DECONTAMINATION OF A FUEL RECEIVING AND STORAGE POOL AT THE WEST VALLEY DEMONSTRATION PROJECT

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ABSTRACT

The West Valley Demonstration Project (WVDP) is a radioactive waste management project being conducted under the direction of the U.S. Department of Energy (DOE) and the New York State Energy Research and Development Authority (NYSERDA). The WVDP Act (Public Law 96-358) was established by Congress in 1980 to demonstrate the cleanup of liquid high-level radioactive waste that remained after shutdown of the nation's only commercial nuclear fuel reprocessing facility. New York State owns the property on which the WVDP is located south of Buffalo, NY.

Pretreatment of the liquid high-level radioactive waste was completed in 1990; vitrification of the remaining waste was completed in 2002 and resulted in 275 canisters of radioactive waste produced for future shipment to the federal repository. With its major mission completed, the WVDP has turned its focus to decontaminating and deactivating facilities used during the course of the radioactive waste management project, as well as some facilities used during the former reprocessing operations.

The Fuel Receiving and Storage (FRS) building housed all the facilities previously used for the receipt, storage, and shipment of spent nuclear fuel. After the WVDP was established, 750 spent nuclear fuel assemblies remained in the facility's 800,000-gallon-capacity Fuel Storage Pool. Contractor West Valley Nuclear Services Company (WVNSCO) removed 625 of the assemblies in the mid-1980s and returned them to the utilities that owned them. The DOE took ownership of the remaining 125 assemblies, which were loaded into fuel casks in 2001 and shipped to Idaho in 2003. With all of the spent fuel assemblies removed from the pool, the WVDP began the task of decontaminating the FRS in late 2001 by removing 149 empty fuel storage canisters. This phase of work then paved the way for nuclear divers to remove canister storage racks and other miscellaneous material from the FRS pool by April 2002.

This paper will describe the challenging activities completed following removal of the fuel storage racks. It will provide details on draining and treating the pool water using ion exchange media; sorting, removing and packaging waste, some of which required shielding; vacuuming the pool floor to remove sediment; cleaning and fixing remaining surface contamination on the pool walls to less then 20,000 dpm/100cm^2 beta and 2,000 dpm/100cm^2 alpha; and completing final

radiological characterization of the FRS. The FRS decontamination project was completed in May 2003. The facility in its current state has an empty pool with a smooth grouted floor surface and walls that have been coated with a fixative to capture any residual contamination.

DESCRIPTION OF FACILITIES

The FRS building includes the Fuel Storage Pool (FSP), Cask Unloading Pool (CUP), and other ancillary facilities. The objectives of the FRS decontamination project were to reduce the long-lived curie inventory, radiological hazards, and maintenance costs associated with the FRS portion of the former fuel reprocessing plant at the WVDP.

The FSP is made of reinforced concrete, measures 40 feet wide by 75 feet long by 29 feet deep, and holds approximately 800,000 gallons of water. The pool was designed to hold 924 canisters of spent fuel. The pool floor is 3.3 feet thick; the outer walls are 3.6 feet thick at the base, tapering to 1.6 feet at grade. Above floor level, the pool walls are 1.0 foot wide by 3.5 feet high. A 100-ton overhead bridge crane with two auxiliary 5-ton hooks and a pair of 2-ton service bridges straddling the FSP and CUP provide lifting capabilities.

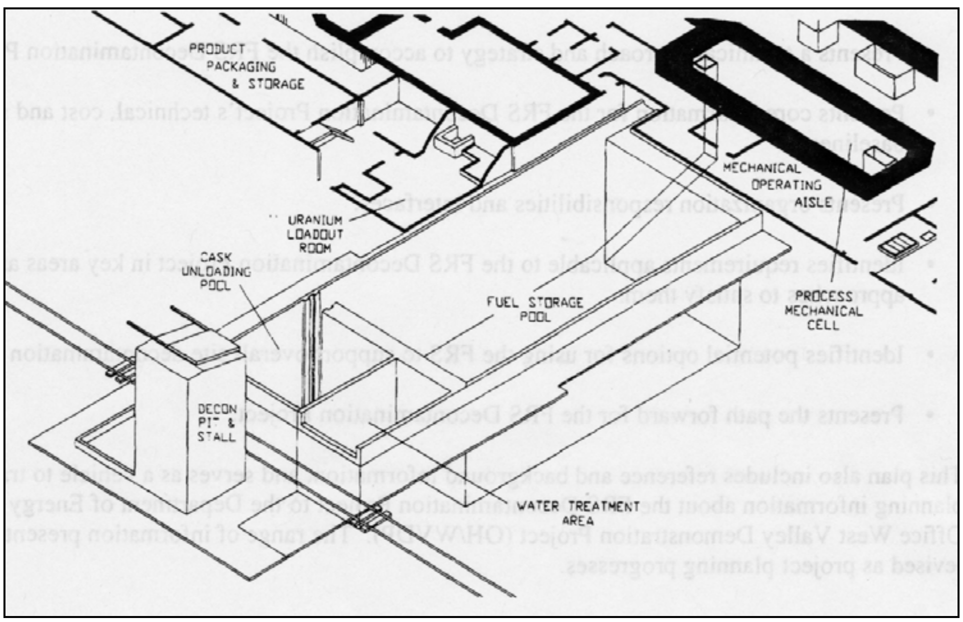

Fig. 1 Schematic shows fuel receiving and storage pool, cask unloading pool and tunnel to adjoining facility

