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**USE OF BARIUM AND LEAD IN THE SURROGATE FEED FOR
VITRIFICATION DURING OPERABLE UNIT 4 PILOT PLANT PHASE I
TREATABILITY STUDY**

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Department of Energy
Fernald Environmental Management Project
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DOE-1007-95

Mr. James A. Saric, Remedial Project Director
 U.S. Environmental Protection Agency
 Region V - 5HRE-8J
 77 W. Jackson Boulevard
 Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
 Ohio Environmental Protection Agency
 401 East 5th Street
 Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

**USE OF BARIUM AND LEAD IN THE SURROGATE FEED FOR VITRIFICATION DURING OPERABLE
 UNIT 4 PILOT PLANT PHASE I TREATABILITY STUDY**

This letter requests the U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) concurrence with the use of lead and barium in Phase I of the Operable Unit 4 (OU4) Pilot Plant Treatability Study. The study is being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to support remedial design and will verify the vitrification technology selected in the final OU4 Record of Decision (ROD) for scaleup to full remediation of the K-65 and Silo 3 wastes at the Fernald Environmental Management Project (FEMP). Phase I of the Pilot Plant Treatability Study is designed to test the equipment, process, and operational methodology of the OU4 Pilot Plant using non-radioactive materials. Phase II testing, which follows Phase I, will demonstrate the vitrification process using actual K-65 and Silo 3 radioactive materials.

The Pilot Plant Phase I Treatability Study Work Plan was transmitted to the U.S. EPA and OEPA in February 1994, for information only. Included in the Phase I testing is the vitrification of surrogate material designed to closely simulate actual OU4 wastes to identify potential problem areas before processing waste containing radionuclides during Phase II. A concern exists regarding the potential for lead and barium in the K-65 material to attack the molybdenum electrodes of the melter during Phase II or final remediation. An additional concern is whether lead and barium compounds will undergo decomposition which may result in phase separation and/or crystallization, or precipitate in the melter. A decision was made to add commercial lead and barium compounds to the surrogate prior to feeding the material into the melter to evaluate the effect these metals may have on melter operation prior

to Phase II testing. Use of these compounds could produce glass or other residues that may exhibit a characteristic of hazardous waste under the Resource Conservation and Recovery Act (RCRA).

Four campaigns are planned for the 30 days of Phase I operations. The amounts of lead and barium compounds to be added to the feed will average approximately 5.7 percent and 2.3 percent, respectively by weight. The four successive campaigns are expected to nominally produce 30 metric tons (66,000 pounds) of vitrified glass product. Appropriate physical and operational controls and procedures will be used to ensure that addition of the lead and barium during Phase I will: 1) not adversely impact worker health, safety, or the environment; 2) minimize the amount of waste produced; and 3) not adversely affect proper management of the product and residuals. Workers potentially exposed to dusts generated during handling of the materials, including the loading of powdered chemical compounds into the feed hoppers, will be suited in appropriate personal protective equipment. Loading of the lead and barium will be done at a dry additives station, equipped with an induced draft hood and dust control (baghouse) system to prevent the release of dust into the environment. Secondary containment is provided for the batch slurry tanks, thickener, melter, quench tower, and recycle water tank. Both the melter feed system and recycle water lines are totally enclosed systems; all tanks and lines handling this material are located above either secondary containment or a concrete pad surrounded by a six-inch high sealed concrete curb.

As recently demonstrated during vitrification of the Waste Pit 5 sludge in the Minimum Additive Waste Stabilization (MAWS) facility at the FEMP, most of the metallic compounds in a feed (up to 99.9 percent) will be incorporated into the glass product. During operation of the vitrification Pilot Plant, any metals that volatilize in the melter will condense in the off-gas and be removed in the quench tower or scrubber unit. Following treatment by the carbon beds and High-Efficiency Particulate Air (HEPA) filtration unit, the off-gas in the stack will be sampled by continuous isokinetic sampling to evaluate the presence of lead and barium to verify that no metal bearing particulate material is being released into the atmosphere. Pilot Plant wastewater will be sampled for lead and barium prior to release to the FEMP Advanced Waste Water Treatment (AWWT) system. Vitrified material will be characterized using the toxicity characteristic leaching procedure (TCLP) to determine whether the material exhibits a RCRA hazardous waste characteristic for lead or barium. Any residues that exhibit a RCRA characteristic will either undergo reprocessing in the melter, or be managed as hazardous waste in accordance with RCRA requirements. The Applicable or Relevant and Appropriate Requirements (ARARs) and "To Be Considered" (TBC) criteria for management of waste streams containing RCRA metals are listed and described in the Phase I and II Pilot Plant Treatability Study Work Plans.

Residuals may remain in the process lines, sumps, or other units of the Pilot Plant at the end of Phase I operations. Since it is not planned to shut down the melter between Phase I and II, any remaining residues are expected to be cycled through the process and incorporated into the glass product during Phase II operations. During decontamination and demolition of the Pilot Plant, all residuals remaining in the lines or process units will be removed,

characterized, and managed in accordance with the pertinent regulations, as well as approved site procedures and Department of Energy (DOE) Orders.

DOE requests concurrence by the U.S. EPA and OEPA with the proposed approach to Phase I testing, specifically the addition of lead and barium to the surrogate, under this CERCLA treatability study within 30 days of date of receipt of this letter. Use of the proposed approach will ensure a greater probability of success during Phase II operations. The proposed action should not result in an increased risk to site personnel or the public, or result in additional environmental contamination. Once concurrence is received, this modification of the Phase I procedure will be incorporated into a revised Phase I Work Plan, which will be re-submitted to the U.S. EPA and OEPA for information only. The revised Work Plan will be part of the Administrative Record for the OU4 remediation.

If there are any questions regarding this request, please contact Randi Allen at (513) 648-3102.

Sincerely,



for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Akgunduz

cc:

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