PROGRESS ON CLEANING UP THE ONLY COMMERCIAL NUCLEAR FUEL REPROCESSING FACILITY TO OPERATE IN THE UNITED STATES

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ABSTRACT

This paper describes the progress on cleanup of the West Valley Demonstration Project (WVDP), an environmental management project located south of Buffalo, NY. The WVDP was the site of the only commercial nuclear fuel reprocessing facility to have operated in the United States (1966 to 1972). Former fuel reprocessing operations generated approximately 600,000 gallons of liquid high-level radioactive waste stored in underground tanks. The U.S. Congress passed the WVDP Act in 1980 (WVDP Act) to authorize cleanup of the 220-acre facility.

The facility is unique in that it sits on the 3,345-acre Western New York Nuclear Service Center (WNYNSC), which is owned by New York State through the New York State Energy Research and Development Authority (NYSERDA). The U.S. Department of Energy (DOE) has overall responsibility for the cleanup that is authorized by the WVDP Act, paying 90 percent of the WVDP costs; NYSERDA pays 10 percent. West Valley Nuclear Services Company (WVNSCO) is the management contractor at the WVDP.

This paper will provide a description of the many accomplishments at the WVDP, including the pretreatment and near completion of vitrification of all the site's liquid high-level radioactive waste, a demonstration of technologies to characterize the remaining material in the high-level waste tanks, the commencement of decontamination and decommissioning (D&D) activities to place the site in a safe configuration for long-term site management options, and achievement of several technological firsts. It will also include a discussion of the complexities involved in completing the WVDP due to the various agency interests that require integration for future cleanup decisions.

INTRODUCTION

Former spent fuel reprocessing activities at the WNYNSC were conducted under a U.S. Nuclear Regulatory Commission (NRC) license that is currently held in abeyance to allow DOE to complete responsibilities mandated by the WVDP Act. The WVDP Act directs DOE to complete specific radioactive waste management activities and then return site control to New York State. Also, DOE must meet the NRC's prescription for D&D of WVDP facilities to allow the premises to be returned to New York State control.

Fig. 1 Aerial view of the West Valley Demonstration Project

Congress mandated five specific activities for the WVDP:

- Solidification of the high-level waste (HLW) by vitrification
- Development of containers suitable for permanent disposal of the high-level waste
- Transportation of the waste to a federal repository
- Disposal of low-level radioactive waste and transuranic waste produced during the Project
- Decontamination and decommissioning (D&D) of the tanks, facilities, and any material and hardware used in connection with the WVDP in accordance with NRC-prescribed criteria

Since 1982, the WVDP has: decontaminated several cells in the main reprocessing facility for reuse; designed, constructed, tested, and operated pretreatment systems for the liquid portion of the waste; and designed, constructed, tested, and operated the Vitrification Facility to process the remaining sludge waste into glass. Through December 2001, 99.7 percent of the high-level radioactive waste had been solidified by vitrification into 263 canisters of borosilicate glass.

Work now is also focused on cleaning out the high-level waste tanks (two main tanks out of four total) and shutting down the Vitrification Facility (VF). Decontamination of additional cells is also under way to place the site in a safe configuration for future cleanup decisions. To size-reduce and package large and highly radioactive equipment and other components for eventual disposal, the WVDP is constructing a Remote-Handled Waste Facility. Additionally, DOE and NYSERDA have resumed negotiating final cleanup options for the WVDP and will jointly prepare a final Decommissioning and/or Long-Term Stewardship Environmental Impact Statement (EIS).

A significant WVDP achievement in 2001 was the loading of 125 spent nuclear fuel assemblies, the site's remaining assemblies from former fuel reprocessing operations, into two specially designed casks for rail shipment to Idaho. Shipment of the assemblies, which are owned by DOE, would be the largest commercial cross-country shipment of such material. The shipment is currently on hold pending completion of DOE shipments of transuranic waste from the Idaho National Engineering and Environmental Laboratory (INEEL) to the Waste Isolation Pilot Plant; however, the spent fuel project demonstrated unprecedented integration among federal, state, and tribal governments, as well as the NRC. The WVDP's excellent working relationship with the NRC resulted in the agency's decision to allow full-load shipments of the assemblies, resulting in one shipment instead of two and avoiding more than $2 million in costs.

