FACT SHEET: EVALATION OF SILO 3 ALTERNATIVES

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FACT SHEET

United States
Department of Energy
Fernald Environmental Management Project

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Fact Sheet:

Evaluation of Silo 3 Alternatives

August 1996

This Fact Sheet Describes:

- The background of Operable Unit 4;
- The revised remedial alternatives being considered for Silo 3 residues;
- How the public can participate in the selection/modification of the alternative for the remediation of Silo 3 residues;
- Where the public can obtain more information;
- Evaluation of potential environmental impacts resulting from the new alternatives being considered; and
- The proposed path forward.

You are invited to a public workshop

The DOE, together with the U.S. and Ohio Environmental Protection Agencies (EPAs), encourage public involvement in the decision-making process for the reevaluation of remedial actions for the Silo 3 residues at Operable Unit 4 at the FEMP site. Representatives from the DOE and the U.S. and Ohio EPAs will be present at a public workshop to discuss the Silo 3 residues remedial alternatives, including the proposed path forward, answer questions, and accept public comments. The workshop is scheduled for 7:00 p.m., August 20, 1996, at the Alpha Building, located at 10967 Hamilton-Cleves Road, Ross, Ohio.

INTRODUCTION

This fact sheet provides a brief discussion of the U.S. Department of Energy's (DOE's) proposed revised remedial management strategy for contaminated material in Silo 3 in the area designated as Operable Unit 4 of the Fernald Environmental Management Project (FEMP). This fact sheet also describes how the public can participate in the reevaluation of the selected remedy for the Silo 3 material and how the public can obtain additional information. It is DOE Policy to integrate the values of the National Environmental Policy Act (NEPA) into the procedural requirements of the Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended (CERCLA).

The FEMP is a DOE-owned, contractor-operated federal facility that produced high-purity uranium metal products for the DOE and its predecessor agencies from 1952 through 1989. Thorium was also processed on a smaller scale and stored on site. Production activities ceased in 1989, and the production mission formally ended in 1991. The Fernald site was included on the CERCLA National Priorities List (NPL) in 1989. The current mission is the safe environmental restoration of the site in accordance with requirements that are protective of human health and the environment.

UNDERSTANDING OPERABLE UNIT 4

Operable Unit 4 is one of five operable units at the FEMP. Operable Unit 4 consists of the following facilities and associated environmental media:

- Silos 1 and 2 and their contents (K-65 residues, byproduct material);
- Silo 3 and its contents (cold metal oxides, byproduct material);
- K-65 decant sump tank and its contents;
- Silo 4 (empty, except for rainwater infiltration);
- A radon treatment system;
- A portion of a concrete pipe trench and other concrete structures;
- An earthen berm surrounding Silos 1 and 2
- Soils beneath and immediately surrounding Silos 1, 2, 3, and 4;
- Perched groundwater encountered in the vicinity of the silos during the implementation of cleanup activities.

The Operable Unit 4 silos were constructed in the early 1950's to receive residues for storage. These residues were generated from the process of extracting uranium from high grade uranium-bearing ores and concentrates in support of the United States defense programs. These residues are classified as byproduct materials, consistent with Section 11(e)(2) of the Atomic Energy Act (AEA) of 1954. Facilities and equipment associated with the placement, storage, and continued maintenance of these materials include: a decant sump tank, radon treatment system (RTS), various concrete pads, and miscellaneous piping and appurtenances. In 1991, a bentonite clay layer was added over the residues inside Silos 1 and 2 to reduce chronic radon emanation from both silos. In addition, an Expedited Removal Action was completed in January 1992, when an out-of-service dust collector and hopper assembly were removed from the dome of Silo 3. Minor facility modifications (i.e., equipment upgrades) have also been made in recent years to enhance radon monitoring capabilities, storm water runoff controls, and decant sump tank maintenance activities.

In July 1986, the DOE and the U.S. Environmental Protection Agency (EPA) signed a Federal Facilities Compliance Agreement (FFCA), addressing impacts to the environment associated with federally operated sites (including the FEMP). In accordance with the FFCA, the DOE agreed to conduct the FFCA investigation as a Remedial Investigation/Feasibility Study in accordance with CERCLA guidelines. In November 1989, EPA added the FEMP site to the NPL. The FFCA was later amended by the June 1990 Consent Agreement between DOE and EPA which was further amended in September 1991 (Amended Consent Agreement).

