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WEST VALLEY DEMONSTRATION PROJECT PLAN

By

S. Khanna

December 1987

Work Performed Under Contract No. DE-AC07-81NE 44139

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Prepared for
U.S. Department of Energy
Assistant Secretary for Nuclear Energy

Prepared by
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FIGURES

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PROJECT PLAN

1.0 EXECUTIVE SUMMARY

In 1980 Congress enacted Public Law 96-368, the West Valley Demonstration Project (WVDP) Act.[1] As a primary objective, the act authorized the United States Department of Energy (DOE) to solidify the high-level waste (HLW) stored at the Western New York Nuclear Service Center (WNYNSC) into a form suitable for transportation and disposal in a federal repository as a demonstration of high-level waste processing technology. This Project Plan provides an overview of how the WVDP plans to conduct the project to meet the requirements of Public Law 96-368. The project's highest priority is protection of public health and safety.

The principal source of HLW to be vitrified resulted from operation of a PUREX reprocessing cycle. The wastes produced from this process are stored in an underground tank contained in a concrete vault and were adjusted with caustic prior to storage.

Over 90 percent by volume of the 2.3 million litres of the caustic HLW is a supernatant liquid containing about 40 weight percent dissolved sodium salts (nitrate, carbonate, sulfate). The supernatant contains about half of the total radioactive materials contained in the waste, mostly as cesium (Cs) salts with minor amounts of strontium in solution and lesser amounts of plutonium as fine suspended particulate matter. The remaining 10 volume percent is a sludge on the bottom of the tank, composed of mixed salts (nitrates, carbonates, hydroxides, oxides) of fission products and heavy metals. This sludge contains the other half of the radioactive material, primarily as strontium salts with lesser amounts of other fission products and actinides.

The Project strategy is to reduce the volume of bulk material that ultimately will become solidified HLW. Thus, the supernatant will be decanted, passed through an ion exchange medium (zeolite) to remove principally Cs-137 in the Supernatant Treatment System (STS), and the resulting low-level waste (LLW) will be solidified in cement. The solidified LLW is planned to be stored at the on-site disposal area. The sludge will be washed to remove excess soluble sodium salts to the extent practical and the wash water treated in a manner similar to the supernatant.

The washed sludge, the Cs-loaded zeolite, and a relatively small volume of THOREX acid waste will be mixed in the active high-level waste tank and pumped to the Shielded Solidification System (SSS) via the Waste Mobilization System (WMS). The three wastes will be mixed with glass-forming chemicals and fed to a Joule heated slurry fed ceramic melter. The melter feed will be mixed and heated by the flow of electric current through the feed material, until it becomes molten glass. The glass will flow from the melter into stainless steel canisters, the canisters will be cooled, closed, decontaminated and moved to a HLW interim storage facility until they can be shipped to a federal repository in accordance with the WVDP Act.

The approximately 2,300 cubic meters (m^3) of waste will be immobilized as follows: (1) LLW into about 2,100 m^3 of cement in approximately 15,000 drums and (2) HLW vitrified into about 240 m^3 (650 tons) of borosilicate glass in about 300 stainless steel canisters.

When the existing HLW has been removed from the tanks, the tanks and associated piping will be washed to remove residual radioactivity and the washes processed into solidified HLW.

After the solidification campaign has been completed, the WVDP will decontaminate and decommission (D&D) the facilities used. The final decommissioning plan will be completed after an analysis of impacts and risks of potential disposition modes for the tanks and other facilities used have been reviewed and the decontamination and decommissioning criteria prescribed. The plan will include the engineering and operating activities to be performed.

The project is funded 90 percent by DOE and 10 percent by New York State (NYS). In conducting the Project, DOE consults regularly with the NRC, EPA, and other agencies particularly on matters related to public health and safety and environmental protection.

2.0 PROGRAM STRATEGY

2.1 Introduction

The Project Plan provides an overview of the tasks to be accomplished by the WVDP to remove the HLW from storage, solidify it and store it, prepare it for shipment and disposal in a federal repository, and D&D the facilities used for handling the waste.

2.2 WVDP Plan

The DOE has established relations with other government agencies in accordance with the Act and has: (1) entered into a cooperative agreement with the New York State Energy Research and Development Authority (NYSERDA) on the use of the WNYNSC;[2] (2) developed a Memorandum of Understanding with the NRC to review and consult on matters relating to health and safety of the public and the WVDP workers;[3] (3) is developing a Memorandum of Understanding with the EPA to review and consult on matters relating to the protection of the environment; (4) consulted with the United States

Geological Survey (USGS) on geotechnical and hydrologic issues; and (5) consulted with the United States Department of Transportation (DOT) on shipping of radioactive materials.

