

The effectiveness of this Removal Action is determined by comparing the concentration of radon in the silo headspace before and after the placement of bentonite and examining other available monitoring data. Such a comparison indicates the bentonite

has resulted in approximately a 99 percent reduction of radon accumulation in the silo headspace.

The DOE has completed a statistical evaluation of available data to demonstrate the effectiveness of the bentonite. This data was provided to the U.S. EPA in January 1993, for review and comment.

Operable Unit 5 - Environmental Media

RI/FS Activities

Operable Unit 5 Work Plan

Addendum: An addendum to the RI/FS Work Plan was submitted to the U.S. EPA and the Ohio EPA outlining additional investigations necessary to support Operable Unit 5. The addendum has been revised to incorporate U.S. and Ohio EPA comments. The revised addendum was submitted to the U.S. and Ohio EPAs in October 1992 for review. The U.S. EPA and Ohio EPA conditionally approved the work plan in November 1992.

The addendum proposed limited investigations to resolve some remaining issues regarding the nature and extent of chemical and radiological constituents in the subsurface soils and groundwater at the Fernald site. The investigations included sampling of soils and perched groundwater in the former production area adjacent to the Plant 1 Pad, fire training area, electrical substation and several underground pipelines. This sampling effort is complete and laboratory analyses are in progress.

Other field work for Operable Unit 5 includes an additional investigation of the glacial overburden, which is a deposit of clay, sandy-clay, and silty-clay

which underlies the Fernald site but overlies the Great Miami Buried Valley Aquifer. Since water does not readily flow through clay, the glacial overburden helps protect the underlying aquifer from surface contamination. Because of the importance of the glacial overburden, additional hydraulic data are being gathered to further calculate how effective it is in protecting the aquifer.

The degree of protection provided by the overburden is crucial in deciding how contamination within the overburden should be addressed in final remediation. The additional hydraulic data will also be used to create a more refined groundwater transport model, which is needed to make long-term predictions of how contamination might move through the overburden. Additional hydraulic data and a more refined groundwater model will be used to support RI/FS documents for Operable Unit 5.

Reports: The U.S. EPA approved the revised Operable Unit 5 Treatability Study Work Plan in September 1992. The treatability work plan is designed to examine physical separation and chemical

extraction of uranium from soils. A pilot unit is being installed in Plant 8 at Fernald to demonstrate the feasibility of soil washing as a remedial technology for cleaning Fernald site soils. The pilot unit is on schedule to be operational in February 1993. Data generated from the study will be used to support the Operable Unit 5 Feasibility Study and subsequent remedy selection.

DOE submitted the work plan for the installation of a well at Manhole 180 to the U.S. EPA and Ohio EPA in October 1992. DOE is now preparing responses to U.S. and Ohio EPA comments on the work plan. Both U.S. EPA and Ohio EPA are aware that the well has been installed, and preliminary data results indicate uranium concentrations are at background levels. The Initial Screening of Alternatives (ISA) for Operable Unit 5 was submitted to the U.S. EPA November 13, 1992. The U.S. EPA has conditionally approved the report pending incorporation of U.S. EPA comments. The ISA involves the development and screening of remediation alternatives, and identifies remedial

Continued on page 11

Operable Unit 5

Continued from page 10

action objectives, contaminants of concern in various environmental media (such as uranium in soils), exposure pathways, and

preliminary remediation goals. The report also identifies and evaluates possible ways to clean contaminated environmental media, and develops alternatives to address contaminated

groundwater, soils, and sediments. During later stages of the Feasibility Study, the alternatives for the entire scope of Operable Unit 5 will be refined in detail and evaluated.

Removal Actions

Contaminated Water Beneath FEMP Buildings (Removal Action No. 1):

This Removal Action was initiated to minimize the potential for uranium-contaminated groundwater to infiltrate the underlying aquifer from perched water zones located beneath some former production buildings. "Perched" water is present in isolated pockets of groundwater within the layers of clay-rich glacial soils that exist above the Great Miami Buried Valley Aquifer in the regional area of Fernald.

Perched water zones beneath Plants 6, 2/3, 8, and 9, are of concern due to the discovery of significant concentrations of uranium and volatile organic compounds. To minimize the potential for the movement of contaminated water in these zones to the underlying aquifer, a series of wells were installed to extract the perched groundwater for treatment.

Pumping operations are in progress at all locations. A treatment system at Plant 8 uses activated carbon filters to remove any volatile organic compounds from the extracted water. The water is then processed through the Fernald site's existing water treatment system for the removal of uranium and eventually discharged to the Great Miami River. As of February 1, 1993, approximately 300,000 gallons of extracted perched groundwater have been processed through the treatment system at a rate of approximately 5,000 gallons per week. Treatment of perched groundwater will continue in this manner until the Advanced Waste Water Treatment

system is operational in 1994.