In accordance with the Amended Consent Agreement, the DOE performed a Remedial Investigation and Feasibility Study which received EPA approval in August 1994.

The Final Record of Decision (ROD) for Remedial Actions at Operable Unit 4 was submitted to the EPA in November 1994. The EPA approved and signed the Final ROD for Remedial Actions at Operable Unit 4 on December 7, 1994. The selected remedy primarily consists of the following components:

- Removal of contents from the Silos 1, 2, and 3 structures, vitrification of the Silo residues, and transportation and disposal of the vitrified material at the DOE-owned Nevada Test Site;
- Decontamination and demolition of all silo structures and remedial facilities in accordance with the approved Operable Unit 3 ROD;
- Excavation and treatment of contaminated soils in accordance with the approved Operable Unit 5 ROD.

In order to identify and define the activities required to implement the Operable Unit 4 selected remedy, a Remedial Design Work Plan (RDWP) and a Remedial Action Work Plan (RAWP) were prepared by the DOE. A Draft RDWP was submitted by the DOE to the EPA on January 26, 1995, with the Final RDWP being submitted on May 16, 1995. The EPA

approved the Final RDWP on June 15, 1995. Remedial activities under the RAWP are divided into two phases. Phase I of the RAWP focuses on underground utilities, site preparation, silo superstructure construction, and construction of the new radon treatment system, and Phase II focuses on vitrification facility construction and operation. The Phase I RAWP was submitted to the EPA on October 6, 1995, and received EPA approval on January 9, 1996.

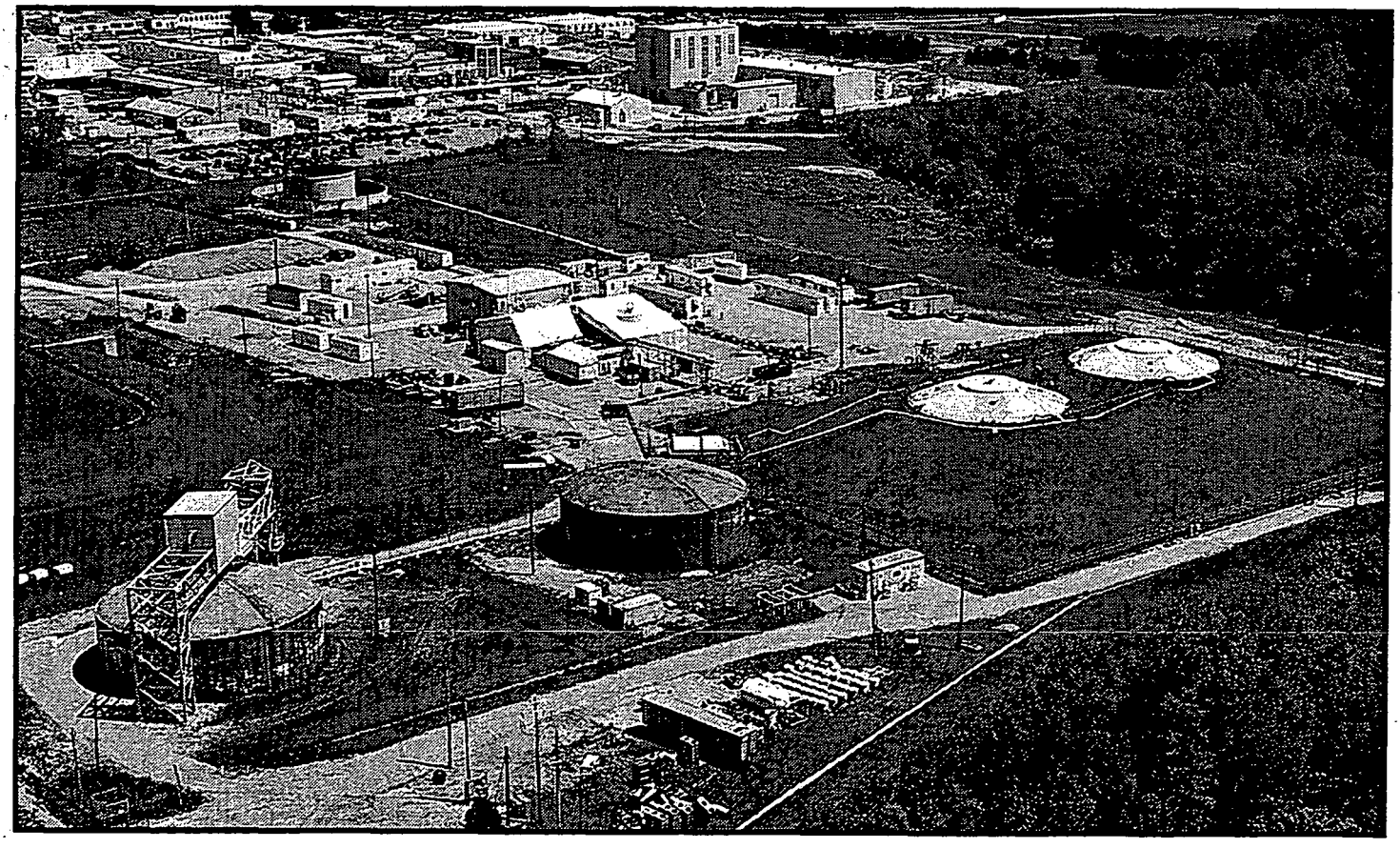
Consistent with the remedial management strategy outlined by the Operable Unit 4 RDWP, the DOE initiated several advanced pilot-scale RD treatability studies onsite and in partnership with the academic community. The Vitrification Pilot Plant (VITPP) Phases I and II Treatability Study Programs have been integrated directly into the Operable Unit 4 RD/RA program in order to collect quantitative performance data to support the full-scale application of the vitrification technology to the remediation of the silo residues. Bakeout operations of the VITPP recently began May 17, 1996 with Phase I Campaign 1 testing activities beginning on June 19, 1996.

