

**PACKAGING OF MAJOR PROCESS COMPONENTS FROM THE VITRIFICATION
DISMANTLEMENT PROJECT AT THE WEST VALLEY DEMONSTRATION PROJECT**

M. Cain, L. Rowell
West Valley Nuclear Services Company
10282 Rock Springs Road, West Valley, New York 14171

A. Al-Daouk
U. S. Department of Energy Ohio Field Office West Valley Demonstration Project
10282 Rock Springs Road, West Valley, New York 14171

ABSTRACT

The West Valley Demonstration Project (WVDP) is a radioactive waste cleanup project being conducted by the U. S. Department of Energy (DOE) in New York State. The WVDP is located on the site of the only commercial nuclear fuel reprocessing facility to operate in the United States. The reprocessing facility shut down in 1972 and cleanup operations have been under way since 1982. West Valley Nuclear Services Company (WVNSCO) is the site contractor; the New York State Energy Research and Development Authority owns the site property and is a project partner.

The WVDP's Vitrification program, conducted between 1996 and 2002, was the nation's first successfully completed Vitrification effort. During the facility's six years of operation, 275 canisters of solidified high-level waste glass were produced. The canisters remain in temporary storage until the federal repository is available to accept them. The Vitrification Dismantlement Project began in late summer 2003 to remove highly radioactive piping and components from the Vitrification Cell.

Dismantling the inactive but highly radioactive and contaminated Vitrification Cell required a team of 100 people, skilled in remote dismantlement of contaminated equipment. Engineers and specialists in the packaging and transport of large, contaminated vessels were also integral to the team. The radiological inventory was estimated to be 290,000 curies prior to decontamination. Radiation levels were as high as 1,500 R/hr and contamination levels were greater than 100 million dpm/cm². Due to radiological concerns, items were dismantled using in-cell tools that were remotely controlled from outside the cell. Approximately 708 cubic meters of expended materials, manufactured primarily from stainless steel, Inconel®, and Hastelloy®, were removed over the course of a 18-month period.

The waste was removed intact for packaging and disposal. The weights of the major vessels ranged from 9,900 to 49,000 kilograms and the dimensions ranged from 3.6 to 5.8 meters. Once the major vessels were packaged and grouted in shielded containers, the final shipping weight of the heaviest container was nearly 181,000 kilograms.

This paper will focus on the unique challenges of remotely dismantling a highly contaminated cell and packaging the huge vessels for disposal. Safety was paramount while working to a very aggressive schedule. This paper will provide important information to other project managers facing high-risk dismantlement projects worldwide.

BACKGROUND

For the past two decades, activities to solidify high-level waste (HLW) into an approved borosilicate glass waste form according to the West Valley Demonstration Project Act have been the focus of work at the WVDP. The Vitrification Facility operated from 1996 until 2001 preparing batches of a more stable waste form by mixing chemical glass formers with HLW. Following processing of the final batch of HLW, a series of system flushes were conducted and most of the residual molten glass was removed from the Melter with an evacuated canister system. The facility was placed in a safe lay-up configuration after the Melter was powered down.

In 2003, the DOE received additional funding to accelerate site clean-up activities. The DOE requested WVNSCO to review available scopes on-site and identify work that could be accomplished by December 2004 (the end of the current contract period). WVNSCO identified, and DOE accepted, the Vitrification Cell Dismantlement project as it represented:

- Continued progress on cleanup of the WVDP
- Could be accomplished with available funding
- Used the talents and experience of the current work force

SCOPE OF WORK

The work scope required that all vessels, piping, and expended material be removed from the Vitrification Cell and packaged. Once this debris was removed from the cell, the liner was to be vacuumed. Class A Low-Level Waste (LLW) generated was to be characterized and shipped off-site for disposal. Class B and C LLW generated was to be packaged and staged for future shipment. The remaining suspect transuranic and high-level waste was to be packaged for future waste processing. This scope of work was to be completed by December 2004.