South Groundwater Contamination Plume (Removal Action No. 3):

The purpose of this Removal Action is to protect public health by limiting access to the use of uranium-contaminated groundwater in an area south of the Fernald site. This Removal Action is broken into five parts.

Part 1 provided an alternate water source to an industry affected by the contamination plume. This portion of the project involved the installation of production wells outside the plume area and a water supply system to the affected industry. Part 1 construction was completed December 7, 1992. Following Ohio EPA approval to begin operation, there will be a 60-day operating acceptance period before the system is turned over to the affected industry.

Another affected industry, which uses a minimal amount of groundwater for non-drinking purposes, will be provided with an alternate water supply by being connected to the proposed public water system. In January 1993, the Department of Energy agreed to pay Hamilton County \$4,501,516 for DOE's share of the cost of providing the public water system.

Part 2 involves the installation of a groundwater recovery well system to extract and pump groundwater from the South Plume through a force main back to the Fernald site for monitoring and subsequent discharge to the Great Miami River.

Use of the Fernald site's current effluent outfall pipeline to the Great

Miami River will be discontinued due to its age and limited capacity to handle future flow. A new effluent outfall pipeline is being installed under Part 2 of this Removal Action. The new outfall pipeline will parallel the existing outfall pipeline to the Great Miami River.

Part 2 work also includes increasing the pump-out capacity at the Stormwater Retention Basin to reduce the potential for future overflow of the basin.

The construction of the force main, the new outfall pipeline, and providing increased pump-out capacity at the Stormwater Retention Basin began in July 1992.

Construction of the new outfall pipeline was put on hold in September 1992 when contaminated soils and concrete construction rubble were discovered near the discharge pipeline to the river. The rubble had been placed on the riverbank years ago to prevent erosion near the discharge pipeline. The U.S. EPA approved a revision to the Part 2 construction procedure to allow construction of the new pipeline to continue while cleanup of contaminated materials was in progress. A cofferdam structure was used to complete construction of the outfall to the river. Soils and rubble within the cofferdam have been removed and returned to the Fernald site for monitoring and evaluation to determine appropriate disposition. In addition, monitoring is being performed to determine the extent

Continued on page 12

Operable Unit 5

Continued from page 11

of any remaining contamination in the vicinity of the discharge pipeline adjacent to the cofferdam. Construction of the force main and outfall pipeline from the Part 2 well field to the Great Miami River is progressing on schedule.

Construction of the Part 2 well field and the associated test well are on hold pending property acquisition through condemnation. As a result of property acquisition difficulties, the DOE requested and the U.S. EPA approved a schedule extension for completion of the groundwater recovery well system. The groundwater recovery well system, originally scheduled to be operational by January 29, 1993, is now scheduled to be operational by August 28, 1993.

Construction of a Dissolved Oxygen System is now in progress under Part 2. It was determined that the groundwater to be extracted under Part 2 of this removal action has a low dissolved oxygen content. The Fernald site's National Pollutant Discharge Elimination System (NPDES) permit requires Fernald site wastewater to be discharged at a minimum of five parts of dissolved oxygen per million parts of water (ppm). Groundwater extracted under Part 2 will be aerated prior to discharge to the Great Miami River in order to comply with the Fernald site's current NPDES permit.

Part 3 involves construction of an Interim Advanced Wastewater Treatment (IAWWT) system. The IAWWT system removes uranium from site wastewater streams and, by doing so, reduces the amount of uranium discharged to the Great

Miami River. This treatment capacity will compensate for the additional planned discharges of uranium from the South Plume to the river. The design of the IAWWT system was modified to incorporate the additional treatment capacity required to address the relocation of the Part 2 well field. The new location is in an area of higher uranium concentration which means that more uranium will have to be removed from site wastewater streams to achieve the desired reduction of uranium discharges to the river.

Two trailer-mounted IAWWT facilities and associated support systems comprise the IAWWT unit located near the Stormwater Retention Basin, and a second IAWWT unit is located at the Fernald site's existing Bionitrification Effluent Treatment building. The IAWWT system became operational on July 30, 1992.

The IAWWT unit at the Bionitrification building was taken off line in August 1992 due to operational difficulties. Alterations are now being made to that unit. The IAWWT system will be returned to operational status before the pumping of contaminated groundwater is initiated under Part 2 in August 1993; therefore, the negotiated reduction of uranium discharges to Great Miami River will not be affected by current IAWWT operational difficulties.

Part 4 of the Removal Action involves groundwater monitoring and institutional controls to prevent the use of contaminated groundwater. This activity is being implemented through the Fernald

site's existing Groundwater Monitoring Program. The program has been expanded to include more frequent monitoring of private wells located near areas of known contamination.