Resolution of technical issues encountered during the treatability study program associated with the application of the vitrification technology to the Operable Unit 4 silo residues have resulted in schedule delays, cost growth, and technical concerns related to the VITPP treatability study and have resulted in DOE reassessing the overall project for opportunities to improve schedule, reduce project costs, and optimize the RD/RA process using data obtained from the treatability studies.

SUMMARY OF SILO 3 REMEDIAL ALTERNATIVES

The Operable Unit 4 ROD identified vitrification as the preferred treatment alternative for silo residues in order to stabilize radionuclide and heavy metal contaminants present in the residues, reduce their associated leachability, and eliminate their hazardous characteristic. In addition, vitrification would attenuate Radon-222 (Rn-222) emanation rates associated with material in Silos 1 and 2.

The physical, chemical, and radiological characteristics associated with the Silo 3 residues make it a leading candidate



for alternative treatment to allow for improvement of the Operable Unit 4 remediation project schedule. Therefore, an alternative method such as solidification/stabilization alternative could be used to remediate the Silo 3 residues in an equally protective manner in parallel to remediation of the Silos 1 and 2 residues.

By performing several remedial activities in parallel (i.e., vitrification of Silos 1 and 2 residues and solidification/stabilization of the Silo 3 residues), the schedule improvement goals for the Operable Unit 4 remediation could readily be achieved on an accelerated basis. Based on information regarding vitrification operations in the current baseline schedule, it is anticipated that an alternative solidification/stabilization technology could be implemented for the Silo 3 residues approximately twenty-four months prior to that of vitrification and complete those operations approximately 3-1/2 years sooner than that for vitrification in the current baseline schedule. Likewise, the vitrification process for the Silos 1 and 2 would not be impacted by this alternative and would complete its mission approximately nine months earlier than the current baseline schedule without the Silo 3 residues. In addition, it is also being considered that the treatment of Silo 3 residues could be contracted to a commercial vendor experienced in solidification/ stabilization techniques to further enhance cost and schedule savings. The bases for the above statements are provided in the Draft Final Evaluation of Silo 3 Alternatives Report currently available at the Public Environmental Information Center (PEIC).