The DOE has also established technical exchange agreements for the West Valley Nuclear Services Company, Inc. (WVNS), their prime contractor for the WVDP, to work with and exchange information on an international level with the Japanese, the Federal Republic of Germany (FRG) and the French, through Societe General Pour Les Techniques Nouvelles (SGN).

The exchange of technical information on a national level has also been extensive, and WVDP has been working with others as follows: (1) the Oak Ridge National Laboratory (ORNL) on the cement waste form; (2) Sandia National Laboratory (SNL) on the packaging and transportation of the HLW; (3) Idaho National Engineering Laboratory (INEL) and the Argonne National Laboratory (ANL) on environmental requirements; and (4) the Los Alamos National Laboratory (LANL) on the assaying equipment for identifying LLW and TRU waste.

WVNS, through the WVDP-DOE, has regular technical exchange meetings with: (1) Battelle Pacific Northwest Laboratory (PNL) who has a major role in the design, fabrication and process modeling of the SSS, as well as the determination of process parameters for the STS, (2) Savannah River Laboratory (SRL) on the SSS and the WMS, and (3) Rockwell Hanford Operations (RHO) on the WMS and its installation in the HLW tank.

WVNS is also working with repository projects, i.e., Basalt Waste Isolation Project (BWIP), Salt Repository Project (SRP), Nevada Nuclear Waste Storage Isolation (NNWSI) and the DOE Waste Acceptance Committee (WAC) on the Waste Acceptance Preliminary Specifications (WAPS), Waste Compliance Plan (WCP) and Waste Qualification Report (WQR).

WVNS is working with the Material Characterization Center (MCC), Catholic University of America (CUA), and Alfred University (AU) on glass product performance and properties.

Examples of peer review by WVNS include the WVNS Corporate Review Board to review WVNS overall performance, the Technical Advisory Group (TAG) to overview WVNS technical approaches, and the use of design review teams to review the specific designs being proposed for the WVDP.

2.3 Key Decisions

Several key engineering decisions have been made, in particular, decisions regarding both the HLW and LLW waste form and the basic method for producing these waste forms. A listing of these key decisions follows:

- o The HLW final waste form will be borosilicate glass.
- o The SSS will use the Slurry Fed Ceramic Melter (SFCM) as the reference process.
- o The HLW will be poured/solidified in stainless steel canisters.
- o The HLW glass logs will be stored on-site till a Federal repository is available.
- o The LLW liquid final waste form will be cement.
- o LLW cement drums will be stored on-site until a decision is made regarding their disposal.
- o TRU waste will be stored on-site until a facility is available off-site for permanent disposal.
- o The CSS will use a high-shear cement mixer as the reference process.
- o The supernatant in Tank 8D-2 will be processed to remove salts from the supernatant, to reduce the amount of HLW to be processed into borosilicate glass.
- o The LWTS will use evaporation, filtration, and ion exchange as the reference process to reduce the amount of liquid low-level waste to be solidified and to ultimately collect the decontaminated liquid for reuse in the plant.

In making the above decisions, extensive use and review of existing technology was made, and the NRC was consulted prior to the final decision.

2.4 Safety Analysis Report

To assess the risk to the public health and safety resulting from Project activities, the WVDP prepares Safety Analysis Reports (SAR) that ensure (1) potential hazards are systematically identified; (2) potential impacts are analyzed; and (3) reasonable measures to eliminate, control, or mitigate the hazards have been taken. The SARs are forwarded by DOE to the NRC for independent review.

The SARs address in appropriate detail the following topics:

- Description and evaluation of the Project facility or process.
- Design criteria for systems, components, and structures.
- Normal and emergency operating procedures to be used.
- Identification of hazards.
- Physical design features and administrative controls provided to prevent or mitigate potential accidents.
- Potential accidents and consequences including those resulting from natural phenomena.
- Operational Safety Requirements.
- Means for controlling effluents and minimizing radiation exposure.

Prior to the start of radioactive operation of plant facilities, the SARs are updated to address any changes in design, operating safety requirements and limiting conditions for operation.

