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DOE-0408-98

Mr. Gene Jablonowski, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
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Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Jablonowski and Mr. Schneider:

FINAL EXPLANATION OF SIGNIFICANT DIFFERENCES FOR OPERABLE UNIT 4 SILO 3 REMEDIAL ACTION

Enclosed for your review, approval, and signature, is the Final Explanation of Significant Differences (ESD) for Operable Unit 4 (OU4) Silo 3 Remedial Action. Comments on the Draft Final ESD received during the public review period from November 17, 1997, through December 16, 1997, are addressed in the Responsiveness Summary now included as Section 4 of the Final ESD.

As you are aware, the July 1997 Dispute Settlement Agreement requires a revised Remedial Design Work Plan (RDWP) for the Silo 3 Remedial Action to be submitted within 60 days of the U.S. Environmental Protection Agency (U.S. EPA) signature of this Final ESD. Preparation of a draft Silo 3 RDWP is currently underway.

If you have any questions, please contact Nina Akgündüz at (513) 648-3110.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Akgündüz

Enclosure: As Stated

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FINAL

EXPLANATION OF SIGNIFICANT DIFFERENCES for OPERABLE UNIT 4 SILO 3 REMEDIAL ACTION at the FERNALD ENVIRONMENTAL MANAGEMENT PROJECT FERNALD, OHIO

40400-RP-0004

REVISION 0

JANUARY 1998

FINAL

EXPLANATION OF SIGNIFICANT DIFFERENCES for OPERABLE UNIT 4 SILO 3 REMEDIAL ACTION at the FERNALD ENVIRONMENTAL MANAGEMENT PROJECT FERNALD, OHIO

JANUARY 1998

Lean Dever 2/5/98

Lean Dever, Manager — Date
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William E. Muno, Director — Date
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1. INTRODUCTION

1.1 Background

The Fernald Environmental Management Project (FEMP) is a former uranium processing facility located northwest of Cincinnati, Ohio and owned by the United States Department of Energy (DOE). In November 1989, the FEMP site (referred to at that time as the Feed Materials Production Center) was included on the National Priorities List (NPL) of the U.S. Environmental Protection Agency (U.S. EPA). DOE is the lead agency for remediation of the FEMP pursuant to the 'Consent Agreement as Amended Under CERCLA Sections 120 and 106(a)' (ACA), which was signed by DOE and U.S. EPA in September 1991 (Reference 1).

Operable Unit (OU) 4 is one of five operable units identified in the ACA and consists primarily of four concrete storage silos, three of which contain materials placed there primarily in the 1950s. A Record of Decision (ROD) for OU4 was signed on December 7, 1994 (Reference 2), identifying on-site vitrification and off-site disposal at the DOE Nevada Test Site (NTS) as the selected remedy for remediation of the silo materials.

1.2 Circumstances Giving Rise to Preparation of an Explanation of Significant Differences (ESD) for Remediation of Silo 3 Material

As part of the OU4 remedial design process, a Vitrification Pilot Plant (VITPP) treatability study program was initiated to collect quantitative performance data to support full-scale application of the vitrification technology to the silo materials. The high sulfate content of the surrogate Silo 3 material resulted in significant technical and operational difficulties during Phase I operation of the VITPP (Reference 3). Through vitrification of surrogate materials simulating Silo 1, 2, and 3 materials, it was observed that, although blending surrogate Silo 3 material with surrogate Silo 1 and 2 material did reduce the overall sulfate concentration of the feedstream, high melter operating temperatures (> 1,150°C) and the use of reductants were still necessary to attempt control of sulfate layering and foaming events within the melt pool. The high operating temperatures resulted in accelerated component wear and, coupled with the addition of reductants, created a melt pool

environment conducive to the formation of molten lead. Thus, although addition of reductants did help to control sulfate foaming, their use exacerbated operational problems associated with the high lead content of the surrogate Silo 1 and 2 material. The relatively high and varying lead content in the Silos 1 and 2 material, without proper controls, could precipitate in the melter and compromise the integrity of the melter's materials of construction. The competing glass chemistry, specifically high lead content of Silos 1 and 2 material and high sulfate concentration in Silo 3 material, creates a high degree of uncertainty in the ability to reliably produce a vitrified material on a full-scale continuous basis. These difficulties culminated on December 26, 1996 with failure of melter hardware caused by incompatible materials of construction and glass composition, in combination with high operating temperatures. Phase I operations were suspended following this incident.

Attempts to resolve technical and operational issues during Phase I operation resulted in documented schedule and cost increases. During early stages of Phase I operation, the DOE identified the need to reassess the technical path forward for remediation of OU4 in order to identify opportunities to address the technical and operational issues experienced with vitrification. In November 1996, the DOE convened the Silos Project Independent Review Team (IT) as a technical resource to assist the DOE in reevaluating the path forward for remediation of the silo material. The IT was comprised of technical representatives from throughout the DOE complex and private industry with expertise in various aspects of waste treatment, vitrification, and other treatment technologies. The recommendations of the IT (Reference 4), the evaluation of the December 26, 1996 melter hardware failure (Reference 5), and other evaluations on the part of the DOE and FEMP stakeholders (Section 7), supported a decision that although a vitrification process could potentially be developed to effectively vitrify Silo 3 material, the cost and the significant extension in cleanup time would not be practical. In addition, the evaluations concluded that separating the materials would significantly reduce the technical uncertainties and programmatic risks of developing an effective treatment process for Silos 1 and 2 material. The DOE made the decision that treatment of Silo 3 material should be implemented separately from treatment of the Silo 1 and 2 material, and further

that an alternate remedy should be considered for treatment and disposal of Silo 3 material. Consistent with the July 22, 1997 dispute settlement discussed in Section 2.3, this ESD has been prepared to document the change in remedy for treatment and disposal of Silo 3 material.

1.3 Regulatory Basis

Pursuant to Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act as amended (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at Title 40 Code of Federal Regulations (CFR) §300.435(c)(2)(I), an ESD document 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." The U.S. EPA's position (Reference 8) is that implementation of an alternate remedy for treatment and disposal of Silo 3 material is not a fundamental change as long as the alternate treatment process is a stabilization/solidification process that continues to meet all remedial objectives and performance standards of the approved OU4 ROD (see Section 2.2) for a cost roughly equivalent to the original remedy, and the remedy includes disposal at a protective, appropriately permitted offsite disposal facility. As long as the alternate remedy for treatment of Silo 3 material satisfies these conditions, an ESD is a sufficient means of documenting the change.

1.4 Public Availability of ESD

This ESD will become part of the Administrative Record pursuant to 40 CFR §300.825(a)(2) and will be available at the Public Environmental Information Center (PEIC), 10995 Hamilton-Cleves Highway, Harrison, Ohio, (513) 648-7480. A draft ESD was submitted to Ohio EPA and U.S. EPA for review (Reference 21) and was approved by both agencies after incorporation of their comments (References 23 through 25). As described in Sections 4 and 6, a draft Final ESD (Reference 26) was made available for public review. All comments received during public review of the draft Final ESD, and the response to each comment, are documented in the responsiveness summary in Section 4.

A list of the documents which form the basis for this ESD is provided in Section 7. These documents are available at the PEIC.

2. SUMMARY OF SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 Site History

The FEMP site is a 425 hectare (1,050 acre) facility north of Fernald, Ohio, a small farming community 18 miles northwest of Cincinnati, Ohio, that lies on the boundary between Hamilton and Butler Counties. Between 1951 and 1989, the primary mission of the FEMP was to process uranium ore concentrates and residues into metallic uranium materials for use at other DOE facilities in the nation's defense program. Production operations at the facility were limited to a fenced 55 hectare (136 acre) tract of land, now known as the former Production Area, located near the center of the site.

OU4 is situated in the southwestern portion of the Waste Storage Area, west of the former Production Area, and consists of two earthen-bermed, concrete silos containing K-65 materials (described below), a decant sump tank, one silo containing Silo 3 material, one unused silo, and various quantities of contaminated soils, perched water, and debris.

The OU4 silos were constructed in the early 1950's for storage of byproduct materials. The materials in Silos 1, 2, and 3 are classified as byproduct materials, as defined in Section 11(e)(2) of the Atomic Energy Act (AEA) of 1954. Silos 1 and 2 contain residues, known as K-65 material, which were generated from the processing of high-grade uranium ores. K-65 material is a silty, clay-like material containing significant activity concentrations of radionuclides including Radium-226, Thorium-230, Lead-210, and Polonium-210. The material also contains levels of lead above the RCRA TCLP limits. Due to the radium content of the K-65 material, Silos 1 and 2 represent a significant source of Radon-222 emanations. As required by the 1991 Federal Facility Agreement for Control and Abatement of Radon-222 Emissions, and the Amended Consent Agreement, a Removal Action was implemented to place a bentonite clay layer over the materials inside Silos 1 and 2 to reduce chronic radon emanation from both silos.

Silo 3 contains material, known as cold metal oxides, that was generated at the FEMP site during uranium extraction operations in the 1950s. These oxides were formed by calcining residues from the solvent extraction process used to extract uranium from ore concentrates and residues. The material in Silo 3 is substantially different from that in Silos 1 and 2. The K-65 material is silty and clay-like, whereas Silo 3 material is dry and powdery. Second, while the radiological constituents in Silo 3 material are similar to those found in the Silo 1 and 2 material, certain radionuclides, such as radium, are present in much lower concentrations in the Silo 3 material. On an activity basis, the predominant radiological constituent of the Silo 3 material is Thorium-230. Due to the lower radium content, Silo 3 exhibits a much lower direct radiation field and has substantially lower Radon-222 emanations than Silos 1 and 2. Therefore, where the original remedy identifies radon attenuation and destruction of organics as factors in selecting vitrification, those are factors almost exclusively associated with the Silos 1 and 2 material and not with the Silo 3 material. Data from the OU4 Remedial Investigation (RI) report indicates that Silo 3 material contains the metals arsenic, cadmium, chromium, and selenium at levels above RCRA TCLP limits.

2.2 Description of Current Selected Remedy

In accordance with the ACA, the DOE performed a Remedial Investigation/Feasibility Study (RI/FS) for OU4 which was approved by the U.S. EPA in August 1994. The OU4 FS (Reference 9) evaluated a number of alternatives for stabilization/solidification of the K-65 and Silo 3 material. The initial phase of this evaluation involved the development of Remedial Action Objectives (RAOs) for each portion of the remedial action. The RAOs identified in the FS for the Silo 3 material are:

- Prevent direct contact with or ingestion of waste material;
- Prevent release or migration of waste materials to soil, groundwater, surface water or sediment; and
- Prevent exposures to waste material that may cause an individual to exceed applicable dose limits.

In addition, the OU4 ROD specifies that the Silo 1, 2, and 3 materials will be treated to "significantly reduce the leachability of metal contaminants of concern to levels that are

below RCRA regulatory thresholds."

The initial evaluation of potential alternatives for stabilization/solidification of Silo 3 material considered several stabilization/solidification-type technologies including vitrification, chemical treatment, and also removal and disposal with no additional treatment. Two treatment options, vitrification and cement stabilization, each with either on-site or off-site disposal, were carried forward along with removal and onsite disposal with no further treatment for detailed analysis. The evaluation summarized in the ROD indicated that vitrification provided greater radon attenuation than cement stabilization. The primary factors influencing the selection of vitrification over cement stabilization for treatment of Silo 3 material were its anticipated reduction in waste volume and resulting lower estimated implementation cost.

The draft Final ROD for Remedial Actions at OU4 was submitted to the U.S. EPA in November 1994. The U.S. EPA approved and signed the ROD for Remedial Actions at OU4 on December 7, 1994. The selected remedy consisted of the following components:

- Removal of contents from the Silos 1, 2, and 3 structures, on-site vitrification of the silo materials, and transportation and disposal at the DOE's Nevada Test Site (NTS);
- Decontamination and demolition of all silo structures and the vitrification facility in accordance with the approved OU3 ROD;
- Excavation and treatment of contaminated soils, and treatment of perched water encountered during remedial action, in accordance with the approved OU5 ROD.

This ESD addresses only a change in the treatment portion of the selected remedy for Silo 3 material. No change to any other portion of the selected remedy for OU4 is addressed in this document.

2.3 Current Status

Consistent with the strategy outlined in the OU4 Remedial Design Work Plan approved by the U.S. EPA on June 15, 1995 (Reference 10), the DOE initiated several advanced pilot-scale treatability studies both on-site and in partnership with the academic community. The VITPP Phases I and II Treatability Study Programs were integrated directly into the OU4 Remedial Design/Remedial Action (RD/RA) program in order to collect quantitative performance data to support application of the vitrification technology to remediation of the silo materials. Phase I VITPP testing activities began June 19, 1996 with initiation of the first of four campaigns. On December 26, 1996, VITPP operations were suspended during the final campaign of Phase I due to failure of melter hardware.

In response to the previously discussed schedule delays and need to reassess the technical path forward for remediation of OU4, the DOE requested an extension of certain RD/RA milestones (Reference 11). The U.S. EPA denied the request for extension and agreed to a period of informal dispute resolution to allow the DOE, in consultation with the U.S. EPA, OEPA, and stakeholders, to reassess the path forward (Reference 12). During this period of informal dispute resolution, the DOE, with input from the IRT, U.S. EPA, Ohio EPA, and the public, evaluated the results of the VITPP program, the results of the melter incident, and the technical and schedule impacts of alternatives for OU4 remediation.

These evaluations culminated in a decision not to restart the VITPP for additional Phase I or Phase II testing. These same evaluations supported DOE's decision, originally proposed in August 1996, to recommend that remediation of Silo 3 material be implemented separately from Silo 1 and 2 material and that an alternate remedy should be considered for treatment and disposal of Silo 3 material.

The July 22, 1997 "Agreement Resolving Dispute Concerning Denial of Request for Extension of Time for Certain Operable Unit 4 Milestones," (Reference 13) specified that the change in remedy for Silo 3 material should be documented in an ESD, and further

that the Feasibility Study, Proposed Plan, and ROD for Silos 1 and 2 Remedial Action should be revised and resubmitted.

As discussed in Section 6, a significant level of public involvement was maintained throughout reevaluation of the OU4 path forward, meetings of the Silos Project IRT, and the dispute resolution process.

3. DESCRIPTION OF THE SIGNIFICANT DIFFERENCES AND THE BASIS FOR THOSE DIFFERENCES

3.1 Separation of Silo 3 Material Treatment From Treatment of Silo 1 and 2 Material

Phase I operation of the Vitrification Pilot Plant evaluated the vitrification technology by testing a variety of silo surrogate formulations. Silo 3 material contains relatively high concentrations of sulfates (approximately 15 wt%). It was observed that although a "blend" of the Silo 1, 2, and 3 surrogate streams reduced the overall sulfate concentrations of the feedstream, higher melter operating temperatures (>1,150°C) and the use of reductants were still necessary to control sulfate layering and foaming events within the melt pool. Although addition of reductants did help to control sulfate foaming, their use exacerbated operational problems associated with the high lead content of the surrogate Silo 1 and 2 waste. As was discussed in Section 1.2, the competing glass chemistry creates a high degree of uncertainty in the ability to reliably produce a vitrified waste from Silo 3 material on a full-scale continuous basis. These phenomena were documented as significant causal factors in the February 1997 "Vitrification Pilot Plant Melter Incident Final Report." Tests conducted on a "Silo 3 only" surrogate stream at the Catholic University of America - Vitreous State Laboratory (VSL), in support of the VITPP program, observed the same inherent difficulties associated with vitrification of a material, such as Silo 3 material, with a high sulfate content.