Initially, DOE also wanted the Melter to be packaged and shipped off-site as a super-stretch objective. However, this was later changed to only packaging the melter for transport due to issues related to selecting a receiver site and off-site transport.

Pre-Decontamination Vitrification Cell Condition

The Vitrification Cell (Figure 1) is lined with stainless steel and measures 20 meters long, 12 meters wide, by 11 meters tall. One of the major features of the cell is a pit that contained most of the major HLW processing vessels. The pit measures 7 meters long by 12 meters wide by 4 meters tall. There are seven major components in the cell, including three major HLW processing vessels, off-gas equipment, and canister welding and handling equipment. Large component weights ranged up to 49,000 kilograms. The cell also contained approximately 579 meters of utility and process piping. The general area dose rates ranged from 5 to 50 R/hr with smearable contamination levels greater than 100 million dpm/100 cm² beta gamma.

In-cell handling equipment at the time of project start-up consisted of five sets of manipulators at in-cell work stations. There is also a 22,680 kilogram overhead crane and two 4,090 kilogram hoists in the Vitrification Cell. The Equipment Decontamination Room (EDR), a room adjacent to the Vitrification Cell, was equipped with two 9,072 kilogram cranes. The Load-Out Facility, which provided the means to load in boxes, tooling and equipment, and remove packaged wastes, had one 13,608 kilogram crane for

handling equipment. Finally, a transfer cart was available to shuttle materials and equipment from in-cell to areas external to the cell.

Based on the in-cell component weights and the work required to be conducted in-cell, it was necessary to upgrade handling and decontamination tooling to complete the project scope.

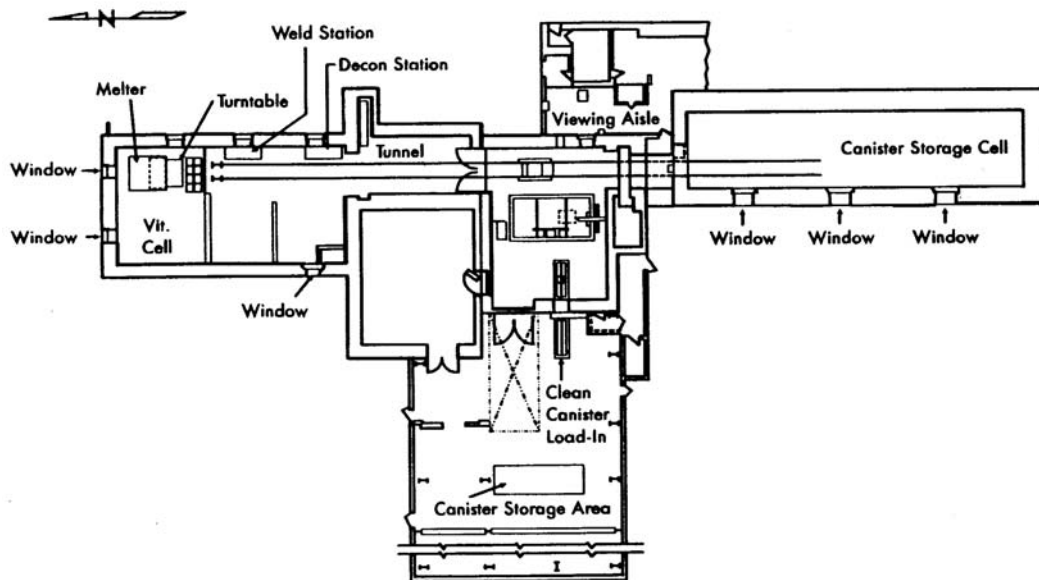


Fig. 1. Vitrification Facility Schematic.

Facility and In-Cell Tooling Upgrades

Although the Vitrification Cell was originally designed to be disassembled remotely from outside the cell using a crane-deployed electric impact wrench, the technology was insufficient to package the components for removal in the time frame available. As a result, several additional tools were deployed in the Vitrification Cell to expedite the work including band saws, rotating abrasive saws, shears, liquid sump pumps, fixative spray pumps and vacuums, electronic dosimeters, and radiation probes.

