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CONDITIONAL APPROVAL OF THE SECOND REVISION OU #4 VITRIFICATION TREATABILITY STUDY WORK PLAN

04/01/92

USEPA/DOE-FN
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LETTER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

APR 01 1992

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REPLY TO THE ATTENTION OF:

HRE-8J

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

RE: Conditional Approval of the
Second Revision
OU #4 Vitrification
Treatability Study Work Plan

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the second revision of the Operable Unit #4 Vitrification Treatability Study Work Plan. Also in a conference call on March 27, 1992, representatives of the U.S. EPA and the United States Department of Energy (U.S. DOE) discussed the revised Work Plan.

The revised Work Plan incorporates all of U.S. EPA's comments, except those relating to testing and analytical methods, and procedures. However, during the March 27, 1992 conference call, comments on the procedures were discussed and U.S. DOE committed to responding and providing revised procedures incorporating U.S. EPA's comments by April 27, 1992.

Therefore, U.S. EPA approves the revised Work Plan pending incorporation of the attached comments.

Please contact me at (312/FTS) 886-0992 if you have any questions.

Sincerely,

James A. Saric
Remedial Project Manager

Enclosure

(allen)
partial
action
response
to doe-11792
(4102)

cc: Graham Mitchell, OEPA-SWDO
Pat Whitfield, U.S. DOE-HDQ
Dennis Carr, WMCO

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ATTACHMENT

PROCEDURES FOR VITRIFICATION OF OPERABLE UNIT 4 WASTES

TECHNICAL REVIEW COMMENTS [redacted]

GENERAL COMMENTS

1. The procedures are not in the standard format for Fernald Environmental Management Project (FEMP) documents (i.e., with pages and lines numbered). Page and line numbers should be added to the procedures.

2. The treatability study procedures are very brief and do not follow EPA Region 5's standard operating procedures guidance. Some important elements that are missing include:

   - Linear range of the instrument measurement
   - Detailed information on the test apparatus, sampling or monitoring methods, and monitoring equipment
   - Calibration procedures
   - Detailed operating procedures
   - Quality assurance and quality control

   This information is needed to evaluate the quality of data that will be generated and is especially important for the radon emanation monitoring procedures and the gamma dose rate measurement.

SPECIFIC COMMENTS

1. **Pacific National Laboratory (PNL) General Procedures.** The procedures state that the sample size will be sufficient to give the required precision for measurements; however, it does not state what the required precision will be for the treatability study. In addition, the procedure does not state how the sample size will be determined.

[redacted]

2. **PNL General Procedures.** The procedures state that all determinations will be made in triplicate. It is not clear what is considered to be a determination. The procedure should state which determinations will be made in triplicate.

3. **Procedure for Determination of Moisture Content.** The procedure states that the sample should be covered and placed in a drying oven until a constant weight is reached. First, it is not clear why the sample will be covered, because covering the sample may not allow moisture to escape from the sample. Second, the procedure does not state how PNL will determine when a sample has reached constant weight. The procedure should be modified to state that the sample will be left uncovered for a predetermined amount of time, or PNL should further explain the procedures.

4. **Procedure for Determination of Bulk Density.** PNL proposes to use a 25-milliliter (mL) graduated cylinder to determine bulk density. Because the material from the K-65 silo may contain significant amounts of rocks and debris (as indicated in Table 1 of Characteristics of Fernald's K-65 Residue Before, During and After Vitrification), a 25-mL graduated cylinder may not be large enough to contain the waste material. In addition, it may be difficult to avoid forming air pockets in such a small graduated cylinder. PNL should provide the basis for selecting the 25-mL cylinder or consider using a larger container for conducting bulk density measurements.

5. **Procedure for Determination of Apparent Density.** This procedure includes a step that involves converting the mass of water to volume of water. The procedure should include the calculation used to perform this conversion. In addition, the conversion is dependent on the temperature of the water; therefore, the temperature of the water should be measured.

[redacted]

[redacted]

6. **Procedure for Determination of Radon Emanation from Waste and Glass.** This procedure contains a step that involves measuring the cross-sectional area of a crucible at the surface of the material. The procedure should describe how the cross-sectional area will be measured.

   Second, PNL proposes to monitor radon concentration in this procedure. The following information is missing from the radon monitoring procedure and needs to be added: (1) the equipment that will be used to monitor for radon, (2) where the flow of air will be measured, (3) how the air will be moved through the can, (4) how the flow of air will be measured, and (5) what the approximate flow rate of air will be.

7. **Procedure for Determination of Radon Emanation During Vitrification.** This procedure needs more detail. Step 3 states that after the system is sealed, the flow meter on the air inlet to the furnace will be closed to allow air to enter the system. However, it appears that the sealed system will be at atmospheric pressure; therefore, it is not clear why air would enter the system. Step 4 states that after the air inlet is opened, a background reading will be taken. It is not clear what background concentration is being measured. As discussed above, it appears that the system will be at atmospheric pressure; therefore, air would not flow to the radon monitor. There are also several references to opening flow meters and adjusting air flow. It is not clear how air flow is induced in the system at this step in the procedure. The diagram in the procedure should be modified to show all valves, fans, and flow meters.

   The procedures do not contain information concerning the desired air flow rates in the system or the desired percentage of air flow through the radon monitor. This information should be included in the procedure.

   PNL proposes to draw air through a desiccator to remove water vapor generated during vitrification. Radon that may be present in the water vapor will probably also be removed, thus lowering the level of radon

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measured downstream from the desiccator. This would lead to an underestimation of radon emanation during vitrification. The procedure should be modified to account for all radon emanated during vitrification.

8. **Procedure for Determination of Gamma Dose Rates of Vitrified Wastes.** The procedure should describe the type of equipment that will be used to measure gamma rays, how long after vitrification the gamma dose rate will be measured, and how background gamma radiation will be measured. Step 1 states that the dimensions of the vitrified waste block should measured. The procedure should state what waste form will be measured and how the block will be measured. The procedure also refers to the "half height" of the vitrified mass. Half height should be defined in the procedure.

9. **Nuclear Waste Glass Product Consistency Test - Version 3.0 (U).** This section presents general information concerning how the product consistency test (PCT) was developed but does not present the procedures for conducting the PCT test. The procedures should be given.