STATEMENT OF BASIS/FINAL DECISION AND RESPONSE TO COMMENTS SUMMARY

REGION V
ID #

U.S. Department of Energy
Fernald Environmental Management Project
Operable Unit 4
Fernald, Ohio
(Signed November 3, 1994)

Facility/Unit Type: **Uranium metal product manufacturer**
Contaminants: **Uranium and thorium; inorganics**
Media: **Groundwater and soil**
Remedy: **Excavation of wastes/contaminated soils, treatment by vitrification, interim storage of treated materials on-site pending final decision**

FACILITY DESCRIPTION

The Fernald Environmental Management Project (FEMP) is divided into five operable units, of which Operable Unit 4 (OU4) is one, under investigation pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and to the extent practical, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300.

The FEMP is a government-owned, contractor-operated federal facility that produced high-purity uranium metal products for DOE and its predecessor agencies from 1952 until 1989. Thorium was also processed on-site, however, on a smaller scale. The production operations generated a wide variety of waste materials containing both radiological and chemical constituents. In 1989, EPA placed the FEMP on the National Priorities List. Production activities were stopped in 1989, and the production mission of the facility was formally ended in 1991.

The FEMP is located on a 1,050 acre site in a rural agricultural area approximately 18 miles northwest of Cincinnati, Ohio. The land adjacent to the site is primarily devoted to open land use such as agriculture and recreation. Some commercial activity is also nearby. Industrial usage is concentrated in the areas south of the FEMP in Fernald and in a small industrial park. The elevation slopes slightly toward Paddys Run, a small intermittent stream on the west side of the facility. Natural drainage at the FEMP generally flows from east to west, with the exception of the extreme northeast corner, which drains east toward the Great Miami River. Surface water flow within OU4 is directed through a series of trench drains, concrete curbs, and gutters to an inground concrete sump located in waste storage area. Water from these storm water control facilities are directed through the existing site treatment systems prior to discharge to the Great Miami River. An estimated 23,000 residents live within a 5-mile radius of the facility.

OU4 is divided into three subunits: Subunit A consists of the contents in Silos 1 and 2 (K-65 residues and bentonite clay) and the sludge in the decant sump tank; Subunit B consists of the contents in Silo 3 (cold metals oxides); Subunit C consists of Silos 1,2,3, and 4 structures, contaminated soils within the OU4 boundary, including surface and subsurface soils and the earthen berm around Silos 1 and 2. Subunit C also contains the decant sump tank, the radon treatment system, the concrete pipe trench, and the miscellaneous concrete structures within OU4, any debris generated through implementing cleanup for Subunits A and B, and any perched groundwater encountered during remedial activities. Sampling performed in the vicinity of OU4 indicates the occurrence of above background levels of uranium and many inorganic constituents, and to a lesser degree other radionuclides, in the surface soils, subsurface soils, surface water, and groundwater.

CONTAMINATION DETECTED AND CLEANUP GOALS

Media	Estimated Volume	Contaminant	Maximum Concentration (/)	Action Level	Cleanup Goal	Point of Compliance
Surface water	Not given	Pb-210+2 progeny Ra-226+5 progeny Ra-228+1 progeny Sr-90+1 progeny Tc-99 Th-228 U-238+2 progeny	4.5 88 .048 1.8 3.6 2.9 37	Not given	78 2 2 N/A N/A 2 60	Not given
Subsurface soil	Not given	Pb-210+2 progeny Ra-226+5 progeny Ra-228+1 progeny Sr-90+1 progeny Tc-99 Th-228 U-238+2 progeny	101 206 1.24 0.8 3.6 1.3 53	Not given	78 2 2 N/A N/A 2 60	Not given

EXPOSURE PATHWAYS

Potential contaminant transport via groundwater through leaching of contaminants from the waste pits is through the vadose (unsaturated) zone to underlying groundwater or infiltration of contaminated surface water from Paddys Run to the Great Miami Aquifer. Potential contaminant transport via air emissions is through the volatilization of organic compounds, wind erosion of contaminated particulate matter, and the direct release of radon gas. Potential exposure to groundwater and surface water is via direct radiation, direct contact, inhalation and ingestion. Potential exposure to contaminated soils is via direct contact, radiation, ingestion, and inhalation of dust. Ecological receptors would have minimal contact with residual contaminants and residual contamination would not pose a risk to ecological receptors within OU4.

SELECTED REMEDY

The selected remedy will satisfy the requirements of both CERCLA and NEPA for the protection of human health and the environment; will be cost effective; will utilize permanent solutions to the maximum extent practicable; and will utilize treatment as a principal element of the response. The major components of the selected remedy include:

- Remove the contents of Silos 1, 2, and 3 (K-65 residues and cold metal oxides) and the decant sump tank;
- Vitrification (glassification) to stabilize the residues and sludges from the silos and decant sump tank;
- Off-site shipment for disposal at the Nevada Test Site of the vitrified contents of Silos 1, 2, 3, and the decant sump tank;
- Demolish Silos 1, 2, 3, and 4 and decontamination, to the extent practicable, of the concrete rubble, piping, and other generated construction debris;
- Remove the earthen berms and excavation of contaminated soils within the boundary of OU4, to achieve remediation levels. Placement of clean backfill to original grade following excavation;
- Demolish the vitrification treatment unit and associated facilities after use; and the decontaminate or recycle debris;

- On-site interim storage of excavated contaminated soils and contaminated debris in a manner consistent with the approved work plan for removal action 17 (improved storage of soil and debris) pending final disposition in accordance with the Records of Decision of OU5 and OU3;
- Continue access controls and maintenance and monitor stored waste inventories;
- Institutional controls of the OU4 area such as deed and land use restrictions;
- Potential additional treatment of stored OU4 soil and debris using OU3 and OU5 waste treatment systems;
- Pump and treat as required of any contaminated perched groundwater encountered during remedial activities; and
- Dispose of OU4 contaminated debris and soils consistent with the Records of Decision for OU3 and OU5, respectively.

The total estimated cost for the selected remedy is $91.7 million.

PUBLIC PARTICIPATION

Various forums have been used to provide information to the community, including a periodic newsletter, regular community meetings, and other availability sessions. Availability for public inspection of OU4 documents were published in April 1993 and in September 1993 in three local newspapers. Many public meetings were held both before and after the start of the 45-day public comment period, which began on March 8, 1994. The public comment period was extended an additional 60-days until June 19, 1994. Many comments were received and considered. The Citizens Advisory Board for NTS Programs (CAB), a site-specific advisory board made up of concerned citizens and representatives from EPA, the State, and DOE, will play a key role in advising DOE about stakeholder concerns involving major program decisions at OU4.

INNOVATIVE TECHNOLOGIES

Vitrification was considered and selected as the preferred alternative for treating the contaminated soils/waste from OU4. Excavated materials would be dried and treated by vitrification (a process that transforms the waste into a glassified material).

NEXT STEPS

Completion of the site-wide environmental impact statement under NEPA.

KEYWORDS:

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