The Silo 3 Alternatives report evaluated only those alternatives that were technically feasible (using conventional and proven treatment methods), cost-effective, and which offered acceleration of the Operable Unit 4 remediation schedule. The existing selected alternative, vitrification, and four other alternatives were evaluated to determine if the alternatives provided overall protection of human health and the environment and complied with applicable or relevant and appropriate requirements (ARARs). The following is a list of the five alternatives evaluated:

- VIT - Removal of Residues from Silo 3, Onsite Vitrification of Silo 3 Residues Blended with Silos 1 and 2, Off-site Disposal of Treated Residues at the Nevada Test Site (NTS);
- ALT1 - Removal of Residues from Silo 3, Onsite Solidification/ Stabilization of Silo 3 Residues, Off-site Disposal of Treated Residues at the NTS;
- ALT2 - Removal of Residues from Silo 3, Onsite Solidification/ Stabilization of Silo 3 residues, Off-site Disposal of Treated Residues at a Representative Permitted Commercial Disposal Facility (RPCDF);
- ALT3 - Removal of Residues from Silo 3, Off-site Solidification/ Stabilization of Silo 3 Residues and Disposal of Treated Residues at a RPCDF; and
- ALT4 - Removal of Residues from Silo 3, Onsite Blending of Silo 3 Residues with Operable Unit 1 Waste Pit 5 Material, Off-site Disposal of Blended Material at a RPCDF.

All alternatives evaluated would meet the objective of providing overall protection of human health and the environment. With the exception of ALT4, all alternatives would be able to comply with all ARARs and to be considered criteria.

In addition, implementation of ALT4 would not be consistent with the preference for a remedial alternative that "permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances or contaminated materials" [CERCLA section 121(b)(1)]. This section further states "The off-site transport and disposal of hazardous substances or contaminated materials without such treatment should be the least favored alternative remedial action where practicable treatment technologies are available." Since blending with material from Operable Unit 1 does not provide adequate treatment for the Silo 3 residues and both solidification/stabilization and vitrification are "practicable treatment technologies" available for treating Silo 3 residues to reduce the toxicity resulting from the presence of heavy metals, ALT4 was dropped from consideration as a viable remedial alternative.

A comparative analysis of the four remaining alternatives was

conducted to develop the basis for determining the most appropriate alternative for treating the Silo 3 residues.

Alternative VIT - Removal of Residues from Silo 3, Onsite Vitrification of Silo 3 Residues Blended with Silos 1 and 2, Off-site Disposal of Treated Residues at the NTS

- Years to Implement and Complete: 5 - 6 years
- Total Present Worth Cost: approx. $20.4 million (over and above the cost for vitrifying the residues from Silos 1 and 2)

Alternative VIT requires removing the cold metal oxide residues from Silo 3; blending the residues with additives, glass-formers, and residues from Silos 1 and 2; stabilizing the materials by vitrification; and disposing the vitrified material off-site at a low-level radioactive waste disposal facility at the NTS.

The metal oxides from Silo 3 would be removed by a mechanical/pneumatic removal system and then mechanically/pneumatically transferred to the vitrification facility for treatment.

Under this alternative, approximately 3,890 m3 (5,088 yd3) of untreated residues would be removed from Silo 3 and stabilized in a vitrified glass form. Following treatment, approximately 1,737 m3 (2,273 yd3) of vitrified residues would be packaged in containers and transported to the NTS for final disposition. The vitrified material would have to meet the NTS waste acceptance criteria and would have to be packaged and transported in accordance with U.S. Department of Transportation (DOT) regulations pertaining to shipments of radioactive materials.

Alternative 1 (ALT1) - Removal of Residues from Silo 3, Onsite Solidification/Stabilization of Silo 3 residues, Off-site Disposal of Treated Residues at the NTS

- Years to Implement and Complete: 3 - 4 years
- Total Present Worth Cost: approx. $18.8 million

Alternative ALT1 requires removing the cold metal oxide residues from Silo 3; treating the residues by a solidification/stabilization process such as cementation; and disposing the stabilized material off-site at a low-level radioactive waste disposal facility at the NTS.

The metal oxides from Silo 3 would be removed by a mechanical/pneumatic removal system and then mechanically/pneumatically transferred to the treatment facility for solidification/stabilization.

Under this alternative, approximately 3,890 m3 (5,088 yd3) of untreated residues would be removed from Silo 3 and stabilized in a monolithic form. Following treatment, approximately 4,657 m3 (6,088 yd3) of treated residues would be packaged in containers and transported to the NTS for final disposition. The stabilized material would have to meet the NTS waste acceptance criteria and would have to be packaged and transported in accordance with DOT regulations pertaining to shipments of radioactive materials.