2.5 Quality Assurance

Quality Level requirements have been developed for each item based on its safety and service classification. Considerations other than safety, such as reliability, remote maintenance, and service requirements may often call for more stringent requirements over and above those required for a particular safety classification. The current QA reference program will adhere to the procedures specified in NQA-1. The DOE is also investigating for consideration an enhanced QA program which incorporates the requirements of OCR, Supplement B3 for repository activities. DOE will make its decision based on funding and other considerations.

2.6 Readiness Review

The final step before radioactive operation is the Operational Readiness Review (ORR). At that time certification is required which shows that the facility is capable of being operated safely in accordance with the facility's design criteria. An independent team of senior personnel knowledgeable in the various areas that will be released for operations reviews the following: all as-built information and testing results to show compliance with design requirements; a review of the environmental evaluation; technical specifications; operating and maintenance procedures; operator training and qualification.

2.7 Waste Disposal

HLWIS Facility

It is planned to store all of the approximately 300 HLW glass logs on-site in the High Level Waste Interim Storage Facility until they can be shipped to a Federal repository. Dry storage in the existing Chemical Process Cell (CPC) is the reference approach.

A conceptual design has been completed for a system that transports the glass logs from the SSS hot cell on a cart through a new tunnel to the existing Equipment Decontamination Room (EDR) and into the existing CPC. The CPC is the one existing plant area with adequate shielding and space to facilitate storage. Prior to utilization, these existing cells (EDR and CPC) must be decontaminated and significant progress has been made to this end.

The WVDP has contacted the Transportation Systems Development Testing Division of Sandia National Laboratory (SNL) and is monitoring its program on the transportation of HLW. The use of the SRL HLW cask, being developed by SNL for transporting SRL HLW, is being investigated for West Valley use as one possibility. Other transportation options are under evaluation.

Class A LLW Disposal

The reference case for project LLW is disposal at the existing site disposal facility known as the NDA (NRC-licensed disposal area). The reference method for Class A waste is planned to be disposal in an engineered shallow land trench designed to preclude water intrusion through the trench cap and to accommodate cap subsidence due to compression of the waste during the post-disposal period. Final decisions will be made upon completion of an environmental impact statement for disposal of LLW.

Class B and C LLW Disposal

The reference method for Class B and C waste disposal, as defined in 10CFR61, is planned to be in an aboveground tumulus. During the Project's operating period, the waste will be remotely loaded into a surface facility and will be placed on a basemat which consists of three-foot thick compacted gravel layer over compacted clay. The facility (drum cell) is designed to accommodate storage of 21,000 round drums (or 15,000 square drums). Drums will be handled remotely using a computerized crane system. The drums will be surrounded by a 20-inch thick concrete shield wall. The facility will be heated during winter for drum curing. When the facility is filled to capacity, the building will be removed and the facility converted to an aboveground disposal facility, with the construction of an engineered cap. This cap has design features to prevent intrusion into the waste and to control access to the waste by water.

Construction of the drum cell facility has been completed. The final method for disposal of Class B and C wastes will also be made pending issuance of an environmental impact statement regarding disposal of Class B and C wastes.

2.8 Presolidification Decontamination and Decommissioning Program

An early Project decision was made to utilize the existing reprocessing plant facilities to the maximum extent possible for housing the new systems required to conduct the HLW and LLW solidification program. As of January 1, 1988, 70 percent of the plant facilities have been decontaminated.

2.9 Postsolidification Program

Postsolidification D & D of the facilities used by the WVDP will be included in the Postsolidification Project D & D Plan. This Plan will be submitted to the NRC who will prescribe final D & D requirements in accordance with Public Law 96-368.

A study of alternative Postsolidification Project activities is being prepared to provide the Department of Energy (DOE) a basis for long-range budget planning. The requirements of the West Valley Demonstration Project (WVDP) Act and the New York State Energy Research and Development Authority (NYSERDA)/DOE Cooperative Agreement and requirements of interim storage and transportation of solidified high-level waste (HLW) and transuranic (TRU) wastes, site maintenance, disposal of Low-Level Waste (LLW) and final D & D will be considered in the study.

The U.S. Nuclear Regulatory Commission (NRC) and the U.S. Environmental Protection Agency (EPA) are currently coordinating efforts to develop residual radioactivity standards for decommissioned NRC-licensed plants. The WVDP Act of 1980 requires that the decommissioning of Project facilities be done in accordance with criteria established by the NRC. Pending development of these standards, performance objectives for final D & D of Project facilities will be proposed for the purposes of this study based on the results of environmental and safety evaluations. These performance objectives and derived criteria will be submitted to the NRC for concurrence.