It is theoretically possible that process flow sheets and melter designs could be developed to successfully vitrify Silo 3 material alone or in combination with Silo 1 and 2 material. However, as demonstrated during the VITPP program, materials containing high sulfate

concentrations are extremely difficult to control during vitrification. Vitrification of these materials can result in foaming events which cause potentially serious safety and operational concerns. In addition, use of reductants to control foaming can reduce waste loading in the glass matrix to an undesirable level.

Although a vitrification process could potentially be developed to accommodate these conditions in order to effectively vitrify Silo 3 material, the cost and the significant extension in cleanup time required to develop two independent melter designs would not be practical. Separating the materials, however, will significantly reduce the technical uncertainties and programmatic risks of developing an effective treatment process for Silos 1 and 2 material. For example, vitrification of Silo 1 and 2 material separate from Silo 3 material could be accomplished using a lower-temperature, commercially-available melter design, thus reducing the uncertainties associated with melt pool chemistry, melter life, and materials of construction. Therefore, DOE recommends that treatment of Silo 3 material be evaluated and implemented separately from treatment of Silos 1 and 2 material.

3.2 Decision to Identify an Alternative to Vitrification for Stabilization/Solidification of Silo 3 Material

Based upon the results of the VITPP program, reductants alone would not be an effective means of managing the high sulfate levels present in Silo 3 material. The use of reductants reduces waste loadings and increases the cost of treating the material, and, even if reductants were to be used, foaming could still occur due to irregularities in the sulfate concentrations of the Silo 3 stream. The most certain means of managing the sulfate levels in the Silo 3 material, in order to successfully vitrify the material, would be to dilute the Silo 3 material to reduce the sulfate levels from the 15 to 17 weight-percent levels present in Silo 3 material to as low as 1.5 weight-percent prior to vitrification. Dilution of the Silo 3 material to reduce the sulfate content to these levels would result in a large increase in the volume of material requiring vitrification and a resultant increase in treated waste volume. Associated with this increase in treated waste volume would be an increase in operation and maintenance costs, packaging, transportation, and disposal

costs, and transportation risk. Thus, dilution of the Silo 3 material effectively eliminates the advantages that resulted in the original selection of vitrification. Evaluations indicate that the cost to vitrify Silo 3 material could be as much as several times higher than the cost to treat the material using an alternate process.

The FEMP has demonstrated through several successful mixed waste stabilization projects that stabilization/solidification technologies other than vitrification can be effectively implemented for treatment of waste materials, such as thorium-bearing waste, that are relatively similar to the Silo 3 material. Chemical stabilization technologies have been implemented successfully at the FEMP for treatment of waste streams including:

- Thorium Nitrate
- Grit Blast Residues
- Solidified Furnace Salts
- Sump Cakes
- Construction Rubble
- Miscellaneous Trash

A total of more than 850 yd^3 of waste has been successfully treated at the FEMP through these projects.

In addition to waste stabilized at the FEMP, chemical stabilization processes have been implemented at numerous projects of varying scales throughout the United States. A search of professional journals, electronic databases, and other sources revealed a substantial number of commercial and Superfund remediation projects that have utilized chemical stabilization processes to treat hazardous and mixed waste. A partial list of the journals that were consulted include the *Journal of Hazardous Materials Remediation, Environmental Protection,* and the *Journal of Environmental Science and Health.* The electronic databases that were accessed include the Superfund Innovative Technology Evaluation (SITE) Program, the Alternative Treatment Technology Information Center (ATTIC) and both the U.S. EPA and Ohio EPA Internet Home Pages. Information was also obtained from a variety of published literature, and Internet Home Pages for specific Agencies, Universities and Corporations.

This search revealed several successful chemical stabilization processes within the DOE, Superfund, and commercial sectors. Successful chemical stabilization processes within the DOE complex have stabilized/solidified over 70,000 yd^3 of liquids, sludges, and soils containing radioactive and mixed waste characteristics. The projects included the Savannah River Site, M-Area, where 63,000 yd^3 of soil were stabilized in the 1988 - 1989 period. The Savannah River Saltstone Facility has also stabilized approximately 2,000 yd^3 of sodium nitrate mixed waste. The West Valley Facility stabilized approximately 5,100 yd^3 of sodium nitrate solution. Smaller scale projects have been completed on the Oak Ridge Melton Valley Storage Tanks, and at FERMI Laboratory, the Portsmouth Gaseous Diffusion Plant, and the Pantex Plant.

Of the information that could be quantified, this search revealed that over 1,000,000 yd^3 of soils, sludges, residues, and liquids have been successfully treated using cement (chemical) stabilization processes at Superfund sites and commercial facilities. Examples of these stabilization projects are listed below:

- Carolina Stadium Site, Charlotte NC - 19,000 yd^3 of soil contaminated with lead, PCBs, and semi-volatiles;
- Sacramento Army Depot - 40,000 yd^3 of contaminated soil burn pits and oxidation lagoons;
- Pennington Army Co. - 50,000 yd^3 of hazardous sludge stabilized in situ;
- Eglin Air Force Base - 900 yd^3 of contaminated sand;
- Vickery Surface Impoundment - 400,000 yd^3 of hazardous waste sludge also containing PCBs and dioxins;
- American Airlines, Oklahoma - 1,100 yd^3 of hazardous spent blast media;
- Pioneer Sand Site (Superfund) - 6,000 yd^3 of hazardous waste sludge containing metals and organics;
- Davie Landfill (Superfund) - 82,000 yd^3 of sludge containing cyanide, lead;
- Sapp Battery and Salvage (Superfund) - 200,000 yd^3 of soils containing lead and mercury; and
- Peppers Steel and Alloy (Superfund) - 89,000 yd^3 of soil containing lead, arsenic, and PCBs.

Treatability studies conducted on Silo 3 material during the OU4 FS found alternatives such as cement (chemical) stabilization to be viable remediation alternatives. The characteristics of the Silo 3 materials, and the level of commercial development of

stabilization/solidification technologies, indicate that an alternative to vitrification will provide greater certainty of producing a treated Silo 3 material form which satisfies all DOE and environmental regulations and requirements for disposal, in a timely and cost effective manner. Thus, the DOE concluded that the Silo 3 materials should not be vitrified either individually or in combination with the Silo 1 and 2 material.

The DOE has concluded that the method for achieving the objectives of the OU4 ROD for Silo 3 material should be changed from vitrification followed by disposal at the NTS to a revised alternative consisting of:

- Treatment at the FEMP or an appropriately-permitted offsite facility, using a process other than vitrification, to stabilize characteristic metals to levels below RCRA TCLP limits and disposal facility Waste Acceptance Criteria (WAC); and
- Offsite disposal at either the NTS or an appropriately-permitted Commercial Disposal Facility (PCDF) that complies with the CERCLA 'offsite rule' (40 CFR 300.440).

The remainder of this section will describe the process used to identify the acceptable stabilization/solidification technology, or technologies, to be used to implement the revised alternative described above for treatment and disposal of Silo 3 material.

3.3 Screening of Potential Stabilization/Solidification Alternatives

As discussed in Section 1.3, in order to be acceptable for implementation through an ESD, the revised alternative must meet the RAOs and performance standards of the approved OU4 ROD for a cost roughly equivalent to that of the original selected remedy. Any treatment alternative not meeting these criteria would have to be evaluated through a ROD amendment. In Section 3.4, the stabilization alternatives selected for detailed evaluation will be compared against vitrification relative to the Silo 3 RAOs to demonstrate their acceptability for implementation through an ESD.

The first step in identifying the acceptable stabilization/solidification technology, or technologies, to be used to implement the revised alternative was to research literature

and other information sources to identify potentially applicable technologies (References 14 through 19).

Several categories of potential treatment technologies were judged not applicable to treatment of the Silo 3 material and were eliminated from the screening process. Silo 3 material is the result of oxidation of the residue from a solvent extraction process by calcination. Subjecting the material to further oxidation or solvent extraction would provide no further reduction in mobility of toxic constituents, and would fail to accomplish the remedial action objectives identified in Section 2.2. Solvent extraction and thermal desorption technologies were judged not to warrant further evaluation.

Retrieval and off-site disposal without treatment was also eliminated from the screening process. The requirements of RCRA, which are identified as Applicable or Relevant and Appropriate Requirements (ARARs) in the approved OU4 ROD, require that the material be treated to remove the toxicity characteristic before being disposed. These regulations also preclude blending as a substitute for treatment. The option of retrieval and off-site disposal with no further treatment, therefore, fails to comply with all ARARs and does not warrant further evaluation.

The following alternatives were identified for consideration in the screening process:

- Asphalt (Bitumen) Stabilization
- Chemical Stabilization/Solidification
- Polymer (Micro) Encapsulation
- Ceramics
- Ceramic Silicon Foam
- Macro Encapsulation
- Metal Matrix (Ceramet)
- Molten Metal Technology
- Thermal Setting (Epoxy) Resins
- Sulfur/Polymer Encapsulation
- Phoenix Ash Stabilization

Information regarding the potential technologies was drawn from the previously identified research sources as well as from input of technical experts in waste treatment. The

eleven alternatives were then evaluated, with participation of the public, against the 3 criteria specified in U.S. EPA regulations for the RI/FS Preliminary Screening of Alternatives process (40 CFR 300.430(e)(7)). Public involvement in the screening and detailed evaluation of stabilization/solidification alternatives is discussed in greater detail in Section 6. As illustrated below, more detailed sub-criteria were developed within each of the three National Contingency Plan (NCP) screening criteria to provide a more detailed screening.

The following screening criteria were used to screen the alternatives and identify those to be carried forward for detailed evaluation:

Effectiveness

- Reduction in Mobility of Constituents of Concern (COCs)
- Volume Increase/Decrease
- Attainment of WAC for Characteristic Metals, based upon WAC at NTS and a representative PCDF
- Long-term Effectiveness/Permanence
- Attainment of ARARs and To Be Considered (TBC) requirements

Implementability

- Commercial Availability
- Generation of Secondary Waste Streams
- Pretreatment Requirements
- Processing Throughput
- System Reliability/Maintainability

Cost

- Overall Cost
- Capital or Operation, Maintenance, and Disposal Cost- Intensive

The comparison of potential stabilization/solidification alternatives against the screening criteria is summarized in Tables 1 through 3. As a result of the screening process, it was determined that eight of the alternatives did not warrant further consideration in the detailed analysis of alternatives. These eight alternatives, and the basis for their exclusion, are identified in Table 4.

TABLE 1
SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - EFFECTIVENESS

STABILIZATION ALTERNATIVE	MOBILITY OF CONSTITUENTS OF CONCERN	VOLUME INCREASE / DECREASE	WAC[1] FOR CHARACTERISTIC METALS [1]Based upon evaluation of WAC from NTS and a representative PCDF	LONG-TERM EFFECTIVENESS / PERMANENCE
Asphalt (Bitumen) Stabilization	Mobility reduced through physical binding	Volume increase	May not meet WAC for characteristic metals	Acceptable long-term effectiveness
Chemical Stabilization/Solidification	Demonstrated ability to reduce mobility of Silo 3 COCs	20% volume increase shown in Silo 3 treatability tests	Demonstrated ability to attain WAC with same metals present in Silo 3 material	Acceptable long-term effectiveness
Polymer (Micro) Encapsulation	Mobility reduced through physical binding	Volume increase should be similar to cement stabilization/solidification	Pilot-scale testing on similar material shows ability to immobilize metals	Acceptable long-term effectiveness
Ceramics	Mobility reduced through physical binding	Volume increase / decrease unknown	Requires development work to confirm ability to meet WAC for characteristic metals	Acceptable long-term effectiveness
Ceramic Silicon Foam	Mobility reduced through physical binding	Volume increase less than that from cementation	Likely would not meet WAC for characteristic metals	Acceptable long-term effectiveness
Macro Encapsulation	Mobility reduced through physical binding	Volume increase	Would not meet WAC for characteristic metals	Would fail to produce acceptable material form for long-term disposal from Silo 3 material

TABLE 1
SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - EFFECTIVENESS

STABILIZATION ALTERNATIVE	MOBILITY OF CONSTITUENTS OF CONCERN	VOLUME INCREASE / DECREASE	WAC[1] FOR CHARACTERISTIC METALS [1] Based upon evaluation of WAC from NTS and a representative PCDF	LONG-TERM EFFECTIVENESS / PERMANENCE
Metal Matrix (Ceramet)	Mobility reduced through physical binding	Volume increase / decrease unknown	Requires development work to confirm ability to meet WAC for characteristic metals	Acceptable long-term effectiveness
Molten Metal Technology	Reduces mobility of constituents of concern	Volume increase	Requires development work to confirm ability to meet WAC for characteristic metals	Acceptable long-term effectiveness
Thermal Setting (Epoxy) Resins	Reduces mobility of constituents of concern through physical binding	Volume increase or decrease unknown	Requires development work to confirm ability to meet WAC for characteristic metals	Acceptable long-term effectiveness
Sulfur/Polymer Encapsulation	Reduces mobility of constituents of concern through physical binding	Volume increase	May require additives to chemically bind characteristic metals	Acceptable long-term effectiveness
Phoenix Ash Stabilization	Reduces mobility of constituents of concern	Potential volume decrease	Requires development work to confirm ability to meet WAC for characteristic metals	Acceptable long-term effectiveness

TABLE 2

SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - IMPLEMENTABILITY

STABILIZATION ALTERNATIVE	COMMERCIAL AVAILABILITY	SECONDARY WASTE	PRETREATMENT REQUIREMENTS	PROCESSING THROUGHPUT	RELIABILITY / MAINTAINABILITY
Asphalt (Bitumen) Stabilization	Mature technology; not widely used	Volatiles in offgas require treatment;	None required	Large processing throughput achievable	Flammability issue; complex facility and equipment requirements; operator-friendly and easily maintained
Chemical Stabilization/Solidification	Mature technology; used on a commercial scale by numerous vendors	Secondary waste is limited to HEPA filters	None required	Large processing throughput achievable	Facility and equipment requirements are not complex; ambient temperature operation; easily maintained
Polymer (Micro) Encapsulation	Commercially available	Volatiles in offgas may require offgas treatment	May require drying prior to encapsulation	Large processing throughput achievable	Facility and equipment requirements are not complex
Ceramics	Not commercially available	Volatiles in offgas may require offgas treatment	Pretreatment may be required; mechanical compression or drying	Processing throughput unknown	Complex facility and equipment requirements; Unknown reliability / maintainability

