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EXPLANATION OF SIGNIFICANT DIFFERENCES FOR OPERABLE UNIT 4 REMEDIAL ACTIONS

UNITED STATES DEPARTMENT OF ENERGY
FERNALD CLOSURE PROJECT
FERNALD, OHIO

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Revision A

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1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

1.1 BACKGROUND

The Fernald Closure Project (FCP) is a former uranium processing facility located in Hamilton and Butler Counties, Ohio approximately 18 miles northwest of Cincinnati, Ohio. The FCP is owned by the United States Department of Energy (DOE). In November 1989, the FCP site (formerly the Feed Materials Production Center [FMPC] and then the Fernald Environmental Management Project [FEMP]) was included on the National Priorities List established under the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA). The DOE is the lead agency for remediation of the FCP pursuant to the *Consent Agreement as Amended under CERCLA Sections 120 and 106(a)* (the ACA) signed with U.S. EPA in September 1991. The Ohio Environmental Protection Agency (OEPA) is also participating in the cleanup process at the site.

Operable Unit 4 is one of the five operable units identified in the ACA and consists of Silos 1, 2, and 3 and their contents, the empty Silo 4, and associated facilities. Disposal of treated Silos 1, 2, and 3 material as 11e.(2) byproduct material at the NTS was originally proposed by the DOE as a protective, compliant disposal option in the original Proposed Plan for Operable Unit 4 in February 1994. After formal public review by regulators and stakeholders in Ohio and Nevada, the DOE and U.S. EPA specified treatment by vitrification, followed by offsite disposal at the NTS, as the selected remedy for Silos 1, 2, and 3 material in the December 7, 1994 OU4 ROD. The DOE has maintained the involvement of regulators and stakeholders in the state of Nevada on a continuing basis since finalizing the OU4 ROD. This involvement has included:

- Numerous briefings and 16 public meetings and hearings in Nevada during reevaluation and modification of the OU4 remedy;
- Tours of the FCP, and the processing facilities for the Silo materials for members of the Nevada Test Site Citizens Advisory Board (NTSCAB);
- Status reports and formal and informal briefings on plans and status of FCP activities for the Nevada Department of Environmental Protection (NDEP); and
- Maintaining representatives of the NDEP as standing members on the NTS Waste Acceptance Review Panel, responsible for reviewing and recommending approval of waste streams proposed for disposal at the NTS.

Subsequent revisions to the remedy for Silo 3 (Explanation of Significant Differences (ESD) in March 1998, and ROD Amendment in September 2003) modified the selected remedy for Silo 3 to treatment to the extent practical to reduce dispersability and mobility of heavy metals, followed by off-site disposal at the NTS or an appropriately permitted commercial disposal facility (PCDF).

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Revisions to the remedy for Silos 1 and 2 (ROD Amendment in June 2000 and ESD in November 2003) modified the selected remedy for Silos 1 and 2 to treatment by chemical stabilization, followed by off-site disposal at the NTS or a PCDF.

1.2 CIRCUMSTANCES GIVING RISE TO PREPARATION OF AN ESD FOR OPERABLE UNIT 4

Since the Operable Unit 4 ROD Amendment and its subsequent modifications were finalized, the DOE and U.S. EPA have evaluated alternatives for ensuring implementation and completion of the remedy in the most expeditious manner. The primary circumstance giving rise to this evaluation involves legal issues raised by the state of Nevada concerning the currently identified disposal remedy. As documented in recent letters from the Attorney General of the State of Nevada to the DOE (letters dated April 13, 2004, and August 23, 2004) the Nevada Attorney General has requested that DOE respond to several legal issues concerning disposal of the treated Silo materials at the NTS. These letters, and the DOE's response, are contained in the appendix to this ESD.

DOE's efforts to resolve the issues with the State of Nevada have included:

- Discussions with the State of Nevada
- Creation of a DOE team to find and implement potential solutions to issues raised
- April 30,2004 commitment to review legal issues raised by Nevada Attorney General, and to provide 45-day notification prior to initiating shipment of Silo material to the NTS
- July 28, 2004 letter to the State of Nevada clarifying DOE's legal position that disposal at the NTS in accordance with the 1994 ROD is legal, protective, and compliant

It is U.S. EPA's and DOE's position that the current OU4 remedy, originally specified in 1994 with input from regulatory agencies and stakeholders in the states of Ohio and Nevada, is legal, compliant, and fully implementable. A September 27, 2004 letter from the U.S. EPA Region V to the DOE states:

> "Historically, disposal of Silo materials at the Nevada test Site (NTS) has been a component of the Silos Project remedy since 1994 as stated in the 1994 *Record of Decision for Remedial Actions for Operable Unit 4(ROD)*. Off-site disposal of the Silo materials is also a key component of the 'balanced approach' that included Ohio stakeholder acceptance of a 2-million cubic yard onsite disposal facility at Fernald. DOE expended great effort to work with the State of Nevada and its stakeholders to ensure the disposal of Silo materials at NTS."

Although the DOE remains committed to the disposal component of the current remedy, the DOE is also committed to resolving the issues raised by the Attorney General of the State of Nevada in the most

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expeditious manner. Therefore, it is DOE's position that the changes addressed under this ESD are to required in order to:

- Maintain continuing progress towards completing treatment and off-site disposal of the Silo materials in the most cost-effective and expeditious manner;
- Minimize risk to the public and the environment due to continued storage of silo materials in their in current configuration as soon as possible;
- Maintain progress towards the scheduled 2006 closure of the FCP; and
- Continue to honor its commitment to respond to stakeholder concerns.

The change addressed under this ESD consists of allowing the option for temporary offsite storage of Silo materials, after necessary treatment, prior to permanent offsite disposal at the NTS and/or a PCDF.

1.3 REGULATORY BASIS

Pursuant to Section 117 of CERCLA as amended and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 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, and cost." The OU4 ROD has always provided for off-site management of the Silo materials in the form of transportation to and disposal at a protective off-site facility. As defined by this ESD, temporary offsite storage at a government-owned facility or a properly permitted commercial facility is a form of offsite management in accordance with the same criteria applied under the current ROD. In addition, since the revised remedy would 1) maintain the final remedy of protective, permanent offsite disposal of silo material; 2) limit offsite storage to a finite period of time prior to permanent offsite disposal; 3) maintain all current criteria for treatment, packaging, transportation & disposal; 4) preclude return of the material to FCP; and 5) the cost, schedule, and risk-reduction benefits of adding this incremental step in offsite management of the silo material outweigh the incremental cost of storage, there is no fundamental change to the scope, performance, or cost of the remedy. Adding the option for temporary offsite storage prior to final disposal represents a significant, but not fundamental, change to the current OU4 remedy.

The DOE prepared a Supplement Analysis evaluating the need for additional National Environmental Policy Act (NEPA) evaluation of this change in the OU4 Remedy. The supplement analysis was made available to the public and subsequently approved by the DOE xx/xx/2004. The Supplement Analysis documents DOE's determination that the original OU4 Feasibility Study/Proposed Plan/Environmental

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Impact Statement, and subsequent Supplement Analyses provided sufficient evaluation of the OU4 remedy and therefore the change addressed by this ESD requires no additional NEPA documentation.

1.4 ADMINISTRATIVE RECORD

This ESD will become part of the Administrative Record pursuant to 40 CFR 300.825(a)(2). This ESD, as well as the NEPA Supplement Analysis and other supporting information, will be available to the public at the Public Environmental Information Center (PEIC), 7400 Willey Road, Hamilton, Ohio. The PEIC is open from 7:30 a.m. to 5:00 p.m. on Tuesday and Thursday and may be contacted at (513) 648-5051.