2.10 Size-Reduction Facility

A Contact Size Reduction Facility (CSRF) located in the former Master Slave Manipulator Repair Shop (MSMRS) and Lag Storage Buildings has been completed for contact handled components. A liquid abrasive decon booth, a supercompactor and a plasma arc torch have been procured and are now operational.

The Remote Size Reduction Facility (RSRF) is to be designed and will be located in the FRS. The remaining fuel assemblies will be removed from the fuel storage pool, the area decontaminated and prepared for remote size reduction operations. Large vessels will be size-reduced in the underwater pool using plasma arc or other cutting tools. A decon station will be located in the shallow pool section where a high-pressure water cleaning unit will be deployed. A loadout area will segregate waste for disposal, supercompaction or transfer to the CSRF for further decontamination.

2.11 TRU Waste Assay and Disposal

TRU waste will be stored on site and disposed of at a site to be identified by DOE.

The WVDP is monitoring the development of repository criteria and is basing its TRU waste certification program on the Waste Isolation Pilot Plant criteria until commercial repository criteria are available.

2.12 Programs Not Addressed

The following activities conducted at WNYNSC will not be addressed in this Project Plan: (1) the NRC Disposal Area (NDA); (2) the New York State Disposal Area; (3) the existing LLW processing facility and lagoons; (4) the shipout of the spent fuel back to its owners; (5) the day-to-day operation and maintenance of the existing facilities; and (6) general plant projects (GPP) for upgrading the site such as roads, parking lots, drainage, etc.

3.0 HLW PROCESSING

The primary mission of the Project is the immobilization of about 2.3 million litres of HLW (supernatant and sludge) stored on-site in a 70-foot diameter single-shell carbon steel underground tank (8D-2) contained within a concrete vault.

In essence, the HLW processing systems and steps may be described as follows: (Refer to Figure 1)

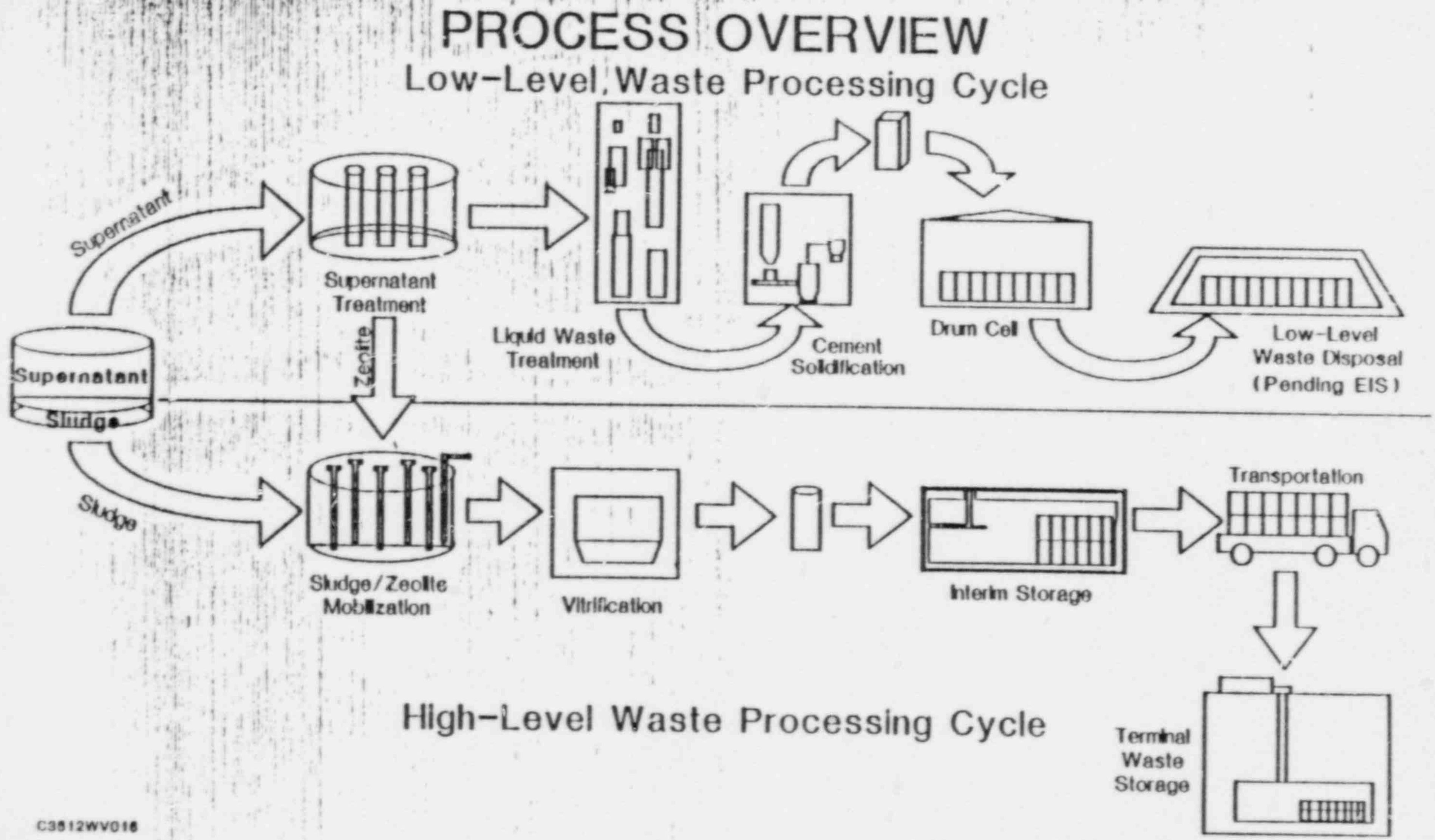
- o STS - Process the bulk HLW supernatant through the STS, extracting and retaining the Cs-137 on zeolite ion exchange media and sending the remaining bulk LLW liquid to the LWTS. The spent zeolite will be retained in the spare HLW tank (8D-1).
- o LWTS - Process the LLW stream (from the STS) through the LWTS, producing a concentrated LLW stream and a clean water stream. The decontaminated water can be reused or processed further for discharge to the environment. The concentrated LLW stream is sent to the CSS for solidification in cement.
- o CSS - Immobilize the LLW stream from the LWTS by mixing with cement using a qualified waste specific recipe and loading the mixture into drums.
- o SMS - Mobilize and wash the HLW sludge remaining in 8D-2 with water, releasing the interstitial supernatant and dissolving the Na_2SO_4, allow the washed sludge to settle, and decant the liquid for processing through the STS as described previously.
- o SMS - Send the Cs-137 bearing spent zeolite, washed sludge and THOREX waste after blending in the HLW tank (8D-2) to the Shielded Solidification System Facility for vitrification into borosilicate glass.
- o SSS - Mix the HLW stream with glass formers and process the slurry through the melter immobilizing the HLW in borosilicate glass.