Of particular significance was a new, mobile, floor-mounted demolition machine (Brokk 330) which had more impact than any other tool because the mating shears, rotating abrasive saw, and grabber were more easily positioned than similar crane-mounted tools.

The Brokk 330 (Figure 2) is a mobile working platform for hydraulic tools. In its fully retracted state, the Brokk 330 is approximately a five-foot cube. It weighs slightly more than 4,082 kilograms and can carry tools weighing up to 544 kilograms. The unit deployed at the WVDP is electrically powered, track-driven and outfitted with a quick connect hub that mates with a shear, a grabber, a clam shell bucket, and two different types of saws. The Brokk 330 was used to perform most of the cutting operations in-cell.



Fig. 2. The Brokk 330.

While the standard Brokk unit can be remotely controlled during operations, hands-on maintenance and adjustments are still required to be made on the unit when it is not operating. Due to As Low As Reasonably Achievable (ALARA) considerations and because personnel cannot enter the Vitrification Cell due to the high dose rates and contamination levels, the unit was modified to allow some maintenance and adjustment to be done remotely. Furthermore, modifications to shorten the time spent performing hands-on maintenance were supportive of ALARA goals.

In addition to the Brokk, two remotely-operated manipulators were mounted on a new bridge and installed. This unit, referred to as the Remote Manipulator System or RMS, provided the means to vacuum the floors, measure dose over the inside surface of the cell and remove piping above the level reached by the existing cell cranes.

The Remote Manipulator System (RMS, Figure 3), manufactured by SA Robotics, was first deployed in early November 2004. The RMS bridge gantry travels north and south on the previously existing overhead crane rails inside the Vitrification Cell and adjacent Crane Maintenance Room. Two telescoping masts travel independently east and west on the bridge and are capable of rotating to an inverted position. A five degree of freedom manipulator is attached to the end of each mast and provides the point of attachment for grippers, an electrically powered impact wrench and electrically powered saws.

The standard forearm assembly is installed at the end of the south mast and has a lifting capacity of 91 kilograms at the gripper when positioned in the horizontal position and 454 kilograms in a straight vertical lift. The high capacity forearm is installed at the end of the north mast and has a lifting capacity of 272 kilograms pounds at the gripper when positioned in the horizontal position and 454 kilograms when the gripper and the arm are positioned straight down. The north mast has no capability to lift a vertical load directly below the mast.

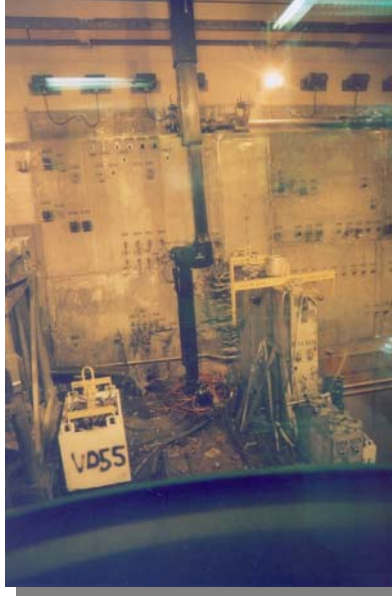


Fig. 3. Remote Manipulator System.

The installation of the RMS was fairly complex because the existing hatches in the Vitrification Facility were not large enough to allow the bridge of the new crane to pass up to the existing rails. (The span of the bridge was much, much longer than the diagonal distance across the largest of the openings.) The bridge beam was first spliced to separate the span into two parts and allowed one end of the bridge to pass through the existing hatch. Second, a unique and specially designed lift fixture was attached to the overly long end of the bridge to tip it up to an angle that allowed it to pass through the existing hatchway and maintain a single lift point.