Alternative 2 (ALT2) - Removal of Residues from Silo 3, Onsite Solidification/Stabilization of Silo 3 Residues, Off-site Disposal of Treated Residues at a RPCDF

- Years to Implement and Complete: 3 - 4 years
- Total Present Worth Cost: approx. $17.1 million

Alternative ALT2 requires removing the cold metal oxide residues from Silo 3; treating the residues by a solidification/stabilization process such as cementation; and disposing the stabilized material off-site at a low-level radioactive waste disposal facility at a RPCDF.

The metal oxides from Silo 3 would be removed by a mechanical/pneumatic removal system and then mechanically/pneumatically transferred to the treatment facility for solidification/stabilization.

Under this alternative, approximately 3,890 m3 (5,088 yd3) of untreated residues would be removed from Silo 3 and

stabilized in a granular form. Following treatment, approximately 4,830 m3 (6,320 yd3) of treated residues would be packaged in containers and transported to the RPCDF for final disposition. The stabilized material would have to meet the RPCDF waste acceptance criteria and would have to be packaged and transported in accordance with DOT regulations pertaining to shipments of radioactive materials.

Under this alternative, treated residues would be bulked disposed at the RPCDF. Containers used to transport the residues to the RPDCF could be decontaminated and reconditioned for reuse at the FEMP.

Alternative 3 (ALT3) - Removal of Residues from Silo 3, Off-site Solidification/Stabilization of Silo 3 Residues, Disposal of Treated Residues at a RPCDF

- Years to Implement and Complete: 3 - 4 years
- Total Present Worth Cost: approx. $19.5 million

Alternative ALT3 requires removing the cold metal oxide residues from Silo 3; conditioning the residues to reduce dispersibility during transport; and transporting the residues off-site to a low-level radioactive waste disposal facility for treatment and disposal at a RPCDF.

The metal oxides from Silo 3 would be removed by a mechanical/pneumatic removal system and then mechanically/pneumatically transferred to a facility for conditioning prior to being packaged for shipment to an RPCDF for final treatment. The conditioned material would have to be packaged and transported in accordance with DOT regulations pertaining to shipments of radioactive materials.

Under this alternative, approximately 3,890 m3 (5,088 yd3) of untreated residues would be removed from Silo 3, conditioned onsite to reduce dispersibility, and stabilized in a compactible form at a RPCDF. Following treatment, approximately 4,555 m3 (5,960 yd3) of treated residues would be bulk disposed at the RPCDF. Treated residues would have to meet the RPCDF waste acceptance criteria prior to final disposition.

Under this alternative, conditioned residues would be treated and bulked disposed at the RPCDF. Containers used to transport the residues to the RPDCF could be decontaminated and reconditioned for reuse at the FEMP.

PROPOSED PATH FORWARD

DOE recognizes the importance of the involvement of the regulators and stakeholders in the Operable Unit 4 remedial process. Obtaining stakeholder input into the process is vital to the success of the Operable Unit 4 remediation program. Pending acceptance of the revised path forward for the Silo 3 selected remedy by the regulators and stakeholders, the DOE would implement the remedy in an expeditious manner consistent with the CERCLA process.

Based on information presented in the Draft Final Evaluation of Silo 3 Alternatives Report, DOE is proposing to treat Silo 3 residues by an alternative solidification/stabilization process described in either ALT1 or ALT2 of the referenced report. It is proposed that treatment of Silo 3 residues would be performed onsite with final disposition off-site at either the NTS or a RPCDF.

The proposal to treat the Silo 3 residues by an alternative solidification/stabilization process does not infer that the vitrification technology would be unsuccessful for treatment of the Silo 3 residues. The data obtained through the post-ROD treatability study testing confirms vitrification will work for the Silos 1, 2, and 3 residues. However, alternative solidification/stabilization of the Silo 3 residues creates a significant opportunity to accelerate the remediation schedule for Operable Unit 4 at no additional cost to the project without compromising protectiveness of human health and the environment.