2.0 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 SUMMARY OF SITE OPERATING HISTORY

Operating as the FMPC between 1951 and 1989, the site produced high purity uranium metal products in support of national defense programs. The site consists of approximately 1,050 acres encompassing three primary areas: the former production area, the waste storage area, and adjacent forest/pasture land. The former production area is a 136-acre tract at the center of the site. The waste storage area, which includes the OU4 area, is located west of the former production area. In 1989, operations ceased and efforts were focused on environmental restoration and waste management activities. In 1991, the site name changed to the FEMP to recognize this new emphasis. In 2003, the site name changed again to the FCP to reflect the increased focus on final site closure.

The ACA organized the remediation of the FCP into five operable units. Operable Units 1 through 4 are considered source operable units while Operable Unit 5 encompasses all environmental media, both on and off FCP property. The final remedial actions include: facility decontamination and dismantlement; on-site disposal of the majority of contaminated soil and debris; off-site disposal of the contents of Silos 1 and 2, Silo 3, waste pit material, nuclear product inventory, low-level waste, mixed waste, and limited quantities of soil and debris not meeting on-site waste acceptance criteria; and treatment of contaminated groundwater to restore the Great Miami Aquifer. Records of Decision have been finalized for all five operable units, and current site activities consist entirely of implementing remedial actions in accordance with the final RODs, and enforceable milestones established under the ACA.

DOE's current baseline schedule forecasts the completion of the OU4 remedy by March 31, 2006. The DOE has completed construction and testing of facilities described in the OU4 remedy selection and

remedial design/remedial action documents to retrieve, treat, and package material from Silos 1, 2, and 3 for off-site disposal. DOE has initiated the process of transferring material from Silos 1 and 2 into tanks for storage pending subsequent transfer to the Silos 1 and 2 Remediation Facility for treatment and packaging.

DOE and U.S. EPA have recently agreed to extend milestones for initiating operation of the Silo 3 and Silos 1 and 2 Remediation facilities, in recognition of the issues discussed in this ESD. Facilities, personnel, and support systems are in place, however, to support completing the processing, packaging and offsite disposal of the Silos 1, 2, and 3 material, as well as subsequent remediation and site closure activities, in accordance with the current approved ROD and baseline schedule. DOE and U.S. EPA agree that the change described by this ESD, which affords DOE flexibility to use temporary offsite storage if required, will further ensure completion as currently scheduled.

The option of off-site interim storage is necessary because the Nevada Attorney General recently requested that the DOE respond to concerns regarding disposal of the Silo materials at NTS as specified in the 1994 OU4 ROD (letters dated April 13, 2004, and August 23, 2004). While DOE and U.S. EPA believe that the remedy specified in the OU4 ROD is legal, protective, and implementable, DOE prefers to work with the Nevada Attorney General to resolve his concerns prior to proceeding. However, the timeframe for completing this process is uncertain and, in the end, it may be preferable to pursue other off-site disposal options.

Halting progress on processing and offsite disposal of the Silo materials pending resolution of the Nevada Attorney General's concerns is impracticable. Not only would DOE risk missing an enforceable milestone but facilities, procedures, and qualified and trained workers are in place to operate the complicated processing equipment. Delaying operation of the facilities will result in significant costs to maintain these resources in a status to allow effective initiation of operation. In addition, delay risks extensive retraining and significant delays in startup schedules and, eventually, the loss of the key knowledge and resources required to effectively initiate safe operation of the facilities.

In addition, other elements of the Fernald cleanup could be delayed, resulting in substantial cost and schedule impacts to the overall closure of the FCP. For example, final closure of the On-site Disposal Facility (OSDF) could be delayed since some demolition debris and contaminated soil from OU4 are expected to be disposed in the OSDF.

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2.2 CONTENTS OF SILOS 1, 2, and 3

Silos 1 and 2 contain a total of 8,012 cubic yards of 11e.(2) byproduct material and a total of 878 cubic yards of BentoGrout clay for a total volume of 8,890 cubic yards. The BentoGrout clay layer was added in 1991 to the Silos 1 and 2 material in order to reduce the radon emanation. The materials in Silos 1&2 are moisture-rich, silty, and clay-like materials. Radionuclides at significant activity levels within these silos are actinium-227, radium-226, thorium-230, polonium-210, and lead-210. These radionuclides are naturally occurring elements found in the original ores. Non-radiological constituents detected in significant concentrations in Silos 1 and 2 material include sodium, magnesium, nickel, barium, lead, calcium, and iron (also naturally constituents from the original ore), and tributyl phosphate (a solvent used in the former uranium extraction process at the FCP). Tests performed on samples of stored material identified that lead could leach from the untreated material in levels that thresholds for leachability as measured through the toxicity characteristic leaching procedure (TCLP) laboratory test.

Silo 3, contains 5,088 cubic yards of 11e.(2) byproduct material consisting of cold metal oxides, a by-product material generated during Fernald's uranium processing operations. The predominant radionuclide of concern identified within the material is thorium-230, which is produced from the natural decay of uranium-238. The materials contained in Silo 3 consist of relatively dry, powder-like residues that were placed in the silo over the time period 1954 to 1957. The residues consist of the metallic and non-metallic impurities that remained following the extraction of uranium from ore and ore concentrates in Fernald's refinery operations during the mid-1950s. The residues were prepared for storage following a volume reduction and concentration step known as calcining, which is a roasting process in the presence of lime that serves to remove moisture and convert the impurities to their more stable (less leachable) oxide form. Following calcining, the dry residues were pneumatically conveyed to Silo 3 for longer-term interim storage as part of DOE's ongoing custodial responsibility for the materials. Silo 3 materials have a much lower radium content than the K-65 materials, and therefore Silo 3 exhibits a much lower direct radiation field and has a substantially lower radon-222 emanation rate compared to Silos 1&2. The Silo 3 materials are dry and powdery, with ambient moisture contents ranging from 3 to 10 percent by weight. Some analyses of Silo 3 material have exhibited levels of four metals (arsenic, cadmium, chromium, and selenium) such that they can exceed thresholds for leachability as measured through the TCLP laboratory test.

As consistently documented and subjected to regulator and public review in the original OU4 ROD (December 1994) and in its subsequent modifications, the residues contained in Silos 1, 2, and 3 consist solely of byproduct material under Section 11e.(2) of the Atomic Energy Act of 1954 as amended (AEA),

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and have been managed by the DOE pursuant to its authority under the AEA since their original generation. The designation as 11e.(2) byproduct material acknowledges the origin of the materials and identifies that they consist of tailings or wastes that were produced by the extraction and concentration of uranium from ores that were processed primarily for their source material content. The designation as 11e.(2) material was formally documented in 1984 when the DOE assumed ownership of the residues, and has been consistently documented and subjected to regulatory agency, state, and public review in the 1994 OU4 ROD and each of its subsequent modifications. Further, Section 312 of the 2004 Energy and Water Development Appropriations Act (Public Law 108-137) states that the Silo material "shall be considered byproduct material as defined by Section 11e.(2) of the Atomic Energy Act of 1954, as amended." In House Report 108-554, Congress clarifies that "The language included in the Energy and Water Development Appropriations Act, 2004 was intended to allow the Department to consider commercial NRC-regulated disposal options as well as the use of government-owned disposal sites," such as the NTS, which do not require NRC licenses.