Dismantlement of the Vitrification Cell

Dismantlement of the Vitrification Cell began with removal of the in-cell utility and process jumpers. Nearly 200 jumpers carried fluids between the vessels and walls of the Vitrification Cell. The first jumpers to be removed were those connected at both ends using PUREX connectors. An electrically-powered impact wrench hanging from a crane was used to loosen the Purex connectors. Jumpers with easily accessed Purex connectors were removed prior to jumpers with at least one end that could not be reached and loosened. Jumpers welded at either or both ends were removed later using shears or abrasive saws.

Hydraulic shears manufactured by Megatech and Atlas Copco were used to perform most of the work. Megatech shears were deployed from the existing Vitrification Cell cranes. The Atlas Copco shear was deployed from the Brokk. Four-inch diameter stainless steel pipe and tube steel with no more than standard wall thicknesses were the largest structures sheared. Wider and thicker-walled structural shapes were cut using electrically-powered abrasive saws deployed from either the cranes or the Brokk. A number of different commercially manufactured saws were used in different circumstances and for different tasks. All were equally effective and reliable. The largest diameter abrasive saw wheel was 1 meter in diameter.

Once the jumpers were cleared from the cell, removal of large components was initiated. There were seven major incell components including the Melter Feed Hold Tank (MFHT), Concentrator Feed Makeup Tank (CFMT), Submerged Bed Scrubber (SBS), Canister Turntable, Canister Decontamination Station, Canister Welding Station, and Melter. Significant schedule constraints required that the components be removed and packaged whole rather than attempting size reduction.

The CFMT, MFHT, Canister Decontamination Station, and Canister Weld Station were removed and packaged whole into Department of Transportation (DOT) self-certified containers. Due to Resource Conservation and Recovery Act (RCRA) concerns related to mercury contamination, vessels and piping downstream of the HLW processing off-gas stream, including the Submerged Bed Scrubber, were handled as mixed waste. Mixed waste components were staged in an adjacent shielded cell for future processing and packaging.

The three largest waste containers were fabricated in Cleveland within 370 kilometers of the project site near Buffalo. Barge transport or rail transport of the empty containers to the site was discounted because either would have required a transfer from a truck to and from a barge or to and from a railcar. The empty containers ranged between 63,503 to 90,718 kilograms in weight. The largest was a 6-meter long, 5-meter diameter, circular cylinder with flat sides. All were oversized and overweight shipments. The relatively short 370 kilometer trip from the fabricator's shop to the project site took four (4) days in the best case, and as long as fourteen days in the worst. These "super-loads" required different permits and escorts from each of the three states along the route. Efforts by the trucking company to expedite approvals were unsuccessful. The empty containers had to move immediately after fabrication to meet the project schedule. The containers also moved during August and September in the midst of an interstate highway construction/maintenance season that started slowly in the spring and was disrupted in August and September by the after-effects of three major hurricanes.

The process for removing the CFMT and MFHT from the cell included trimming the support structure of the vessels. The vessels were then sprayed with fixative and placed on a special tipping device to overturn the components onto a transfer cart for removal from the cell. The transfer cart was used to transfer the vessels to the EDR where a crane was used to reorient the vessel to proceed to the shipping container. The shipping containers were specially designed and fabricated to allow transport pursuant to DOT regulations. The containers were made of .08 to .13 meter thick carbon steel, with thicker shield plates in selected areas. Once the vessels had been pulled into the containers, the containers were grouted to provide the necessary stability for over-the-road transportation.

The MFHT presented some more unique clearance problems because it had not been designed to be removed through the shield doors. The MFHT did not have a base that allowed it to be tipped to its side and it was too wide to fit out the doorway from the cell. The support ears that protruded from the outer circumference of the tank extended well out into the concrete and steel that framed the shield doors. The engineering solution to resolve the problem was threefold; 1) the ears were trimmed slightly, 2) the MFHT was rolled to a 45 degree angle such that the ears were situated in an upper and its diagonally opposite lower corner of the shield doors as it passed through the openings, and 3) the MFHT shipping container was placed on wedges in its cradle. The wedges effectively rolled the container to mate with the MFHT and permitted the design of the MFHT and CFMT containers to be fairly uniform, with overall length being the major dimensional difference.

