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FINAL

EXPLANATION OF SIGNIFICANT DIFFERENCES FOR OPERABLE UNIT 4 SILOS 1 AND 2 REMEDIAL ACTIONS

UNITED STATES DEPARTMENT OF ENERGY
FERNALD CLOSURE PROJECT
FERNALD, OHIO

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40750-RP-0038

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

11/7/03

William E. Muno, Director — Date
Superfund Division
United States Environmental Protection Agency – Region 5

1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE - 8273

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 of the United States Environmental Protection Agency (U.S. EPA). As the owner, DOE is the lead agency for remediation of the FCP pursuant to the Amended Consent Agreement under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended Sections 120 and 106(a) 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 Amended Consent Agreement and consists of Silos 1, 2, and 3 and their contents, the empty Silo 4, and associated facilities. A Record of Decision (ROD) for Operable Unit 4 was signed on December 7, 1994 and an Operable Unit 4 Silos 1 and 2 ROD Amendment was signed on July 13, 2000. The 1994 ROD documented vitrification and off-site disposal at the Nevada Test Site (NTS) as the selected remedy for both Silos 1 and 2 and Silo 3. The 2000 Silos 1 and 2 ROD Amendment modified the selected remedy to chemical stabilization of the Silos 1 and 2 material and off-site disposal at NTS.

1.2 CIRCUMSTANCES GIVING RISE TO PREPARATION OF AN EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD) FOR OPERABLE UNIT 4 SILOS 1 AND 2

Since the Operable Unit 4 Silos 1 and 2 ROD Amendment was issued, DOE and U.S. EPA have received new information concerning (1) the waste acceptance criteria for the NTS disposal facility, and (2) the potential availability of other commercial facilities that can accept the Silos 1 and 2 residues for disposal as byproduct materials.

The changes addressed under this ESD align the quantitative performance standards for treating the Silos 1 and 2 material stipulated in Section 2.1.3 of the Operable Unit 4 ROD Amendment with the recently revised NTS waste acceptance criteria (February 2002) and also allow the option of disposal at an appropriately permitted commercial disposal facility.

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1.3 REGULATORY BASIS

Pursuant to Section 117 of CERCLA as amended and the National Contingency Plan 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." After a review of the proposed changes to the remedy, DOE and U.S. EPA have determined that since the revised remedy will still include retrieval, chemical stabilization, and protective off-site disposal of Silos 1 and 2 material, the adjustments to the ROD provided in this ESD are significant but do not fundamentally alter the overall Silos 1 and 2 remedy with respect to scope, performance, or cost.

1.4 ADMINISTRATIVE RECORD

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), 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 Silos 1 and 2, 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.

Through the Amended Consent Agreement, the cleanup activities for the site were organized 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.

2.2 CONTENTS OF SILOS 1 AND 2

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. 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, iron, 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 can leach from the untreated material in concentrations that exceed federal guidelines for hazardous wastes.

As mentioned above, the residues contained in Silos 1 and 2 are designated by DOE as Section 11e.(2) byproduct materials under the Atomic Energy Act of 1954 as amended (AEA), which is a regulatory classification that acknowledges the origin of the materials and identifies that they consist of tailings and wastes that were produced by the extraction and concentration of uranium from ores that were processed primarily for their source material content. 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 policies and directives.

As a point of reference, although they are statutorily excluded from formal RCRA hazardous waste definitions and administrative requirements, the Silos 1 and 2 residues do contain sufficient quantities of lead, a RCRA regulated metal, such that they can exceed RCRA thresholds for leachability as measured through the RCRA toxicity characteristic leaching procedure (TCLP) laboratory test. As explained further below, this condition was a consideration in establishing remedy-specific quantitative performance levels in the 1994 Operable Unit 4 ROD and the 2000 Operable Unit 4 Silos 1 and 2 ROD Amendment for rendering the Silos 1 and 2 residues suitable for off-site disposal through treatment, in accordance with NTS waste acceptance criteria requirements at that time.