As 11e.(2) byproduct materials, the residues are statutorily excluded from the definition of solid and hazardous waste under the Resource Conservation and Recovery Act (RCRA) of 1976; this statutory exclusion is described in the RCRA regulations under 40 CFR 261.4(a)(4). Specific regulatory requirements for management of the byproduct materials are defined through the AEA regulations and accompanying DOE Orders, policies and directives.

2.3 OPERABLE UNIT 4 SELECTED REMEDY

The Operable Unit 4 ROD was signed and effective on December 7, 1994. The following documents modified the remedy documented in the original ROD:

- Explanation of Significant Differences for Operable Unit 4 Silo 3 Remedial Action, signed and effective March 27, 1998
- ROD Amendment for Operable Unit 4 Silos 1 and 2 Remedial Action, signed and effective on July 13, 2000
- ROD Amendment for Operable Unit 4 Silo 3 Remedial Action, signed and effective on September 24, 2003
- Explanation of Significant Differences for Operable Unit 4 Silos 1 and 2 Remedial Action, signed and effective November 24, 2003

Each of the remedy modifications identified above was documented, subjected to formal public review, and approved in accordance with CERCLA and the NCP.

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The current selected remedy defined in the OU4 ROD and its subsequent revisions consists of:

- Removal of the contents of Silos 1 and 2 and the Decant Sump Tank System sludge from the Silos and transfer to the Transfer Tank Area for storage pending subsequent transfer to the Silos 1 and 2 Remediation Facility;
- Complete removal of contents of Silos 1 and 2 and the Decant Sump Tank System sludge from the Transfer Tank Area followed by treatment using chemical stabilization to attain the disposal facility waste acceptance criteria;
- Removal of material from Silo 3 by pneumatic and/or mechanical processes, followed by treatment to the extent practical by addition of a chemical stabilization reagent and a reagent to reduce dispersability
- Off-site shipment and disposal of the treated silo materials at the NTS and/or an appropriately permitted commercial disposal facility;
- Gross decontamination, demolition, size reduction, and packaging of the Silos 1, 2, and 3 structures and remediation facilities in accordance with the Operable Unit 3 ROD;
- Shipment of the concrete from the Silos 1 and 2 structures for off-site disposal at the NTS or an appropriately permitted commercial disposal facility;
- Disposal of contaminated soil and debris, excluding concrete from Silos 1 and 2 structures, in accordance with the FCP On-Site Disposal Facility waste acceptance criteria or an appropriate off-site disposal facility, such as the NTS or a permitted commercial disposal facility;
- Removal of the earthen berms and excavation of the contaminated soils within the Operable Unit 4 boundary to achieve the remediation levels outlined in the Operable Unit 5 ROD;
- Appropriate treatment and disposal of all secondary wastes at either the NTS or an appropriately permitted commercial disposal facility;
- Collection of perched water encountered during remedial activities for treatment at Operable Unit 5 water treatment facilities;
- Continued access controls and maintenance and monitoring of the stored waste inventories; and
- Institutional controls of the Operable Unit 4 area such as deed and land-use restrictions.

3.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THE CHANGE

3.1 SUMMARY OF DIFFERENCES

The change to the OU4 remedy defined by this ESD consists of the potential addition of an incremental step in the offsite management of the silo materials (temporary storage), prior to final disposal in accordance with the current remedy. The modified remedy will maintain all of the components of the existing remedy, as described above, unchanged. The change addressed by this ESD is limited to allowing the option for temporary offsite storage of treated silo materials prior to final offsite disposal in

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accordance with the current OU4 remedy. In order to ensure that there is not a fundamental change to the scope, performance, or cost of the OU4 remedy, the modified remedy will include the following constraints:

- Temporary offsite storage must be at an offsite government-owned facility in accordance with the appropriate DOE-orders and other applicable regulations or at a commercial facility appropriately permitted by the relevant regulatory agency.
- Storage will be limited to a period of two years. No more than two years from the date storage of material from a particular silo is initiated, the material from that silo must be either 1) permanently disposed at the storage facility in accordance with the OU4 remedy and all applicable regulatory requirements, or 2) transported to the NTS and/or a PCDF for permanent disposal.
- Under no circumstances will it be allowable for the silo material to be returned to the FCP after it has been transported to an offsite facility for temporary storage and/or final disposal.
- Transportation from FCP to the storage facility, and any subsequent transportation to a disposal facility must meet the transportation risk criteria and all other criteria and applicable regulations specified by the current remedies.

3.2 BASIS FOR CHANGE

3.2.1 Original OU4 Remedial Action Objectives

The basis for selection of the original remedy for OU4, and for the subsequent modifications, was attainment of the Remedial Action Objectives for OU4 identified in the OU4 Feasibility Study Report, issued in February 1994. The original OU4 Remedial Action Objectives consisted of:

- Prevent 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.

Due to the uncertain structural life of the silos, one of the primary potential exposure pathways identified in the Baseline Risk Assessment that supported the OU4 FS was the risk of exposure to the release of Silo material resulting from the structural failure of the silo structure that would be assumed to occur in the long-term. The expeditious retrieval, treatment and offsite packaging of Silo material, thereby eliminating the risk to the public and the environment associated with continued storage in the silos, is critical to the fundamental objectives of the OU4 remedial action.

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3.2.2 Uncertainty With Current Off-site Disposal Options and Emergence of Potential New Options

Subsequent to the approval of the 1994 OU4 ROD, the DOE identified commercial disposal facilities which were either considering or were in the process of obtaining appropriate permitting as potential additional options for offsite disposal of the treated silo material. Subsequent modifications of the OU4 remedy added the alternative for disposal of treated Silo materials at an appropriately permitted commercial disposal facility in addition to the already-approved option of disposal at the NTS.

In an effort to proceed to the next steps in the approved remedy in the most expeditious manner, DOE has evaluated potential alternatives to disposal at the NTS in parallel with its ongoing efforts to resolve the previously discussed issues with the State of Nevada (Section 1.2). Preliminary evaluation has identified potential options, such as temporary offsite storage prior to transfer to the NTS or permitted commercial disposal facility, and alternate offsite disposal locations. These alternate paths could allow continuation the onsite portions of the OU4 remedy to continue as scheduled, and allow an incremental step towards permanent offsite disposal, while current efforts to initiate permanent disposal at the NTS and/or a PCDF are concluded.

3.2.3 Impact of Delaying OU4 Remedial Actions

The DOE is currently in the final stages of implementing the remediation of the FCP in accordance with its agreements with U.S. EPA in accordance with the ACA, as well as its commitments to the state of Ohio and other stakeholders. The final remedial actions defined under the ACA include facility decontamination and dismantlement; on-site disposal of the majority of contaminated soil and debris; off-site disposal of the contents of Silos 1 and 2, Silo 3, waste pit material, nuclear product inventory, low-level waste, mixed waste, and limited quantities of soil and debris not meeting on-site waste acceptance criteria; and treatment of contaminated groundwater to restore the Great Miami Aquifer.

Facilities for the treatment, and packaging of Silo 3 material have been constructed, tested, and demonstrated to be ready for safe operation. Facilities for treatment and packaging of Silos 1 and 2 material have been constructed and are anticipated to be verified as ready for operation in December 2004. While these facilities can be maintained in a state of readiness to allow initiation of operations within a short period of time, the cost to maintain equipment in operable condition, as well as the time

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and cost required to effectively initiate operation will quickly result in a significant cost impact. These impacts increase significantly the longer startup is delayed, and include:

Silo 3

- Maintain up to 70 personnel on standby status
- Hire and train 16 chemical operators and 4 supervisors (standby beyond 3 months)
- Termination of project personnel; re-staffing and retraining adds six months to schedule for startup (standby beyond six months)
- While the costs of maintaining the facility in operational status can, for a limited period of time, be mitigated by temporarily assigning personnel to training and other temporary activities, standby will eventually require all resources to be maintained on full-time standby status, resulting in costs of up to $1 million per month.