TABLE 2

SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - IMPLEMENTABILITY

STABILIZATION ALTERNATIVE	COMMERCIAL AVAILABILITY	SECONDARY WASTE	PRETREATMENT REQUIREMENTS	PROCESSING THROUGHPUT	RELIABILITY / MAINTAINABILITY
Ceramic Silicon Foam	Not commercially available	Volatiles in offgas may require offgas treatment	Pretreatment required: may require drying	Processing throughput unknown	Complex facility and equipment requirements; reliability and maintainability similar to polymer encapsulation
Macro Encapsulation	Mature technology for large discrete objects (equipment, debris, etc), but not applicable to Silo 3 material	No secondary waste	No pretreatment required	Large processing throughput achievable	Facility and equipment requirements are not complex; operator-friendly and easily maintained
Metal Matrix (Ceramet)	Developmental technology; commercial availability unknown	Produces volatile gases	Pretreatment required; proprietary process	Processing throughput limited	Complex facility and equipment requirements; high temperature operation(above metal melting point); system reliability and maintainability unknown

TABLE 2

SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - IMPLEMENTABILITY

STABILIZATION ALTERNATIVE	COMMERCIAL AVAILABILITY	SECONDARY WASTE	PRETREATMENT REQUIREMENTS	PROCESSING THROUGHPUT	RELIABILITY / MAINTAINABILITY
Molten Metal Technology	Has been used for volume reduction of nuclear reactor spent resins; not commercially available	Produces SO_2, CO_x, PO_x in offgas; also produces slag waste	Pretreatment required; waste sizing requirement	Processing throughput limited	Facility and equipment requirements, and system reliability / maintainability similar to vitrification
Thermal Setting (Epoxy) Resins	Not commercially available	Volatiles in offgas may require offgas treatment	Pretreatment (drying) may be required	Processing throughput unknown	Complex facility and equipment requirements; Higher-than-ambient operating temperatures. Reliability / maintainability similar to polymer encapsulation
Sulfur/Polymer Encapsulation	Commercially available	SO_2 and H_2S in offgas may require treatment	Pretreatment required; moisture sensitive	Large processing throughput possible	Thermal process; involves handling of molten sulfur; computerized process control required; flammability issues (flash point 177°C). More complex and difficult to maintain than cement stabilization

TABLE 2

SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - IMPLEMENTABILITY

STABILIZATION ALTERNATIVE	COMMERCIAL AVAILABILITY	SECONDARY WASTE	PRETREATMENT REQUIREMENTS	PROCESSING THROUGHPUT	RELIABILITY / MAINTAINABILITY
Phoenix Ash Stabilization	Developmental technology; commercially available; one equipment vendor	Secondary waste limited to HEPA filters	Pretreatment required - mechanical compression; particle size-reduction and pretreatment for chromium and cadmium	Limited processing throughput	Facility and equipment requirements and reliability similar to cement stabilization. High pressure operation results in higher maintenance requirements

TABLE 3

SCREENING OF POTENTIAL STABILIZATION/SOLIDIFICATION ALTERNATIVES - COST

STABILIZATION ALTERNATIVE	OVERALL COST	CAPITAL OR OPERATION AND MAINTENANCE (O&M) COST INTENSIVE
Asphalt (Bitumen) Stabilization	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Chemical Stabilization/Solidification	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Polymer (Micro) Encapsulation	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Ceramics	Medium	Capital cost is predominant factor
Ceramic Silicon Foam	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Macro Encapsulation	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Metal Matrix (Ceramet)	Medium	Capital cost is predominant factor
Molten Metal Technology	High	Capital cost is predominant factor
Thermal Setting (Epoxy) Resins	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Sulfur/Polymer Encapsulation	Medium	Majority of cost associated with processing, packaging, shipping, and disposal
Phoenix Ash Stabilization	Medium	Similar to cement stabilization

STABILIZATION/SOLIDIFICATION ALTERNATIVES NOT CARRIED FORWARD FOR DETAILED EVALUATION

STABILIZATION ALTERNATIVE	BASIS FOR EXCLUSION FROM DETAILED EVALUATION
Asphalt (Bitumen) Stabilization	May not meet WAC for characteristic metals; complex facility and equipment requirements; safety (flammability) concerns
Ceramics	Not commercially available; complex facility and equipment requirements
Ceramic Silicon Foam	Not commercially available; may not meet WAC for characteristic metals
Macro Encapsulation	Would fail to meet WAC for characteristic metals; would fail to produce an acceptable material form for long-term disposal from Silo 3 material
Metal Matrix (Ceramet)	Commercial availability unknown; complex facility and equipment requirements
Molten Metal Technology	Not commercially available; complex facility and equipment requirements (analogous to vitrification); high cost
Thermal Setting (Epoxy) Resins	Not commercially available; complex facility and equipment requirements
Phoenix Ash Stabilization	Limited commercial availability; falls within Chemical Stabilization/Solidification alternative

The following three alternatives were identified for detailed evaluation:

Chemical Stabilization/Solidification

This type of stabilization process is the most widely commercially-used method for stabilization of low-level and mixed waste. The process involves mixing the waste with a variety of inorganic chemical additive formulations such as cement, lime, pozzolans, gypsum, or silicates, to accomplish chemical and physical binding of the constituents of concern. These processes provide reduction in contaminant mobility by chemically stabilizing contaminants into a non-leachable form, as well as physically binding the chemically stabilized contaminants in a solid matrix. It is a non-thermal process with relatively simple facility and equipment requirements. Cement stabilization/solidification was evaluated in detail in the original OU4 Feasibility Study.

Polymer (micro) Encapsulation

Polymer (micro) encapsulation is a thermal process which physically binds the COCs in a thermoplastic polymer. Polyethylene is melted and mixed with the dry waste using a typical commercial extruder. The molten mixture is poured into the disposal container where solidification occurs as the mixture cools.

Sulfur/Polymer Encapsulation

Similar to polymer (micro) encapsulation, sulfur/polymer encapsulation (SPC) is a thermal process that produces a solid waste form that physically binds the COCs. SPC encapsulates the COCs in a cement, sulfur, and polymer matrix. The sulfur provides a highly corrosion-resistant cement, while the polymer ensures proper curing to prevent crystallization of the sulfur.

3.4 Detailed Evaluation of Silo 3 Stabilization/Solidification Alternatives

The OU4 FS evaluated several alternatives for stabilization/solidification of Silo 3 material, including vitrification, and cement stabilization, which is representative of a wide range of

chemical stabilization/solidification-type technologies. The FS found that both vitrification and cement stabilization successfully met all RAOs and treatment objectives for Silo 3 material. Table 5 provides a comparison of Chemical Stabilization/Solidification, Polymer-based Encapsulation (which includes both Sulfur/Polymer encapsulation and Polymer (micro) Encapsulation), and vitrification, relative to the RAOs and treatment objectives for Silo 3 material.

As illustrated in Table 5, the three alternatives carried forward from the initial screening are successful in attaining the RAOs and treatment objectives specified for vitrification of Silo 3 material. The primary basis for selecting vitrification in the OU4 ROD was lower estimated implementation cost and lower treated waste volume. The superior radon attenuation provided by vitrification was also a factor influencing selection of vitrification for treatment of Silo 1 and 2 material. Due to the significantly lower radium content of Silo 3 material, radon attenuation was not a predominant factor in selecting the treatment remedy for Silo 3 material; all three alternatives can provide adequate radon attenuation. As discussed in Section 3.2, measures to control the sulfate levels present in Silo 3 material would likely minimize the advantage in treated waste volume offered by vitrification. The rough-order of-magnitude costs estimated for the three stabilization alternatives are roughly equivalent to the cost originally estimated for vitrification. Based upon the comparison summarized in Table 5, all three alternatives carried forward from the initial screening are judged acceptable for detailed evaluation through an ESD.

TABLE 5
ATTAINMENT OF SILO 3 REMEDIAL ACTION OBJECTIVES

REMEDIAL ACTION OBJECTIVE	VITRIFICATION	CHEMICAL STABILIZATION/SOLIDIFICATION	POLYMER-BASED ENCAPSULATION
Prevent Direct Contact with / Ingestion of Waste Material	Radiological and toxic constituents are solidified in a solid matrix. The disposal configuration will be permitted, designed and located to prevent contact with the treated waste by members of the public or inadvertent intruders.	Radiological and toxic constituents are solidified in a solid matrix. The disposal configuration will be permitted, designed and located to prevent contact with the treated waste by members of the public or inadvertent intruders.	Radiological and toxic constituents are physically bound in a polymer matrix. The disposal configuration will be permitted, designed and located to prevent contact with the treated waste by members of the public or inadvertent intruders.

TABLE 5
ATTAINMENT OF SILO 3 REMEDIAL ACTION OBJECTIVES

REMEDIAL ACTION OBJECTIVE	VITRIFICATION	CHEMICAL STABILIZATION/SOLIDIFICATION	POLYMER-BASED ENCAPSULATION
Prevent Release or Migration of Waste Material to Soil, Groundwater, or Surface Water	COCs are chemically bound in a glass matrix.	COCs are chemically stabilized into a non-leachable form.	Migration of COCs is prevented through physical binding in a polymer matrix.
	Demonstrated ability to immobilize contaminants present in Silo 3 material through OU4 FS and subsequent testing.	Demonstrated ability to immobilize contaminants present in Silo 3 material through OU4 FS and subsequent testing, and both FEMP and commercial treatment of mixed wastes.	Pilot-scale testing on mixed wastes similar to Silo 3 material shows ability to successfully immobilize hazardous constituents.
	Met TCLP limits for all hazardous constituents in OU4 FS and VITPP testing.	Met TCLP limits for all hazardous constituents in OU4 FS testing.	
	Met NESHAP Subpart Q radon flux limit in OU4 FS testing.	Met NESHAP Subpart Q radon flux limit in OU4 FS testing.	
	Disposal facility design and location minimizes exposure of treated waste to potential degradation mechanisms	Disposal facility design and location minimizes exposure of treated waste to potential degradation mechanisms	Disposal facility design and location minimizes exposure of treated waste to potential degradation mechanisms

TABLE 5
ATTAINMENT OF SILO 3 REMEDIAL ACTION OBJECTIVES

REMEDIAL ACTION OBJECTIVE	VITRIFICATION	CHEMICAL STABILIZATION/SOLIDIFICATION	POLYMER-BASED ENCAPSULATION
Prevent Exposures to Waste Material Causing an Individual to Exceed Annual Dose Limits of: 25mrem/year whole body 75 mrem/year to the thyroid 25 mrem/year to any other organ 100 mrem/year effective dose equivalent above background, from all exposure routes	The disposal configuration will be permitted, designed and located to prevent contact with the treated waste by members of the public or inadvertent intruders. Cumulative dose equivalent to transportation worker during transportation of vitrified Silo 3 material - 0.86 mrem Dose equivalent to maximally exposed member of the public during routine transportation of all shipments of vitrified Silo 3 material - 0.002 mrem.	The disposal configuration will be permitted, designed and located to prevent contact with the treated waste by members of the public or inadvertent intruders. Cumulative dose equivalent to transportation worker during transportation of chemically stabilized Silo 3 material - 0.95 mrem Dose equivalent to maximally exposed member of the public during routine transportation of all shipments of chemically stabilized Silo 3 material - 0.006 mrem.	The disposal configuration will be permitted, designed and located to prevent contact with the treated waste by members of the public or inadvertent intruders. Dose to worker and member of the public during transportation of encapsulated Silo 3 material can be assumed roughly equivalent to that from chemically-stabilized material.

TABLE 5
ATTAINMENT OF SILO 3 REMEDIAL ACTION OBJECTIVES

REMEDIAL ACTION OBJECTIVE	VITRIFICATION	CHEMICAL STABILIZATION/SOLIDIFICATION	POLYMER-BASED ENCAPSULATION
Achieve Residual Risk < $1x10^{-6}$ Transportation	Estimated Lifetime Cancer Risk (LCR) of $3x10^{-10}$ to maximally exposed member of the public during routine transport from all shipments (assuming onsite treatment)	Estimated Lifetime Cancer Risk (LCR) of $8x10^{-10}$ to maximally exposed member of the public during routine transport from all shipments (assuming onsite treatment) Transportation risk for offsite treatment will be maintained less than $1x10^{-6}$ through onsite pretreatment of Silo 3 material and packaging in accordance with DOT regulations	Estimated Lifetime Cancer Risk (LCR) to maximally exposed member of the public during routine transport from all shipments of $8x10^{-10}$ (assuming onsite treatment) Transportation risk for offsite treatment will be maintained less than $1x10^{-6}$ through onsite pretreatment of Silo 3 material and packaging in accordance with DOT regulations
Onsite (FEMP)	Residual risk less than $1x10^{-6}$ will be attained through removal of the source term	Residual risk less than $1x10^{-6}$ will be attained through removal of the source term	Residual risk less than $1x10^{-6}$ will be attained through removal of the source term
Offsite (Disposal Facility)	Residual risk less than $1x10^{-6}$ will be attained through design and location of the disposal facility to minimize the potential for human or ecological receptors	Residual risk less than $1x10^{-6}$ will be attained through design and location of the disposal facility to minimize the potential for human or ecological receptors	Residual risk less than $1x10^{-6}$ will be attained through design and location of the disposal facility to minimize the potential for human or ecological receptors

TABLE 5
ATTAINMENT OF SILO 3 REMEDIAL ACTION OBJECTIVES

REMEDIAL ACTION OBJECTIVE	VITRIFICATION	CHEMICAL STABILIZATION/SOLIDIFICATION	POLYMER-BASED ENCAPSULATION
Cost	$28 million - 1994 dollars (ROM cost from OU4 FS, alternative 3B/1/Vit)	Rough-order-of-magnitude cost estimate - $25 million	Assumed roughly equivalent to cement stabilization due to expected similar waste volume and capital costs (based upon U.S. EPA literature review)

The three technologies were then evaluated using the criteria defined by CERCLA for the RI/FS Detailed Analysis of Alternatives process [40 CFR 300.430(e)(9)]. These criteria are:

Threshold Criteria

- Overall Protection of Human Health and the Environment
- Compliance with ARARs

Balancing Criteria

- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume Through Treatment
- Short-term Effectiveness
- Implementability
- Cost

As was the practice with the original OU4 FS, formal consideration of the modifying criteria of State and Community Acceptance was accomplished through review of the draft Final ESD by the state and the public, as formally documented in the responsiveness summary included as Section 4 of this Final ESD. No changes to the draft Final ESD were required based upon consideration of state and community acceptance.

A comparison of the three stabilization/solidification alternatives against the criteria is summarized in Tables 6 through 11. As illustrated by Table 6, all three alternatives successfully meet the two threshold criteria. Although the evaluation identified potential advantages offered by each of the three alternatives in individual balancing criteria, none of the advantages were judged sufficient to preclude further consideration of all three alternatives.