DOE has completed the first two WVDP Act responsibilities: development of the containers suitable for disposal of the solidified HLW and solidification of more than 99 percent of the HLW into borosilicate glass.

WVDP Accomplishments

When DOE assumed control of the site, only six percent of the former reprocessing plant could be classified as free of contamination. Over a period of six years, the WVDP decontaminated 22 areas or 70 percent of the main plant. This key accomplishment allowed the reuse of existing facilities to the maximum extent possible and limited new construction.

For example, one of the cells that contained nuclear fuel processing equipment was decontaminated and reconfigured to house new equipment that was used to treat the supernatant liquid in the high-level waste tank. The plant's largest cell, the Chemical Process Cell, was remotely decontaminated of 17 vessels, 1,500 feet of jumpers, two 22.5-ton pedestals, and one 10-ton pedestal. The cell is now a High-Level Waste Interim Storage Facility (HLWISF) used to temporarily store the stainless steel canisters containing borosilicate glass produced during vitrification operations. Several modifications made to the former Equipment Decontamination Room (EDR) also allowed construction of a transfer tunnel between the Vitrification Cell and the HLWISF. This project demonstrated high-pressure cutting technology to create 14-foot by 12-foot-wide doorways in the west/north walls of the EDR and the removal of the existing three-foot-thick shield door and its foundation.

The initial WVDP D&D effort demonstrated the safe and successful use of several technologies: high-pressure cutting using water, an abrasive saw, and plasma torches; robotics and remote applications; electro-mechanical and hydraulic manipulators; and surface decontamination methods using alkaline foam and water.

Concurrently with the D&D effort, the design and construction of a vitrification test facility was completed and later connected to a transfer tunnel and the HLWISF described above. Using the test facility, the WVDP produced its first canister of nonradioactive glass in 1984. A five-year nonradioactive testing period then followed between 1984 and 1989. This testing successfully demonstrated the WVDP's ability to produce high-quality glass on a production schedule. To validate the chemistry process used in the nonradioactive testing program, the WVDP also built, installed, and operated a minimelter to perform additional process chemistry qualification and sampling, and provide a mechanism for operator training on Conduct of Operations implementation. The minimelter allowed access to the slurry feed and glass-pouring areas that were inaccessible in the full-scale system.

To pretreat the liquid supernatant contained in the high-level waste tank, the WVDP designed, built, and operated an Integrated Radwaste Treatment System (IRTS) to remove the salts and sulfates that would be harmful to the vitrification process, and to capture radioactive cesium and strontium contained in the liquid. This four-stage system consisted of ion exchange columns installed in an adjacent waste tank to remove cesium; an evaporator that concentrated the resultant material after ion-exchange processing; a cement solidification system to combine the concentrated, pretreated waste into 71-gallon drums of cement; and an aboveground Drum Cell used to store the waste material. The IRTS was operated between 1988 and 1990 and reduced the amount of HLW canisters to be produced from 1,300 (if all the HLW tank material were vitrified) to 300. Use of this system, in combination with filling the HLW canisters to 91 percent, resulted in a cost savings of approximately $350 million. Also, use of square drums was an industry-first application at the WVDP that allowed maximum use of space through a compact stacking configuration in the aboveground Drum Cell facility.

After pretreatment was completed, the WVDP washed the layer of sludge on the bottom of the main waste tank from 1991 to 1994. By using titanium-treated zeolite (Ti-zeolite) in the sludge washing process, more of the waste's radioactive components (cesium, strontium, and alpha-plutonium) were removed for incorporation into glass, the more stable waste form. Had the technology not been available, this material likely would have been solidified in cement. Ti-zeolite, a new technology at the time, was developed at the Pacific Northwest National Laboratory (PNNL) and first demonstrated at the WVDP.

An additional tank of thorium extraction (THOREX) wastes was generated during former nuclear fuel reprocessing operations. This material was neutralized, transferred into the main waste tank in 1995, washed, and processed through the IRTS. The zeolite used during the pretreatment process was transferred into the main high-level waste tank and combined with the tank sludge to make up the vitrification feed. During liquid pretreatment operations and sludge/THOREX washing, 9,877 drums of cemented waste were produced.