2.3 OPERABLE UNIT 4 SILOS 1 AND 2 SELECTED REMEDY

The Operable Unit 4 ROD was signed and effective on December 7, 1994 and the Operable Unit 4 Silos 1 and 2 ROD Amendment was signed and effective on July 13, 2000. The current selected remedy defined in the ROD and ROD Amendment provide for:

- 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 stabilize characteristic metals to meet RCRA toxicity characteristic limits and attain the NTS waste acceptance criteria;
- Off-site shipment and disposal of the chemically stabilized waste at the NTS;
- Decontamination and dismantlement of all structures and remediation facilities in accordance with the Operable Unit 3 ROD;
- Gross decontamination, demolition, size reduction, and packaging of concrete from Silos 1 and 2 structures followed by shipment 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 appropriate 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 selected remedy will maintain the requirement to treat the Silos 1 and 2 materials using chemical stabilization. Therefore, there will be no decrease in the benefits currently provided by the treated waste form, including a reduction in the mobility of contaminants, decreased transportation risks, and a safe, permanent disposal method. However, to cost-effectively align the remedy with the waste acceptance criteria of the disposal facilities, this ESD removes the quantitative TCLP performance standard as a relevant and appropriate regulatory requirement for execution of the Silos 1 and 2 remedy. It also allows the option of disposal of the chemically stabilized Silos 1 and 2 waste at an appropriately permitted commercial disposal facility in addition to, or instead of, the NTS. Only the first two bullets from the list above in Section 2.3 require revision. They are modified as follows:

- 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;
- Off-site shipment and disposal of the chemically stabilized waste at the NTS or an appropriately permitted commercial disposal facility.

Material from Silos 1 and 2 and from the Decant Sump Tank will be removed by a hydraulic slurry retrieval process that will transfer the bulk of the waste. It is anticipated that there will be some "heel" material in the bottoms of the silos and sump tank that will be resistant to removal by the hydraulic slurry retrieval process. A variety of techniques are available to remove this material and are currently being evaluated. The selected method(s) for heel removal will be documented in the Remedial Action Work Plan for Waste Retrieval. Following heel removal, a small amount of residual material may remain in the silos, the decant sump, or in the soil underneath the silos. For these small quantities of residues, the DOE will employ a cost effective and protective approach that may differ from the chemical stabilization treatment process. This approach will be developed in conjunction with the U.S. EPA and the Ohio EPA based on the volume and characteristics of the residues that remain. Whatever process is employed, the residual will be converted into a form that complies with the waste acceptance criteria for NTS or an appropriately permitted commercial disposal facility and with applicable transportation regulations prior to shipment and off-site disposal.

3.2 BASIS FOR CHANGE

In the 1994 Operable Unit 4 ROD, on-site vitrification and off-site disposal at the NTS of both the Silos 1 and 2 and the Silo 3 materials was selected as the preferred remedy for the Operable Unit 4 materials as a whole. Vitrification is a treatment process that heats the materials to such temperatures that the materials fuse to a glass-like state, which in turn binds up the radioactive and non-radioactive metals in the waste to a low leachability condition. At the time of the 1994 ROD, the NTS was the only available disposal location that could accept the vitrified silo materials for permanent disposal. As part of its waste acceptance criteria, the NTS required in 1994 that all treated or untreated waste accepted for disposal at the facility – regardless of its RCRA statutory exempt or non-exempt status – meet TCLP limits for toxicity characteristic constituents otherwise regulated under RCRA. Based on this disposal-facility-specific requirement, the 1994 Operable Unit 4 ROD adopted the TCLP limits as *relevant and appropriate* regulatory performance requirements for waste treatment (versus broader adoption as *applicable* requirements, since the materials continued to retain their statutorily exempt legal status). The NTS TCLP limits therefore became the relevant and appropriate quantitative performance standard in the 1994 ROD for treating the Silos 1 and 2 wastes to meet the existing waste acceptance criteria for the RCRA metal of concern (lead) contained within the Silos 1 and 2 waste.

Although the treatment component of the selected remedy was re-evaluated and modified from vitrification to chemical stabilization in the 2000 Operable Unit 4 Silos 1 and 2 ROD Amendment, the NTS TCLP limits remained the relevant and appropriate quantitative performance standards for chemically stabilizing the Silos 1 and 2 wastes.

