



Department of Energy
Washington, DC 20585

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December 22, 1989

EPA RCRA Docket (OS-305)
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington D.C. 20460

RE: Docket Number F-89-LD12-FFFFF

Docket:

The United States Department of Energy (DOE) is pleased to respond to the Proposed Rulemaking on Land Disposal Restrictions for Third Third Scheduled Wastes, issued on November 22, 1989 (54 FR 48372). In this proposed rulemaking, it was requested that all new data submitted during the comment period be provided within 30 days (i.e., December 22, 1989). DOE would like to take this opportunity to resubmit information and data on the treatment of high level radioactive mixed waste that was provided to the U.S. Environmental Protection Agency (EPA) in an earlier package, dated September 26, 1989. Furthermore, the Department is today providing additional materials supplemental to the information provided in the above mentioned package.

As the Department has asserted in the past, many of the treatment standards and corresponding technologies established and proposed for hazardous wastes are inappropriate for much of DOE's radioactive mixed waste (i.e., radioactive and hazardous waste). Treatment technologies applicable to hazardous wastes may not allow for the safe treatment and handling of both the radiological and chemical hazards associated with radioactive mixed wastes. One such DOE waste that presents unique difficulties in treatability is high level radioactive mixed waste (HL-RMW) that is generated from the chemical processing of nuclear reactor fuels and targets.

A demonstrated method for treating this high level waste is vitrification. Due to the highly radioactive component of HL-RMW, and the need to prevent or minimize potential radiation exposure to workers, the public and the environment, the Department has pursued the development of this method for treating DOE's high level wastes in order to achieve a final waste form that offers long-term stability and protection. Vitrified HL-RMW will be placed in stainless steel canisters in order to insure that the wastes are safely stored, and eventually transported for disposal in a future high level waste geologic repository. DOE is proceeding with the development of waste



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vittrification plants at three facilities: Savannah River Site (South Carolina), Hanford (Washington), and the West Valley Demonstration Project (New York). The vittrification plant at the Savannah River Site is about 90% complete; at Hanford, a \$ 550 million contract was recently signed to build a waste vittrification plant; and at West Valley, the process is scheduled to begin in the mid 1990's. The vittrification process for HL-RMW at Idaho National Engineering Laboratory is in the initial stages of development.

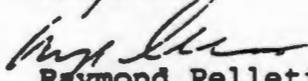
In a data package being resubmitted today (titled: High Level Waste Vittrification for Hanford Waste Vittrification Plant and Defense Waste Processing Facility), the treatment performance data include results from simulated (i.e., nonradioactive) waste samples. These simulated samples were doped with concentrations 2-3 times the expected concentrations of hazardous constituents in the HL-RMW (based on a numerical analysis of all process streams in the Defense Waste Processing Facility, DWPF). These data include both EP Toxicity and Toxicity Characteristic Leaching Procedure (TCLP) results, and indicate that the vittrification process can achieve treatment levels below the level at which the waste exhibits the characteristic of EP Toxicity. Today, DOE is also submitting additional information and data relative to the vittrification process to support the establishment of treatment standards that specifically address HL-RMW.

With consideration to the attached documentation, DOE requests that EPA evaluate the establishment of a separate waste treatability group or waste code specific to HL-RMW. Furthermore, the Department requests that EPA develop corresponding treatment standards for the process wastes associated with the treatment of HL-RMW (separation of the low-level and high-level radioactive fractions is part of the HL-RMW treatment process). For the high level radioactive fraction of the process wastes, DOE requests that EPA establish high level waste vittrification as the treatment standard (i.e., specified technology). The remaining process wastes generally include low-level radioactive supernate solution/salts, low-level radioactive organic waste (e.g., benzene - a by-product of the precipitate hydrolysis process), and low-level radioactive mercury that will be recycled. DOE requests that EPA establish the following specified technologies as the treatment standards for these low-level radioactive process waste fractions: incineration of the low-level radioactive organic waste fraction; solidification of the low-level radioactive supernate solution/salts, and recycling of the low-level radioactive mercury.