3.5 Description of Alternate Remedy for Silo 3 Material

Based upon the detailed evaluation against the criteria prescribed by the NCP, both Chemical Stabilization / Solidification, and Polymer-based Encapsulation processes (such

TABLE 6
COMPARATIVE EVALUATION OF SILO 3 STABILIZATION/SOLIDIFICATION ALTERNATIVES

THRESHOLD CRITERIA

EVALUATION CRITERION	CHEMICAL STABILIZATION	POLYMER (micro) ENCAPSULATION	SULFUR/POLYMER ENCAPSULATION
PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	<= = = = = = = = = = = = = = = = =	All alternatives are very protective: Effectively immobilizes all hazardous and radiological constituents to meet disposal facility WAC Potential disposal facilities will be permitted, designed, and located to minimize the potential for human or ecological exposure Engineered disposal design minimizes potential for access by inadvertent intruders Short-term (transportation) risks to the public are maintained well within CERCLA criteria (see short-term effectiveness evaluation)	= = = = = = = = = = = = = = = = = = =>
COMPLIANCE WITH ARARS	<= = = = = = = = = = = = = = = = =	All three alternatives can comply with current ARARs No modifications to current ARARs will be required or requested	= = = = = = = = = = = = = = = = = = =>

TABLE 7
COMPARATIVE EVALUATION OF SILO 3 STABILIZATION/SOLIDIFICATION ALTERNATIVES

BALANCING CRITERIA

LONG-TERM EFFECTIVENESS AND PERMANENCE

CHEMICAL STABILIZATION	POLYMER (micro) ENCAPSULATION	SULFUR/POLYMER ENCAPSULATION
	All three alternatives provide adequate long-term effectiveness	
< =	Disposal facility design and location minimizes exposure of treated material to potential degradation mechanisms (freeze thaw, groundwater infiltration, etc), thus maintaining the protectiveness discussed above	= >

TABLE 8
COMPARATIVE EVALUATION OF SILO 3 STABILIZATION/SOLIDIFICATION ALTERNATIVES

BALANCING CRITERIA

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

	CHEMICAL STABILIZATION	POLYMER (micro) ENCAPSULATION	SULFUR/POLYMER ENCAPSULATION
TOXICITY	<= = = = = = = = = = = = = = = = = = =	None of the three alternatives provide destruction of toxic constituents (no significant reduction of toxicity is accomplished). All three alternatives provide effectiveness by immobilizing toxic constituents	= = = = = = = = = = = = = = = = = = =>
MOBILITY	Demonstrated ability to immobilize contaminants present in Silo 3 material through OU4 FS and subsequent testing, and both FEMP and commercial treatment of similar materials. Reduces mobility through chemical stabilization of COCs, as well as physical binding.	Pilot-scale testing on materials similar to Silo 3 material shows ability to successfully immobilize hazardous constituents. Reduces mobility by physically encapsulating COCs; no chemical stabilization	Pilot-scale testing on materials similar to Silo 3 material shows ability to successfully immobilize hazardous constituents. Reduces mobility by physically encapsulating COCs; no chemical stabilization
VOLUME	Estimated 20% volume increase, based upon treatability tests with Silo 3 material Minimal secondary waste	Assumed equivalent to Cement Stabilization, based upon U.S. EPA literature review. Could potentially provide lower treated waste volume than cement stabilization	Assumed equivalent to Cement Stabilization, based upon U.S. EPA literature review. Could potentially provide lower treated waste volume than cement stabilization

TABLE 9

COMPARATIVE EVALUATION OF SILO 3 STABILIZATION/SOLIDIFICATION ALTERNATIVES

BALANCING CRITERIA

IMPLEMENTABILITY

	CHEMICAL STABILIZATION	POLYMER (micro) ENCAPSULATION	SULFUR/POLYMER ENCAPSULATION
ADMINISTRATIVE IMPLEMENTABILITY	< = = = = = = = = = = = = = = = =	NTS provides preliminary confirmation of acceptability of treated waste under existing PA	= = = = = = = = = = = = = = = = = >
TECHNICAL IMPLEMENTABILITY	More widely implemented on a commercial scale for mixed waste treatment than other two alternatives Has been successfully implemented on a commercial scale to treat mixed waste at numerous DOE and non-DOE superfund sites Has been successful at FEMP on other mixed wastes, including thorium waste	Limited commercial implementation Successful on a bench scale with mixed waste and on a pilot-scale with surrogate Development required to confirm treated waste volume and achievable throughput	More uncertain than Cement(chemical) Stabilization due to limited commercial implementation More complex facility and equipment requirements than cement(chemical) stabilization or polymer (micro) encapsulation Successful on a pilot scale; small-scale commercial facility exists Development required to confirm treated waste volume and achievable throughput

TABLE 10
COMPARATIVE EVALUATION OF SILO 3 STABILIZATION/SOLIDIFICATION ALTERNATIVES

BALANCING CRITERIA

SHORT-TERM EFFECTIVENESS

	CHEMICAL STABILIZATION	POLYMER (MICRO) ENCAPSULATION	SULFUR / POLYMER ENCAPSULATION
Worker Risks	Lower than other three alternatives due to lower operating temperature and shorter period of operation	Operating temperatures, and therefore worker risk, are slightly higher than Cement Stabilization, but lower than Sulfur/Polymer Encapsulation.	Higher than Cement Stabilization or Polymer Encapsulation due to higher operating temperatures and handling of molten sulfur
Transportation Risk	Occupational, public, and accident-scenario (including accident with fire) transportation risks are well within CERCLA guidelines	Equivalent to Cement Stabilization, assuming equal treated waste volume; lower treated waste volume would result in risk lower than that for cement stabilization	Equivalent to Cement Stabilization, assuming equal treated waste volume; lower treated waste volume would result in risk lower than that for cement stabilization
Offgas Issues	Minimal; process maintains moisture in untreated waste, resulting in minimal particulate emissions	Minimal; process requires very low moisture content in feed stream, resulting in waste particulate generation during material handling	Greater than cement stabilization or Polymer (micro) encapsulation. Process requires very low moisture content in feed stream , resulting in waste particulate generation during material handling. Potential generation of SO_2 and H_2S during process upsets can be treated through typical offgas controls
Clean-up Time	Clean-up time is most certain of the three alternatives based upon OU4 treatability testing and commercial experience with similar wastes. Potential clean-up time of less than 9 months - actual cleanup time will be determined by selected subcontractor	Achievable throughput and resulting clean-up time must be determined through development work. U.S. EPA literature indicates clean-up time should be roughly similar to that achievable by chemical stabilization	Achievable throughput and resulting clean-up time must be determined through development work. U.S. EPA literature indicates clean-up time should be roughly similar to that achievable by chemical stabilization

TABLE 11
COMPARATIVE EVALUATION OF SILO 3 STABILIZATION/SOLIDIFICATION ALTERNATIVES
BALANCING CRITERIA

COST

CHEMICAL STABILIZATION	POLYMER (micro) ENCAPSULATION	SULFUR/POLYMER ENCAPSULATION
Due to wide-spread commercial implementation and more certain implementability, cost is most certain of the three alternatives	Assumed roughly equivalent to cement stabilization due to expected similar waste volume and capital costs (based upon U.S. EPA literature review)	Assumed roughly equivalent to cement stabilization due to expected similar waste volume and capital costs (based upon U.S. EPA literature review)
Rough- order-of-magnitude cost estimate: $25 million	Cost is more uncertain than that for cement stabilization due to limited commercial-scale basis for estimate	Cost is more uncertain than that for cement stabilization due to limited commercial-scale basis for estimate

as Polymer (micro) Encapsulation and Sulfur/Polymer Encapsulation) were judged acceptable, and demonstrated to meet RAOs and treatment objectives for stabilization/solidification of the Silo 3 material. Therefore, the alternate remedy for remediation of Silo 3 material will be defined as:

- Treatment, using either Chemical Stabilization/Solidification or a Polymer-Based Encapsulation process, to stabilize characteristic metals to meet RCRA TCLP limits and attain disposal facility WAC; and
- Offsite disposal at either the NTS or an appropriately-permitted commercial disposal facility.

The treatment portion of the alternate remedy may be accomplished through either onsite treatment at the FEMP to meet disposal facility WAC, or pretreatment onsite as required to reduce dispersability of thorium-bearing particulates and render the material acceptable for transportation, followed by transportation to an appropriately permitted offsite facility for treatment using Chemical Stabilization/Solidification or a polymer-based encapsulation process to meet disposal facility WAC. For offsite treatment to attain the Silo 3 RAOs, onsite pretreatment, in combination with packaging in accordance with Department of Transportation (DOT) regulations, must reduce the dispersability of thorium-bearing particulates and result in transportation risk less than 1×10^{-6}. The specific process to be used will be selected through evaluation of proposals submitted by potential subcontractors. A request for proposal (RFP) will be issued requesting potential contractors to submit proposals for implementation of the alternate remedy described above. The specific process to accomplish the treatment and disposal of Silo 3 material will then be designed, tested, and implemented by the selected contractor.

4. SUPPORT AGENCY AND PUBLIC COMMENTS AND RESPONSIVENESS SUMMARY

A formal public comment period, and preparation of a responsiveness summary addressing all comments, are typically included in the process of issuing a ROD in accordance with the NCP and U.S. EPA guidance. Although a formal comment period is not specifically

as part of issuing an ESD, U.S. EPA guidance on the preparation of an ESD recommends that public comments be accepted, and formally responded to, in cases where there is considerable public interest in the changes being addressed in an ESD.

Public involvement in the development and issuance of this ESD is addressed in detail in Section 6. A draft Final ESD (Reference 26) was made available for public review and comment beginning November 17, 1997. Notices announcing the availability of the draft Final ESD at the PEIC, the period for public comment, and the schedule of formal public hearings were mailed to stakeholders.

A hearing for stakeholders in the vicinity of the FEMP was held on November 25, 1997. A transcript of this hearing is contained in Appendix A. After a brief review of the background and contents of the draft Final ESD, stakeholders were invited to comment, either orally at the hearing, or in writing at any time prior to December 16, 1997. No oral comments were presented at the hearing.

A second hearing, for stakeholders in the vicinity of the NTS, was held on December 2, 1997. Following a briefing on the contents of the draft Final ESD, three members of the public presented oral comments. A transcript of the hearing, including the complete text of oral comments, is contained in Appendix B.

The public comment period for the draft Final ESD was closed on December 16, 1997. Written comments were received from only one commentor. These comments are contained in Appendix C.

No changes to the draft Final ESD were required as a result of addressing comments received during public review of the document.

4.1 Responses to Public Comments on the Draft Final ESD

Commentor A

Earl McGhee, Amargosa Valley, NV

Summary of Comment:

Oral Comment A.1: '...I see by all of the things that are happening, you want to destroy people. You want to destroy a perfect habitat for humanity and wildlife, and you are putting it all at risk...'

Response: The remedy for treatment and disposal of Silo 3 material has been selected, and will be implemented, fully in accordance with CERCLA, NEPA and other applicable regulations promulgated to assure protection of the public and the environment. As evidenced by the evaluation documented in this ESD, CERCLA requires risk to the public and the environment to be evaluated as primary factors in the remedy selection process. By statute, the selected remedy is required to be protective of human health and the environment. CERCLA also requires input from the public as an integral part of selecting and implementing remedial actions. As described in Section 5 of the ESD, the remedy for treatment and disposal of Silo 3 material has also been fully evaluated under the NEPA process to assure that potential impacts to the environment, wildlife, and other ecological resources have been appropriately addressed.

Commentor B

Dennis A. Bechtel, Henderson, NV

Summary of Comments:

Oral Comment B.1: '... The performance assessment should include more than just the operation of material...There is a lot of ways you can test the performance, one of which is the transportation of the waste itself...there should be a performance assessment of things like the packaging, training of the drivers...'

Response: See responses to Written Comments B.4 and B.5.

Oral Comment B.2: '...One concern we have had, we discussed this, is about our big issue out here regarding transportation and the fact that Fernald is looking at a number of operable units in their clean-up.... There should be somebody looking at overall shipments of waste, and whether it's at an individual site, Fernald should be considering shipments from all of the operable units....'

Response: See response to Written Comment B.7.

Oral Comment B.3: 'I had a couple of comments with regards to the RFP.'

Response: These comments on the draft Request for Proposal (RFP) for treatment of Silo 3 material will be addressed, along with other stakeholder comments, during preparation of the final RFP.

Written Comment B.4: 'With the change in the recommendation from the original ROD, it is important that a performance assessment be conducted of the stabilization processes selected. Given the problems experienced with the Pondcrete at Rocky Flats and the K-25 waste stabilization the performance of the material must meet a number of demands.'

Response: The stabilization process implemented for treatment of the Silo 3 material will be required to meet TCLP limits for metals and attain WAC of the waste disposal facility. The RFP issued for the Silo 3 Project will specify treatability testing, using actual Silo 3 material, to demonstrate the ability of potential treatment processes to effectively stabilize the constituents of concern. As is the case with current low-level waste shipments, analyses of treated waste will be performed in accordance with the disposal facility WAC prior to shipment for disposal to confirm that the treated waste has attained the established WAC.

Written Comment B.5: '*Performance Assessment* should include a range of considerations from the stabilization of the waste at Fernald to the final disposal at either the NTS or a commercial facility. *Performance standards* should be specified for quality control, waste handling, the "packaging" of the waste. And the multitude of issues associated with the transportation of the waste (e.g., driver training) need to be addressed as important elements of a performance assessment.'

Response: Standards for quality control (inspection, sampling to confirm WAC attainment), handling (marking, labeling, record keeping), packaging and transportation of the treated waste are specified by ARARs in the approved ROD, as well as disposal facility WAC, U.S. DOT regulations, and site-specific FEMP procedures. Independent of which specific stabilization process is selected for treatment of Silo 3 material, the treated material will be managed, transported, and disposed in full compliance with these standards.

Written Comment B.6: 'While the draft recommends Stabilization or Encapsulation for Silo-3 waste, it appears that, given the problems being experienced with the Vitrification Pilot Project at Fernald, Silos 1 and 2, may also become candidates for Stabilization, and, perhaps off-site disposal at the NTS. The future potential use of Stabilization for Silos 1 and 2 needs to be addressed.'

Response: The current selected remedy for Silo 1 and 2 material, identified in the approved ROD, is on-site stabilization by vitrification, followed by off-site disposal at the NTS. The treatment remedy for Silo 1 and 2 material is currently being reevaluated, primarily due to cost issues, to identify the most effective means of attaining the RAOs for treatment of the Silo 1 and 2 material. This evaluation of potential treatment alternatives, which will culminate in preparation of a revised FS and issuance of an amendment to the OU4 ROD, will consider both vitrification and other commercially available stabilization technologies.

Written Comment B.7: 'The fact that the cleanup of the Operable Units is organized independently, apparently has precluded the comprehensive evaluation of issues such as cumulative effects from the transportation of the waste. Individually each of the units have a moderate number of shipments and what is described basically as minimal impacts, but collectively the total number of shipments will be greater , and, potentially, the potential risk to the public greater as well. Because other sites are also in the queue to ship waste to the NTS, DOE needs to tackle the issue of cumulative shipments to the NTS.

Since the Nevada Test Site is being considered as either a regional or centralized site for the storage, treatment, or disposal many shipments through urbanized, and rapidly growing Las Vegas, it is important that cumulative impacts must be addressed.'

