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**FERNALD PROJECT CLEAN UP REPORT**

**07/01/94**

**DOE-FN      PUBLIC**  
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**FACTSHEET**

# FERNALD PROJECT Cleanup

R E P O R T

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**DOE Workshop**

on proposal to ship waste by rail

7:00 p.m. Tuesday, August 9

Alpha Bldg., 10991 Hamilton-Cleves Hwy.

## Pilot facility will convert Fernald silo waste into glass

DOE has initiated construction of a facility that will convert low-level radioactive waste from three silos into a glass form that is stable, durable, and safe for permanent disposal.

In a process known as vitrification, radium-bearing residues from the two K-65 silos at Fernald, and uranium-bearing waste from a

third silo, will be heated with additives in furnaces under controlled conditions to form a glass-like substance.

The purpose of the new facility is to test the feasibility of vitrifying the silo waste materials by mixing sand, calcium oxide, and other additives with the silo waste. This will enable

DOE and the Fernald Environmental Restoration Management Corp. (FERMCO) to better define remediation costs and engineering design for final remediation of the silos.

Vitrification is DOE's and the U.S. Environmental Protection Agency's (EPA) preferred alternative for stabilizing the silo wastes. The final glass product will be sampled at several points in the process to ensure it meets required specifications.

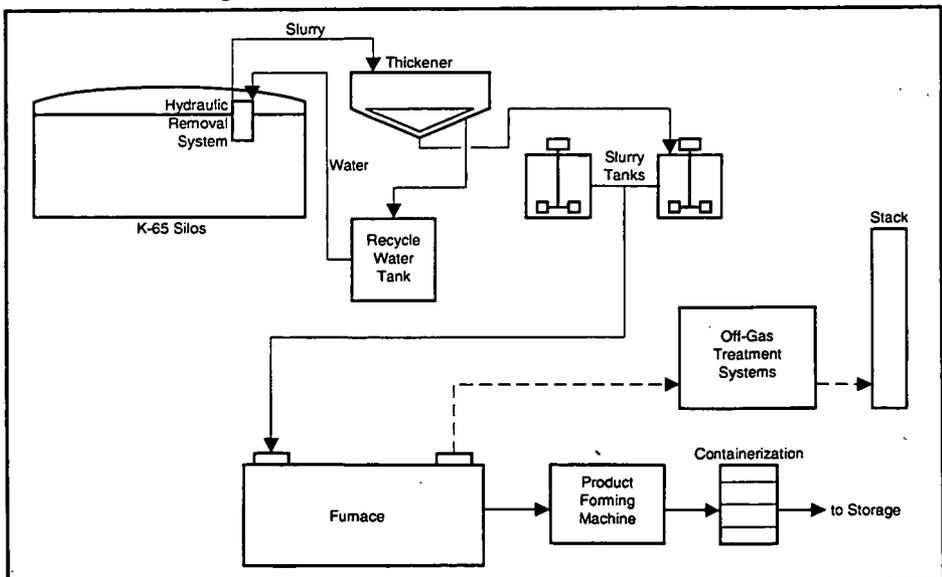
Construction is scheduled for completion in February 1995, at a total estimated cost of \$12.6 million.

The facility is expected to operate using non-radioactive surrogate material beginning in March 1995. Actual silo wastes will be fed into the furnace beginning in August 1995. The facility is expected to operate for about three months and process approximately 30 metric tons (66,000 pounds) of silo material.

After this initial treatment program, it is envisioned that the vitrification pilot plant facility will continue to play an important role in support of the final Operable Unit 4 remediation facility.

A fourth silo, which is empty, will be used as a test bed for demonstrating waste retrieval technologies using non-radioactive surrogate materials, hydraulic mining, and remote handling of waste materials.

The two K-65 silos contain about 9,700 tons of radium-bearing wastes that generate radon gas as a decay product. As an interim measure, a bentonite clay cover was applied over the surface of K-65 residues in 1991, which effectively reduced radon emanation.



This illustration shows the vitrification pilot plant process for treating silo waste.

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Glass formulations were developed for several mixtures of silo material and bentonite clay during a previous laboratory-scale treatability study for vitrification of silo waste. The laboratory study found the glass to be stable, durable, non-hazardous,

and well within the acceptable range for leaching of radionuclides from the glass.

"Findings from that bench-scale study included a reduction in the radon emanation rate of about 500,000 times, and the initial waste volume was reduced by more than 50

percent," said Jack Craig, Acting Deputy Director of the DOE Fernald Office.

"Vitrification has been proven to be an effective technology for converting low-level radioactive waste into a stable, durable glass form," Craig said.

## Controlled detonation cutting to take down Plant 7 steel frame

Contractors handling the dismantling of Plant 7 at Fernald plan to use special steel cutting explosive charges to take down the structural steel framework of the building. This controlled detonation cutting is planned for September 10, 1994.