3.1 System Descriptions

Component Test Stand (CTS)

The Project made an early commitment to selection, assembly and nonradioactive operation of the full-scale vitrification processing equipment in the Component Test Stand (CTS), which became operational in December 1984. So far about 60 tons of nonradioactive test glass have been produced, providing valuable information and experience in component and process design, checkout, process control, establishing glass

FIGURE 1


PROCESS OVERVIEW
Low-Level Waste Processing Cycle
Supernatant
Supernatant
Sludge
Supernatant Treatment
Liquid Waste Treatment
Cement Solidification
Drum Cell
Low-Level Waste Disposal (Pending EIS)
Zeolite
Sludge
Sludge/Zeolite Mobilization
Vitrification
Interim Storage
Transportation
Terminal Waste Storage
High-Level Waste Processing Cycle
C3512WV016

chemistry for (simulated) HLW and operator training and experience. The Project is converting the CTS to the HLW shielded solidification system while continuing significant nonradioactive glass testing. This strategy enables the project to offer more than four years of "Cold Operations" equivalent experience towards process and waste form qualification at the start of hot operations. The CTS is detailed in references [4-9].

Supernatant Treatment System (STS)

The design of the supernatant processing equipment was completed in FY 1986 and the major equipment procured by WVNS. Installation of the equipment has been completed. The STS will be ready for hot operations in early 1988.

The STS is basically an ion exchange system utilizing zeolite as the exchange medium for extracting Cs-137. The system utilizes four ion exchange columns, three of which operate in series at any given time while the fourth discharges the spent zeolite and is loaded with fresh zeolite. The STS is detailed in References [10 - 13].

The STS is located in Tank 8D-1 but has been designed so as to ensure that 8D-1 retains the capacity for emergency transfer from 8D-2 in the event of failure of 8D-2.

Sludge Mobilization System (SMS)

The Sludge Mobilization System will come on line in three (3) phases in support of processing needs:

Phase I - Supernatant Processing
Phase II - Sludge Wash
Phase III - Shielded Solidification System Feed

Construction and startup testing of Phase I in support of STS hot operations has been completed.