Since the issuance of the Operable Unit 4 Silos 1 and 2 ROD Amendment, DOE and U.S. EPA received new information concerning (1) revisions to the waste acceptance criteria for the NTS disposal facility, and (2) the availability of other commercial facilities that can accept the Silos 1 and 2 residues for disposal as byproduct materials.

3.2.1 Waste Acceptance Criteria for the NTS

In February 2002, the NTS, in conjunction with the state and federal regulatory agencies that oversee the facility's waste disposal operations, updated the waste acceptance criteria for the facility. Prior to the update, the waste acceptance criteria required that "low-level waste offered for disposal *must not* exhibit characteristics of, or be listed as, hazardous waste...." This language was modified in February 2002 and now states that "waste regulated under Title 40 CFR 261-268 [the RCRA hazardous waste regulations] and state of Nevada hazardous waste regulations *shall not* be accepted for disposal." Therefore, materials that are not regulated under Title 40 CFR 261-268 or State of Nevada hazardous waste regulations, such as 11e.(2) materials or waste from the beneficiation of ores, no longer need to meet TCLP-based acceptance criteria, provided the waste is otherwise disposed of in a manner that is protective of human health and environment. As part of an eligibility evaluation, a waste profile for each waste must be reviewed individually to ensure that: (1) the waste is exempt from Federal and State of Nevada hazardous waste regulations and (2) protective requirements are met for the constituents that would otherwise be regulated under RCRA. NTS personnel have already completed an eligibility review and have determined that this material is both exempt from Federal and State of Nevada hazardous waste regulations and acceptable for disposal at NTS as 11e.(2) material (see Attachment 1).

3.2.2 Emergence of a Commercial Disposal Facility to Potentially Accept DOE 11e.(2) Materials

Also since the time that the 2000 Operable Unit 4 Silos 1 and 2 ROD Amendment was prepared, potential commercial disposal options have been identified for disposal of Silos 1 and 2 material. Similar to the revised waste acceptance criteria requirements at the NTS, a commercial facility would be able to accept treated Silos 1 and 2 materials without applying the TCLP limits as quantitative performance standards provided the material is deemed eligible for disposal by the regulatory agency, a waste-specific profile review is conducted, and all other waste acceptance criteria requirements that are applicable to the waste

are met. For purposes of this ESD, the Envirocare facility, in Clive, Utah is identified as a representative permitted commercial disposal facility that may be eligible to accept the Silos 1 and 2 material. The Envirocare facility is currently in the process of working with the State of Utah to modify their Nuclear Regulatory Commission license to allow them to accept the Silos 1 and 2 materials into their 11e.(2) disposal cell.

This new development may result in additional off-site disposal site options for DOE and U.S. EPA to consider in addition to the NTS and may result in reduced schedule and accompanying cost risks. A cost estimate shows that up to $30 million may be saved by shipping the waste to a permitted commercial disposal facility. The actual disposal facility will be selected as part of the design process and may include the NTS, an appropriately permitted commercial disposal facility that can accept the materials, or a combination of both. NTS will continue as the baseline Silos 1 and 2 waste disposal location for ongoing planning and budgeting purposes until such time that the final disposal facility selection is made.

3.2.3 Statement of Significant Difference

The new information summarized above demonstrates that it is now permissible to permanently dispose of the treated Silos 1 and 2 residues at the NTS without applying the TCLP limits as quantitative performance standards, and that a commercial facility may also be able to accept the Silos 1 and 2 materials in the near future. Based on this new information, DOE and U.S. EPA conclude that the TCLP-based waste treatment performance standard, adopted in both the 1994 ROD and the 2000 Operable Unit 4 Silos 1 and 2 ROD Amendment as a facility-specific relevant and appropriate requirement for treatment, is no longer necessary to maintain compliance with disposal facility waste acceptance requirements, either at NTS or an appropriately permitted commercial disposal facility. DOE and U.S. EPA are therefore removing the quantitative TCLP performance standard as a relevant and appropriate regulatory requirement for execution of the Silos 1 and 2 selected remedy. In addition, DOE will have the option of disposal of the treated Silos 1 and 2 material at an appropriately permitted commercial disposal facility.