Silos 1 and 2

- Maintain up to 200 personnel on standby status
- Standby charges for container vendors for storage of empty containers; standby charges for transportation vendors (standby beyond one month)
- Termination / settlement charges for demobilization of disposal container and transportation vendors (standby beyond 6 months)
- Termination of project personnel; re-staffing and retraining adds six months to schedule for startup (standby beyond six months
- While the costs of maintaining the facility in operational status can, for a limited period of time, be mitigated by temporarily assigning personnel to training and other temporary activities, standby will eventually require all resources to be maintained on full-time standby status, resulting in costs of up to $4 million per month.

Further, the ability to maintain this state of readiness decreases over time due to loss of personnel and degradation of equipment and technical expertise, eventually resulting in a substantial risk of being unable to effectively initiate operations.

In addition to the costs and risk impacts on OU4 remediation, delay in implementing the remaining on-site portions of the OU4 remedy have significant cost and schedule impacts on overall FCP closure. Removal, treatment, and offsite disposal of the Silo materials, Decontamination and Demolition (D&D) of the Silo structures and remediation facilities (scheduled for completion by December 2005), and the subsequent disposition of D&D debris and soil prior to closure of the OSDF, define the critical path for completion of site closure, currently scheduled for March 31, 2006. Due to their position on the critical path towards site closure, delaying retrieval and treatment of Silo materials and the subsequent D&D and soil remediation activities have substantial cost and schedule impacts due to factors such as delaying the

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phase-out of the site infrastructure, and impacting the ability to dispose of soil and D&D debris in the FCP On-site Disposal Facility (OSDF). Potential impacts include:

- Day-for-day delay in completing FCP closure
- Inability to complete safe shutdown and D&D of Silo structures and remediation facilities, and remediation of underlying soil, prior to the March 2006 scheduled closure of the OSDF, necessitating either
    1. Offsite disposal of soil and debris; or
    2. Delaying closure of the OSDF

  The potential impact of delaying OU4 D&D and soil remediation is estimated to be up to $*xxx* million.

3.2.3 Statement of Significant Difference

The DOE and the U.S. EPA remain committed to timely and cost effective implementation of the current OU4 remedy, which was proposed, demonstrated to be compliant and protective of human health and the environment, and approved in accordance with CERCLA and the NCP. Addition of the option for temporary offsite storage of treated silo material, prior to permanent offsite disposal maximizes DOE's ability to achieve the fundamental objectives of the OU4 remedial action and complete closure of the FCP in a timely and cost effective manner, while honoring its continuing commitment to consider stakeholder concerns during the remedial action process. The revised remedy still specifies appropriate treatment, packaging and protective offsite disposal of all Silo 1, 2, and 3 material. Further, if implemented as specified in this ESD, temporary offsite storage would maintain compliance with all remedial action objectives, ARARs, and other criteria associated with the current OU4 remedy.

The potential cost of temporary offsite storage of the Silo materials is not expected to be sufficient to represent a fundamental change to the overall cost of the remedy. The costs projected in the documents defining the current remedies are as follows:

Silo 3[1]		Silos 1 and 2[2]	
Transportation:	$ 1.8 Million	Transportation:	$14 million
Disposal:	$5.4 Million	Disposal:	$10 million
Total Cost	$42.4 Million	Total Cost	$300 million

[1]Estimated costs from Revised Proposed Plan for Silo 3, April 2003

[2] Estimated costs from ROD Amendment for OU4 Silos 1 and 2 Remedial Actions, June 2000

The actual cost of temporary offsite storage will be determined through the government procurement process and will depend upon factors including the specifics of the selected offsite facility(s); the material to be stored (Silo 3, Silos 1 and 2, a fraction of either, or both), and the length of the storage period.

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Based upon rough order of magnitude estimates, the maximum cost of temporary offsite storage of Silo 3 and/or Silos 1 and 2 materials for the entire two-year period allowed under this ESD is not expected to exceed 5-10% of the total estimated cost of the current remedies for these materials. Costs for transportation from the FCP to a temporary offsite storage facility, and subsequent disposal at either the storage facility, or at a subsequent offsite facility, will be equivalent to the transportation and disposal costs estimated for the current remedy. If transportation were to be required from a storage facility to another offsite facility for disposal, the additional costs would be equivalent to the transportation cost reflected above. Based upon the above estimates, the "worst case" incremental cost of temporary offsite storage (storage of the material from all three silos for the entire two-year period, with subsequent transportation to a disposal site) would be well below the level requiring reevaluation of the OU4 remedy by the EPA Remedy Review Board. Further, the cost, schedule, and risk-reduction benefits of adding this incremental step in offsite management of the silo material would outweigh the incremental cost of storage.

Adding the option for temporary offsite storage represents a significant, but not fundamental, change to the current remedy with respect to scope, performance, and cost.

4.0 AFFIRMATION OF THE STATUTORY DETERMINATIONS

Considering the new information that has become available and the changes that have been made to the selected remedy, DOE and U.S. EPA believe that the revised remedy meets all of the statutory requirements of Section 121 of CERCLA as amended. The revised remedy 1) is protective of human health and the environment, 2) complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and 3) since the cost of the revised remedy would remain proportional to its overall effectiveness, the revised remedy is cost-effective.

5.0 PUBLIC PARTICIPATION

The following is an example of the public participation section – the information will be filled in in detail after completion of the public comment period.

The draft final ESD was made available for public inspection for formal public comment from xx, xx, 2004 through xx, xx, 2004. A notification that included a brief description of the changes being considered was published in a newspaper of general circulation, in accordance with 40 CFR 300.435(c)(2)(i). On XXXX, 2004, notification of the availability of the draft final ESD document for public review and comment appeared in the Cincinnati Enquirer, The Hamilton Journal, and the Harrison

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Press. A In addition to newspaper notification, post cards announcing this public review and comment period were mailed to XXX key Fernald stakeholders.

A formal public hearing was held on xx xx, 2004 at yyyy. A presentation was made by DOE-FEMP on the proposed changes and a question and answer period was conducted. The formal comment period followed this question and answer period. A court reporter was present to record and prepare a transcript of the formal comment period.]

As a result of this public comment period *[and public hearing]*, the DOE-FEMP received comments from XX individuals. A responsiveness summary to all comments received has been prepared and is Attachment 1 to this final ESD. In addition, copies of the actual comments received and the transcript from the public hearing is included as Attachment 2 to this final ESD.

State of Ohio Environmental Protection Agency

Southwest District Office

401 East Fifth Street
Dayton, Ohio 45402-2911

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Bob Taft, Governor
Maureen O'Connor, Lt. Governor
Christopher Jones, Director

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November 10, 2004

William J. Taylor
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Re: Draft Explanation of Significant Differences for Operable Unit 4

Dear Mr. Taylor:

Ohio EPA has reviewed the document "Draft Explanation of Significant Differences for Operable Unit 4," received on October 27, 2004. After review, we have no comments and therefore approve this document.

If you have any questions, please contact me at (937) 285-6466.