The WVDP was the first to receive NRC endorsement of its cement waste form. During pretreatment operations, the WVDP developed two new stabilized cement-waste forms to solidify the sludge waste and THOREX streams to meet NRC requirements, as well as applicable U.S. Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) regulations for immobilized heavy metals. The drums of solidified material from the washes meet federal criteria for either Class A or Class C low-level waste.

After the nonradioactive vitrification testing campaign was completed, the WVDP removed and examined the equipment that was used during the program. The Vitrification Facility was then converted to a remotely operated facility, with a majority of the equipment — including the vitrification melter — replaced or newly procured and installed. Construction of the Vitrification Facility was completed over a six-year period beginning in 1988, while the test program was winding down.

The first construction contract included the Crane Maintenance Room and adjoining operating aisle, the tunnel between the Vitrification Cell and HLWISF, Secondary Filter Room, Diesel Generator Room, and Cold Chemical Facility. The second contract consisted of a trench constructed between the High-Level Waste Tank Farm and the VF, and the placement of five wall modules. The wall module placement was unique in that the prefabricated modules were placed between previously cast-in-place concrete columns, then transported to the WVDP for installation in the Vitrification Cell. The modules consisted of a structural framework to support internal piping and various penetrations for windows and utilities. Nine radiation shield doors, weighing 241 tons total, were also installed in the VF.

The third contract consisted of all equipment and electrical components for the VF, as well as installation of the final two wall modules. Construction of the off-gas treatment system, which again involved converting a portion of an existing building to treat melter off gases, was the last to be constructed and was completed in 1995.

Once construction of the VF was completed, the WVDP conducted a checkout testing program in parallel with a line management self-assessment to verify readiness of each VF component. The assessment validated that the people, parts, and papers were in place to proceed with radioactive operations. WVNSCO then conducted a formal Operational Readiness Review (ORR), as did the DOE-Ohio/West Valley Demonstration Project Office. With both ORRs completed and verifying readiness to proceed with radioactive operations, a DOE-Headquarters ORR team conducted its own extensive week-long review. The team recommended radioactive start-up operations in June 1996.

On June 19, 1996, the DOE Assistant Secretary for Environmental Management authorized radioactive operations at the WVDP, and five days later the first transfer of radioactive waste was made from the Waste Tank Farm to the Vitrification Facility. The WVDP joined the

Westinghouse Savannah River Site that year as one of only two facilities operating vitrification plants in the United States.

Major Accomplishments in Vitrification

The first phase of vitrification operations was completed three weeks ahead of schedule and $57 million under budget, with 210 canisters of borosilicate glass produced between June 1996 and June 1998. The 1991 approved baseline for Phase 1 of the WVDP was $1.4 billion, with completion scheduled for September 1998. However, the Phase I completion was accelerated to June 30, 1998 and rebaselined to the $1.394 million level. Actual costs for this phase were $1.337 million.

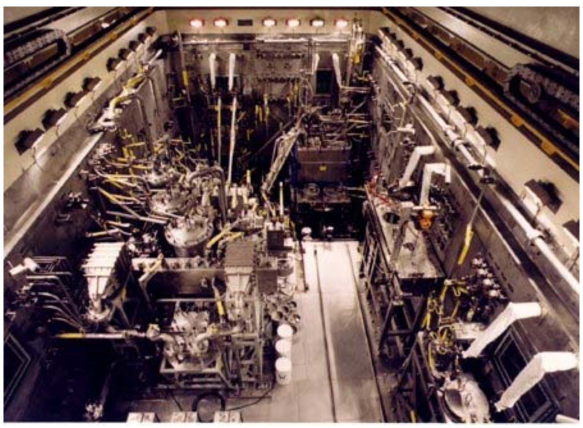

Fig. 2 - Vitrification Cell at the WVDP; the melter is at top right

The WVDP has continued to retrieve waste from the tank heels and since 1996 has processed 99.7 percent of the high-level waste — 23 million curies total (cesium, strontium, and daughter products) — into 263 canisters of borosilicate glass. The WVDP Vitrification Facility has operated safely and successfully, demonstrating several major achievements:

- a first-year melter availability of approximately 75 percent, compared to 45 percent for PAMELA (Belgium), 25 percent for Sellafield (England), and 33 percent for Tokai (Japan)
- a production rate of 35 kg/hour versus a design rate of 30 kg/hour
- a Vitrification Facility shielding rate of <0.1mrem/hour versus a design rate of 0.25 mrem/hour

- a glass durability rate that exceeds the requirement by a factor of 10
- a canister fill height of approximately 91 percent, which exceeds the requirement by 11 percent. Using an infrared level detection system, the WVDP increased the canister fill height and avoided the production of an additional 39 canisters.