Response: The integrated CERCLA/National Environmental Policy Act (NEPA) evaluations, which were included in the FS for each operable unit, provided evaluation and public review of the cumulative risks of transportation and disposal of the waste generated from remediation of the FEMP. These evaluations, which resulted in the 'balanced approach' developed for on-site and off-site disposal of the waste from FEMP remedial actions, demonstrated that the risks associated with shipment and disposal of waste from FEMP operable units, including treated OU4 material, are well within CERCLA guidelines.

In addition, review of the *Final EIS for NTS and Off-Site Locations in the State of Nevada* dated August 1996, indicates that the document provided a comprehensive evaluation of transportation and socioeconomic impacts from all material anticipated to be transported to and from the NTS. For example, Section 5.1.1.2 provides an analysis of transportation impacts for an alternative dealing with continuing current operations of the NTS.

Written Comments B.8 and B.9: This commentor also provided two specific comments on text from the draft RFP for treatment of Silo 3 material. These comments will be addressed, along with other stakeholder comments on the RFP, during preparation of the final RFP.

Commentor C

Dale Schutte, Pahrump, NV

Summary of Comments:

Oral Comment C.1: '...I would like you to give serious consideration to shipping all this material by rail, as it appears to be safer than by truck.'

Response: DOE is currently evaluating intermodal transportation of waste from DOE facilities, including FEMP, to the NTS utilizing a transfer point that does not require truck transport through the Las Vegas valley. Based on the results of this evaluation, which will include evaluation of safety, cost effectiveness, and availability of rail transport, consideration will be given to intermodal transportation of waste to the NTS. Input from stakeholders will continue to be part of this decision process.

Oral Comment C.2: 'You pay only a portion of what it costs the Nevada Test Site here to handle this material. There is nothing that will help us pay for closure of the sites, service thereto, monitoring of the sites, the long-term stewardship of these sites....you are only paying a portion of the lifecycle cost of this material, and we need pressure on Congress to help us with the full lifecycle cost...you have to have something set up, a long-term funding; and Nevada does not have that.'

Response: DOE-FEMP includes funding for the cost of disposing of waste from FEMP at the NTS in its budget requests. Funding for operation and monitoring of the NTS are be included in budget requests submitted by DOE-NV. There is currently no mechanism within the federal budget process for establishing a monitoring and surveillance/post-closure fund in advance of the five-year budget

planning period. DOE-NV. Funding for closure of the NTS, will have to be requested from congress at the appropriate time . DOE-FEMP will, if requested, assist DOE-NV in justifying and obtaining necessary funding.

5. AFFIRMATION OF STATUTORY DETERMINATION

Changing the stabilization/solidification process for Silo 3 materials from vitrification to Chemical Stabilization/Solidification, or a Polymer-based Encapsulation process, followed by off-site disposal, does not fundamentally alter the remedy selected in the approved OU4 ROD. The alternate remedy will effectively immobilize the heavy metals present in the material to reduce the leachability and associated toxicity of the material and in order to meet RCRA TCLP limits and the disposal facility WAC. In addition, the alternative provides for disposal of treated waste at a protective off-site disposal facility after stabilization/ solidification. As discussed in Section 3.4, either type of treatment process can attain the RAOs specified by the OU4 FS and ROD for Silo 3 material. Treatment, using either of the identified treatment technologies, at an off-site location can also attain all of the Silo 3 RAOs, provided that the risk during transportation to the treatment facility is maintained less than $1x10^{-6}$ through on-site pretreatment to reduce dispersability and packaging in accordance with DOT regulations.

The NTS and representative PCDFs are located in remote, arid regions of the western United States so that human health and environmental impacts are similar for both facilities. Changing the selected remedy for Silo 3 materials from vitrification to either of the potential alternatives will not result in any changes to the ARARs identified in the approved OU4 ROD. Treatment of Silo 3 materials using either Chemical Stabilization/Solidification or a Polymer-based Encapsulation process will comply with all ARARs identified in the approved OU4 ROD. Off-site treatment of Silo 3 material, using either type of technology, can also attain all ARARs, provided that transportation risk is minimized as discussed above.

In order to meet the substantive and procedural requirements of the DOE's NEPA Implementing Regulations (10 CFR 1021), the OU4 FS and Proposed Plan (PP) were prepared as an integrated NEPA Environmental Impact Statement (EIS). The DOE's NEPA regulations mandate that proposed changes to a federal action which has been the subject of an EIS evaluation, must be evaluated in a Supplemental Analysis to determine if formal revision to the original EIS is required through issuance of a Supplemental EIS. A Supplemental Analysis (Reference 20) was prepared to evaluate the NEPA impacts of the proposed changes in the Silo 3 stabilization technology and potential changes in the final disposal location. The Supplemental Analysis concluded the proposed change in treatment technology and the potential change in the disposal location were sufficiently evaluated in the original OU4 FS/PP-EIS and did not require the preparation of a Supplemental EIS. The Silo 3 Supplemental Analysis was made available for stakeholder review and approved by the DOE-Ohio Field Office NEPA Compliance Officer and placed in the PEIC in December of 1996 pursuant to the requirements of the DOE's NEPA regulations regarding public availability.

6. PUBLIC PARTICIPATION

Public participation played an integral role in reevaluating the remedy for remediation of Silo 3 material. Formal public involvement opportunities during identification of the alternate remedy for Silo 3 material and development of this draft Final ESD are summarized in Table 12.

A draft ESD was reviewed and approved by both U.S. EPA and Ohio EPA (References 21-25). A draft Final ESD (Reference 26) was made available for public review from November 17, 1997 through December 16, 1997. Formal public hearings were held at the FEMP on November 25, 1997, and at the NTS on December 2, 1997 to receive stakeholder comments and concerns. A responsiveness summary document, which formally addresses stakeholder comments received on the draft Final ESD, is contained in Section 4.

FORMAL PUBLIC INVOLVEMENT OPPORTUNITIES
DEVELOPMENT OF ALTERNATE REMEDY FOR SILO 3 MATERIAL

DATE	PARTICIPANTS	TOPIC
August 20, 1996	DOE, FDF, U. S. EPA, Ohio EPA, local stakeholders	OU4 path forward; Evaluation of Silo 3 Alternatives
September 4, 1996	DOE, FDF, Nevada Test Site Citizens Advisory Board, NTS Stakeholders	OU4 path forward; Evaluation of Silo 3 Alternatives
September 11, 1996	DOE, FDF, Fernald Citizens Advisory Board (FCAB), Waste Management Subcommittee	Reevaluation of OU4 path forward
November 6, 1996	DOE, FDF, Nevada Test Site Citizens Advisory Board, NTS Stakeholders	Resolution of NTS stakeholder comments on Silo 3 Alternatives Evaluation
November 9, 1996	DOE, FDF, FCAB	VITPP status; Silo 3 path forward
November 14-15, 1996	DOE, FDF, IRT, U.S. EPA, Ohio EPA, local stakeholders	OU4 Path forward, IRT kickoff
December 12-13, 1996	DOE, FDF, IRT, U.S. EPA, Ohio EPA, local stakeholders	IRT meeting
January 21-23, 1997	DOE, FDF, IRT, U.S. EPA, Ohio EPA, local stakeholders	IRT meeting
February 11-13. 1997	DOE, FDF, IRT, U.S. EPA, Ohio EPA, local stakeholders	IRT meeting; included a public availability session concerning the IRT on February 12, 1997
February 25-28, 1997	DOE, FDF, IRT, U.S. EPA, Ohio EPA, local stakeholders	IRT meeting; included a public briefing on draft recommendations of the IRT on February 26, 1997
May 14, 1997	DOE, FDF, U.S. EPA, Ohio EPA, local stakeholders	Screening of potential stabilization/solidification alternatives

FORMAL PUBLIC INVOLVEMENT OPPORTUNITIES
DEVELOPMENT OF ALTERNATE REMEDY FOR SILO 3 MATERIAL

DATE	PARTICIPANTS	TOPIC
June 3, 1997	DOE, FDF, Nevada Test Site Citizens Advisory Board, NTS Stakeholders	Presentation of May 14, 1997 public workshop to NTS stakeholders
June 16, 1997	DOE, FDF, U.S. EPA, Ohio EPA, local stakeholders	Review of screening of potential stabilization / solidification alternatives; technical briefing on stabilization, solidification and encapsulation technologies; initial detailed evaluation of alternatives
July 1, 1997	DOE, FDF, Nevada Test Site Citizens Advisory Board, NTS Stakeholders	Presentation of June 16, 1997 public workshop to NTS stakeholders
July 16, 1997	DOE, FDF, Fernald Citizens Advisory Board(FCAB)	Technical briefing and tour at Brookhaven National Laboratory concerning polymer-based encapsulation technologies
July 29, 1997	DOE, FDF, U.S. EPA, Ohio EPA, local stakeholders	Detailed evaluation of stabilization/solidification alternatives
November 25, 1997	DOE, FDF, U.S. EPA, Ohio EPA, local stakeholders	Formal public hearing on draft Final ESD
December 2, 1997	DOE, FDF, Nevada Test Site Citizens Advisory Board, NTS Stakeholders	Formal public hearing on draft Final ESD

After approval of this Final ESD, public participation will continue to be an integral part of implementing stabilization/solidification of Silo 3 material. The DOE will keep stakeholders, locally and at potential disposal locations, involved throughout implementation of Silo 3 material stabilization/solidification through periodic written and verbal updates. The Administrative Record, which provides greater detail on the decision-making process for changing the selected treatment technology for Silo 3 materials is available at the PEIC, 10995 Hamilton-Cleves Highway, Harrison, Ohio. The PEIC may also be contacted by calling (513) 648-7480 or (513) 648-7481.

7. REFERENCES

1. U.S. EPA 1991, "Consent Agreement as Amended Under CERCLA Sections 120 and 106(a)," United States Environmental Protection Agency Region V, Administrative Docket Number V-W-90-C-057, September 20, 1991
2. DOE 1994, "Final Record of Decision for Remedial Actions at Operable Unit 4," December 1994
3. FDF 1997, "Operable Unit 4 Vitrification Pilot Plant Phase I Interim Treatability Study Report Campaign 4," March 12, 1997
4. IRT 1997, "Silos Project Independent Review Team Final Majority Report," April 1997
5. FDF 1997, "Vitrification Pilot Plant Melter Incident Final Report," February 26, 1997
6. DOE 1996, DOE-0309-97, "Draft Final Evaluation of Silo 3 Residues Alternatives," December 16, 1996
7. DOE 1996, "Value Engineering Presentation Report, Project: Remedial Actions at Operable Unit 4, Fernald/FEMP, Record of Decision Plan," January 12, 1996
8. U.S. EPA 1997, letter, James A. Saric, U.S. EPA to Johnny Reising, DOE, "OU 4 Post-ROD Changes," May 21, 1997
9. DOE 1994, "Feasibility Study for Operable Unit 4," February 1994
10. DOE 1995, "Workplan for the Operable Unit 4 Remedial Design," May 1995
11. DOE 1996, letter, DOE-1349-96, Johnny Reising, DOE to James A. Saric, U. S. EPA and Tom Schneider, OEPA, "Request for Extension - Operable Unit 4," September 26, 1996
12. DOE 1996, letter, DOE-0036-97, Johnny Reising, DOE to James A. Saric, U.S.

EPA, "U. S. Environmental Protection Agency October 2, 1996 Nonconcurrence with Extension Request and Notice of Intent to Assess Stipulated Penalties," October 9, 1996

13. U.S. EPA 1997, "Agreement Resolving Dispute Concerning Denial of Request for Extension of Time for Certain Operable Unit 4 Milestones," United States Environmental Protection Agency Region V, Administrative Docket Number V-W-90-C-057, July 22, 1997
14. "Encyclopedia of Technologies," 1992
15. U.S. EPA 1996, "Stabilization/Solidification Processes for Mixed Waste"
16. Literature Survey of "Innovative Technologies for Hazardous Waste Site Remediation," 1987-1991
17. U.S. EPA 1994, "Fifth Forum on Innovative Hazardous Waste Treatment Technologies: Domestic and International"
18. U.S. EPA 1993, "Remediation Technologies Screening Matrix and Reference Guide"
19. U. S. NRC 1989, "Workshop on Cement Stabilization of Low-Level Radioactive Waste"
20. DOE 1996, "Draft Final Evaluation of Silo 3 Alternatives Volume 2 of 2 Revision B, Appendix F 'NEPA Supplemental Analysis'," December 16, 1996
21. DOE 1997, letter DOE-1330-97, Johnny Reising, DOE to James A. Saric, U. S. EPA and Tom Schneider, Ohio EPA, "Draft Explanation of Significant Differences (ESD) for Operable Unit 4 Silo 3 Remedial Action," dated September 12, 1997
22. OEPA 1997, letter, Tom Schneider, Ohio EPA to Johnny Reising, DOE, "Conditional Approval - OU4 Silo 3 ESD Draft Final Comments," dated September 22, 1997
23. U.S. EPA 1997, letter, Gene Jablonowski, U.S. EPA to Johnny Reising, DOE,"Silo 3 ESD Disapproval," dated October 16, 1997
24. DOE 1997, letter DOE-0099-98, Johnny Reising, DOE to Gene Jablonowski, U. S. EPA and Tom Schneider, Ohio EPA, "Response to Ohio Environmental Protection Agency and United States Environmental Protection Agency Comments on Draft Explanation of Significant Differences (ESD) for Operable Unit 4 Silo 3 Remedial Action," dated October 28, 1997
25. U.S. EPA 1997, letter, Gene Jablonowski, U.S. EPA to Johnny Reising, DOE, "Silo 3 ESD Approval," dated November 5, 1997
26. DOE 1997, "Draft Final Explanation of Significant Differences (ESD) for Operable Unit 4 Silo 3 Remedial Action," dated November 6, 1997

APPENDIX A

TRANSCRIPT OF NOVEMBER 25, 1997 PUBLIC HEARING ON DRAFT FINAL ESD AT FERNALD, OHIO

FERNALD CLEANUP PROGRESS BRIEFING/
SILO PROJECT PUBLIC HEARING

Tuesday, November 25, 1997

6:00 P.M.

Spangler Reporting Services

PHONE (513) 381-3330 FAX (513) 381-3342

responses back to the final RFP, will those be shared with us at some point?

MR. HAGEN: Yes.

MS. CRAWFORD: And we can look at those?

MR. HAGEN: Yes. In that period of time between December 3rd and March, yes.

MS. CRAWFORD: Okay. All right, that's it.

MR. STEGNER: Any more questions out there before we move into the official public comment period? If not, what I want to do is to excuse Dave and Terry so as not to be a distraction.

So what I will do now is I will begin the formal public comment process, and I would ask that anyone who wants to comment on the record tonight verbally to please, you can stand up if you project well, if not, there's a microphone back there that you're welcome to use. State your name and please provide your comment. As I said also earlier, that you're under no obligation at all to comment tonight either verbally or in writing. The comment period is open until the 16th of December,

and you can submit those comments to us in writing on or before the 16th of December.

Anybody want to talk, speak on the record tonight? Anyone prepared to do so? Going once, twice. Okay, I assume we're going to have a lot of comments in writing then.