Under the method proposed by Project Development Group, Inc. (PDG), and Best Group, Inc., (FERMCO subcontractors on the Plant 7 dismantling project), linear shaped explosive charges will be placed strategically at key structural supporting columns. The specialized steel cutting charges will be detonated sequentially to cut columns and use the weight and configuration of the building, to cause it to lean in a northwest direction and fall into a pre-determined open area. After the shaped charges are detonated, the structure will fold within seven seconds.

Upon detonation, there will be a minimal amount of black smoke due to the shaped charge. There will be no toxic dust or fumes. The area surrounding the building is covered in concrete or clean gravel and will be pre-wet as a dust control measure.

The procedure will be performed on a weekend, when there are few workers and little activity at the site.

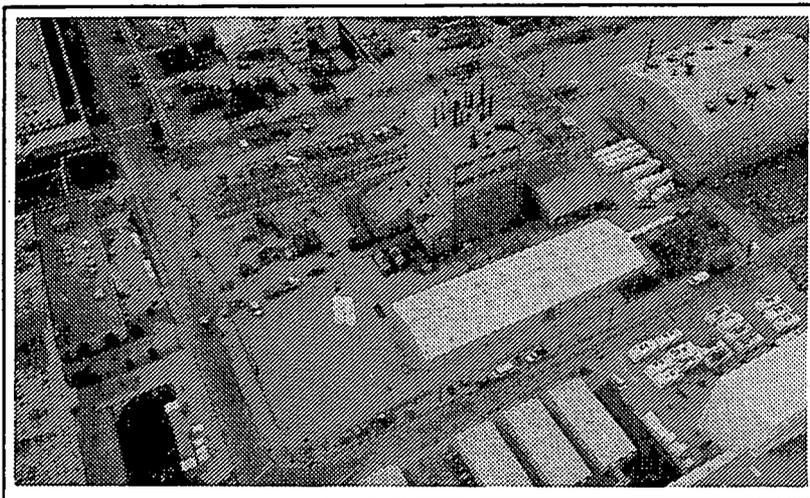
Before the detonation is

counterweight), will have been removed from the Plant 7 structure. Only the building's main structural steel will be involved in the fall.

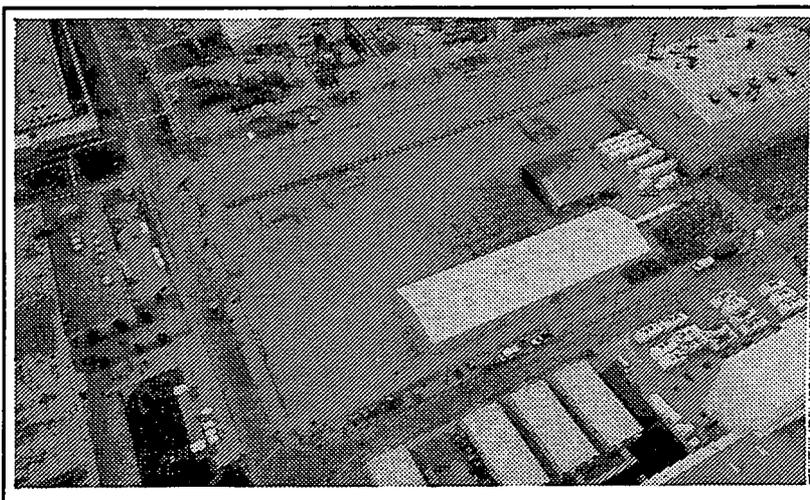
Air monitors will be placed around the perimeter of the work site to detect any possible airborne activity, which is highly unlikely since any loose contamination will have been removed from the building prior to the controlled detonation and the building will fall onto a wetted gravel area.

This method will: 1) minimize worker exposure to lead-based paint; 2) reduce the amount of time working at high altitudes; 3) reduce radiological contamination exposure; 4) reduce the number of lifts by the crane by 75 percent; and 5) shorten the schedule and reduce FERMCO's support staff costs.

The entire structure will collapse, leaving the highest structural member less than 35 feet off the ground and well within the reach of shears to cut the steel. The charges will be fashioned to burn the steel in a manner that is many times faster and hotter than torch cutting. When the structure is weakened from the burning at critical points, gravity will



The photo above shows Plant 7 today; the photo below is an artist's concept of the area following dismantling.



performed, all interior and exterior walls, piping, equipment, the penthouse, the elevator (shaft, cab and

hotter than torch cutting. When the structure is weakened from the burning at critical points, gravity will

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cause the building to fold upon itself.

A comparison of this proposal against the previous floor-by-floor dismantling plan led DOE and FERMCO to conclude that controlled detonation cutting will be safer, faster, environmentally sound and cost efficient.

The overriding advantage of this alternative is the increased level of workers' safety. There is a high degree of risk due to the height of

Plant 7 and because the workers would have to cut steel which contains lead. Due to the presence of lead, workers would have been required to wear protective clothing, respirators, and use air filtration devices while the steel was being cut. While the previous work plan safely addresses these issues, the new proposal is safer. In addition, a cost savings will be realized with the demolition of a nearby maintenance building at no additional cost to the

project.

Protection of adjacent buildings will be accomplished by having columns along the east face of Plant 7 pulled in a northwest direction by cables tied to interior columns.