In 2000, the WVDP completed a first-ever demonstration of sampling material from a working vitrification melter to determine the presence of noble metals. Since this was the first time such a sample would be taken, a sampling device would have to be developed that would withstand temperatures of more than 1100°C, operate remotely, and obtain and retrieve a sample of the sludge without being contaminated by glass. Once removed from the melter, the sample had to be extracted from the sampler for the on-site analytical laboratory analysis. WVDP engineers developed the original design for the sampling tool, which was later modified by PNNL. Samples were successfully retrieved in August 2000 and the resultant chemical analysis confirmed the expected increase in noble metal concentration, which was at least partially responsible for the increased electrical conductivity of the molten glass.

The WVDP has now turned its focus to cleanout of the high-level waste tanks, shutdown of the Vitrification Facility, shipment of low-level waste off site for disposal, D&D of certain former reprocessing plant cells to place the facility in a safer configuration pending site closure and/or long-term management decisions, and construction of the Remote-Handled Waste Facility to size-reduce and package large radioactive equipment and components from both former and current operations.

Future Vitrification Facility shutdown activities will be completed in 2002 and include flushing all systems, cleaning out the melter using an evacuated canister system, and powering down the melter.

High-Level Waste Tanks Technologies

Several innovative technologies have been deployed in support of high-level waste tank cleanout and are discussed more fully in the Waste Management '02 paper titled, "High-Level Waste Tank Cleaning and Field Characterization at the West Valley Demonstration Project," by John Drake, Carol McMahon, and Daniel Meess.

The recovery of the remaining waste has been challenging primarily due to the complex internal structural support system within the main tank. However, the WVDP has demonstrated several technological achievements related to the high-level waste tanks. In 2001, two remotely operable tool deployment systems were installed 180° apart in the main tank. From these two access points, remotely operated sluicers guided by video cameras were used to wash the tank walls, columns, and bottom reinforcing structures. The sluicers have washed more than 75 percent of the main tank's interior surfaces.

Other innovative characterization technologies deployed in the tanks include a burnishing sampler, which rubs tank surfaces and draws the residual surface contamination into a sample head for analysis. Thirty-nine samples have been obtained using this technology. Also, a modified gamma camera was deployed — the first such use of this state-of-the-art technology — to map the tank for areas of cesium-137 accumulation. In addition, neutron detectors, gamma probes, color video cameras, and a custom-designed remote arm for beta-gamma readings have been used in the WVDP tanks with success.

Vitrification Facility - Use of Technologies

The Vitrification Expended Materials Processing (VEMP) program was initiated in July 1999 with a strategy for cell disassembly sequencing and removal, size reduction, segregation, and packaging of large process components in the Vitrification Cell. Since that time, 67 items have been size-reduced. During this process, the WVDP segregates high-level waste from low-level waste, avoiding future disposal costs. Based upon unit volume disposal costs and the current waste volume that has been processed, the VEMP program will realize future cost avoidances of more than $9 million. High-level waste items have been placed in the High-Level Waste Interim Storage Facility and low-level waste equipment has either been shipped off site or is in on-site storage.

The WVDP completed the design of equipment for the encapsulation of the glass-coated Inconel® components and successfully performed a mock-up demonstration in a nonradioactive environment. The WVDP also demonstrated jumper size reduction using Schilling® arms and a DoAll® band saw. Reengineering of cutting and handling size-reduction equipment allowed the WVDP to avoid $800,000 in costs by modifying existing tool designs to operate using the in-cell crane power and control. The WVDP developed and deployed three technologies for use in VEMP: a project-specific band saw, a mini-max steam cleaner, and a reactionless ratchet wrench, all of which functioned well in test operations prior to use in the radioactive Vitrification Cell.