Thank you all for coming tonight. I appreciate -- we all appreciate your attendance, your participation, and we will reconvene for next session on December 9th.

- - -

PROCEEDINGS CONCLUDED

- - -

C E R T I F I C A T E

I, LOIS A. ROELL, RPR, the undersigned, a notary public-court reporter, do hereby certify that at the time and place stated herein, I recorded in stenotypy and thereafter had transcribed with computer-aided transcription the within (92) ninety-two pages, and that the foregoing transcript of proceedings is a complete and accurate report of my said stenotypy notes.

MY COMMISSION EXPIRES: AUGUST 12, 2002.

LOIS A. ROELL, RPR
NOTARY PUBLIC-STATE OF OHIO

Spangler Reporting Services
PHONE (513) 381-3330 FAX (513) 381-3342

APPENDIX B

TRANSCRIPT OF DECEMBER 2, 1997 PUBLIC HEARING ON DRAFT FINAL ESD AT NORTH LAS VEGAS, NEVADA

FERNALD ENVIRONMENTAL PROJECT

UNITED STATES DEPARTMENT OF ENERGY

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PUBLIC STENOGRAPHER'S TRANSCRIPT

OF

PUBLIC ORAL STATEMENTS

DURING FORMAL PUBLIC COMMENT PERIOD

AT INFORMATION HEARING

* * * * * * * * *

RE: FERNALD SILOS PROJECT

ENVIRONMENTAL MANAGEMENT

* * * * * * * * *

On Tuesday, December 2, 1997
6:30 p.m. to 8:00 p.m.

At the Department of Energy Building
223 Energy Way
North Las Vegas, Nevada

Reported by: DEBBIE F. BARTLETT, CCR #62

APPEARANCES

Representatives from the Public Environmental Information Center:

Nina Akgunduz

Terry Hagen

Don Paine

* * * * * * * *

MEETING AGENDA AND RELATED CONTENTS

Welcome/Opening Remarks - Nina Akgunduz

Overview of Silo 3 - Draft Final Explanation of Significant Differences document - Terry Hagen (see indexed attachments)

Status of other Fernald Silos Projects - Don Paine

Question and Answer Session

Formal Public Comment Period - (see oral comments at Page 4, and indexed written attachment.)

Meeting Conclusion

Public Sign-In sheets (see indexed attachments)

PUBLIC ATTENDANCE

(see attached sign-in sheets)

Name	Address
Dennis Bechtel (Affiliation: Self)	[redacted]
S. J. Gordon (Affiliation: HAZMED)	
Earl B. McGhee (Affiliation: Citizen)	
Frank Overbey (Affiliation: NTS CAB)	
Paul R. Ruttan (Affiliation: KDOL Radio - CAB)	
Dale Schutte (Affiliation: NTS CAB)	
Joan Schweda (Affiliation: NRAMP Stakeholder)	
Steve Schweda (Affiliation: NRAMP Stakeholder)	

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PUBLIC ORAL STATEMENTS

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WHEREUPON,

Following an informational overview and introduction by representatives from Fernald Environmental Management, oral statements/comments were made to the public stenographer for inclusion in the record as follows:

EARL McGHEE

[redacted]

My name is Earl McGhee. I live in Armagosa Valley, and I see by all of the things that are happening, you want to destroy people. You want to destroy a perfect habitat for humanity and wildlife, and you are putting it all at risk.

Being 30 years in construction, I had to debate and discuss with and catch engineers in a lot of mistakes. I'll name one project, which is O'Danna Junior High School in San Pedro, where I tried to tell an inspector that, "Hey, this won't work."

On the plans, they had designed a 12-inch square going into a 14 and a half inch circle, and there is no way that that would work. We went, you know, went round and round.

This intellectual kept telling me, "The man that drew that out went to a university, a college. He knows what he's doing and you don't."

And I had a crew there. So I stayed, put the tools on, and worked with them. When you start to put this 12-inch square in that 14

and a half inch circle, we had to use a sledge hammer.

He came over and said, "This isn't going to work. We can't do this." And I told him where to go. He said, "What are we going to do?"

And I had fabricated 3,000 extra ties, and this was a division of Raymond's International. So he finally backed off. He said, "Well, what can we do?"

I said, "I'll tell you what you can do. You get the hell away from me and get away from this concrete pour," and what have you, "and do it right."

And we had to eat the 3,000 that we sent out there. We didn't have to, but they didn't backcharge, and we went ahead and did it the way it was supposed to be done.

In Santa Monica Shores, they had designed 14 bars in a pile where it shows as a four radius hook. These engineers weren't bright either. They couldn't do it. The people couldn't place one bar of steel.

A friend of mine with Economy Steel Southwest in Rolling Hills, he was following

this, so I called him up and I told him, I said, "Chuck, if I put this in or have the men put it in the way it shows, you won't be able to do a thing," because they had number 18 bars going across this.

I'm just telling you about some stumbling and bumbling, and this was federal funds that was in that project, and he laughed like I was trying to get out of the 10 or $20,000 worth of fabrication.

I told him, "You draw it out to scale and take a look at it. It won't work." So I waited about an hour. He just laughs. I didn't start the fabrication, and about within an hour, I got a phone call in the office.

And he says, "Hey, did you start that with that material?"

I said, "No. I've been waiting for your phone call."

He said, "Don't touch it." He said, "We're calling a structural right now." So just bumbling stunts and stupid mistakes.

The courthouse in Norwalk, same thing. Somebody wasn't using their head and they changed their design.

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So you wonder why people are

skeptical about any of this? This is one of the reasons I'm skeptical. I've seen mistakes. I could write a book on them after 30 years in construction, but it wouldn't make any difference anyways.

I thank you very much, and that's my public comment.

---o0o---

DENNIS A. BECHTEL
[redacted]

My name is Dennis Bechtel. I'm a Community Advisory Board member and a citizen and resident of Henderson, Nevada.

I apologize. I haven't had a chance to review the document, and I believe you have answered some of my thoughts, but I'll share them anyway.

What I would like to say, as a member of the CAB, I would like to say I appreciate your coming out here and having this public meeting. I think this is something that I think the Department of Energy can learn from.

Most of the issues we're dealing with involves multiple sites. So I think there should be multiple measures, not just on this, but on other venues.

So I think this is good, and I would like to -- I hope this works out as the Nevada Test Site interacts with other sites as time goes on.

With regard to just some general comments, I'm glad to see that you are processing

permits with the use of performance assessments to test materials.

And I think one of the concerns I had before as a member of the Board, we visited the Rocky Flats site, and, you know, the concrete and all these other stabilization systems that didn't work, there was some concern about the process there, and I'm a little more comfortable that I'm not from Missouri. We'll watch that process as it goes on, but I think the performance assessment should include more than just the operation of material.

You are going to have to -- this part relates to a couple of other comments that people had. You are going to have to get the stuff from Fernald to Nevada or to a commercial site, and I think there is a lot of ways you can test the performance, one of which is the transportation of the waste itself.

So I hope in your performance assessment -- I know you do ship things out here, but you are talking about a lot larger quantities, and I think there should be a performance assessment of things there like the packaging, training of the drivers, and I think that is an important

consideration as well.

I had the question about the Silos 1 and 2, and I think you covered that. One concern we have had, we discussed this, is about our big issue out here regarding transportation and the fact that Fernald is looking at a number of operable units in their clean-up.

But even when you look at transportation, these things should be looked at separately, and I think this is an issue where we had a problem with the DOE in general.

There should be somebody looking at overall shipments of waste, and whether it's at an individual site, Fernald should be considering shipments from all of the operable units.

When you consider impact, there should a problematical explanation. This applies in a smaller sense to Fernald, and this is of particular concern to Nevada, as you are aware, as either being a site as a final disposal or treatment of waste.

I had a couple of comments with regards to the RFP. I was concerned about the time frame, whether there was a shut-off for public comments, but Section C.6.2, CAB, of Draft D, sets

out here the criteria for waste packaging, transportation, and disposal of Fernald materials.

And I think one of the things I think should be noted in the RFP is the fact we are in the process right now of developing a feasibility study for the transfer of waste within Las Vegas, and I think this probably ultimately resulted in the development of environment assessments.

When putting out the RFP, they should be sensitive to the fact this is something that is kind of above DOE regulations. So they should be aware of that, and I think the DOE should modify as such.

The Section C.6.2.11 dealing with contingency planning and emergency response suggests -- mentioned the FEMP emergency plan. I don't know what that is. I guess it's like other emergency response plans.

But one of the issues we have had to discuss with DOE is just the fact that if there is an accident, the plan has to be sensitive to the fact of what's going to happen to the community.

And since the locals will probably be the first responders, there should be

some interaction. Maybe they already have, but just to make sure that that part of it works out.

That's all I have. Thank you.

---o0o---

DALE SCHUTTE

[redacted]

I'm Dale Schutte with the CAB. This is my own personal opinion, but I would like you to give serious consideration to shipping all this material by rail, as it appears to be safer than by truck.

The other problem I have, as a stakeholder in Nevada, this material that you have sent here in the past, and that's what you will be sending here in the future, does not cover the lifecycle cost of the handling of this material.

You pay only a portion of what it costs the Nevada Test Site here to handle this material. There is nothing that will help us pay for the closure of the sites, service thereto, monitoring the sites, the long-term stewardesship of these sites.

Your material is one of many that we have been getting and that we will be getting. We will, I hope, be able to come to some of the other sites in the future and ask for some help with this long-term lifecycle problem that is developing here in Nevada.

If this was a commercial permitted site, the performance assessments, the closures, and the licensing would already have been done, whereas here, it hasn't been done yet, only a portion of it, yet we are still accepting your waste and we're going to continue accepting your waste.

There is no law that says we can prohibit it from coming here, even though most surveys show that the majority of stakeholders in Nevada really don't want the material coming here. It's basically a liability.

There is no benefit to our accepting it, but the reality is, of course, that we have so much here right now, if you send more, it doesn't really make a lot of difference.

Just remember that you are only paying a portion of the lifecycle cost of this material, and we need pressure on Congress to help us with the full lifecycle cost.

Operating a waste disposal site on year-to-year funding is one of the poorest procedures I have ever seen. The commercial sites, you can't do that. You have to have something set up, a long-term funding, and Nevada does not have that. Thank you.

REPORTER'S CERTIFICATE

STATE OF NEVADA)
: ss
COUNTY OF CLARK)

I, Debbie F. Bartlett, CCR 62, do hereby certify that I took down in shorthand (stenotype) the oral comments of the public during the formal public comment period of said hearing held on Tuesday, December 2, 1997, commencing at 6:30 p.m., at the Department of Energy Building, 223 Energy Way, North Las Vegas, Nevada;

That thereafter said shorthand notes were transcribed by computer-aided transcription at and under my direction and supervision, and that the foregoing transcript constitutes a true and accurate transcript of the oral comments made by the public during the formal public comment period of said hearing.

Dated at Las Vegas, Nevada, this 14th day of January, 1998.

DEBBIE F. BARTLETT, CCR NO. 62

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APPENDIX C

WRITTEN COMMENTS RECEIVED ON DRAFT FINAL ESD

Comments by:
Dennis A. Bechtel
[redacted]

SILO-3 EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD) AND OTHER ISSUES

1. As a member of the Nevada Test Site (NTS) Community Advisory Board and a citizen of Clark County I, first, appreciate the time and effort taken by the Department of Energy at Fernald to have public meetings in Nevada and Ohio on these important issues. Since cleanup activities invariably affect multiple sites, I feel that this is an important initiative that should be replicated throughout the Complex.

2. More detailed comments will be sent prior to the deadline. Since more time is needed to review the Draft Explanation of Significant Differences (ESD), I am going to reiterate briefly a number of my concerns. It should be noted that I am making my comments as a private citizen and the comments are not those of the Community Advisory Board.

General Comments

1. With the change in the recommendation from the original ROD, it is important that a performance assessment be conducted of the stabilization processes selected. Given the problems experienced with the Pondcrete at Rocky Flats, and the K-25 waste stabilization the performance of the material must meet a number of demands.

2. *Performance Assessment* should include a range of considerations from the stabilization of the waste at Fernald to the final disposal at either the NTS or a commercial facility. *Performance standards* should be specified for quality control, waste handling, the "packaging" of the waste, and the multitude of issues associated with the transportation of the waste (e.g., driver training) need to be addressed as important elements of a performance assessment.

Other Issues

1. While the draft recommends Stabilization or Encapsulation for Silo-3 waste, it appears that, given the problems being experienced with the Vitrification Pilot Project at Fernald, Silos 1 and 2, may also become candidates for Stabilization, and, perhaps off-site disposal at the NTS. The future potential use of Stabilization for Silos 1 and 2 needs to be addressed.

2. The fact that the cleanup of the Operable Units is organized independently, apparently has precluded the comprehensive evaluation of issues such as cumulative effects from the transportation of the waste. Individually each of the units have a moderate number of shipments and what is described basically as minimal impacts, but collectively the total number of shipments will be greater, and, potentially, the potential risk to the public greater as well. Because other sites are also in the queue to ship waste to the NTS, DOE needs to tackle the issue of cumulative shipments to the NTS.

Since the Nevada Test Site is being considered as either a regional or centralized site for the storage, treatment or disposal many shipments through urbanized, and rapidly growing Las Vegas, it is important that cumulative impacts must be addressed.

3. Section C.6.2.10 of the Draft D Request for Proposals sets the criteria for the waste packaging, transportation and disposal of the Fernald materials. State and local government planners and DOE are currently working on a *Feasibility Study* for intermodal transportation and routing of waste to the Nevada Test Site. It is important that the RFP incorporate the process being used in this work to guide the ultimate transportation of the waste in Nevada.

4. Section C.6.2.11 (Contingency Planning and Emergency Response). This may be covered but it is important that the FEMP Emergency Management Plan include a plan to interact with local governments which will probably be the first responders in the event of an accident.

E 8058

FLUOR DANIEL FERNALD

P.O. Box 538704 Cincinnati, Ohio 45253-8704 (513) 648-3000

February 9, 1998

Fernald Environmental Management Project
Letter No. C:PS(RM):98-0008

Mr. Gary Stegner,
Public Information Officer
Department of Energy
Fernald Environmental Management Project
P. O. Box 538705
Cincinnati, Ohio 45253-8705

Dear Mr. Stegner:

CONTRACT DE-AC24-92OR21972, PROPOSED ADDITIONS TO THE POST-ROD FILES - TRANSMITTAL 18

Attached for your review is a listing of documents proposed for inclusion in the FEMP Post-ROD files via the next transmittal (18). Please inform all DOE-FEMP Operable Unit Managers of the need to review this listing to ensure the completeness of the Post-ROD files for their respective Operable Units. Forward any additional documents for future considerations or any comments to **René Eichhold at MS 78 by COB Thursday, February 19, 1998.** If there are no comments, please give your concurrence. The letter formally transmitting the document indices to the USEPA will be prepared and forwarded to you for signature with a shipment date of February 27, 1998.