Sincerely,

Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S. EPA
Ruth Vandergrift, ODH
Michelle Cullerton, Tetra Tech EM Inc.
Mark Shupe, HSI GeoTrans

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EXPLANATION OF SIGNIFICANT DIFFERENCES FOR OPERABLE UNIT 4 REMEDIAL ACTIONS

UNITED STATES DEPARTMENT OF ENERGY
FERNALD CLOSURE PROJECT
FERNALD, OHIO

October 2004

40000-RP-0037
Revision A

Robert Warther, Manager — Date
United States Department of Energy – Ohio Field Office

Richard C. Karl, Director — Date
Superfund Division
United States Environmental Protection Agency – Region 5

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1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

1.1 BACKGROUND

The Fernald Closure Project (FCP) is a former uranium processing facility located in Hamilton and Butler Counties, Ohio approximately 18 miles northwest of Cincinnati, Ohio. The FCP is owned by the United States Department of Energy (DOE). In November 1989, the FCP site (formerly the Feed Materials Production Center [FMPC] and then the Fernald Environmental Management Project [FEMP]) was included on the National Priorities List established under the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA). The DOE is the lead agency for remediation of the FCP pursuant to the *Consent Agreement as Amended under CERCLA Sections 120 and 106(a)* (the ACA) signed with U.S. EPA in September 1991. The Ohio Environmental Protection Agency (OEPA) is also participating in the cleanup process at the site.

Operable Unit 4 is one of the five operable units identified in the ACA and consists of Silos 1, 2, and 3 and their contents, the empty Silo 4, and associated facilities. Disposal of treated Silos 1, 2, and 3 material as 11e.(2) byproduct material at the NTS was originally proposed by the DOE as a protective, compliant disposal option in the original Proposed Plan for Operable Unit 4 in February 1994. After formal public review by regulators and stakeholders in Ohio and Nevada, the DOE and U.S. EPA specified treatment by vitrification, followed by offsite disposal at the NTS, as the selected remedy for Silos 1, 2, and 3 material in the December 7, 1994 OU4 ROD. The DOE has maintained the involvement of regulators and stakeholders in the state of Nevada on a continuing basis since finalizing the OU4 ROD. This involvement has included:

- Numerous briefings and 16 public meetings and hearings in Nevada during reevaluation and modification of the OU4 remedy;
- Tours of the FCP, and the processing facilities for the Silo materials for members of the Nevada Test Site Citizens Advisory Board (NTSCAB);
- Status reports and formal and informal briefings on plans and status of FCP activities for the Nevada Department of Environmental Protection (NDEP); and
- Maintaining representatives of the NDEP as standing members on the NTS Waste Acceptance Review Panel, responsible for reviewing and recommending approval of waste streams proposed for disposal at the NTS.

Subsequent revisions to the remedy for Silo 3 (Explanation of Significant Differences (ESD) in March 1998, and ROD Amendment in September 2003) modified the selected remedy for Silo 3 to treatment to the extent practical to reduce dispersability and mobility of heavy metals, followed by off-site disposal at the NTS or an appropriately permitted commercial disposal facility (PCDF).

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Revisions to the remedy for Silos 1 and 2 (ROD Amendment in June 2000 and ESD in November 2003) modified the selected remedy for Silos 1 and 2 to treatment by chemical stabilization, followed by off-site disposal at the NTS or a PCDF.

1.2 CIRCUMSTANCES GIVING RISE TO PREPARATION OF AN ESD FOR OPERABLE UNIT 4

Since the Operable Unit 4 ROD Amendment and its subsequent modifications were finalized, the DOE and U.S. EPA have evaluated alternatives for ensuring implementation and completion of the remedy in the most expeditious manner. The primary circumstance giving rise to this evaluation involves legal issues raised by the state of Nevada concerning the currently identified disposal remedy. As documented in recent letters from the Attorney General of the State of Nevada to the DOE (letters dated April 13, 2004, and August 23, 2004) the Nevada Attorney General has requested that DOE respond to several legal issues concerning disposal of the treated Silo materials at the NTS. These letters, and the DOE's response, are contained in the appendix to this ESD.

DOE's efforts to resolve the issues with the State of Nevada have included:

- Discussions with the State of Nevada
- Creation of a DOE team to find and implement potential solutions to issues raised
- April 30,2004 commitment to review legal issues raised by Nevada Attorney General, and to provide 45-day notification prior to initiating shipment of Silo material to the NTS
- July 28, 2004 letter to the State of Nevada clarifying DOE's legal position that disposal at the NTS in accordance with the 1994 ROD is legal, protective, and compliant

It is U.S. EPA's and DOE's position that the current OU4 remedy, originally specified in 1994 with input from regulatory agencies and stakeholders in the states of Ohio and Nevada, is legal, compliant, and fully implementable. A September 27, 2004 letter from the U.S. EPA Region V to the DOE states:

> "Historically, disposal of Silo materials at the Nevada test Site (NTS) has been a component of the Silos Project remedy since 1994 as stated in the 1994 *Record of Decision for Remedial Actions for Operable Unit 4(ROD)*. Off-site disposal of the Silo materials is also a key component of the 'balanced approach' that included Ohio stakeholder acceptance of a 2-million cubic yard onsite disposal facility at Fernald. DOE expended great effort to work with the State of Nevada and its stakeholders to ensure the disposal of Silo materials at NTS."

Although the DOE remains committed to the disposal component of the current remedy, the DOE is also committed to resolving the issues raised by the Attorney General of the State of Nevada in the most

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expeditious manner. Therefore, it is DOE's position that the changes addressed under this ESD are to required in order to:

- Maintain continuing progress towards completing treatment and off-site disposal of the Silo materials in the most cost-effective and expeditious manner;
- Minimize risk to the public and the environment due to continued storage of silo materials in their in current configuration as soon as possible;
- Maintain progress towards the scheduled 2006 closure of the FCP; and
- Continue to honor its commitment to respond to stakeholder concerns.

The change addressed under this ESD consists of allowing the option for temporary offsite storage of Silo materials, after necessary treatment, prior to permanent offsite disposal at the NTS and/or a PCDF.

1.3 REGULATORY BASIS

Pursuant to Section 117 of CERCLA as amended and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 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, and cost." The OU4 ROD has always provided for off-site management of the Silo materials in the form of transportation to and disposal at a protective off-site facility. As defined by this ESD, temporary offsite storage at a government-owned facility or a properly permitted commercial facility is a form of offsite management in accordance with the same criteria applied under the current ROD. In addition, since the revised remedy would 1) maintain the final remedy of protective, permanent offsite disposal of silo material; 2) limit offsite storage to a finite period of time prior to permanent offsite disposal; 3) maintain all current criteria for treatment, packaging, transportation & disposal; 4) preclude return of the material to FCP; and 5) since the increased cost, schedule, and risk-reduction benefits of adding this incremental step in offsite management of the silo material outweigh the incremental cost of temporary off-site storage, there is a significant but not a fundamental change to the scope, performance, or cost of the remedy ~~the cost, schedule, and risk-reduction benefits of adding this incremental step in offsite management of the silo material outweigh the incremental cost of storage, there is no fundamental change to the scope, performance, or cost of the remedy~~. Adding the option for temporary offsite storage prior to final disposal represents a significant, but not fundamental, change to the current OU4 remedy.