The SMS is primarily a system of pumps and transfer lines for washing and mobilizing the sludge in Tank 8D-2 and transferring HLW to the vitrification system.

Liquid Waste Treatment System (LWTS)

The LWTS consists of two parallel process trains, one for processing decontaminated supernatant and other liquid waste streams with a high total dissolved solids (TDS) content and a second one for processing for low TDS waste.

The high TDS waste processing train includes chemical adjustment, evaporation, and ion exchange polishing of condensates. Evaporator concentrates will be pumped to the CSS for solidification. The low TDS waste processing train includes filtration and ion exchange.

The LWTS construction has been completed and will be ready for hot operations in early 1988.

Cement Solidification System (CSS)

The CSS is a batch process system which is automatically controlled to provide the optimum mixing time and the optimum cement-to-waste ratio for the particular liquid waste to be processed. The heart of the CSS is a high-shear mixer. This mixer has the ability to encapsulate the wide variety of radioactive wastes found at West Valley. The high-shear mixer provides a strong mechanical action which has been demonstrated to provide excellent waste homogeneity.

The CSS is installed in the 01-14 building. Process equipment removal, building modifications, and installation of the CSS were completed in FY 1985 and uranyl nitrate waste solidification was completed FY 1986. The CSS consists of three subsystems: (1) the waste encapsulation system which consists of the high-shear mixer and associated equipment; (2) the cement storage and transfer system which consists of the silo, the cement storage bin for the day's operation and the transfer system for metering the cement to the mixer; and (3) the material handling system which moves and monitors the drums from the drum storage mixing station, capping station, survey station, waste storage, and waste loadout. The CSS is detailed in References [14-19].

4.0 WASTE QUALIFICATION

Borosilicate glass has been selected as the reference waste form for the WVDP based upon its high degree of development and desirable physical properties. The decision to use this as the reference glass was made after (1) WVNS had made an extensive review and had considered alternatives, (2) the DOE had conducted an independent review and had considered alternatives, and (3) the NRC and NYS had been consulted. The reference glass formulation was updated to ATM-10 based upon continued vitrification testing in the actual West Valley melter system and complimentary work at Catholic, Washington and Alfred Universities. These statistically designed studies, included glass melting and testing of the various glass properties such as leach rate, resistivity, viscosity and crystallinity to aid in refining the selection of the reference glass.

The waste acceptance process is a multifaceted program involving the candidate federal repositories, the waste producers and their respective DOE offices (NE and DP), and the Office of Civilian Radioactive Waste Management (OCRWM) of the DOE. The process is reviewed by the NRC. The most important phases of this process are the formulation of the Waste Acceptance Preliminary Specifications (WAPS), the West Valley Waste Compliance Plan (WCP), and the West Valley Waste Qualification Report (WQR).

The WAPS were created by the Waste Acceptance Committee (WAC), a group of representatives from the repositories, producers, MCC, and the DOE. This document describes the specifications with which the waste form must comply to be accepted by any of the candidate repositories. These preliminary specifications have been reviewed by the NRC. The WAPS has been issued to the project by OCRWM.

A draft of the WCP has been sent to DOE including OCRWM for review. Resolution of comments is in progress.

The WVDP strategy for preparation of the WQR, the document providing the data showing compliance with the WAPS, is to provide chapters of this document for review as they are completed. This strategy is intended to resolve issues arising during the review process at the earliest possible date. Preparation of sections of the WQR has been initiated.

Specific qualification tests will be conducted prior to producing the actual high-level waste glass and the performance of particular waste glass compositions are being characterized.

Details on glass chemistry and glass qualification are available in References.[20-26]

The details of the stainless steel canister to receive the HLW glass are described in Reference.[27]

Samples of nonradioactive and radioactive glass are being tested at CUA, AU, PNL, SRL, MCC, and WVDP. Confirmatory qualification testing was started in FY 1985. These samples are based on characterization of actual West Valley waste samples using the STS and the as-designed melter flow sheet. Radioactive samples have been produced at PNL, corresponding with these flow sheets and are being analyzed. The data from the characterization tests will be made available to the NRC as part of the WQR.

The simulated waste vitrification runs will be made in support of the completion and approval of the WQR. Two important objectives here are establishing that the reference chemistry is acceptable and that the processing control is adequate to consistently produce glass within acceptable limits.