Sincerely,

Diana L. Rayer

Diana L. Rayer, Team Leader
Environmental Records

Concurrence: Gary Stegner 2/17/98
Date

DLR:RE

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FLUOR DANIEL FERNALD

c: N. Akunduz, DOE-FEMP, MS45
D. J. Carr, FDF, MS52-2
R. V. Holmes, FDF, MS3
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R. J. Janke, DOE-FEMP, MS45
D. A. Lojek, DOE-FEMP, MS45
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L. E. Parsons, DOE Contract Specialist, MS45
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T. J. Walsh, FDF, MS65-2
R. D. Warner, DOE-FEMP, MS45
File Record Storage Copy 106.4.14.14.1

Index No	Document No	Title	Date	From To	Pages Doc Type	Concurrence
6-100.15 1218	DOE-0304-98	AUDIT FINDINGS OF THE ADMINISTRATIVE RECORD FILE COPY AT THE U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 5 OFFICE	01/20/98	DOE-FEMP USEPA	1 LETTER	
6-104.12 1147	DOE-0244-98	CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT/REMEDIAL INVESTIGATION/FEASIBILITY STUDY/CONSENT DECREE MONTHLY REPORT DURING NOVEMBER 1, 1997 THROUGH NOVEMBER 30, 1997	12/15/97	DOE-FEMP EPAS	12 REPORT	
6-104.13 1203	DOE-0356-98	CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT/REMEDIAL INVESTIGATION/FEASIBILITY STUDY/CONSENT DECREE MONTHLY REPORT FROM DECEMBER 1, 1997 THROUGH DECEMBER 31, 1997, AND QUARTERLY REPORT FROM OCTOER 1, 1997 THROUGH DECEMBER 31, 1997, INCLUDING EFFLUENT RADIATION REPORTS, RADON REPORTS AND REMOVAL ACTION STATUS REPORT	01/16/98	DOE-FEMP EPAS	30 REPORT	
6-104.14 1236	DOE-0369-98	REQUEST FOR APPROVAL TO RELOCATE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS AIR MONITORING STATION 24	01/28/98	DOE-FEMP EPAS	4 LETTER	
6-105.10 1184		COMMENTS: NRIA & NRRP - (REVISED FERNALD NATURAL RESOURCE IMPACT ASSESSMENT AND RESTORATION PLAN)	01/05/98	OEPA DOE-FEMP	19 COMMENTS	
6-105.11 1194	DOE-0254-98	TRANSMITTAL OF THE DRAFT PRELIMINARY WETLAND MITIGATION ASSESSMENT	01/12/98	DOE-FEMP EPAS	125 REPORT	
6-105.12 1195	DOE-0254-98	RESPONSES TO TECHNICAL REVIEW COMMENTS ON THE DRAFT PRELIMINARY WETLAND MITIGATION ASSESSMENT	01/12/98	DOE-FEMP EPAS	10 RESPONSES	
6-106.14 1134	C:SWP(ARP):97-0038	OHIO ENVIRONMENTAL PROTECTION AGENCY DISCHARGE MONITIORING REPORTS - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - NPDES PERMIT NUMBER 1IO00004*ED - NOVEMBER, 1997	12/11/97	FDF OEPA	8 REPORT	
6-106.15 1170	DOE-0263-98	AMENDMENT TO FERNALD SITE TREATMENT PLAN	12/22/97	DOE-FEMP OEPA	4 AMENDMENT	
6-106.16 1212	C:SWP:(ARW):98-000	OHIO ENVIRONMENTAL PROTECTION AGENCY DISCHARGE MONITORING REPORTS - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - NPDES PERMIT NUMBER 1IO00004*ED - DECEMBER 1997	01/14/98	FDF OEPA	18 REPORT	
6-106.17 1244		COMMENTS - INTEGRATED ENVIRONMENTAL MONITORING STATUS REPORT FOR THIRD QUARTER 1997	01/27/98	OEPA DOE-FEMP	8 COMMENTS	
6-500.3 1198	DOE-0330-98	TRANSMITTAL OF ANALYTICAL DATA ASSOCIATED WITH THE FIRST INTEGRATED ENVIRONMENTAL MONITORING PLAN QUARTERLY STATUS REPORT	01/09/98	DOE-FEMP EPAS	4 DATA	
6-600.8 1161	DOE-0272-98	PROPOSED REDUCTION IN HAZARDOUS WASTE MANAGEMENT UNIT INSPECTION FREQUENCIES	12/22/97	DOE-FEMP OEPA	3 LETTER	
6-600.9 1187	DOE-0310-98	SUBMITTAL OF CROSS-REFERENCE INDEX PURSUANT TO THE DIRECTOR'S FINAL FINDINGS AND ORDERS FILED JUNE 6, 1996	01/06/98	DOE-FEMP OEPA	10 LETTER	
6-601.30 1125	C:FCDP(PSI):97-007	NOTIFICATION OF START-UP DATE FOR A NSPS SOURCE, PREMISE NO. 1431110128B006, 100 MMBTU NATURAL GAS/DIESEL FUEL FIRED BOILER AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT	12/08/97	FDF OEPA	1 LETTER	

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6-601.31 1133	CLFCDP:97-0040	SUBMITTAL OF CONSTRUCTION COMPLIANCE CERTIFICATION FOR PERMIT TO INSTALL APPLICATION NO. 14-4253 AT THE FERNALD ENVIRONMENATL MANAGEMENT PROJECT (OEPA) PERMISE NO. 1431110128B006	11/25/97	FDF HAMILTON COU	3 LETTER	
6-601.32 1213	C:SWP(ARW):98-0006	NONCOMPLIANCE REPORT - DECEMBER 1997 - NPDES PERMIT NUMBR 1IO0004*ED - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT	01/14/98	FDF OEPA	3 REPORT	
6-601.33 1214		DENIAL OF REQUESTED MODIFICATIONS TO NPDES PERMIT #1IO00004	01/08/98	OEPA DOE-FEMP	1 DISAPPROVAL	
6-601.34 1217	DOE-0348-98	REPORTING FISCAL YEAR 1997 ELECTRIC AND NATURAL GAS UTILITY SERVICES DATA	01/16/98	DOE-FEMP EXETER ASSOC	3 LETTER	
6-601.35 1221	C:FCDP(PSI):98-000	FUEL USAGE REPORT - FOURTH QUARTER, CALENDAR YEAR 1997 - FERNALD ENVIRONMENMTAL MANAGEMENT PROJECT (FEMP), PERMIT NO. 1431110128 B006, B007. B008, AND B009	01/20/98	FDF HAMILTON COU	8 REPORT	
6-603.3 1216		COST RECOVERY GRANTS/FINANCIAL CASH TRANSACTION REPORTS	01/15/98	OEPA DOE-FEMP	5 LETTER	
6-604.3 1164		FINAL INSPECTION REPORT ON THE FERNALD ENVIRONMENTAL MANAGMENT PROJECT WITH RESPECT TO COMPLIANCE WITH THE NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS FOR RADIONUCLIDES	12/17/97	USEPA DOE-FEMP	40 INSPECTION	
6-703.8 1127		FERNALD CLEANUP PROGRESS BRIEFING DECEMBER 9, 1997, AGENDA, OVERHEADS AND HANDOUTS	12/09/97	DOE-FEMP/FDF PUBLIC	40 AGENDA	
6-703.9 1206		FERNALD CLEANUP PROGRESS BRIEFING, JANUARY 13, 1998 - OVERHEADS AND HANDOUTS	01/13/98	DOE-FEMP/FDF PUBLIC	60 OVERHEADS	
6-704.8 1207		FERNALD CLEANUP PROGRESS BRIEFING FERNALD ENVIRONMENTAL MANAGEMENT PROJECT SIGN-IN SHEETS - JANUARY 13, 1998	01/13/98	PUBLIC DOE-FEMP	8 ROSTERS	
6-704.9 1208		FERNALD CLEANUP PROGRESS BRIEFING FERNALD ENVIRONMENTAL MANAGEMENT PROJECT EVALUATION FORMS SHEETS - JANUARY 13, 1998	01/13/98	PUBLIC DOE-FEMP	20 EVAL FORMS	
6-708.20 1176		FERNALD REPORT - NOVEMBER 1997	12/01/97	DOE-FEMP/FDF PUBLIC	12 FACT SHEET	
6-708.21 1177		FERNALD REPORT - DECEMBER 1997	12/01/97	DOE-FEMP/FDF PUBLIC	12 FACT SHEET	
6-708.22 1231		FERNALD REPORT - JANUARY 1998 EDITION	01/01/98	FDF/DOE-FEMP PUBLIC	12 FACTSHEET	
6-709.30 1191		FERNALD COMMUNITY REUSE ORGANIZATION (CRO) 1997 HIGHLIGHTS	12/31/97	CRO/FDF CRO/PUBLIC	2 HIGHLIGHTS	
6-709.31 1192		FERNALD COMMUNITY REUSE ORGANIZATION (CRO) PUBLIC PARTICIPATION PLAN - PRELIMINARY DRAFT - 01/06/98	01/06/98	CRO DOE/PUBLIC	9 PLAN	
6-710.45 1172		FERNALD CITIZENS ADVISORY BOARD WEEKLY MAILING OF UPCOMING EVENTS AND MEETINGS	12/19/97	TASK FORCE TASK FORCE	25 ANNOUNCEMENT	

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6-710.46 1180		FERNALD CITIZENS ADVISORY BOARD WEEKLY MAILING OF UPCOMING EVENTS AND MEETINGS	12/26/97	TASK FORCE TASK FORCE	50 ANNOUNCEMENT	
6-710.47 1181		FERNALD CITIZENS ADVISORY BOARD WEEKLY MAILING OF UPCOMING EVENTS AND MEETINGS - ALSO INCLUDES SAVANNAH RIVER SITE CITIZENS ADVISORY BOARD ANNUAL REPORT	01/02/98	TASK FORCE TASK FORCE	20 ANNOUNCEMENT	
6-710.48 1182		1/17/1998 MEETING OF THE FERNALD CITIZENS ADVISORY BOARD INVITATION - ALSO INCLUDED ARE DRAFT MINUTES FROM 11/15/1997 MEETING	01/02/98	APPLEGATE TASK FORCE	7 MEMORANDUM	
6-710.49 1193		FERNALD CITIZENS ADVISORY BOARD WEEKY ANNOUNCEMENT OF UPCOMING EVENTS AND MEETINGS	01/09/98	TASK FORCE TASK FORCE	8 ANNOUNCEMENT	
6-710.50 1215		USEPA RESPONSE TO FERNALD CITIZEN ADVISORY BOARD REQUEST FOR THE ADVICE OF DEPARTMENT OF ENERGY AND THE REGULATORY AGENCIES ON PRIORITIES AND ISSUES	01/18/98	USEPA TASK FORCE	3 RESPONSE	
6-710.51 1222		1/17/1998 MEETING OF THE FERNALD CITIZENS ADVISORY BOARD	01/01/98	APPLEGATE STAKEHOLDERS	1 MEMO	
6-710.52 1237		FERNALD CITIZENS ADVISORY BOARD WEEKLY MAILING OF UPCOMING EVENTS AND MEETINGS, ALSO ENCLOSED IS A LETTER FROM T. WAGNER TO J. CRAIG (WHITE METAL BOX INCIDENTS) AND NEWSCLIPPINGS	01/23/98	TASK FORCE TASK FORCE	16 ANNOUNCEMENT	
6-710.53 1254		FERNALD CITIZENS ADVISORY BOARD WEEKLY MAILING OF UPCOMING EVENTS AND MEETINGS, ALSO INCLUDED IS THE FACT SHEET ON THE WHITE METAL BOX INCIDENT, TECHNICAL REPORT SUMMARY FOR THE FERNALD SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL STRATEGY CRITICAL ANALYSIS TEAM REPORT, APPROVED MINUTES FROM 11/15/1997 MEETING AND NEWSCLIPPINGS	01/30/98	ADVISORY BOA ADVISORY BOA	10 ANNOUNCEMENT	

FEMP Post-ROD Documents
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Index No	Document No	Title	Date	From To	Pages Doc Type	Concurrence
1-301.3 1149	DOE-0202-98	TRANSMITTAL OF AMENDMENT TO THE FINAL REMEDIAL ACTION WORK PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 1	12/15/97	DOE-FEMP EPAS	4 AMENDMENT	
1-308.5 1228		FINAL OU1 RAWP (REMEDIAL ACTION WORK PLAN)	01/22/98	USEPA DOE-FEMP	1 APPROVAL	
1-708.7 1205		WASTE PITS REMEDIAL ACTON PROJECT TRANSPORTATION FACT SHEET - JANUARY, 1998	01/01/98	DOE-FEMP/FDF PUBLIC	4 FACT SHEET	

FEMP Post-ROD Documents
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Index No	Document No	Title	Date	From To	Pages Doc Type	Concurrence
2-202.5 1124	DOE-0217-98	LEACHATE MANAGEMENT CONTINGENCY PLAN FOR PHASE I OF THE ON-SITE DISPOSAL FACILITY	12/05/97	DOE-FEMP EPAS	10 PLAN	
2-203.36 1151	DOE-0209-98	CERTIFIED FOR CONSTRUCTION TECHNICAL SPECIFICATIONS AND CONSTRUCTION DRAWINGS FOR AREA 2, PHASE I EXCAVATION PACKAGE - (NOTE ONLY TECHNICAL SPECIFICATIONS ARE LOCATED HERE. DRAWINGS ARE IN 2-203.37 AND 2-203.38)	12/04/97	DOE-FEMP EPAS	60 SPECIFICATIONS	
2-203.37 1152	DOE-0209-98	CERTIFIED FOR CONSTRUCTION TECHNICAL SPECIFICATIONS AND CONSTRUCTION DRAWINGS FOR AREA 2, PHASE I EXCAVATION PACKAGE - (NOTE ONLY ONE SET OF DRAWINGS IS LOCATED HERE. OTHER DRAWINGS ARE IN 2-203.38 AND THE TECHNICAL SPECIFICATIONS ARE LOCATED IN 2-203.36)	12/04/97	DOE-FEMP EPAS	25 DRAWINGS	
2-203.38 1153	DOE-0209-98	CERTIFIED FOR CONSTRUCTION TECHNICAL SPECIFICATIONS AND CONSTRUCTION DRAWINGS FOR AREA 2, PHASE I EXCAVATION PACKAGE - (NOTE ONLY ONE SET OF DRAWINGS IS LOCATED HERE. OTHER DRAWINGS ARE IN 2-203.37 AND THE TECHNICAL SPECIFICATIONS ARE LOCATED IN 2-203.36)	12/04/97	DOE-FEMP EPAS	45 DRAWINGS	
2-203.39 1156	DOE-0245-98	KEY REVISIONS MADE TO AREA 2, PHASE I EXCAVATION PACKAGE BETWEEN 95 PERCENT DESIGN AND CERTIFIED FOR CONSTRUCTION DESIGN	12/17/97	DOE-FEMP EPAS	13 REVISIONS	
2-210.7 1162	DOE-0283-98	REQUEST FOR EXTENSION - OPERABLE UNIT 2; PLACEMENT OF SEASONAL COVER ON THE ON-SITE DISPOSAL FACILITY	12/22/97	DOE-FEMP EPAS	3 LETTER	
2-210.8 1173	DOE-0296-98	PLACEMENT OF SELECT IMPACTED MATERIAL AND PLACEMENT OF SEASONAL COVER ON THE ON-SITE DISPOSAL FACILITY	12/23/97	DOE-FEMP EPAS	2 LETTER	
2-210.9 1211		APPROVAL: SELECTED IMPACTED MATERIAL AND SEASONAL COVER PLACEMENT	12/24/98	OEPA DOE-FEMP	1 APPROVAL	
2-402.20 1200	DOE-0349-98	TRANSMITTAL OF ON-SITE DISPOSAL FACILITY IMPACTED MATERIALS PLACEMENT PLAN, REVISION 0	01/15/98	DOE-FEMP EPAS	65 PLAN	
2-402.21 1251	DOE-0389-98	SUBMITTAL OF DRAFT FINAL WASTE ACCEPTANCE CRITERIA ATTAINMENT PLAN FOR THE ON-SITE DISPOSAL FACILITY	01/29/98	DOE-FEMP EPAS	200 PLAN	
2-408.39 1155		OSDF LINER CERTIFICATION REPORT	11/15/97	OEPA DOE-FEMP	2 COMMENTS	
2-410.7 1199	DOE-0321-98	U. S. ENVIRONMENTAL PROTECTION AGENCY ENFORCEABLE MILESTONES MET IN DECEMBER 1997 AND JANUARY 1998	01/08/98	DOE-FEMP EPAS	2 LETTER	
2-500.1 1174	DOE-0260-98	CARBONATE TESTING RESULTS FOR ON-SITE DISPOSAL FACILITY GRANULAR DRAINAGE MATERIAL	12/22/97	DOE-FEMP EPAS	4 LETTER	