The DOE prepared a Supplement Analysis evaluating the need for additional National Environmental Policy Act (NEPA) evaluation of this change in the OU4 Remedy. The supplement analysis was made available to the public and subsequently approved by the DOE xx/xx/2004. The Supplement Analysis

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documents DOE's determination that the original OU4 Feasibility Study/Proposed Plan/Environmental Impact Statement, and subsequent Supplement Analyses provided sufficient evaluation of the OU4 remedy and therefore the change addressed by this ESD requires no additional NEPA documentation.

1.4 ADMINISTRATIVE RECORD

This ESD will become part of the Administrative Record pursuant to 40 CFR 300.825(a)(2). This ESD, as well as the NEPA Supplement Analysis and other supporting information, will be available to the public at the Public Environmental Information Center (PEIC), 7400 Willey Road, Hamilton, Ohio. The PEIC is open from 7:30 a.m. to 5:00 p.m. on Tuesday and Thursday and may be contacted at (513) 648-5051.

2.0 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 SUMMARY OF SITE OPERATING HISTORY

Operating as the FMPC between 1951 and 1989, the site produced high purity uranium metal products in support of national defense programs. The site consists of approximately 1,050 acres encompassing three primary areas: the former production area, the waste storage area, and adjacent forest/pasture land. The former production area is a 136-acre tract at the center of the site. The waste storage area, which includes the OU4 area, is located west of the former production area. In 1989, operations ceased and efforts were focused on environmental restoration and waste management activities. In 1991, the site name changed to the FEMP to recognize this new emphasis. In 2003, the site name changed again to the FCP to reflect the increased focus on final site closure.

The ACA organized the remediation of the FCP into five operable units. Operable Units 1 through 4 are considered source operable units while Operable Unit 5 encompasses all environmental media, both on and off FCP property. The final remedial actions include: facility decontamination and dismantlement; on-site disposal of the majority of contaminated soil and debris; off-site disposal of the contents of Silos 1 and 2, Silo 3, waste pit material, nuclear product inventory, low-level waste, mixed waste, and limited quantities of soil and debris not meeting on-site waste acceptance criteria; and treatment of contaminated groundwater to restore the Great Miami Aquifer. Records of Decision have been finalized for all five operable units, and current site activities consist entirely of implementing remedial actions in accordance with the final RODs, and enforceable milestones established under the ACA.

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DOE's current baseline schedule forecasts the completion of the OU4 remedy by March 31, 2006. The DOE has completed construction and testing of facilities described in the OU4 remedy selection and remedial design/remedial action documents to retrieve, treat, and package material from Silos 1, 2, and 3 for off-site disposal. DOE has initiated the process of transferring material from Silos 1 and 2 into tanks for storage pending subsequent transfer to the Silos 1 and 2 Remediation Facility for treatment and packaging.

DOE and U.S. EPA have recently agreed to extend milestones for initiating operation of the Silo 3 and Silos 1 and 2 Remediation facilities, in recognition of the issues discussed in this ESD. Facilities, personnel, and support systems are in place, however, to support completing the processing, packaging and offsite disposal of the Silos 1, 2, and 3 material, as well as subsequent remediation and site closure activities, in accordance with the current approved ROD and baseline schedule. DOE and U.S. EPA agree that the change described by this ESD, which affords DOE flexibility to use temporary offsite storage if required, will further ensure completion as currently scheduled.

The option of off-site interim storage is necessary because the Nevada Attorney General recently requested that the DOE respond to concerns regarding disposal of the Silo materials at NTS as specified in the 1994 OU4 ROD (letters dated April 13, 2004, and August 23, 2004). While DOE and U.S. EPA believe that the remedy specified in the OU4 ROD is legal, protective, and implementable, DOE prefers to work with the Nevada Attorney General to resolve his concerns prior to proceeding. However, the timeframe for completing this process is uncertain and, in the end, it may be preferable to pursue other off-site disposal options.

Halting progress on processing and offsite disposal of the Silo materials pending resolution of the Nevada Attorney General's concerns is impracticable. Not only would DOE risk missing an enforceable milestone but facilities, procedures, and qualified and trained workers are in place to operate the complicated processing equipment. Delaying operation of the facilities will result in significant costs to maintain these resources in a status to allow effective initiation of operation. In addition, delay risks extensive retraining and significant delays in startup schedules and, eventually, the loss of the key knowledge and resources required to effectively initiate safe operation of the facilities.

In addition, other elements of the Fernald cleanup could be delayed, resulting in substantial cost and schedule impacts to the overall closure of the FCP. For example, final closure of the On-site Disposal Facility (OSDF) could be delayed since some demolition debris and contaminated soil from OU4 are expected to be disposed in the OSDF.

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2.2 CONTENTS OF SILOS 1, 2, and 3

Silos 1 and 2 contain a total of 8,012 cubic yards of 11e.(2) byproduct material and a total of 878 cubic yards of BentoGrout clay for a total volume of 8,890 cubic yards. The BentoGrout clay layer was added in 1991 to the Silos 1 and 2 material in order to reduce the radon emanation. The materials in Silos 1&2 are moisture-rich, silty, and clay-like materials. Radionuclides at significant activity levels within these silos are actinium-227, radium-226, thorium-230, polonium-210, and lead-210. These radionuclides are naturally occurring elements found in the original ores. Non-radiological constituents detected in significant concentrations in Silos 1 and 2 material include sodium, magnesium, nickel, barium, lead, calcium, and iron (also naturally constituents from the original ore), and tributyl phosphate (a solvent used in the former uranium extraction process at the FCP). Tests performed on samples of stored material identified that lead could leach from the untreated material in levels that thresholds for leachability as measured through the toxicity characteristic leaching procedure (TCLP) laboratory test.

Silo 3, contains 5,088 cubic yards of 11e.(2) byproduct material consisting of cold metal oxides, a by-product material generated during Fernald's uranium processing operations. The predominant radionuclide of concern identified within the material is thorium-230, which is produced from the natural decay of uranium-238. The materials contained in Silo 3 consist of relatively dry, powder-like residues that were placed in the silo over the time period 1954 to 1957. The residues consist of the metallic and non-metallic impurities that remained following the extraction of uranium from ore and ore concentrates in Fernald's refinery operations during the mid-1950s. The residues were prepared for storage following a volume reduction and concentration step known as calcining, which is a roasting process in the presence of lime that serves to remove moisture and convert the impurities to their more stable (less leachable) oxide form. Following calcining, the dry residues were pneumatically conveyed to Silo 3 for longer-term interim storage as part of DOE's ongoing custodial responsibility for the materials. Silo 3 materials have a much lower radium content than the K-65 materials, and therefore Silo 3 exhibits a much lower direct radiation field and has a substantially lower radon-222 emanation rate compared to Silos 1&2. The Silo 3 materials are dry and powdery, with ambient moisture contents ranging from 3 to 10 percent by weight. Some analyses of Silo 3 material have exhibited levels of four metals (arsenic, cadmium, chromium, and selenium) such that they can exceed thresholds for leachability as measured through the TCLP laboratory test.

As consistently documented and subjected to regulator and public review in the original OU4 ROD (December 1994) and in its subsequent modifications, the residues contained in Silos 1, 2, and 3 consist solely of byproduct material under Section 11e.(2) of the Atomic Energy Act of 1954 as amended (AEA),

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and have been managed by the DOE pursuant to its authority under the AEA since their original generation. The designation as 11e.(2) byproduct material acknowledges the origin of the materials and identifies that they consist of tailings or wastes that were produced by the extraction and concentration of uranium from ores that were processed primarily for their source material content. The designation as 11e.(2) material was formally documented in 1984 when the DOE assumed ownership of the residues, and has been consistently documented and subjected to regulatory agency, state, and public review in the 1994 OU4 ROD and each of its subsequent modifications. Further, Section 312 of the 2004 Energy and Water Development Appropriations Act (Public Law 108-137) states that the Silo material "shall be considered byproduct material as defined by Section 11e.(2) of the Atomic Energy Act of 1954, as amended." In House Report 108-554, Congress clarifies that "The language included in the Energy and Water Development Appropriations Act, 2004 was intended to allow the Department to consider commercial NRC-regulated disposal options as well as the use of government-owned disposal sites," such as the NTS, which do not require NRC licenses.