3.2.4 Impact on Silos 1 and 2 Treatment and Disposal Process

Regardless of the modification to quantitative performance standards or off-site disposal options, the Silos 1 and 2 material will continue to be treated by chemical stabilization with no changes to the physical characteristics of the final waste form, the associated transportation risks, or the disposal method. Reducing the leachability of metals will continue to be a goal of the treatment process with the primary focus still being the reduction of the direct radiation levels and moisture content of the material to

facilitate safe and efficient transportation and disposal. The treatability study data collected from past and future studies will be used both to optimize the chemical stabilization process requirements and to obtain the maximum reasonably obtainable reduction in leachability. Based on this, the only procedural modification arising from this ESD will be to eliminate sampling and TCLP testing of the treated waste since it is no longer necessary for WAC demonstration purposes. The removal of that sampling step will protect employees from having to work near the open containers to obtain samples and from being exposed to radiation from the waste material during the sampling and laboratory analysis activities. Over the life of Silos 1 and 2 treatment operations and the number of repetitive sampling activities that would have been necessary, this change should reduce potential worker exposure by more than 500 millirem (mrem) over the life of the project and is consistent with DOE's As Low As Reasonably Achievable (ALARA) principles and practices. In addition, elimination of TCLP testing of the treated waste will result in a cost savings of approximately $400,000.

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) is cost effective. In addition, the revised remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable.

5.0 PUBLIC PARTICIPATION

The draft final ESD was made available for formal public comment from August 27 through September 26, 2003. A public hearing was held in the vicinity of the FCP on September 9, 2003 to provide the public with a forum to submit oral comments on the proposed revised remedy. No written or oral comments were received by DOE at the Public Hearing. The availability of the Draft Final ESD and supporting documentation, the schedule for the comment period, and the location and schedule for the public hearing, were announced in local newspapers. In addition, this information was announced on the Fernald Closure Project web site (www.fernald.gov) and communicated by direct mail to stakeholders on the FCP Public Affairs mailing list.

Comments were received from only two stakeholders during the public comment period. The comments from these two stakeholders, DOE's response to each comment, and a transcript of the public hearing, are presented in the Responsiveness summary contained in Attachment 2 of this ESD.

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ATTACHMENT 1

DOE-NEVADA LETTER DOCUMENTING ACCEPTABILITY OF SILOS MATERIAL AT THE NEVADA TEST SITE

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Department of Energy
National Nuclear Security Administration
Nevada Operations Office
P.O. Box 98518
Las Vegas, NV 89193-8518

FERNALD
LOG C-1436
2002 JUN 25 A 10:00
FILE 9530

JUN 20 2002

Stephen H. McCracken, Director, FEMP, Cincinnati, OH

DISPOSAL OF FERNALD SILOS WASTE MATERIALS AT THE NEVADA TEST SITE (NTS)

This is to inform you that Fernald Silos materials, including the Silo 3 untreated material (all of which is statutorily exempt from the Resource Conservation and Recovery Act), may be accepted for disposal at the NTS as 11(e)(2) byproduct material following the successful completion of the NTS waste approval process.

If you have any questions regarding this letter, please feel free to contact Jhon T Carilli, of my staff, at (702) 295-0672.

Carl P. Gertz
Assistant Manager
for Environmental Management

WMD:JTC-240

cc:
S. A. Robison, DOE/HQ (EM-31)
Cloverleaf
J. M. Sattler, DOE/Fernald,
Cincinnati, OH
N. K. Akgunduz, DOE/Fernald,
Cincinnati, OH

ATTACHMENT 2

RESPONSIVENESS SUMMARY

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RESPONSIVENESS SUMMARY

1 Purpose

As stated in the U. S. Environmental Protection Agency (EPA) Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, the responsiveness summary serves three important purposes. First it provides the DOE with information about community preferences regarding both the proposed remedial alternative and general concerns about the site. Second, it demonstrates how public and support agency comments were integrated into the decision-making process. Third, it allows DOE to formally respond to public comments.