5.0 REFERENCES

1. Public Law 96-368, "The West Valley Demonstration Project Act," October 1, 1980.

2. "Cooperative Agreement Between United States Department of Energy and New York State Energy Research and Development Authority on the Western New York Nuclear Service Center at West Valley, New York," Effective date: October 1, 1980, signed November 3, 1980, amended September 18, 1981.

3. "West Valley Demonstration Project Memorandum of Understanding Between the United States Department of Energy and the United States Nuclear Regulatory Commission," signed September 22, 1981.

4. "Design Alternatives for Feeding of High-Level Radioactive Slurries to the Slurry-Fed Ceramic Melter," C. C. Chapman, D. K. Ploetz, W. G. Richmond, August 1983. Presented at the A.I.Ch.E. Meeting 1983.

5. "Design Preferences for a Slurry-Fed Ceramic Melter Suitable for Vitrifying West Valley HLW," C. C. Chapman, April 1983. Presented at the American Ceramic Society Meeting 1983.

6. "Improved Feed Compositions for Slurry-Fed Ceramic Melters", J. M. Pope, C. C. Chapman, D. E. Harrison, April 1983. Presented at the American Ceramic Society Meeting 1983.

7. "Steam Explosion Assessment in the WVDP Melter," M. Hutcherson, P. G. Ellison, H. K. Fauske, R. E. Henry, C. C. Chapman, W. L. Kuhn, June 1985. Presented at the American Nuclear Society, Summer Meeting 1985.

8. "Startup and Initial Experimental Results for the West Valley Vitrification Demonstration Project," S. M. Barnes, C. C. Chapman, L. L. Petkus, T. F. Murawski, J. M. Pope, March 1986. Presented at the Waste Management Conference 1986.

9. "Results from Functional Checkout of the Vitrification Process at the West Valley Demonstration Project," T. F. Murawski, S. M. Barnes, L. L. Petkus, L. R. Eisenstatt, April 1986. Presented at the American Ceramic Society Meeting 1986.

10. "Design of the Reference West Valley Alkaline Waste Treatment Process," D. E. Carl, J. M. Pope, L. E. Rykken, August 1984. Presented at the Fuel Reprocessing and Waste Management Conference 1984.

11. "Assessment of Four Processes for Treatment of the West Valley Alkaline Waste," L. Bray, L. K. Holton, D. K. Ploetz, March 1984. presented at the A.I.Ch.E. Meeting 1983.

12. "Selection of a Reference Process for Decontaminating the Alkaline Supernatant," D. K. Ploetz, J. N. Pope, L. K. Holton, March 1984. Presented at the A.I.Ch.E. Meeting 1983.

13. "Design of the High-Level Waste Pretreatment Process for the Purpose of Vitrification," M. A. Schiffhauer, D. E. Carl, L. E. Rykken, March 1986.

14. "Immobilization of Low-Level Waste Generated at the West Valley Demonstration Project," J. C. Cwynar, L. R. Eisenstatt, P. M. Petrone, A. K. Saha, D. C. Grant, S. Weisberg, July 18, 1983. Presented at the A.I.Ch.E. Meeting 1983.

15. "Compressive Strength and Radiation Stability of Cement Encapsulated Radwastes," J. C. Cwynar, L. R. Eisenstatt, E. E. Smelter, D. C. Grant, M. C. Skriba, June 1984. Presented at the American Nuclear Society Annual Meeting 1984.

16. "Leachability of Cement Encapsulated West Valley Radwaste Streams," D. C. Grant, E. E. Smeltzer, M. C. Skriba, J. C. Cwynar, L. R. Eisenstatt, November 1984. Presented at the Material Research Society Meeting 1984.

17. "Cement Encapsulation of Low-Level Radwaste Streams," D. C. Grant, E. E. Smeltzer, M. C. Skriba, J. C. Cwynar, L. R. Eisenstatt, March 1985. Presented at the Waste Management Conference 1985.

18. "Physical Stability of Cement Encapsulated Low-Level Radwastes," E. E. Smeltzer, D. C. Grant, M. C. Skriba, J. C. Cwynar, L. R. Eisenstatt, June 1985. Presented at the American Nuclear Society - Summer Meeting 1985.

19. "Cement Encapsulation of Uranyl Nitrate Waste," S. A. Coolidge, J. C. Cwynar, L. R. Eisenstatt, April 1986. Presented at the American Ceramic Society Meeting 1986.

20. "West Valley High-Level Nuclear Waste Glass Development: A Statistically Designed Mixture Study," L. A. Chick, October 1984. (PNL 4992)

21. "Development and Selection of a Feed Slurry for Use in the West Valley Vitrification Process," B. M. Wise, September 27, 1985. (WVST 85/151 JRC).