Due to its size, moving the Melter out of the Vitrification Cell and into the shipping container was the most challenging aspect of the physical work for two reasons. First, most of the movements were done

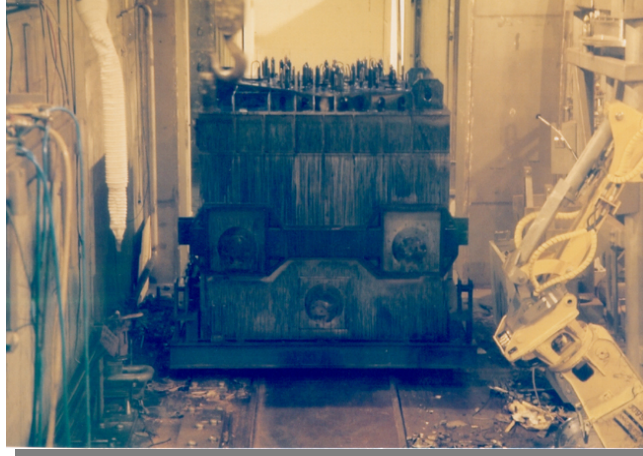


Fig. 4. Initial Moving the Melter.

using equipment controlled by operators outside the cell. Second, the weights of the Melter and its Transfer Shield individually and combined made rolling difficult. The Melter weighed 48,988 kilograms and the Transfer Shield weighed 49,895 kilograms. Unlike the CFMT and MFHT, a Transfer Shield was necessary for the melter since it exceeded the capacity of the EDR crane and required a mechanism for manual re-rigging the Melter to change directions within the EDR.

The Melter started its move out of the cell (Figure 4) from its support structure over the pit inside the cell. It was relocated using two sets of rollers set at different widths that had been built into the Melter when it was originally fabricated. One set of rollers was the same width as the rails on a temporarily installed bridge between the support structure and the apron. The second set of rollers aligned with the rail system on the apron, in the Transfer Tunnel, and in the Transfer Shield. When the Melter had been moved only a few feet, it was discovered that the seismic restraints added just prior to completion of construction were preventing further movement of the Melter to the south. In short, the restraints turned out not to be as removable as they had been designed to be. They had to be cut out by slipping a horizontal band saw into a narrow opening between the Melter and the side walls of the Vitrification Cell using a crane.

Once the seismic restraints were cut out, the in-cell cranes and the mobile demolition machine combined to move the Melter from its original (normal operating) position to the apron across the bridge over the pit. This is a distance of approximately 15 meters.

A hitch was attached to the leading edge of the Melter while it rested on the apron. A wire rope cable was routed from the hitch, down the Transfer Tunnel, up a ramp, through the Transfer Shield sidewall, through the EDR, and out to the Load-Out Facility to a winch mounted on the back of an over-the-road tractor. The winch pulled the Melter from the apron into the Transfer Shield which was staged in the EDR. This is an additional move of approximately 24 meters.

During the Melter movement, the rearward rollers on the Melter slipped off the temporary rails installed in the doorway between the Transfer Tunnel and the EDR. Rail sweeps on the Melter apparently became caught in the rail and damaged it as it was being moved up the inclined ramp section. As a result, the Melter could not be moved further and was stopped in the Transfer Tunnel with its trailing edge around 5 meters from the face of the Transfer Shield. Recovery took 12 days and involved jacking the Melter up and pulling it back onto the rails using a grapple. The equipment for the recovery was threaded through a narrow space above the Melter from the EDR into the Transfer Tunnel. The recovery equipment was

placed in position using the shear mounted on the mobile manipulator. Notably, the entire operation was accomplished remotely. Once the Melter was back on the track, winching resumed until the Melter was pulled into the Transfer Shield.

The Transfer Shield with the Melter inside it was then jacked up, placed on a system of four rollers, pulled across a temporarily installed new floor in the EDR to the shield door between the EDR and the Load-Out Facility. This is an additional move of 11 meters.