As 11e.(2) byproduct materials, the residues are statutorily excluded from the definition of solid and hazardous waste under the Resource Conservation and Recovery Act (RCRA) of 1976; this statutory exclusion is described in the RCRA regulations under 40 CFR 261.4(a)(4). Specific regulatory requirements for management of the byproduct materials are defined through the AEA regulations and accompanying DOE Orders, policies and directives.

2.3 OPERABLE UNIT 4 SELECTED REMEDY

The Operable Unit 4 ROD was signed and effective on December 7, 1994. The following documents modified the remedy documented in the original ROD:

- Explanation of Significant Differences for Operable Unit 4 Silo 3 Remedial Action, signed and effective March 27, 1998
- ROD Amendment for Operable Unit 4 Silos 1 and 2 Remedial Action, signed and effective on July 13, 2000
- ROD Amendment for Operable Unit 4 Silo 3 Remedial Action, signed and effective on September 24, 2003
- Explanation of Significant Differences for Operable Unit 4 Silos 1 and 2 Remedial Action, signed and effective November 24, 2003

Each of the remedy modifications identified above was documented, subjected to formal public review, and approved in accordance with CERCLA and the NCP.

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The current selected remedy defined in the OU4 ROD and its subsequent revisions consists of:

- Removal of the contents of Silos 1 and 2 and the Decant Sump Tank System sludge from the Silos and transfer to the Transfer Tank Area for storage pending subsequent transfer to the Silos 1 and 2 Remediation Facility;
- Complete removal of contents of Silos 1 and 2 and the Decant Sump Tank System sludge from the Transfer Tank Area followed by treatment using chemical stabilization to attain the disposal facility waste acceptance criteria;
- Removal of material from Silo 3 by pneumatic and/or mechanical processes, followed by treatment to the extent practical by addition of a chemical stabilization reagent and a reagent to reduce dispersability
- Off-site shipment and disposal of the treated silo materials at the NTS and/or an appropriately permitted commercial disposal facility;
- Gross decontamination, demolition, size reduction, and packaging of the Silos 1, 2, and 3 structures and remediation facilities in accordance with the Operable Unit 3 ROD;
- Shipment of the concrete from the Silos 1 and 2 structures for off-site disposal at the NTS or an appropriately permitted commercial disposal facility;
- Disposal of contaminated soil and debris, excluding concrete from Silos 1 and 2 structures, in accordance with the FCP On-Site Disposal Facility waste acceptance criteria or an appropriate off-site disposal facility, such as the NTS or a permitted commercial disposal facility;
- Removal of the earthen berms and excavation of the contaminated soils within the Operable Unit 4 boundary to achieve the remediation levels outlined in the Operable Unit 5 ROD;
- Appropriate treatment and disposal of all secondary wastes at either the NTS or an appropriately permitted commercial disposal facility;
- Collection of perched water encountered during remedial activities for treatment at Operable Unit 5 water treatment facilities;
- Continued access controls and maintenance and monitoring of the stored waste inventories; and
- Institutional controls of the Operable Unit 4 area such as deed and land-use restrictions.

3.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THE CHANGE

3.1 SUMMARY OF DIFFERENCES

The change to the OU4 remedy defined by this ESD consists of the potential addition of an incremental step in the offsite management of the silo materials (temporary storage), prior to final disposal in accordance with the current remedy. The modified remedy will maintain all of the components of the existing remedy, as described above, unchanged. The change addressed by this ESD is limited to allowing the option for temporary offsite storage of treated silo materials prior to final offsite disposal in

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accordance with the current OU4 remedy. In order to ensure that there is not a fundamental change to the scope, performance, or cost of the OU4 remedy, the modified remedy will include the following constraints:

- Temporary offsite storage must be at an offsite government-owned facility in accordance with the appropriate DOE-orders and other applicable regulations or at a commercial facility appropriately permitted by the relevant regulatory agency.
- Storage will be limited to a period of two years. No more than two years from the date storage of material from a particular silo is initiated, the material from that silo must be either 1) permanently disposed at the storage facility in accordance with the OU4 remedy and all applicable regulatory requirements, or 2) transported to the NTS and/or a PCDF for permanent disposal.
- Under no circumstances will it be allowable for the silo material to be returned to the FCP after it has been transported to an offsite facility for temporary storage and/or final disposal.
- Transportation from FCP to the storage facility, and any subsequent transportation to a disposal facility must meet the transportation risk criteria and all other criteria and applicable regulations specified by the current remedies.

3.2 BASIS FOR CHANGE

3.2.1 Original OU4 Remedial Action Objectives

The basis for selection of the original remedy for OU4, and for the subsequent modifications, was attainment of the Remedial Action Objectives for OU4 identified in the OU4 Feasibility Study Report, issued in February 1994. The original OU4 Remedial Action Objectives consisted of:

- Prevent 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.

Due to the uncertain structural life of the silos, one of the primary potential exposure pathways identified in the Baseline Risk Assessment that supported the OU4 FS was the risk of exposure to the release of Silo material resulting from the structural failure of the silo structure that would be assumed to occur in the long-term. The expeditious retrieval, treatment and offsite packaging of Silo material, thereby eliminating the risk to the public and the environment associated with continued storage in the silos, is critical to the fundamental objectives of the OU4 remedial action.

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3.2.2 Uncertainty With Current Off-site Disposal Options and Emergence of Potential New Options

Subsequent to the approval of the 1994 OU4 ROD, the DOE identified commercial disposal facilities which were either considering or were in the process of obtaining appropriate permitting as potential additional options for offsite disposal of the treated silo material. Subsequent modifications of the OU4 remedy added the alternative for disposal of treated Silo materials at an appropriately permitted commercial disposal facility in addition to the already-approved option of disposal at the NTS.

In an effort to proceed to the next steps in the approved remedy in the most expeditious manner, DOE has evaluated potential alternatives to disposal at the NTS in parallel with its ongoing efforts to resolve the previously discussed issues with the State of Nevada (Section 1.2). Preliminary evaluation has identified potential options, such as temporary offsite storage prior to transfer to the NTS or permitted commercial disposal facility, and alternate offsite disposal locations. These alternate paths could allow continuation the onsite portions of the OU4 remedy to continue as scheduled, and allow an incremental step towards permanent offsite disposal, while current efforts to initiate permanent disposal at the NTS and/or a PCDF are concluded.

3.2.3 Impact of Delaying OU4 Remedial Actions

The DOE is currently in the final stages of implementing the remediation of the FCP in accordance with its agreements with U.S. EPA in accordance with the ACA, as well as its commitments to the state of Ohio and other stakeholders. The final remedial actions defined under the ACA include facility decontamination and dismantlement; on-site disposal of the majority of contaminated soil and debris; off-site disposal of the contents of Silos 1 and 2, Silo 3, waste pit material, nuclear product inventory, low-level waste, mixed waste, and limited quantities of soil and debris not meeting on-site waste acceptance criteria; and treatment of contaminated groundwater to restore the Great Miami Aquifer.