22. "Comparison of High-Level Wastes at the West Valley Demonstration Project and the Savannah River Plant," L. R. Eisenstatt, November 1983. Presented at the Material Research Society meeting 83/11.

23. "Strategy for Producing a Consistent Quality Glass at West Valley (Abstract)," C. C. Chapman, L. R. Eisenstatt, S. M. Barnes, September 1986, presented at ANS Topical Meeting Spectrum '86.

24. "A method for Showing Compliance with High-Level Waste Acceptance Specification," L. R. Eisenstatt, C. C. Chapman, R. L. Bogart, March 1986. Presented at the Waste Management Conference 1986.

25. "Control and Data Acquisition for a Slurry-Fed Ceramic Melter for High-Level Nuclear Waste," N. E. Chapman, V. C. Drankhan, J. M. Pope, April 1986. Presented at the American Ceramic Society Meeting 1986.

26. "Chemical Determination of West Valley Waste Form Products," D. M. Oldman, J. H. Marlow, J. R. Stimmel, April 1986. Presented at the American Ceramic Society Meeting 1986.

27. "Description of the West Valley Demonstration Project Reference High-Level Waste Form and Canister", L. R. Eisenstatt, July 1986.

ACRONYM/ABBREVIATION LIST

ACI	American Construction Institute
ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineering
AU	Alfred University
BWIP	Basalt Waste Isolation Project
CPC	Chemical Process Cell
Cs	Cesium
CSRF	Contact Size Reduction Facility
CSS	Cement Solidification System
CTS	Component Test Stand
CUA	Catholic University of America
D&D	Decontaminate and Decommission
DOE	Department of Energy
DOE-HQ	Department of Energy Headquarters
DOT	Department of Transportation
EDR	Equipment Decontamination Room
EPA	Environmental Protection Agency
ESM	Experimental Scale Melter
FRG	Federal Republic of Germany
FRS	Fuel Receiving and Storage Area
FY	Fiscal Year
GPP	General Plant Projects
HLW	High-Level Waste
ICRP	International Commission on Radiological Protection
INEL	Idaho National Engineering Laboratory
LANL	Los Alamos National Laboratory
LLLW	Liquid Low-Level Waste
LLW	Low-Level Waste
LWTS	Liquid Waste Treatment System
m^3	Cubic Meters
MCC	Material Characterization Center
MSMRS	Master Slave Manipulator Repair Shop
mR/hr	Millirems Per Hour
NDA	NRC Disposal Area
NNWSI	Nevada Nuclear Waste Storage Isolation
NRC	Nuclear Regulatory Commission
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority
ORNL	Oak Ridge National Laboratory
ORR	Operations Readiness Review
OSR	Operational Safety Requirements
PNL	Pacific Northwest Laboratory
PSCM	Pilot Scale Ceramic Melter
Pu	Plutonium
QA	Quality Assurance
R&D	Research and Development
RHO	Rockwell Hanford Operations

RSRF	Remote Size Reduction Facility
RTS	Radwaste Treatment System
SAR	Safety Analysis Report
SBS	Submerged Bed Scrubber
SFCM	Slurry-Fed Ceramic Melter
SGN	Societe General Pour Les Techniques Nouvelles
SMS	Sludge Mobilization System
SNL	Sandia National Laboratory
Sr	Strontium
SRL	Savannah River Laboratory
SRP	Salt Repository Project
SSS	Shielded Solidification System
STS	Supernatant Treatment System
TAG	Technical Advisory Group
TDS	Total Dissolved Solids
Tons	Metric Tons
TRU	Transuranic
USGS	United States Geological Survey
VS	Vitrification System
WAC	Waste Acceptance Committee, Waste Acceptance Criteria
WAPS	Waste Acceptance Preliminary Specification
WCP	Waste Compliance Plan
WMS	Waste Mobilization System
WNYNSC	Western New York Nuclear Service Center
WVDP	West Valley Demonstration Project
WVNS	West Valley Nuclear Services Company Incorporated
WQR	Waste Qualification Report

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DATE OF DOC. May 9, 1988

DATE RCVD. May 12, 1988

FCUF ____ PDR ✓

FCAF ✓ LPDR ✓

I & E REG ✓ J Rotte (JLB)

SAFEGUARDS ____

FCTC ____ OTHER ✓

DATE 5/12/88 INITIAL Sac