Part 5 involves additional groundwater investigations in the vicinity of the South Plume to identify the location and extent of any remaining contamination attributable to Fernald in the groundwater south (downgradient) of the recovery wells to be installed under Part 2.

The Part 5 investigation includes HydroPunch® sampling, sampling of existing monitoring wells, and groundwater modeling activities. Hydropunching is an efficient method for extracting groundwater samples without the expense of installing wells. The initial phase of Hydropunching is complete.

Because the U.S. EPA has issued a proposed limit of 20 parts per billion (ppb) for uranium in drinking water, the Part 5 investigation will attempt to identify the location of the leading edge of the plume exceeding the 20 ppb level.

Collect Uncontrolled Production Area Runoff - Northeast (Removal Action No. 16): The scope of this Removal Action is to collect stormwater runoff from perimeter areas of the 136-acre production area which are not presently draining into the Stormwater Retention Basin. Construction is in progress along the north perimeter fence where a trench has been excavated and the trench base has been poured to intercept the flow of stormwater. This project is on schedule for completion in August 1993.

Additional RI/FS Activities

Engineered Waste Management Facility Study:

As part of the RI/FS, an investigation is in progress examining the geotechnical and geochemical properties of the soils on the Fernald site. The purpose of this investigation is to determine the technical feasibility of siting an above-ground facility at Fernald to accommodate waste materials derived from remedial activities. The investigation involves the installation of a number of monitoring wells and the completion of a series of subsurface borings along the northern and eastern portions of the Fernald site. The required borings and wells have been completed, and collected samples are currently being analyzed. This study, scheduled for completion in March 1993, will support the evaluation of alternatives in the Feasibility Study reports for each of the Operable Units.

Sitewide Characterization Report:

The DOE issued the Sitewide Characterization Report to the U.S. and Ohio EPAs in August 1992 for review. A revised report incorporating responses to comments from the regulators was issued in December 1992.

The Sitewide Characterization Report presents a summary of site characterization data available through December 1, 1991. Data collected after December 1, 1992, will be incorporated into the individual operable unit reports. The Sitewide Characterization Report provides a preliminary sitewide risk assessment based on the available data. This risk assessment evaluates the risks associated with existing site conditions in the absence of any remedial or removal actions completed after December 1, 1991. The report also presents preliminary remediation goals and "leading remedial alternatives" for

each of the five operable units.

Preliminary remediation goals represent initial target cleanup levels for waste and environmental media (soil, groundwater, etc.) for use in the evaluation of cleanup alternatives in each of the operable unit Feasibility Study (FS) reports. Cleanup goals are finalized in the Records of Decision.

The "leading remedial alternatives" presented in the report were selected from the array of available remedial activities in the RI/FS document for purposes of supporting the individual operable unit FS reports. The identified "leading alternatives" should not be inferred as representing a pre-selection of a cleanup alternative. The "leading alternatives" will be employed in the operable unit FS risk assessments to examine the viability of the preferred remedial alternative in the FS report to attain sitewide cleanup goals.

Fernald Project Cleanup Report is prepared by Fernald Environmental Restoration Management Corporation periodically for the U.S. Department of Energy, to inform the community about cleanup progress at the Fernald Environmental Management Project.

Address all inquiries regarding the *Fernald Project Cleanup Report* to :

Jack R. Craig
Acting Assistant Manager for Environmental Restoration
U.S. Department of Energy
Fernald Field Office
P.O. Box 398705
Cincinnati, OH 45239-8705
Telephone: (513) 738-6159

Fernald Field Office Mr. T. J. Rowland, Acting Manager

FERNALD PROJECT

CLEANUP REPORT

U.S. Department of Energy
Fernald Field Office
P.O. Box 398705
Cincinnati, OH 45239-8705

Administrative Record RI/FS Additions

The following documents are among those which have been added to the Administrative Record since the last community meeting

took place on November 9, 1992. The Fernald site's Administrative Record is located in the Public Environmental Information Center,

JAMTEK Building, 10845 Hamilton-Cleves Highway, Harrison, Ohio, 45030. The telephone number is (513) 738-0164.

- 1991 Annual Environmental Report
- Transcripts of Proceedings, U.S. Department of Energy Fernald Environmental Management Project, Community Meeting, November 9, 1992
- Ohio EPA comments on the Sitewide Characterization Report
- Operable Unit 3 Remedial Investigation and Feasibility Study Work Plan
- Revised Community Relations Plan
- Scrap Metal Piles Removal Action Project Plan
- South Groundwater Contamination Plume Removal Action Part 2 (Pumping and Discharge System) and Part 3 (Interim Advanced Wastewater Treatment System) Work Plans
- Ohio EPA comments on the Improved Soil and Debris Removal Action Work Plan
- Operable Unit 2 Remedial Investigation Report