As the lead agency at the FCP, DOE has prepared this Responsiveness Summary to respond to each of the comments submitted by members of the public on the Draft Final Explanation of Significant Differences for Silos 1 and 2.

2 Community Participation For Silos 1 and 2

DOE is responsible for conducting the community relations for the FCP. A community relations program was established for the FEMP in 1985 to provide information about the site regarding updates and progress of the clean-up activities.

In November 1993, DOE implemented a public participation program at Fernald to involve community members and other interested parties in the decision-making process at the site. This Fernald Community Advisory Board (FCAB), formerly known as the Fernald Citizens Task Force, was chartered to provide DOE, EPA, and Ohio Environmental Protection Agency (OEPA) with recommendations about cleanup solutions and future courses of action at the FEMP. These efforts, along with the community relations activities required by CERCLA, reflect DOE's intent to fully involve the community in the decision-making process.

More recently, DOE has encouraged public involvement and informal comment throughout reevaluation of the remedy for Silos 1 and 2. Stakeholder input was a key factor in development of the recommended changes documented in the Draft Final ESD that was issued for formal review. This approach has provided a genuine opportunity for stakeholders to identify issues, voice their concerns, and learn about the proposed clean-up plan. The informal opportunity for the public to provide input enabled DOE to address stakeholder questions and concerns in advance of the formal public comment period.

Two Administrative Records, located at the Public Environmental Information Center at the FCP and EPA Region V offices in Chicago, Illinois have been established to provide an information repository on the decision-making process for interested members of the public.

2.1 Public Comment Period

The DOE recently held a public comment period from August 27 through September 26, 2003, for interested parties to comment on the modified selected remedy for Silos 1 and 2. The public comment period was held in accordance with Section 117 of CERCLA. A public hearing was held in the vicinity of the FCP on September 9, 2003 to provide the public with a forum to submit oral comments on the proposed revised remedy. No written or oral comments were received by DOE at the Public Hearing. A transcript of the hearing is included in Attachment 2-1 to this Responsiveness Summary.

The availability of the Draft Final ESD and supporting documentation, the schedule for the comment period, and the location and schedule for the public hearing, were announced in local newspapers. In addition, this information was announced on the Fernald Closure Project web site (www.fernald.gov) and communicated by direct mail to stakeholders on the FCP Public Affairs mailing list.

2.1.1 Responses to Public Comments

Comments were received from only two stakeholders during the public comment period. The comments from these two stakeholders are summarized below, along with DOE's response to each comment. The full text of all written comments received on the Draft Final ESD is provided in Attachment 2-2.

Comment 1 (Gerald L. Gels): In previous comments concerning OU-4, I have noted the need for environmental health physics input. The need for that input is demonstrated again in this ESD (Explanation of Significant Differences). This is particularly troubling since this is a project with the potential for some serious onsite and offsite exposures of workers and the public.

A specific example of the needed input in this document is Section 2.2, entitled, "Contents of Silos 1 and 2." Five radionuclides are mentioned as being present "at significant activity levels." Not even mentioned in this section are radon-222, bismuth-214 and lead-214, as well as the alpha-emitting, short-lived daughters of radium, polonium-218 and polonium-214. These five radionuclides are responsible for the lion's share of potential internal and external exposures, yet are not even mentioned in this section. But actinium-227 is mentioned although it is present at an average concentration of less than 2% of those 5 radionuclides that were not mentioned. Actinium-227 decays 99% of the time by emission of a very low energy beta particle, which can be absorbed by a thin piece of plastic or aluminum and is of no consequence as a source of external exposure.

While these omissions and the inexplicable inclusion of actinium-227 may or may not have an immediate or direct exposure consequence, it indicates that environmental health physics involvement in this project is absent. Has OU-4 planning undergone environmental health physics review by DOE-HQ staff?

Response: The text referenced in this comment is a brief summary of detailed information contained in documents such as the Remedial Investigation (RI) and Feasibility Study (FS) reports for OU4, the Revised FS and ROD Amendment for Silos 1 and 2, and subsequent studies and evaluations. These documents demonstrate that the evaluations supporting selection of the Silos 1 and 2 remedy fully considered the radiological characterization of the Silos 1 and 2 material, including the presence of the specific radionuclides referenced in this comment. Implementation of the selected remedy for Silos 1 and 2 will continue to receive appropriate environmental, safety, and health input and oversight.