At the threshold of the shield door to the Load-Out Facility, the Transfer Shield containing the Melter was again jacked up to align the elevation of its rails with the rails inside the shipping container. The final steps in the removal of the Melter was to maneuver the Melter out of the Transfer Shield into the shipping container prior to placing the lid on the shipping container, and move the melter package to an on-site hardstand. The packaged melter will be grouted when approval to ship is received.

Once all the components of the cell were removed, final clean-up of debris was initiated followed by liner vacuuming. A final cell survey was conducted to demonstrate the effectiveness of the decontamination effort. General area dose rates ranged from 1 to 3 R/hr with smearable levels of contamination less than 60 million dpm/100cm² beta gamma.

WASTE MANAGEMENT

Waste containers moved in and out of the Facility through the EDR. Waste materials were placed in liners or containers and relocated out of the Vitrification Cell, the High-Level Waste Interim Storage Facility (HLWISF), and the EDR. Some vessels suspected to contain mixed waste were left intact and relocated into the HLWISF. Smaller pieces of extremely high dose waste materials and mixed waste materials were placed in liners and also staged in the HLWISF.

Twenty-five thousand cubic feet from the existing inventory of radioactive, low-level solid waste was shipped and disposed of, to free storage space for waste containers from the Vitrification Cell Dismantlement Project that could not be shipped because no pathway to disposal exists at this time. Waste relocated from inside the Vitrification Cell was shipped, staged for shipment, or stored. Waste containers that were generated before October 1, 2004, were shipped if a pathway to disposal existed. Waste without a pathway to disposal was staged for shipment or stored for future size reduction.

Five, six-sided concrete vaults of varying sizes were erected at the north end of the site to provide additional covered, radiologically safe storage for waste containers generated as a result of the Vitrification Cell Dismantlement Project. A few waste containers from other projects were also placed into the vaults. The vaults were covered with tarpaulins to reduce in-leakage from joints between the sections of concrete covers. The benefit of the vaults was that they could be modified to support the need for shielded staging because they were of a modular-prefabricated design.

Eight hundred feet of the existing rail spur at the site was replaced to prepare for eventual rail shipment.

SAFETY PERFORMANCE

Injury prevention and radiological protection programs were particularly effective on this project. There were no employee injuries of any kind: no first aid cases, no days away with recorded time, and no radiological exposures above planned limits. More than 200 waste containers were loaded and staged for shipment or storage during the project. The heaviest weighed nearly 181,436 kilograms and approximately three quarters of the containers weighed around 13,608 kilograms. Throughout these moves, there was not a single abnormal event of any kind.

In terms of radiological safety, the dose recorded was below the estimates prepared during ALARA planning. Over the course of the project, operators conducted an estimated 800 entries. During that time, there were two cases of skin contamination and eight cases of clothing contamination, which acted as the catalyst for developing additional controls that were effective in preventing recurrence. Six of the cases of clothing contamination were attributed to contaminated mice droppings. This record is remarkable in light of the fact that personnel from a variety of work groups, dressed in several layers of protective clothing including respiratory protection, made multiple entries into highly radioactive and contaminated areas every day over the 18 months of project work. In areas entered by workers, the highest radiation field was 200 mR/hr, with some components up to 2 R/hr. and the highest contamination level was estimated to be approximately 100 million dpm/100 cm².

LESSONS LEARNED

Design/Modification of Radiological Facilities and Infrastructure Improvements

During the design phase of Vitrification Cell construction, equipment was designed with eventual dismantlement in mind. Features were built-in to aid and simplify disassembly. For example, where possible, fasteners were used rather than welds, and equipment was sized to fit through openings and airlocks and to be handled by cranes and lift fixtures available in shielded cells. These features simplified dismantlement and shortened the duration of the project. Seismic restraints welded into position late in construction posed problems and delayed the work. In the future, work done late in construction should be installed with more of a view to eventual demolition.