To expand EPA's understanding of the HL-RMW vittrification process, the Department would like to invite (and encourages) EPA representatives to tour the Savannah River Site's Vittrification facility (the DWPF). If there is interest in a DWPF site visit,

please let us know and the necessary arrangements will be made. Reports on high level waste vitrification and on the grouting (i.e., solidification) process for the Hanford low-level waste fraction (previously submitted to EPA on September 26, 1989), along with additional supplemental information relative to the vitrification process, are provided in the attached documentation. These documents contain descriptions of the vitrification treatment process, the process wastes associated with the vitrification facilities, information describing an alternate leach test - the Product Consistency Test (PCT), and actual sample results using the PCT procedure. If you have any questions regarding the data and information provided today, or with respect to setting up a DWPF site visit, please contact Thomas Traceski, Chief, RCRA/CERCLA Unit at 586-2481.

Sincerely,



Raymond Pelletier

Director

Environmental Guidance Division

Attachments

cc: Robert Scarberry, Office of Solid Waste (OS-333)
Larry Rosengrant, Office of Solid Waste (OS-322)
Les Otte, Office of Solid Waste (OS-321)

DOCUMENT SUMMARY & INDEXDocument TitleSummary of Document Contents

High Level Waste
Vitrification for
Hanford Waste
Vitrification Plant
and Defense Waste
Processing Facility

Document was provided to EPA via a letter dated September 26, 1989. The document provides background information and discusses in detail the waste codes and the characterization for both the influent and effluent.

Hanford Grout

The document describes the treatment process for the Hanford grout liquid low level radioactive mixed waste. Detail is provided on waste characterization and results of analysis.

Establishing the
Acceptability of
Savannah River Plant
Waste Glass

The paper provides documentation to show that the process to vitrify high level radioactive mixed waste has product control to assure the non-leachability of the waste form. The paper also contains an historical overview which discusses the process of treating the high level radioactive mixed waste from start to finish. The strategy for assuring the vitrified waste is stable is discussed in detail. Some data on the quantity of high level radioactive mixed waste is also provided.

Development of a
Nuclear Waste Glass
Product Consistency
Test

The document contains a description of the waste treatment process with particular emphasis on the history of the development of the Product Consistency Test (PCT). The PCT is compared to several other glass leachate tests with simulated waste as well as actual radioactive waste from the Savannah River Site.

Protocol for Product
Consistency Test for
Defense Waste
Processing Facility
(DWPf) Glass

This document provides the detailed protocol and requirements for operation of the PCT. The document covers preparation of containers, gaskets, cleaning procedures, temperature control, balance sensitivity, volume measurement requirements, specimen bottle preparation, solution analysis, pH measurement, calibration of equipment, and sample crushing requirements. The document also discusses the actual test procedure and the calculations for the use of blank data and calculations for determining the individual elements in the leachate.

Comparison of the
Product Consistency
Test for DWPf Glass
with ASTM and TCLP
Standard Durability
Tests

The document discusses the differences between the PCT and the ASTM D3987-81 Shake Extraction of Solid Waste with Water test, ASTM C-225-85 Resistance of Glass Containers to Chemical Attack test. A table also provides comparative test conditions for the three tests listed above and the TCLP.

Integrated Data Base
for 1988: Spent Fuel
and Radioactive
Waste Inventories,
Projections, and
Characteristics

Pages 40-75 discuss the inventories, projections and characteristics of the high level radioactive mixed waste. Process flow charts are also provided on all four DOE high level radioactive mixed waste treatment facilities. Page 8 of the document provides a very short overview of the high level waste chapter.

Technical and
Project Highlights
for the Defense
Waste Processing
Facility

The document provides a detailed process description of the Savannah River Site vitrification treatment system. Particular emphasis is on the glass melter and the physical plant showing precautions provided to reduce radiation exposure. The off gas from the glass melter is also discussed.

Section C, Waste
Characteristics from
the Savannah River
Site Draft Part B
Application for the
Defense Waste
Processing Facility

West Valley
Demonstration
Project -- Update

Analytical Results
Prepared for West
Valley Nuclear
Services Co., Inc.
Prepared by RECRA
Environmental, Inc.

The document provides draft information on the available chemical and physical analysis of the influent and effluent of the process. The sampling program outlined in the document has been revised and updated. Mercury and organic waste (benzene) are discussed. Test and analysis methods are discussed however, the testing methods as outlined are being reevaluated for radiological concerns.

A short synopsis is provided which provides history of the West Valley site prior to DOE involvement and the Demonstration Project.

EP Toxicity Test results of a vitrified sample of simulated waste from the West Valley Demonstration Project.

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