Comment 2 (Gerald L. Gels): A second issue that I feel should receive review from the highest levels of DOE is the treatment of the K-65 residues solely as a waste... this material is also a potential resource because of the 4000+ curies of radium-226 contained therein. Nowhere else in this country, and perhaps the world, is there the possibility to recover thousands of grams of an element that may have yet-unrealized medical and research benefits in the near future. There are several simple technological ways to overcome the regulatory problems, and these methods should be strongly preferred over the "low-cost" solution of adding massive amounts of fly-ash to the mixture. In fact, at this point in the removal project, an initial stage of chemical separation of the radium (greatly increasing the radioactivity of the "concentrated" fraction) would make a lot of sense. Lacking that, I would like to see strong consideration given to no additional dilution of the residues. Shipping regulatory problems can be solved in other ways. I think that keeping the chemically stabilized residues in their sealed shipping containers at the disposal site is a responsible decision, one that would facilitate recovery of this material at some time in the future if it becomes necessary or desirable.

Response: As documented in the Responsiveness Summary accompanying the Final ROD Amendment for Silos 1 and 2, the issues raised in this comment were considered by the DOE and the EPA in selecting the current treatment remedy for Silos 1 and 2. The scope of the evaluation which resulted in the current ESD is limited to the criteria for treatment, and the potential location for off-site disposal, and does not include reevaluation of the decision to treat Silos 1 and 2 material by chemical stabilization prior to off-site disposal. The chemically stabilized Silos 1 and 2 material will be disposed in the sealed shipping containers as suggested by the commenter.

Comment 3 (James Curry): Page 3 – Line 13 - DOE does not have the authority to declare the material to be 11.e(2) material since this an NRC designation... The statutory exemption from RCRA for pure 11e.(2) material exists only because the material is covered by other statutes which this ESD fails to discuss. Specify what the AEA/NRC rules are so everyone knows what they are, and how DOE will comply with them?...Even if successful in obtaining the authority to designate the material 11e.(2), silo material would certainly have to be designated as *mixed 11e.(2) material* based on this definition which I retrieved from the DOE EM website:

> **Mixed 11e(2) Byproduct Material (M11e(2))** represents material that is chemically contaminated with RCRA-hazardous components and is also radioactively contaminated such that it meets the definition of 11e(2) byproduct material, and is therefore regulated under both RCRA and the AEA.

Response: The definition of 11e.(2) byproduct material is provided by the Atomic Energy Act of 1954 as amended (AEA), and arises from the origin of the material in question. The basis for definition of the Silos 1 and 2 material was documented, subjected to public,

state, and EPA review, and was approved in the original OU4 RI/FS and Record of Decision, as well as in the subsequent revised FS and ROD Amendment for Silos 1 and 2. As documented in the revised FS for Silos 1 and 2, the presence of natural metals is expected in byproduct material and invalidates neither the definition as 11e.(2) material nor the resulting exclusion from regulation under RCRA.

As defined by the DOE Radioactive Waste Management Manual, DOE M 435.1-1, mixed byproduct material consists of "11e.(2) byproduct material determined to be manageable as low-level waste that is also **mixed with** constituents covered under RCRA or TSCA." Since the metals found in the material were present in the natural ore, and no metals from a non-ore source, hazardous waste, or hazardous waste constituents, were added to the stream at any point in the beneficiation process, the Silos 1 and 2 material does not meet the definition of mixed 11e.(2) material.

DOE Order 435.1 provides the basis for management of byproduct materials defined by section 11e.(2) of the Atomic Energy Act of 1954, as amended, at DOE low-level waste facilities. The basis for management and disposal of the materials at a commercial facility would be provided by the applicable NRC or state regulatory agency licensing regulations.