Multiple pathways across radiological boundaries were not available in the Vitrification Cell as it was constructed. There was basically one way in and the same way out. Utilizing only one personnel access doorway and only one larger equipment doorway has the potential to reduce productivity by 50 percent or more during periods when personnel entries, waste container movements and equipment installations are routinely conducted day after day. This configuration does not allow activities to be linked or conducted in parallel when more efficient evolutions would otherwise be conducted. The costs and benefits of constructing new entry-ways should be carefully compared to the cost of delays due to other work, ventilation flows in the plant and operational considerations that force the plant to limit the time and method the project uses to perform work.

The utility of existing equipment relative to the work being performed was critically evaluated. Equipment designed to perform specific functions during operations may not be suitable or reliable when used in similar ways during demolition. For example, on this project a remotely-controlled cart was used to move waste containers out of the former Vitrification Cell to storage. The same cart was used during Vitrification to move the glass-filled canisters to storage. Although the operating history of the cart was uneven and it was repaired many times, the cart was still able to move nearly 300 canisters into and out of the cells over a period that exceeded its design life. During dismantlement, the cart moved heavier loads, more times for a year and a half beyond completion of Vitrification operations. However, the number of

repairs required to keep the cart running delayed waste container movements several times a month. Furthermore, repairs sometimes required very sophisticated features to be restored before even the simplest movements could be performed. A simpler, more conventional industrial solution might have been a better investment and might have more than offset the labor cost for people to constantly repair the cart.

Another lesson we learned is that pre-cast concrete vaults provide cost-effective, shielded, covered storage. The modular design and construction of these units can easily be modified to accommodate waste containers with different footprints and fit in the space available in storage yards. Work inside storage yards erecting modular sections is completed faster than placing a monolithic vault. In addition, the size of each module can be aligned with the capacity of available lifting equipment.

Project Leadership

The most senior members of the project team set expectations in key performance areas such as injury prevention, environmental compliance, and business conduct. Selection of specialty subcontractors to provide the expertise and knowledge to augment the site forces was key. Experience indicates first-time cases of a significant failure or a series of lesser failures in these areas can have catastrophic negative impacts on worker safety and cost, schedule, and customer satisfaction. Zero is the only acceptable target for any type of compliance-related performance measure. Detailed plans, constant communication, and coordinated action among participants are the key elements that turn ambitious goals into concrete accomplishments. Early focus on risk assessment, on failure modes and the effects of failures, and on mitigation or avoidance actions pays large dividends. The project team became conditioned to anticipate problems and take immediate preventive actions which created float and relieved schedule pressure. Structuring the schedule to allow weekly uncertainty analyses allowed the project managers to gauge how accurately the project team was projecting the duration of activities in the schedule. Comparing the actual durations to the range projected in the uncertainty analysis gave an indication of wholesale adjustments that were made to better predict finish dates.

Increasing Productivity

The boundaries within which work could be safely conducted were defined in work control documents. The work to be accomplished was defined, but provided latitude in the methods to be used to perform the work whenever possible. The acceptable options were itemized and included hold points prior to critical inspections, operational sequences, placement of personnel protections, and other activities prerequisite to higher risk evolutions. By specifying the limits of the work rather than by itemizing the work, the expected results were attained. Work control documents were simpler, clearer, and more easily followed, resulted in increased productivity.

Tactics to Increase Efficiency of the Work

Minimize size reduction and place the waste in the largest volume, ready to ship containers that can be moved out through the pathways out of radiological areas and handled with the available cranes and hoists. Weight limits associated with the transport mode selected for shipping and the capability of the location to which the waste will be shipped are also considerations. Purchase special sized or shielded waste containers from multiple suppliers and order them early. A single supplier, in a steel market where supplies are tight and prices are escalating at 6 percent per month, struggles to meet the schedule if for no other reason than the waste containers are generally filled in one shift while the time to design, fabricate, and deliver those same waste containers is 10 to 12 weeks. Purchasing commercial tools and adapting

them for use in radiological areas and in applications where they must be controlled from remote locations is more cost effective than engineering each tool for each unique application. Remote maintainability, protecting workers during hands-on maintenance and the useful working life should be carefully evaluated when designing or selecting tools and equipment being considered for deployment into highly radioactive and contaminated cells. Select either low cost or highly reliable tools for use in radiological areas. Low cost tools can be cost effectively used and discarded. Highly reliable tools require minimal repairs and reduce radiation and contamination exposure to personnel who have to maintain them.