Controlled Demolition Incorporated (CDI), a firm with extensive experience in this type of work, will be procured through PDG, Inc., and Best Group, Inc.

## RI/FS program approaching key milestones

Following is an updated status report on the progress of Fernald's sitewide Remedial Investigation/Feasibility Study. Remedial Investigation (RI) reports define the nature and extent of contamination in areas targeted for cleanup known as "operable units." Feasibility Study (FS) reports evaluate the remedial alternatives available for each of the five operable units at Fernald, and assembles that information into preferred cleanup alternatives and proposed plans for remedial action.

The U.S. EPA is presently reviewing the RI and FS reports for **Operable Unit 1 (the waste pit area)** and DOE's proposed plan for remedial action. DOE's preferred alternative calls for excavating the waste pits, treating the waste materials by thermal drying, and shipping the waste by rail for disposal at a permitted commercial disposal facility. The DOE is scheduled to submit its proposed draft Record of Decision for Operable Unit 1 to the U.S. EPA in November 1994.

The U.S. EPA is reviewing the **Operable Unit 2 (other waste units)** RI and FS reports. A variety of cleanup options are being evaluated

for Operable Unit 2. These include excavation of impacted material and disposal in engineered facilities at on- and off-site locations. Treatment options include soil washing, vitrification, solidification, and stabilization of flyash with on-site lime sludge. The DOE is scheduled to submit its proposed draft Record of Decision for Operable Unit 2 to the U.S. EPA in May 1995.

A Record of Decision for Interim Remedial Action (IROD) for **Operable Unit 3 (former production area)** has been signed by DOE, and the IROD is expected to be signed by the U.S. EPA in late July 1994. The plan calls for decontaminating and dismantling buildings and support facilities in advance of the Record of Decision to be issued by the U.S. EPA in 1997 for final cleanup of Operable Unit 3. Design plans and specifications for performing the interim remedial action are being prepared. This interim action could accelerate cleanup of the former production area by up to four years and result in significant cost savings of approximately \$300 million. Bulk rubble and debris from dismantling activities will be stored temporarily on

site. Final disposition of rubble and debris will await the final Record of Decision for Operable Unit 3.

The U.S. EPA has approved the RI report for **Operable Unit 4 (Silos 1-4)** and conditionally approved the FS report. DOE has identified an initial preference for vitrification of the content removed from Silos 1, 2, and 3 (Silo 4 is empty), followed by off-site shipment of the vitrified material to the Nevada Test Site. The DOE is scheduled to submit its proposed draft Record of Decision for Operable Unit 4 to the U.S. EPA in August 1994.

The RI report for **Operable Unit 5 (Environmental Media)** was submitted on schedule to the U.S. EPA and Ohio EPA on June 24, 1994, for review. The Operable Unit 5 FS report is being developed and will be submitted to the U.S. and Ohio EPAs in November 1994, for review. The DOE is scheduled to submit its proposed draft Record of Decision for Operable Unit 5 to the U.S. EPA in July 1995.

All RI/FS documents are available for public inspection in Fernald's Public Environmental Information Center.

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## South plume pumping scheme modified

An alternate pumping scheme utilizing three of the five South Groundwater Contamination Plume recovery well pumps has been initiated. An unplanned outage of recovery well No. 4 accelerated the decision to modify the pumping arrangement on June 5, 1994.

The alternate pumping scheme now utilizes recovery wells 1, 3, and 5 at flows of 450 gallons per minute (gpm), 550 gpm, and 500 gpm,

respectively. Once this revised pumping rate was implemented, three monitoring wells south of the recovery well field showed an increase in arsenic concentrations. The pumping rates for recovery wells 1, 3, and 5 were adjusted to 400, 550, and 550 gpm, respectively. Arsenic concentrations in the monitoring wells returned to pre-pumping levels by June 28, 1994.

This alternate pumping scheme

was modeled and found to have essentially the same effect as pumping all five wells at 300 gpm, the original pumping rate. Because only three of five wells are being operated, and because the three wells are operating within the manufacturer's pumping range, the South Plume operating costs are anticipated to be reduced by approximately 60 percent.

## Hamric assigned to Ohio Field Office

Phil Hamric has been assigned as manager of the DOE's Ohio Field Office in Miamisburg, Ohio. Hamric, who had been the DOE manager at Fernald since September 1993, assumed his duties June 27, 1994.

With the assignment of Hamric to the Ohio Field Office, Ray Hansen

has been named Acting Director of the Fernald Environmental Management Project and Jack Craig the Acting Deputy Director.

The Ohio Field Office is the first new DOE office formed since the 1950's, when the sites that now report to the Ohio Field Office were first

created. The Ohio Field Office will manage three DOE facilities including the Mound Plant in Miamisburg, the West Valley Demonstration Project near Buffalo, N.Y., and Fernald.

### FERNALD PROJECT CLEANUP REPORT

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Fernald Field Office  
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The Fernald Project Cleanup Report is prepared by Fernald Environmental Restoration Management Corporation monthly 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:

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