Facilities for the treatment, and packaging of Silo 3 material have been constructed, tested, and demonstrated to be ready for safe operation. Facilities for treatment and packaging of Silos 1 and 2 material have been constructed and are anticipated to be verified as ready for operation in December 2004. While these facilities can be maintained in a state of readiness to allow initiation of operations within a short period of time, the cost to maintain equipment in operable condition, as well as the time

and cost required to effectively initiate operation will quickly result in a significant cost impact. These impacts increase significantly the longer startup is delayed, and include:

Silo 3

- Maintain up to 70 personnel on standby status
- Hire and train 16 chemical operators and 4 supervisors (standby beyond 3 months)
- Termination of project personnel; re-staffing and retraining adds six months to schedule for startup (standby beyond six months)
- While the costs of maintaining the facility in operational status can, for a limited period of time, be mitigated by temporarily assigning personnel to training and other temporary activities, standby will eventually require all resources to be maintained on full-time standby status, resulting in costs of up to $1 million per month.

Silos 1 and 2

- Maintain up to 200 personnel on standby status
- Standby charges for container vendors for storage of empty containers; standby charges for transportation vendors (standby beyond one month)
- Termination / settlement charges for demobilization of disposal container and transportation vendors (standby beyond 6 months)
- Termination of project personnel; re-staffing and retraining adds six months to schedule for startup (standby beyond six months
- While the costs of maintaining the facility in operational status can, for a limited period of time, be mitigated by temporarily assigning personnel to training and other temporary activities, standby will eventually require all resources to be maintained on full-time standby status, resulting in costs of up to $4 million per month.

Further, the ability to maintain this state of readiness decreases over time due to loss of personnel and degradation of equipment and technical expertise, eventually resulting in a substantial risk of being unable to effectively initiate operations.

In addition to the costs and risk impacts on OU4 remediation, delay in implementing the remaining on-site portions of the OU4 remedy have significant cost and schedule impacts on overall FCP closure. Removal, treatment, and offsite disposal of the Silo materials, Decontamination and Demolition (D&D) of the Silo structures and remediation facilities (scheduled for completion by December 2005), and the subsequent disposition of D&D debris and soil prior to closure of the OSDF, define the critical path for completion of site closure, currently scheduled for March 31, 2006. Due to their position on the critical path towards site closure, delaying retrieval and treatment of Silo materials and the subsequent D&D and soil remediation activities have substantial cost and schedule impacts due to factors such as delaying the

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phase-out of the site infrastructure, and impacting the ability to dispose of soil and D&D debris in the FCP On-site Disposal Facility (OSDF). Potential impacts include:

- Day-for-day delay in completing FCP closure
- Inability to complete safe shutdown and D&D of Silo structures and remediation facilities, and remediation of underlying soil, prior to the March 2006 scheduled closure of the OSDF, necessitating either
    1. Offsite disposal of soil and debris; or
    2. Delaying closure of the OSDF

  The potential impact of delaying OU4 D&D and soil remediation is estimated to be up to $*xxx* million.

3.2.3 Statement of Significant Difference

The DOE and the U.S. EPA remain committed to timely and cost effective implementation of the current OU4 remedy, which was proposed, demonstrated to be compliant and protective of human health and the environment, and approved in accordance with CERCLA and the NCP. Addition of the option for temporary offsite storage of treated silo material, prior to permanent offsite disposal maximizes DOE's ability to achieve the fundamental objectives of the OU4 remedial action and complete closure of the FCP in a timely and cost effective manner, while honoring its continuing commitment to consider stakeholder concerns during the remedial action process. The revised remedy still specifies appropriate treatment, packaging and protective offsite disposal of all Silo 1, 2, and 3 material. Further, if implemented as specified in this ESD, temporary offsite storage would maintain compliance with all remedial action objectives, ARARs, and other criteria associated with the current OU4 remedy.

The potential cost of temporary offsite storage of the Silo materials is not expected to be sufficient to represent a fundamental change to the overall cost of the remedy. The costs projected in the documents defining the current remedies are as follows:

Silo 3[1]		Silos 1 and 2[2]	
Transportation:	$ 1.8 Million	Transportation:	$14 million
Disposal:	$5.4 Million	Disposal:	$10 million
Total Cost	$42.4 Million	Total Cost	$300 million

[1]Estimated costs from Revised Proposed Plan for Silo 3, April 2003

[2] Estimated costs from ROD Amendment for OU4 Silos 1 and 2 Remedial Actions, June 2000

The actual cost of temporary offsite storage will be determined through the government procurement process and will depend upon factors including the specifics of the selected offsite facility(s); the material to be stored (Silo 3, Silos 1 and 2, a fraction of either, or both), and the length of the storage period.

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Based upon rough order of magnitude estimates, the maximum cost of temporary offsite storage of Silo 3 and/or Silos 1 and 2 materials for the entire two-year period allowed under this ESD is not expected to exceed 5-10% of the total estimated cost of the current remedies for these materials. Costs for transportation from the FCP to a temporary offsite storage facility, and subsequent disposal at either the storage facility, or at a subsequent offsite facility, will be equivalent to the transportation and disposal costs estimated for the current remedy. If transportation were to be required from a storage facility to another offsite facility for disposal, the additional costs would be equivalent to the transportation cost reflected above. Based upon the above estimates, the "worst case" incremental cost of -temporary offsite storage (storage of the material from all three silos for the entire two-year period, with subsequent transportation to a disposal site) would be significant but not fundamental.~~well below the level requiring reevaluation of the OU4 remedy by the EPA Remedy Review Board~~. Further, the cost, schedule, and risk-reduction benefits of adding this incremental step in offsite management of the silo material would outweigh the incremental cost of temporary off-site storage.

Adding the option for temporary offsite storage represents a significant, but not fundamental, change to the current remedy with respect to scope, performance, and cost.

4.0 AFFIRMATION OF THE STATUTORY DETERMINATIONS

Considering the new information that has become available and the changes that have been made to the selected remedy, DOE and U.S. EPA believe that the revised remedy meets all of the statutory requirements of Section 121 of CERCLA as amended. The revised remedy 1) is protective of human health and the environment, 2) complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and 3) since the cost of the revised remedy would remain proportional to its overall effectiveness, the revised remedy is cost-effective.

5.0 PUBLIC PARTICIPATION

The following is an example of the public participation section – the information will be filled in in detail after completion of the public comment period.

The draft final ESD was made available for public inspection for formal public comment from xx, xx, 2004 through xx, xx, 2004. A notification that included a brief description of the changes being considered was published in a newspaper of general circulation, in accordance with 40 CFR 300.435(c)(2)(i). On XXXX, 2004, notification of the availability of the draft final ESD document for public review and comment appeared in the Cincinnati Enquirer, The Hamilton Journal, and the Harrison

Press. A In addition to newspaper notification, post cards announcing this public review and comment period were mailed to XXX key Fernald stakeholders.

A formal public hearing was held on xx xx, 2004 at yyyy. A presentation was made by DOE-FEMP on the proposed changes and a question and answer period was conducted. The formal comment period followed this question and answer period. A court reporter was present to record and prepare a transcript of the formal comment period.]

As a result of this public comment period *[and public hearing]*, the DOE-FEMP received comments from XX individuals. A responsiveness summary to all comments received has been prepared and is Attachment 1 to this final ESD. In addition, copies of the actual comments received and the transcript from the public hearing is included as Attachment 2 to this final ESD.