D&D Projects

The next phase of cleanup operations will focus on decontaminating portions of the former facility that were used to reprocess spent nuclear fuel before DOE took over the site. This phase of operations is being conducted to place the cells into a safer configuration for future facility decommissioning. Initial decontamination efforts in the main plant are focusing on the Head End Cells — the Process Mechanical Cell and General Purpose Cell. These are the cells associated with the shearing of spent nuclear fuel and storing and handling the sheared fuel prior to chemical dissolution. A significant amount of debris is stored in these cells from former reprocessing operations. Background radiation in the cells ranges from 100 to 200 R/hour, with hot spots of up to 2,000 R/hour. For more information, see the Waste Management '02 paper titled, "Decontamination of the Head End Cells at the West Valley Demonstration Project," by John Drake, Ken Schneider, Jeff Choroser, and Scott Chase.

Due to the high radiation fields and the high levels of contamination, the majority of cleanup operations must be performed remotely. In addition, the equipment in the cells is not operational and must be replaced to initiate cleanup operations. The only visual access to these cells was through the use of remote cameras, until the WVDP refurbished the cell windows. In 2000, the WVDP refurbished a total of four 15-ton cell windows by removing, grinding, polishing, and reinstalling the glass. By applying lessons learned with each replacement, the time to complete the project was reduced from 20 days for the first window to 7 days for the last. Once visual access to the cells was achieved, the WVDP began the process of removing unusable cranes and other equipment that required replacement before D&D work could begin. Cleanup of the PMC will involve sorting, segregating, vacuuming, packaging, and storing debris and loose contamination to place the PMC into a safer storage configuration. Two cranes and a bridge-mounted power manipulator required removal and replacement in the this cell before work could begin.

To ensure personnel radiation exposure was as low as reasonably achievable (ALARA), the WVDP evaluated various cutting technologies to size-reduce the large and highly radioactive crane systems. The oxy gasoline cutting technology was found through a technology-sharing program with the Fernald Environmental Management Project (FEMP), under the auspices of the DOE's Accelerated Site Technology Deployment Program. Oxy gasoline technology uses gasoline as its fuel source instead of the typical acetylene-fueled cutting torch and offered many advantages over an oxyacetylene torch. The WVDP adapted the technology for this application by having a 13-foot-long cutting torch fabricated. This allowed operators to lower the torch through a hatch above the PMC's Crane Room and size-reduce the cranes, which were removed from the cell and placed in waste containers. The new replacement equipment was then successfully installed. Following completion of a Readiness Assessment, the WVDP commenced D&D work in the PMC in September 2001. Work inside the cell is ongoing.

A drive mechanism on a 50-ton shield door in the General Purpose Cell Crane Room (GCR) prevented access to the failed cranes in that cell. The shield door had been left in a half-open position and dose rates in the cell were 30 to 150 mrem/hour, with associated high levels of contamination. The repair consisted of installing temporary supports to hold the door during the repair, disconnecting the ball screws, removing the drive motor and gear boxes, finding replacement gear boxes and motors, installing the new drive motor and gear boxes, and operating the door. Meticulous prework planning, work involvement, and extensive use of full-scale mock-ups were essential to the successful completion of the repair. The shield door was safely repaired on schedule and at one quarter the original dose estimate to workers.

Fig. 3 - The oxy gasoline torch was used at the WVDP to size-reduce failed cranes

Also in the GCR, the WVDP removed an inoperable 2.5-ton overhead crane, a challenging task due to radiological hot spots up to 1R/hour, oversized crane beams that were too large to accommodate hand tools, and limited mobility of the crane. After applying a spray fixative to prevent the spread of contamination, the crane was size-reduced and loaded into a specially designed box. A new bridge-mounted manipulator system was also successfully installed in the GCR ahead of schedule.

