

3005

**RESPONSE TO THE U.S. EPA COMMENTS
OPERABLE UNIT 4 TREATABILITY STUDY
WORK PLAN FOR THE VITRIFICATION OF THE
RESIDUES FROM SILOS 1, 2, AND 3**

3-24-92

3

ENCLOSURE

Response to the U.S.
Operable Unit 4 Treatability Study Work Plan
for the Vitrification of the Residues
from Silos 1, 2, and 3

3005

General Comments

1. U.S. EPA Comment: During the teleconference, DOE proposed to reduce the sample volume to be used during the treatability study. EPA has two concerns regarding DOE's proposal to reduce the amount of waste to be vitrified during the treatability studies. First, DOE should document that enough treated waste sample will be available for analysis, including sample volume required for quality assurance and quality control sampling analyses. Second, the decrease in sample volume will increase surface to volume ratio of the waste, which will likely increase radon emanation flux and cause an overestimation of expected radon emanation flux during actual full-scale operation. DOE should describe how the treatability test results will be interpreted if the treatability test does not simulate actual emanation flux expected during full-scale operation.

Response: No change required. The approximate amounts of K-65 and metal oxide materials shown in Table 4-4 of the "Operable Unit 4 Treatability Study Work Plan for the Vitrification of the Residues from Silos 1, 2 and 3" for each test sequence were earlier estimates used to arrive at the total quantities of material that needed to be shipped from the Fernald Environmental Management Project (FEMP) to Battelle's Pacific Northwest Laboratories (PNL). The actual amount of material to be used in each of the Operable Unit 4 vitrification treatability test melts will be determined by PNL scientists based on their previous experience with vitrification melts of the K-65 material and vitrification melts of other similar nuclear waste products. The amount of material to be used in each of the Operable Unit 4 vitrification treatability test melts will utilize a minimum melt size of 1000 grams. The previous vitrification tests conducted on K-65 material at PNL demonstrated that a melt sample size of about 1000 grams was adequate to assure that a representative glass waste product was obtained and that enough sample was available for all required analysis.

It is realized that the radon emanation during vitrification is based on surface area and this will be taken into account during interpretation of the data.

Since it is quite difficult to obtain samples from the Silos, it was decided to base our shipping estimate on conservative quantities of material needed for testing. The excess material will be used for repeating questionable tests and/or conducting additional tests if the results from this test sequence show the need for them in the near future.

1. U.S. EPA Comment: DOE response to EPA General Comment No. 5. Testing and analytical methods are not included in the treatability study work plan and still need to be reviewed before the work plan can be approved.

Response: Will modify work plan. Procedures are included as an appendix.

2. U.S. EPA Comment: Response to EPA General Comment No. 8. It may be difficult to arrive at any definite conclusions concerning the effectiveness of vitrification without analyzing untreated waste samples used in the treatability study. Table C-6 shows a large range in extraction procedure (EP) toxicity levels, especially for lead. During the teleconference, DOE indicated that samples of raw waste from discrete sections of Silos 1 and 2 are currently being analyzed using the toxicity characteristic leaching procedure (TCLP). The samples of raw waste will be composited from each of the A, B, and C horizons and used during the treatability study. The work plan should describe how the TCLP data from samples obtained from the discrete sections will be used to compute the TCLP values of composited untreated waste used in the treatability study.

Response: No change required. TCLP data on untreated waste material will not be generated as part of the treatability study. If there is any comparison to be made between the TCLP results from the treated and untreated material, it will be done during preparation of the Feasibility Study (FS). Performing TCLP on the treated waste will be performed to ensure compliance with the ARARs. The TCLP and analytical data from the treated waste will be compared to the regulatory limits as listed in the ARARs to ensure compliance with disposal requirements.

3. U.S. EPA Comment: Response to EPA Specific Comment No. 3. This comment has not been addressed. Section 4.2, page 31, line 3 states that the bench-scale tests are designed to verify whether or not the alternatives that include vitrification can meet the performance goals established by applicable or relevant and appropriate requirements (ARARs). In addition, compliance with ARARs is an evaluation criteria in the feasibility study process. Therefore, the treatability study work plan should clearly identify which ARARs will be evaluated during treatability testing, and which ARARs will be evaluated using other sources of information, such as available literature on and operating data from existing vitrification systems.

Response: No change required. According to the EPA guidance document for conducting treatability studies, these studies are to generate data to support the remedy evaluation process. The remedy evaluation process is performed during preparation of the FS. The purpose of the treatability studies is to collect data. Evaluation of the data will be performed during the FS.

4. U.S. EPA Comment: Response to EPA Specific Comment No. 6. The fact that vitrification has been identified as a Best Demonstrated Available Technology (BDAT) does not guarantee the long-term stability of vitrified wastes at the FEMP. Long-term effectiveness is a FS evaluation criteria and should be evaluated before remedy

selection. Available data (such as the BDAT data) from the vitrification of high-level radioactive wastes may be satisfactory for comparing vitrification to other alternatives in the FS if wastes previously vitrified are physically and chemically similar to the wastes in Silos 1, 2, and 3. If wastes in the silos are not similar, weathering and durability tests should be conducted. If additional weathering and durability testing is required, treatability testing methods may need to be modified because of the large amount of treated sample required to perform physical tests such as wet/dry weathering tests, freeze/thaw weathering tests, and other tests recommended in Ohio Environmental Protection Agency (OEPA) General Comment No. 2.

Response: Will modify work plan. As discussed in the last DOE/EPA Program Manager's Meetings, and to be consistent with Operable Unit 1, the Product Consistency Test (PCT) will be performed on the vitrified waste material to determine the durability of the treated material.

5. U.S. EPA Comment: Response to EPA Specific Comment No. 15. The treatability study work plan states that sodium hydroxide will be added as a glass-forming reagent. Sodium hydroxide is not a glass-forming reagent but is usually added to increase the electric conductivity of molten waste. Silica and/or aluminum should be added if glass-forming reagents are required.

Response: Will modify work plan. Sodium hydroxide will be used as a flux material.

6. U.S. EPA Comment: Response to OEPA Specific Comment No. 40. Power consumption is important in determining the feasibility of vitrification from a cost effectiveness standpoint. Because cost is an FS evaluation criteria, measuring power consumption during treatability testing may be appropriate. Alternately, DOE may use actual operating data from the Savannah River or Hanford vitrification plants when estimating power consumption costs. However, DOE should state how power consumption costs will be estimated for the FS.

Response: No change required. Measuring power consumption during the vitrification melts is not required or useful data. Actual operating data from existing vitrification plants is available for use in the Feasibility Study. Performing cost estimates in support of the Detailed Analysis of Alternatives (DAA) appendix of the FS will be performed according to the "EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" and the EPA Guidance in the "Remedial Action Costing Procedures Manual."