Modification of the Operable Unit 4 ROD

Changing the selected remedial alternative for Silo 3 residues from vitrification to solidification/stabilization would not fundamentally alter the remedy selected in the Operable Unit 4 ROD. Both technologies would treat the residues by

immobilizing the heavy metals present in the residues by use of a stabilization technique. In addition, both alternatives provide for removal of the treated residues to an off-site disposal facility. Although the solidification/stabilization alternatives would allow use of either the NTS or a RPCDF for final disposition of the treated residues, use of a RPCDF would not result in a fundamental change in that the remedy will still involve off-site disposal. Both the NTS and the RPCDF are located in remote arid regions so that human health and environmental impacts would be similar for both facilities.

Environmental Impact

As required under the DOE NEPA regulations, FERMCO has performed a Supplemental Analysis to determine whether a Supplemental Environmental Impact Statement (SEIS) needs to be conducted for the revised Silo 3 alternatives. Based upon results of this analysis, FERMCO has concluded that the proposed Silo 3 alternatives do not constitute a substantial change in project scope or result in the availability of significant new information related to environmental impacts from the original Environmental Impact Statement. Therefore, a SEIS is not recommended by FERMCO for the proposed alternatives. DOE is currently reviewing the FERMCO's Supplemental Analysis and will provide an appropriate response to FERMCO's recommendations.

Explanation of Significant Differences

Pursuant to the CERCLA Section 117(c) and the National Oil and Hazardous Substances Pollution Contingency Plan at 40 CFR §300.435(c)(2)(i) an explanation of significant differences (ESD) should be published when "differences in the remedial or enforcement action, settlement, or consent decree significantly change but do not fundamentally alter the remedy selected in the ROD with respect to scope, performance, or cost". Upon concurrence from the EPA and OEPA for use of another solidification/stabilization alternative for the Silo 3 residues, the DOE will prepare a draft ESD to discuss differences between vitrification and another proposed solidification/stabilization alternative. The draft ESD would also be made available for public inspection and comment when completed.

In recognition of the vital importance of public input in this process, DOE will be conducting two public workshops and an ESD comment period. One public workshop is scheduled concurrently with EPA and OEPA review of the Draft Final Evaluation of the Silo 3 Alternatives Report on August 20, 1996, and the other will be scheduled in coordination with the ESD comment period during Fall 1996. Public notices will be placed in local papers to notify interested members of the public of the availability of the Silo 3 Alternatives report and ESD document for inspection. Any concerns raised by the public during the ESD inspection period would be documented as part of the final ESD in a separate responsiveness summary document. Specifically, DOE would not propose to finalize the ESD until all public comments had been addressed. The Silo 3 Alternatives report, the ESD, and any other documents that were considered in reaching the determination, will become part of the Administrative Record pursuant to 40 CFR §300.825(a)(2).

COMMUNITY PARTICIPATION

Input from the public is an important element of the decision-making process for cleanup actions at the FEMP site. DOE looks forward to receiving your input on this opportunity to accelerate the remediation of the Silo 3 residues and the overall Operable Unit 4 remediation effort. Comments on the Silo 3 remedial action at the FEMP site will be received during a public inspection period following issuance of the Draft Final Evaluation of Silo 3 Alternatives Report.

The public inspection period for the Silo 3 Alternatives Report is being conducted from July 12 through September 9, 1996. Oral comments may be presented at an informal public meeting that will be conducted August 20, 1996, 7:00 p.m., at the Alpha Building, located at 10967 Hamilton-Cleves Road, Ross, Ohio.

Information relevant to Silo 3, including the Remedial Investigation Report for Operable Unit 4, Baseline Risk

Assessment, Feasibility Study/Proposed Plan-Environmental Impact Statement for Remedial Actions at Operable Unit 4, Record of Decision for Remedial Actions at Operable Unit 4, Work Plan for the Operable Unit 4 Remedial Design, Draft Final Evaluation of Silo 3 Alternatives, and supporting technical reports is in the PEIC, located in the JAMTEK Building, 10845 Hamilton-Cleves Road, Harrison, Ohio. The facility is open Monday, 7:30 a.m to 7:00 p.m.; Tuesday, Wednesday and Thursday, 7:30 a.m. to 5:00 p.m.; and Friday, 7:30 a.m. to 4:30 p.m. For information regarding the PEIC please call 513-738-0164.

For more information about the Fernald site, individuals may contact:

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