Planning for Success

Use personnel familiar with construction of the Cell and operations in the former Cell to develop the sequence to follow when dismantling the equipment in the facility. Assign a core group of engineers, supervisors, technicians, and hourly workers to form a dedicated project team. Weigh knowledge, skills and experience in equal measure with business competencies such as breakthrough thinking, understanding people, tolerance for change, empowerment, drive and energy. Assigning personnel from support organizations to the project team and relocating them into office areas with the project team, continually improves performance. By doing so, project control, purchasing, subcontract administration, training, radiological control and similarly important support organizations receive day-to-day direction from the project and the influence and impact of the program on day-to-day operations increases. The project team gets a quicker response and benefits by having embedded within it, a ready reference and counselor extremely knowledgeable of the program requirements. The programs benefit because their representative becomes familiar with day-to-day operations and gains insight into potential process improvements. Co-locate the project team in a single office area. Open seating in cubicles makes it easier for the project team members to stay up-to-date with the latest developments. Walls tend to inhibit interaction. Planning for over-the-road transport of super-loads should begin months rather than weeks in advance in the eastern United States. The larger number of states multiplies the number of permit approvals required and the almost continual construction reduces the number of routes without obstructions or other limitations.

CONCLUSION

Work began at the end of August 2003. Since then, more than 708 cubic meters of expended equipment was removed from the interior of the Vitrification Cell during this period. To the greatest degree possible these materials were placed into ready-to-ship waste containers and transported to other locations for final disposition. Waste that could not be shipped was packaged or stored for further processing in the future.

WVNSCO delivered several items of significant value to the DOE by completing the Vitrification Cell Dismantlement Project:

- Removal of the expended materials from inside the Vitrification Cell allowed the hazard category of the Facility to be reduced from Category 2 to Category 3.
- The equipment with the highest radiological activity levels at the West Valley Demonstration Project was placed into shipping containers without adverse impacts on workers, the public or the environment. Specifically, the CFMT, the MFHT and the Melter transport containers were prepared for shipment and disposal.

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- Comprehensive characterization and engineering reports for the packaged large processing vessels, including the CFMT, MFHT, and the Melter were produced.
- A federal Department of Transportation Exemption request was prepared for the Melter transport container and provided to the Department of Energy.
- The former Vitrification Cell was outfitted with two remotely controlled robotic manipulators and a track-driven demolition machine. A number of tools such as shears, saws, grabbers and impact wrenches were also made available for future use.
- Fifty of the expected 151 waste containers generated were shipped and disposed of as Class A low-level waste. In addition, approximately 30 containers of suit-up wastes were also disposed of as Class A low-level waste.
- Seventy-six of the expected 151 waste containers generated were packaged for shipment and are ready for disposal when the prohibition against shipment of Class B and C waste is removed. The remaining 36 containers have either been classified as Transuranic waste or are expected to be.

WVNSCO and its subcontractors removed structures, systems and components from the interior of the highly radioactive and contaminated Vitrification Cell over a 18-month period between August 2003 and January 2005. Significantly, removal of the three major vessels, the CFMT, the MFHT, and the Vitrification Melter, was included. Also removed were piles of waste and expended materials from previous and completed operations of the Vitrification Facility that had been placed on the floors in the Vitrification Cell and two neighboring cells, the EDR and the HLWISF. The floor of the Vitrification Cell was also vacuumed.

Because the early phases of the project were a continuation of a previously analyzed campaign of Vitrification Expended Material Processing, no DOE Readiness Review was required. Prior to initiating the subsequent phases of the work, a gap analysis, as authorized in DOE Memorandum OH-976-02 was performed and concluded a DOE Readiness Review was not required. Unreviewed Safety Question Determination evaluations were performed subsequently for each phase of the work.

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