Comment 4 (James Curry): The ESD is deficient since it does not sufficiently explain the differences in packaging and shipping methods. The plan is to ship by rail to expedite shipping and save money. Silo material is not, even after treatment, similar to waste pit material and therefore the hazard analysis developed for rail shipping of pit material is not adequate for silo material. Rail shipment of large inventories of silos materials may present a significant hazard to potential receptors living near the rail right-of-ways as opposed to small, discrete truck shipments.

Response: The remedy defined by the ESD will continue to allow shipment of treated Silos 1 and 2 material to the selected disposal facility by direct rail, direct truck, or a combination of the two (intermodal). Transportation risk calculations indicate that all three modes of transportation can meet applicable Department of Transportation (DOT) regulations and transportation risk criteria. The details of the selected packaging and

transportation mode(s) will be finalized during the remedial design process. These details, as well as demonstration of compliance with DOT regulations and transportation risk criteria will be documented in a Transportation and Disposal Plan to be submitted for regulatory review as a remedial action deliverable.

Comment 5 (James Curry): It appears that the NTS letter attached to the ESD is not based on analysis of the silo waste profile but merely confirms non-mixed 11e.(2) material could be accepted at NTS if it is truly 11e.(2). The statement *"following the completion of the NTS waste approval"* implies that NTS may reject the silo material when they actually review and understand its makeup. Has NTS actually seen and concurred that this material containing, lead and other hazardous waste constituents in a leachable form, can be disposed of as pure 11e.(2) material?

Response: Prior to preparing the letter provided in Attachment 1 of the ESD, NTS personnel completed an eligibility review of a draft waste profile for Silos 1 and 2 material. The draft profile contained a detailed description of the origin of the material, as well as data on its chemical and radiological constituents. Based upon this review, NTS determined that the material is both exempt from Federal and State of Nevada hazardous waste regulations, and acceptable for disposal at the NTS. The final waste profile for Silos 1 and 2 material was submitted to the NTS for formal approval in September 2003, and is currently in the final review and approval process.

ATTACHMENT 2-1

TRANSCRIPT OF SEPTEMBER 9, 2003 PUBLIC HEARING

FERNALD PUBLIC HEARING

- - -

FERNALD PROPOSED PLAN FOR
SILOS #1 AND #2.

- - -

TRANSCRIPT OF PROCEEDINGS

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The above-styled cause came on for public hearing before Gary Stegner at 7:20 p.m. on Tuesday, September 9, 2003, at Fluor Fernald, Inc., Trailer No. 214, 7400 Willey Road, Harrison, Ohio.

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MR. STEGNER: We'll start the formal hearing portion of tonight's meeting. As a reminder, you're free to comment on the record this evening, have your comments become part of the official transcript of the night's meeting, or you can send your comments to me, address is on the cards here, via e-mail or via regular mail.

So with that, I'll open it up for public comment, if there is any right now. Once, twice? That is it, okay. Thank you all very much for coming tonight. Again, the comment period ends the 27th of September.

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PROCEEDINGS CONCLUDED AT 7:22 P.M.

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8273

ATTACHMENT 2-2

FULL TEXT OF PUBLIC COMMENTS

Comments on the Draft Final Report Explanation of Significant Differences for Operable Unit 4 Silos 1 and 2 Remedial Actions

Gerald L. Gels, CHP
Cincinnati, Ohio
September 17, 2003

In previous comments concerning OU-4, I have noted the need for environmental health physics input. The need for that input is demonstrated again in this ESD (Explanation of Significant Differences). This is particularly troubling since this is a project with the potential for some serious onsite and offsite exposures of workers and the public.

A specific example of the needed input in this document is Section 2.2, entitled, "Contents of Silos 1 and 2." Five radionuclides are mentioned as being present "at significant activity levels." Not even mentioned in this section are radon-222, bismuth-214 and lead-214, as well as the alpha-emitting, short-lived daughters of radium, polonium-218 and polonium-214. These five radionuclides are responsible for the lion's share of potential internal and external exposures, yet are not even mentioned in this section. But actinium-227 is mentioned although it is present at an average concentration of less than 2% of those 5 radionuclides that were not mentioned. Actinium-227 decays 99% of the time by emission of a very low energy beta particle, which can be absorbed by a thin piece of plastic or aluminum and is of no consequence as a source of external exposure.