The WVDP has successfully completed other D&D projects including decontamination of an Acid Recovery Pump Room (ARPR), which housed components and piping that transferred radioactive nitric acid streams from the acid recovery cell to storage vessels in the former reprocessing facility. Decontamination of this room presented significant challenges because of its high alpha contamination levels (>10M dpm) and moderate radiation levels (<50 mR/hour general area), as well as the need to remove a large amount of mechanical, electrical, and instrumentation components, and process and utility piping that were left after reprocessing operations. The ARPR also contained acids and process fluids that required removal. The WVDP decontaminated the room by removing debris; isolating permanent utilities; draining and isolating process lines of radioactive liquids; size-reducing and removing electrical and instrumentation components, high-efficiency, particulate air (HEPA) filters, and miscellaneous debris. The project was completed at less than half the budgeted radiation dose to workers (5.8 mR/hour budgeted versus 2.8 mR/hour actual) between December 2000 and April 2001. Specific innovative practices used to achieve this included grouting the uneven floor. This increased worker safety by providing an even work surface and reduced the room radiation dose from an average of 33 mR/hour to an average of 13 mR/hour by 66 percent. Electronic dosimetry was also used to monitor radiation exposure in real time, saving time otherwise spent reading the direct reading dosimeter while in the area, as well as time wasted ending a room entry early due to the use of a single dose rate value to calculate the stay time in the room.

In 2001, the WVDP also completed decontamination, dismantlement, and packaging of a large stainless steel glove box that was used during reprocessing operations to package purified plutonium nitrate for off-site shipment. The glove box was 18 feet long, 16 feet tall, and 4 feet wide, and was housed in the Product Packaging & Handling (PPH) Area. The project represented a challenge to complete not only because of its size, but also due to high alpha contamination (30E+06 dpm/100cm^2) that could become airborne and pose a threat to worker health and safety. A fogging technique was used to fix the contamination inside the box through injection of a polymer that immobilized the contaminants. After fogging, the interior surfaces were coated with a fixative. The combination of these techniques allowed operators safe access to the box. Other challenges faced and met included space restrictions, the inability to use standard containment techniques, specialized hoisting and rigging requirements, and engineered ventilation controls. The glove box was safely separated and removed in four sections and placed in special waste containers procured for packaging the individual glove box sections. This project was completed over a six-month period without incident. For additional information on this project, see the Waste Management '02 paper titled, "Decontamination, Dismantlement, and Packaging of a Plutonium-Contaminated Glove Box," by Dwayne Gordon.

These are examples of a few of the D&D projects the WVDP has safely and successfully completed within the last two years. The lessons learned from these projects will provide key lessons learned for others conducting D&D activities within the DOE Complex.

Fig. 4 - WVDP fuel was loaded into two shipping casks like this one for future transport to INEEL in Idaho

Spent Fuel Shipping Project

When fuel reprocessing operations were halted in 1972, a total of 750 spent nuclear fuel assemblies that were previously sent to the facility for reprocessing operations were left on site in a storage pool. Between 1983 and 1986, 625 assemblies were shipped by truck to the facilities that owned them. DOE took title to the remaining 125 assemblies and in 1995 reached an agreement with the State of Idaho and the U.S. Navy to ship the assemblies by rail to INEEL. This would represent the largest commercial fuel shipment ever made in the U.S.

In April 2001, the WVDP completed a two-year, one-of-a-kind effort to ensure readiness and to complete operations to load the assemblies in specially designed casks for shipment to INEEL. A total of seven detailed readiness reviews were completed — including a DOE ORR — between August 2000 and January 2001. The reviews verified safe operations, personnel training requirements and associated qualifications, training records, operator proficiency, engineering support, and procedures and work control documents.

The WVDP developed and successfully executed a training program for nine operators and three supervisors. The program included a Training Qualification Standard comprised of 43 On-the-Job training guides, proficiency demonstrations, and control manipulations. Hands-on operator training involved using actual hoisting and rigging equipment, the shipping casks, and fuel assembly mock-ups, which proved to be the key to the success of the training and readiness demonstration effort. This approach provided pre-job training that allowed operators to perform incident-free loading of each shipping cask. This was a remarkable effort considering that only two of the 12 Operations personnel had any previous spent fuel handling experience.

The key engineering accomplishment achieved was gaining NRC agreement to allow full-load shipments of the fuel versus the half loads the casks were initially licensed to carry. Loading all the fuel assemblies into two casks allowed for one rail movement instead of two, which in turn reduced: costs by more than $2 million, associated safety issues, and operational handling at INEEL. Additionally, borated stainless steel fuel baskets were used to hold the fuel assemblies inside the casks. Studies have indicated this material displays fracture toughness and has high impact energy. End caps also were designed and installed on the damaged fuel assemblies (seven in total) to confine gross fuel particles to a known subcritical volume.

