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OPERABLE UNIT 4 - SILOS PROJECT FACT SHEET - SEPTEMBER 1996

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FACT SHEET

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Operable Unit 4

Silos Project

September 1996

Introduction

Operable Unit 4 is one of five well-defined areas undergoing remediation at the U.S. Department of Energy's (DOE) Fernald Environmental Management Project (FEMP). The operable units were defined, based on their locations or the potential for similar technologies to be used in the ultimate cleanup.

Located at the western periphery of the FEMP, Operable Unit 4 includes Silos 1 and 2 (K-65 Silos), Silo 3 (metal oxide silo), unused Silo 4, and ancillary structures. Operable Unit 4 remediation will address each of these structures, as well as any contaminated soils within the geographic boundary, and any contaminated perched water encountered during Operable Unit 4 remedial activities.

For each operable unit, the U.S. Environmental Protection Agency (EPA) issues a record of decision. The selected remedial action for an operable unit, as well as the basis for the selection, are formally presented in the record of decision.

On Dec. 7, 1994, U.S. EPA signed the Record of Decision for Remedial Action at Operable Unit 4, in which the selected remedial action and the basis for choosing that remedial action, are presented.

Background

Silos 1 and 2, commonly called the "K-65 Silos," contain radium-bearing, low-level radioactive wastes dating back to the 1950s. In 1964, the two silos were reinforced with an earthen berm, which was upgraded in 1983.

Other improvements include a 30-foot cap on top of the silo domes, installed for added protection, and a polyurethane foam coating applied over the domes for weather protection. A silo headspace radon treatment system was also constructed, and radon monitors were installed around the FEMP boundary and in the immediate vicinity of Silos 1 and 2.

Silo 3 contains dried uranium-bearing wastes. Silo 4 is empty.

Operable Unit 4 Selected Remedy

A restructuring of all FEMP project and support organizations has been completed to strategically align the existing project organizations. This alignment will enable project teams to more efficiently perform remedial design and remedial action activities. The selected remedy for Operable Unit 4 will be performed by the Silos Project Team and the Facilities D&D Team.

Operable Unit 4

Silos Project

Silos Project Team

The Silos Project Team will be responsible for the following activities:

- Removal of the contents of Silos 1, 2, and 3 (K-65 residues and cold metal oxides) and decant sump tank sludge.
- Vitrification (glassification) to stabilize the residues and sludges removed from the silos and decant sump tank.
- Shipment of the vitrified contents of Silos 1, 2, and 3, and the decant sump tank for disposal at the Nevada Test Site (NTS).

Facilities D&D Project Team

The Facilities D&D Project Team will be responsible for the following activities:

- Demolition of Silos 1, 2, and 3 and 4, and decontamination -- to the extent practicable.
- Demolition of concrete rubble, piping and any other construction debris which is generated.
- Demolition of the vitrification treatment unit and associated facilities after use and decontamination or recycling of debris prior to disposition.

Soil Remediation Project Team

The Soil Remediation Project Team will be responsible for the following activities:

- Segregation of non-contaminated soils;
- Removal of the earthen berm and excavation of contaminated soils within the Operable Unit 4 boundary to achieve proposed remediation levels. Placement of clean backfill following excavation.

Remedial Design/Remedial Action

The overall objective of Operable Unit 4 remedial actions is to safely remove a known source of contamination, which will reduce the potential for release of hazardous substances, including radionuclides, to the environment, thereby alleviating a potential risk to human health.

Substantial risk reduction will be achieved by removing the sources of contamination, treating the material for which exposures result in the highest risk, shipping the treated residues off site for disposal, and managing remaining contaminated soils and debris consistent with a sitewide strategy.

Operable Unit 4 remedial actions entail removing the materials from Silos 1, 2, and 3 and treating them in a vitrification facility. Sludge from the decant sump tank, which collects liquids from inside and around the silos, will also be removed and treated in the vitrification facility.