While these omissions and the inexplicable inclusion of actinium-227 may or may not have an immediate or direct exposure consequence, it indicates that environmental health physics involvement in this project is absent. Has OU-4 planning undergone environmental health physics review by DOE-HQ staff? Some decisions such as placement of HEPA filtration at the back end, but not the front end, of the Radon Treatment System, indicate that this has not been done.

A second issue that I feel should receive review from the highest levels of DOE is the treatment of the K-65 residues solely as a waste.

In one sense, this material is a waste product, which should be removed from the FCP site as it is cleaned up. But, in the longer view, this material is also a potential resource because of the 4000+ curies of radium-226 contained therein. Nowhere else in this country, and perhaps the world, is there the possibility to recover thousands of grams of an element that may have yet-unrealized medical and research benefits in the near future. Just a remote possibility of a cure for cancer should be enough reason to keep this material intact in a form that can be recovered if needed. It has already been diluted by more than 10% by the ill-advised addition of bentonite,

and the current plan is to further dilute this material by from 400% to 600% simply to make shipment less difficult from a regulatory point of view.

There are several simple technological ways to overcome the regulatory problems, and these methods should be strongly preferred over the "low-cost" solution of adding massive amounts of fly-ash to the mixture. In fact, at this point in the removal project, an initial stage of chemical separation of the radium (greatly increasing the radioactivity of the "concentrated" fraction) would make a lot of sense. Lacking that, I would like to see strong consideration given to no additional dilution of the residues. Shipping regulatory problems can be solved in other ways. I think that keeping the chemically stabilized residues in their sealed shipping containers at the disposal site is a responsible decision, one that would facilitate recovery of this material at some time in the future if it becomes necessary or desirable.

I appreciate the chance to comment. I would like to see all key decisions involving the radiological nature of the K-65 Silos to be critically reviewed by competent, professional DOE environmental health physicists.

Gerald L. Gels
Certified Health Physicist
General Dynamics Corporation
4820 Olympic Blvd
Building A
Erlanger, KY 41018
859-283-5885

WRITTEN COMMENTS RECEIVED 9/26/03 FROM JAMES CURRY

Comments on the Silos ESD Document

1. Page 3 – Line 13 - DOE does not have the authority to declare the material to be 11.e(2) material since this an NRC designation. I understand DOE has some legislative effort in the works to get authority to make the designation 11.e(2) to avoid meeting RCRA disposal requirements, but at this time does not have that authority.

2. Page 3 – The statement that the material is statutorily exempt from RCRA is very misleading. The statutory exemption from RCRA for pure11e.(2) material exists only because the material is covered by other statutes which this ESD fails to discuss. Specify what the AEA/NRC rules are so everyone knows what they are, and how DOE will comply with them?

3. Even if successful in obtaining the authority to designate the material 11e.(2), silo material would certainly have to be designated as *mixed 11e.(2) material* based on this definition which I retrieved from the DOE EM website:

   > **Mixed 11e(2) Byproduct Material (M11e(2))** represents material that is chemically contaminated with RCRA-hazardous components and is also radioactively contaminated such that it meets the definition of 11e(2) byproduct material, and is therefore regulated under both RCRA and the AEA.

4. The ESD is deficient since it does not sufficiently explain the differences in packaging and shipping methods. The plan is to ship by rail to expedite shipping and save money. Silo material is not, even after treatment, similar to waste pit material and therefore the hazard analysis developed for rail shipping of pit material is not adequate for silo material. Rail shipment of large inventories of silos materials may present a significant hazard to potential receptors living near the rail right-of-ways as opposed to small, discrete truck shipments.

5. It appears that the NTS letter attached to the ESD is not based on analysis of the silo waste profile but merely confirms non-mixed 11e.(2) material could be accepted at NTS if it is truly 11e.(2). The statement "*following the completion of the NTS waste approval*" implies that NTS may reject the silo material when they actually review and understand its makeup. Has NTS actually seen and concurred that this material containing, lead and other hazardous waste constituents in a leachable form, can be disposed of as pure 11e.(2) material?