As a result of detailed planning and preparation, the 125 fuel assemblies were safely and successfully loaded into two specially designed shipping casks and placed on rail cars for transportation to INEEL. For more information on this project, see the Waste Management '02 paper titled, "Achieving Readiness for the Largest Commercial Cross-Country Shipment of Spent Nuclear Fuel in the U.S.," by Joe Jablonski and Ahmad Al-Daouk.

Low-Level Waste Shipping Program

To address the WVDP Act requirement to ship the low-level (and transuranic [TRU]) waste generated, activities were initiated in 1997 to reduce the inventory of the site's legacy low-level waste (WVDP TRU wastes are not currently authorized for disposal at the Waste Isolation Pilot Plant). Wastes were first shipped off site by truck, then truck-to-rail, and eventually completely by rail. More than 125,000 cubic feet of waste have been safely and successfully shipped off site since the program was instituted. The majority of the WVDP waste (to date) has been disposed of at Envirocare in Clive, Utah.

The WVDP also received approval to ship waste to the Nevada Test Site (NTS) in July 2001. Approval was the culmination of an extensive effort to develop a program consistent with DOE Order 435.1 and successfully pass a site review by the NTS. The NTS was very complimentary of WVDP waste management programs during the certification process and noted that the WVDP was the only new generator to receive NTS certification based on an audit that resulted in no findings and only two observations. More information on this topic may be found in the Waste Management '02 paper titled, "A West Valley Milestone - Achieving Certification to Ship Waste to the Nevada Test Site," by Jackie Jackson.

Remote-Handled Waste Facility

Through a series of evaluations, the WVDP characterized and identified waste streams requiring remote handling, and identified a safe, cost-effective option of preparing these waste streams for disposal. Approval to construct the Remote-Handled Waste Facility was received and construction was initiated in September 2000. This facility will allow the size-reduction and packaging of several large components from previous operations that are now in storage and will eventually require disposal. The facility will allow high-end remote D&D and its associated characterization work to be accomplished at the WVDP. Approval to construct the facility outside the radiologically controlled areas is facilitating commercial construction practices, reducing costs, and streamlining requirements. With this project, the WVDP has achieved the largest, continuous, single-day concrete placement — 600 cubic yards — in its history. Construction of the facility is continuing.

Regulatory Complexity

Several factors contribute to the complexity of the WVDP:

Three major agencies are involved in the WVDP: DOE, NYSERDA, and NRC (in addition to federal and state regulators — EPA and NYSDEC). Although DOE has been mandated by an Act of Congress to manage the high-level waste at the former commercial nuclear fuel reprocessing facility, and to decontaminate and decommission (D&D) the facilities it uses to do that, the DOE does not own the facility. The WVDP Act directs DOE to complete specific radioactive waste management activities and then return site control to New York State.

Former spent fuel reprocessing activities were conducted under an NRC license whose technical specifications are currently in abeyance while DOE completes its responsibilities under the Act. The license included oversight of the: fuel reprocessing facility, high-level waste storage tanks and ancillary support facilities, as well as the Nuclear Regulatory Commission-licensed Disposal Area (NDA). An inactive State-Licensed Disposal Area (SDA) is located adjacent to the NDA, but is under permit by the State of New York and was not under NRC licensed oversight.

The NRC is authorized by the WVDP Act to prescribe decontamination and decommissioning criteria for DOE's D&D actions before DOE can complete its requirements under the WVDP Act and return control of the former reprocessing facility, ancillary support facilities, and NDA to New York State control. In February 2002, NRC prescribed its License Termination Rule as the criteria for the WVDP. The LTR requires that maximum off-site dose to the public be less than 25 mrem/year and the maximum intruder dose be less than 500 mrem/year. Both of these limitations must be minimized to be ALARA. The NRC has indicated that the entire source term at the WNYNSC must be considered in the modeling in order to demonstrate compliance with the LTR. That implies that both the NDA and SDA be included in the analysis, as well as the fuel reprocessing facility complex itself. Complex issues such as how the LTR will be applied at the WVDP and long-term stewardship responsibilities are being discussed between DOE and NYSERDA, as well as being evaluated through the National Environmental Policy Act (NEPA) process.

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