Following treatment, the vitrified residues will be containerized, transported and disposed at NTS. The Operable Unit 4 scope includes successful completion of these actions.

Operable Unit 4 Silos Project

After the residues are removed from the silos, the concrete structures, radon treatment system and other structures within Operable Unit 4 will be demolished. After treatment, the vitrification facility will be disassembled. Standard decontamination technologies will be applied, to the extent practical, to minimize the volume of waste requiring disposal. Opportunities for recycling materials will be explored.

Contaminated soils within Operable Unit 4 will be excavated; it is anticipated that a minimum depth of 6 inches will be removed from the Operable Unit 4 area. Clean fill will be placed in excavated areas, which will then be seeded.

Contaminated Operable Unit 4 soil and debris will be placed in an on-site storage facility. As required, the storage facility will be maintained and monitored.

Operable Unit 4 contaminated soil and debris will be disposed consistent with the selected remedial actions for Operable Units 3 and 5 and will be accomplished via the Soils Remediation Project.

On Oct. 6, 1995, DOE submitted the *Work Plan for Operable Unit 4 Remedial Action -- Phase I* to U.S. EPA. On Nov. 20, 1995, DOE received conditional approval, with comments from U.S. EPA. This document identifies the implementation strategy and schedule for completing all Operable Unit 4 remedial activities.

On Jan. 9, 1996, U.S. EPA approved the *Work Plan for Operable Unit 4 Remedial Action -- Phase I*. Phase I of the Operable Unit 4 remedial action work plan focuses on implementation of the initial remedial action in support of the construction of the FEMP Residues Vitrification Plant: site preparation/underground utilities; silo superstructure construction; new radon treatment system construction (Silos 1 and 2).

Phase II of the remedial action work plan will be submitted following integration of test data from the pilot-scale vitrification plant.

Construction of FEMP's pilot-scale vitrification plant began July 17, 1994, and was completed in May 1996. Pilot-scale Phase I testing operations began in June 1996. Operation of this facility supports development of final vitrification processes and design of the full-scale vitrification facility.

Several of the FEMP Residues Vitrification Plant remedial design packages have already been submitted to the U.S. EPA and Ohio EPA. These include the pre-final site preparation/underground utilities design, on Aug. 31, 1995. On May 1, 1996, the silo superstructures design package was submitted to U.S. and Ohio EPAs.

The site preparation/underground utilities design has since been approved by U.S. EPA, and a construction subcontract was awarded Feb. 27, 1996. Construction is currently in progress.

Operable Unit 4 Vitrification Pilot Plant Treatability Study

A two-phase treatability study will be conducted to demonstrate integration of equipment and operation of the vitrification pilot plant, including the melter off-gas and radon adsorption systems.

Other treatability study objectives include: verifying formulations developed from the previous bench-scale studies and glass-development program, producing a satisfactory glass product during full-scale operation, and ensuring compliance with acceptance criteria required for disposal at NTS.

Phase I operations will verify the adequacy of the equipment and process. Bentonite and nonradioactive surrogate materials will be utilized in the vitrification facility to perform integrated system operability testing prior to operating with actual silo residues. The surrogate materials are composed of chemicals, including silica, borax and alumina, to closely duplicate the actual silo materials.

Operable Unit 4

Silos Project

During Phase II, radioactive materials from Silos 2 and 3 will be utilized. Also radon control for the Silos 1 or 2 headspace and off-gas treatment for the vitrification facility will be demonstrated. Silo 2 materials will be removed by a manually operated slurry pumping device suspended from a mobile crane. The device will be deployed through an existing manway. A glovebag will maintain a seal and prevent radon escape. Silo 3 materials will be removed pneumatically.

For More Information

Contact the Public Environmental Information Center (PEIC), located at 10845 Hamilton-Cleves Highway, Harrison, Ohio, 45030 (phone: 513-738-0164).

For specific questions regarding Operable Unit 4, contact: DOE-FEMP Team Leader Nina Akgunduz, 513-648-3110.