FEMP Post-ROD Documents
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Index No	Document No	Title	Date	From To	Pages Doc Type	Concurrence
3-401.1 1131	ANL/EAD/TM-73	AUTHORIZED LIMITS FOR FERNALD COPPER INGOTS	09/01/97	ARGONNE NAT DOE-FEMP	50 REPORT	
3-402.31 1126	C:FCDP(PSI):97-007	NOTIFICATION OF ASBESTOS REMOVALS: ANNUAL PROJECTION OF PLANNED MAINTENANCE RELATED ASBESTOS REMOVALS (FEMP-98-001) AND THE ANNUAL PROJECTION OF ASBESTOS REMOVALS DUE TO INDIVIDUAL NONSCHEDULED OPERATIONS (FEMP-98-ANNUAL) FOR CY 1998	12/08/97	FDF HAMILTON COU	5 LETTER	
3-402.32 1179	C:FCDP(PSI):98-000	UPDATING OF ASBESTOS REMOVAL: FEMP-98-001, ANNUAL PROJECTION OF PLANNED MAINTENANCE RELATED ASBESTOS REMOVALS FOR CY 1998	01/05/98	FDF HAMILTON COU	1 LETTER	
3-402.33 1220	C:FCDP(PSI):98-000	AMENDED NOTIFICATION OF ASBESTOS REMOVAL: FEMP-97-003B	01/21/98	FDF HAMILTON COU	3 LETTER	
3-402.34 1243	C:FCDP(PSI):98-000	UPDATING OF ASBESTOS REMOVAL: FEMP-98-001, ANNUAL PROJECTION OF PLANNED MAINTENANCE RELATED ASBESTOS REMOVALS FOR CY 1998	02/03/98	FDF HAMILTON COU	2 LETTER	
3-405.9 1167	DOE-0276-98	PLANT 1 COMPLEX - PHASE I PROJECT COMPLETION REPORT, REVISION 1	12/23/97	DOE-FEMP EPAS	125 REPORT	
3-408.33 1219		APPROVAL: REVISED WORK PLAN SUPPLEMENTAL ENVIRONMENTAL PROJECTS - (WORK PLAN FOR RECYCLING SUPPLEMENTAL ENVIRONMENTAL PROJECTS)	01/15/98	OEPA DOE-FEMP	1 APPROVAL	
3-408.34 1229		RECYCLING ENVIRONMENTAL PROJECTS	01/22/98	USEPA DOE-FEMP	1 APPROVAL	
3-408.35 1240		RECYCLING ENVIRONMENTAL PROJECTS	01/25/98	USEPA DOE-FEMP	1 APPROVAL	
3-408.36 1245		TECHNICAL REVIEW OF RESPONSE TO COMMENTS ON DRAFT PLANT 1 COMPLEX - PHASE I PROJECT COMPLETION REPORT AND FINAL PLANT 1 COMPLEX - PHASE I PROJECT COMPLETION REPORT	01/28/98	USEPA DOE-FEMP	2 COMMENTS	
3-408.37 1247		CONDITIONAL APPROVAL OF REMOVAL ACTION NUMBER 9 THORIUM STABILIZATION PROJECT TECHNOLOGY SPECIFIC WORK PLAN	01/26/98	OEPA DOE-FEMP	2 COMMENTS	
3-409.12 1168	DOE-0276-98	TECHNICAL REVIEW COMMENTS ON PLANT 1 COMPLEX - PHASE I PROJECT COMPLETION REPORT GENERAL COMMENTS	12/23/97	DOE-FEMP EPAS	21 RESPONSES	
3-601.4 1146	C:FCDP(PSI):97-007	PROCESSING FEE FOR THE NOTIFICATIONS OF ASBESTOS REMOVAL: FEMP-98-001 AND FEMP-98-ANNUAL FOR CY 1998	12/16/97	FDF HAMILTON COU	2 LETTER	
3-708.7 1130		FERNALD ENVIRONMENTAL MANAGEMENT PROJECT COPPER INGOT DISPOSITION ALTERNATIVES FACT SHEET, DECEMBER 1997	12/01/97	DOE-FEMP/FDF PUBLIC	2 FACTSHEET	

FEMP Post-ROD Documents
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4-402.12 1129	DOE-0224-98	WORK PLAN FOR RECYCLING SUPPLEMENTAL ENVIRONMENTAL PROJECTS - DRAFT FINAL - DECEMBER 1997, REV B	12/09/97	DOE-FEMP EPAS	50 WORK PLAN	
4-408.25 1154		COMMENTS: WORK PLAN FOR ECOLOGICAL RESTORATION RESEARCH GRANTS	12/15/97	OEPA DOE-FEMP	2 COMMENTS	
4-408.26 1185		COMMENTS - DRAFT SILOS 1 & 2 PROOF OF PRINCIPLE SOW (STATEMENT OF WORK)	01/06/98	OEPA DOE-FEMP	1 COMMENTS	
4-408.27 1186		COMMENTS: OU4 SEP - CONSERVATION AREA - (PROPOSAL FOR ESTABLISHING CONSERVATION AREA NEAR THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT OPERABLE UNIT 4 SUPPLEMENTAL PROJECT)	01/05/98	OEPA DOE-FEMP	10 COMMENTS	
4-408.28 1223		RESEARCH GRANTS ENVIRONMENTAL PROJECTS	01/22/98	USEPA DOE-FEMP	5 DISAPPROVAL	
4-408.29 1224		CONSERVATION AREA ENVIRONMENAL PROJECT	01/22/98	USEPA DOE-FEMP	4 DISAPPROVAL	
4-408.30 1238		HABITAT AREA ENVIRONMENTAL PROJECT	01/27/98	USEPA DOE-FEMP	9 DISAPPROVAL	
4-408.31 1239		COMMENTS: OU4 SUPPLEMENTAL PROJECT - HABITAT AREA.	01/15/98	OEPA DOE-FEMP	2 COMMENTS	
4-408.32 1252		APPROVAL: RESPONSE TO COMMENTS, OU4 SP - CONSERVATION AREA	01/30/98	OEPA DOE-FEMP	1 APPROVAL	
4-409.11 1128	DOE-0224-98	TRANSMITTAL OF COMMENT RESPONSE PACKAGE REGARDING THE RECYCLING SUPPLEMENTAL ENVIRONMENTAL PROJECTS	12/09/97	DOE-FEMP EPAS	11 RESPONSES	
4-409.12 1232	DOE-0361-98	RESPONSES TO OHIO ENVIRONMENATL PROTESTION AGENCY COMMENTS ON THE PROPOSAL ESTABLISHING A CONSERVATION AREA NEAR THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT	01/28/98	DOE-FEMP EPAS	5 RESPONSES	
4-705.7 1165		TRANSCRIPT FROM THE FERNALD CLEANUP PROGRESS BRIEFING/SILO PRJECT PUBLIC HEARING HELD TUESDAY NOVEMBER 25, AT 6:00PM	11/25/97	PUBLIC/DOE DOE/PUBIC	93 TRANSCRIPT	
4-705.8 1204		FERNALD ENVIRONMENTAL PROJECT, UNITED STATES DEPARTMENT OF ENERGY, PUBLIC STENOGRAPHER'S TRANSCRIPT OF PUBLIC ORAL STATEMENTS DURING FORMAL PUBLIC COMMENT PERIOD AT INFORMATION HEARING, RE: FERNALD SILOS PROJECT ENVIRONMENTAL MANAGEMENT, ON TUESDAY, DECEMBER 2, 1997, AT THE DEPARTMENT OF ENERGY BUILDING, LAS VEGAS, NEVADA	12/02/97	PUBLIC/DOE PUBLIC/DOE	50 TRANSCRIPT	

FEMP Post-ROD Documents
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5-106.17 1169	DOE-0270-98	TRANSMITTAL OF THE INTEGRATED ENVIRONMENTAL MONITORING QUARTERLY REPORT	12/19/97	DOE-FEMP EPAS	175 REPORT	
5-106.18 1201	DOE-0353-98	TRANSMITTAL OF THE DRAFT START-UP MONITORING PLAN FOR THE SOUTH FIELD EXTRACTION AND SOUTH PLUME OPTIMIZATION MODULES, AND; REQUEST FOR MODIFICATION OF COMMENCE OPERATIONS DATES ESTABLISHED IN THE REMDEIAL ACTION WORK PLAN FOR AQUIFER RESTORATION AT OPERABLE UNIT 5	01/15/98	DOE-FEMP EPAS	50 PLAN	
5-203.18 1132	DOE-0219-98	PADDY'S RUN EMBANKMENT STABILIZATION, PHASE II: TRANSMITTAL OF WORK PLAN AND CONCEPTUAL DESIGN	12/09/97	DOE-FEMP EPAS	125 WORK PLAN	
5-203.19 1183	DOE-0297-98	REVISION TO AREA 1 PHASE II, SECTOR 1 CERTIFICATION DESIGN LETTER	12/23/97	DOE-FEMP EPAS	175 REPORT	
5-208.23 1148		COMMENTS: OFF-PROPERTY SOIL CERTIFICATION AND AMENDMENT OF RD WORK PLAN	12/04/97	OEPA DOE-FEMP	2 COMMENTS	
5-208.24 1175		CONDITIONAL APPROVAL PADDY'S RUN EMBANKMENT STABILIZATION WP AND DESIGN	12/18/97	OEPA DOE-FEMP	3 CONDITIONAL APPROV	
5-208.25 1189		COMMENTS: A2 PI IRDP (INTEGRATED REMEDIAL DESIGN PACKAGE FOR AREA 2, PHASE 1)	12/31/97	OEPA DOE-FEMP	64 COMMENTS	
5-208.26 1196		CONDITIONAL APPROVAL: CERTIFICATION DESIGN LETTER AREA 1 PHASE II SECTOR 1 - (CONDITIONAL APPROVAL WITH COMMENTS ATTACHED TOO)	01/07/98	OEPA DOE-FEMP	4 CONDIT APPROVAL	
5-208.27 1225		A1,P2 IRDP (AREA 1, PHASE 2 INTEGRATED REMEDIAL DESIGN PACKAGE)	01/22/98	USEPA DOE-FEMP	10 DISAPPROVAL	
5-208.28 1242		APPROVAL: BASELINE REMEDIAL STRATEGY REPORT RESPONSE TO COMMENTS	01/29/98	OEPA DOE-FEMP	1 APPROVAL	
5-208.29 1246		A1, P2 CERTIFICATION DESIGN LETTER	01/22/98	USEPA DOE-FEMP	4 COMMENTS	
5-209.8 1178	DOE-0281-98	TRANSMITTAL OF RESPONSES TO OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT FINAL BASELINE REMEDIAL STRATEGY REPORT, REMEDIAL DESIGN FOR AQUIFER RESTORATION	12/19/97	DOE-FEMP EPAS	20 RESPONSES	
5-209.9 1210	DOE-0350-98	RESPONSES TO OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE PADDY'S RUN EMBANKMENT STABILIZATION WORK PLAN AND DESIGN	01/20/98	DOE-FEMP EPAS	5 RESPONSES	
5-404.10 1139	204540-PSP-0001 RE	PROJECT SPECIFIC PLAN WAC ATTAINMENT OF COLLAPSED SOIL IN PADDY'S RUN	10/01/97	DOE-FEMP EPAS	60 PSP	
5-404.11 1140	55200-PSP-0002 REV	PROJECT SPECIFIC PLAN FOR PRE-DESIGN INVESTIGATION OF TECHNETIUM-99 IN SOIL IN THE SEWAGE TREATMENT PLANT AREA - SEPTEMBER 1997	09/01/97	DOE-FEMP EPAS	65 PSP	
5-404.12 1150	DOE-0236-98	SUBMITTAL OF THE PROJECT SPECIFIC PLAN FOR THE SAMPLING OF AREA 1, PHASE 1 WEST IMPACTED SOIL STOCKPILE FOR WASTE ACCEPTANCE CRITERIA ATTAINMENT	12/12/97	DOE-FEMP EPAS	34 PSP	

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5-404.13 1171	DOE-0261-98	SUBMITTAL OF THE PROJECT SPECIFIC PLAN FOR SAMPLING THE NORTHEAST CORNER OF AREA 3	12/22/97	DOE-FEMP EPAS	75 PSP	
5-404.14 1190	DOE-0311-98	PROJECT SPECIFIC PLAN FOR LEAD DELINEATION IN THE AREA 2 PHASE 1 FIREING RANGE - FINAL DOCUMENT	01/07/98	DOE-FEMP EPAS	100 PSP	
5-404.15 1209	DOE-0329-98	TRANSMITTAL OF VARIANCES TO PROJECT SPECIFIC PLANS	01/20/98	DOE-FEMP EPAS	7 LETTER	
5-404.7 1136	20710-PSP-0003 REV	AREA 1 PHASE II PRE-DESIGN INVESTIGATION SURVEY PROJECT SPECIFIC PLAN - AUGUST 1997	08/01/97	DOE-FEMP EPAS	50 PSP	
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5-404.9 1138	55200-PSP-0003 REV	AREA 1, PHASE II PROJECT SPECIFIC PLAN FOR PERCHED WATER SAMPLING AT THE SEWAGE TREATMENT PLANT - SPETEMBER 1997	09/01/97	DOE-FEMP EPAS	50 PSP	
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