The CUP is a stainless-steel lined, reinforced concrete pool connected to the east end of the FSP. This area was designed as an unloading and holding area for fuel assemblies during transfer operations from shipping casks to the FSP. It measures 24 feet wide by 26 feet long, and is sectioned to depths of 29 feet (shelf area) and 45 feet (maximum CUP depth). Both the walls and floor are 3.3 feet thick. The walls are lined with 14-gauge stainless steel; the floor is lined with 3/16-inch-thick stainless steel. A 3/4-inch-thick stainless steel plate was added to the bottom of the CUP to repair liner damage due to previous cask handling. Leak detectors are installed in the space between the walls and liner.

Activities Required to Complete Decontamination Project

Completing decontamination of the FRS included the following activities: remove the remaining equipment and debris in the pool; drain the pool water; sort, remove, and package waste; clean or fix surface contamination to a level less than 20,000 dpm/100cm^2 beta and 2,000 dpm/100cm^2 alpha; and complete residual characterization. A final radiological inventory report and post decontamination surveys were also completed.

Removal of Equipment and Debris

A host of equipment and debris from more than 35 years of pool operation remained in the pools at the start of the pool decontamination project. Equipment and debris removal presented several challenges due to the high levels of contamination and high dose rates associated with the equipment and debris, high-dose filters generated during prior water treatment, the need to install a sorting table and barrel holder to segregate debris, and fabrication of special tooling and stainless steel liners to hold activated metals.

Cask Liners

Cask liners were stainless steel or aluminum containers used for shipping Boiling Water Reactor (BWR) and Pressurized Water Reactor (PWR) failed fuel assemblies. These components were left in the FRS CUP from former spent nuclear fuel shipping campaigns. This portion of work involved removing the cask liners from the CUP and packaging them for shipment and disposal, as well as removing the liner storage rack and size reducing it for packaging, shipment, and disposal.

The cask liners had high levels of removable contamination and were a potential source of airborne contamination. To prevent airborne contamination, the liners were sprayed with high-pressure water below the water surface of the CUP prior to removal. Metal spacers inside the cask liners had to be removed because they trapped surface contamination. The liners were also rinsed with demineralized water as they were removed from the CUP. The cask liners were sprayed with fixative and wrapped with Herculite® before placing them into a waste box.

A total of eight cask liners, four empty debris barrels, and the cask liner rack were removed from the CUP in February 2003 and placed into a waste box. The final three cask liners had radiation levels that were still too high to place directly into the box after repeated decontaminations. Two of the three liners, with fixed hot spots greater than 1.5 R/hour on the bottom, were shielded with one-inch-thick steel. The final liner, which had fixed hot spots measuring 12.5 R/hour and 20 R/hour on the bottom, was temporarily shielded and a total of 32 inches of its length were removed from the bottom. The top portion of the liner was wrapped and boxed, and the bottom portion, containing the elevated radiation levels, was placed back into the CUP and later packaged with activated metal hardware.

Removal of Equipment/Debris in CUP

The WVDP prepared for removing equipment and debris from the CUP by first installing a sorting table and barrel holder. Tooling was fabricated to remotely unbolt the lid to the debris containers. ISOCS (In-Situ Object Counting System), an instrument provided by Canberra, was used to evaluate the predominant gamma emitting isotopes in selected pieces of debris. The removal of debris from the four barrels was hampered by previous compaction of the bag filters. Operators used several types of remote tooling, and subsequently improved their ability to grab and remove a bag filter. A recirculating pump equipped with a filter was relocated closer to the sorting operations to remove the sediment that was dispersed into the pool water when the debris was handled.

Sorting of four CUP debris barrels also was completed in February 2003. Decontamination & Decommissioning (D&D) operators reduced the time required to sort the third and fourth barrels by two-thirds by incorporating the lessons learned from sorting the first two barrels.

The four, 10-foot-long debris barrels contained a myriad of miscellaneous equipment and tools used during previous spent fuel storage activities. Operators removed the debris from the barrels and placed them into ten debris baskets. The debris baskets were segregated to keep "like" wastes together and facilitate subsequent packaging of the material into waste boxes.

Activated metals were also among the waste materials in the debris barrels and were found on the CUP floor; these waste materials required special packaging in two disposal liners called 1-13 liners before placement in a storage container. The liners are intended to be used as the containers for shipment to a disposal facility in a commercially licensed shipping cask. Because of the high dose rates (i.e. 48 R/hour on contact), these liners were overpacked in heavily shielded storage containers. Other equipment/debris that was removed from the CUP and packaged in waste containers included: high-dose filters; a pool skimmer; and a pool filter housing.

WVDP operators sluiced out the resin in the original 1-C-35 pool water demineralizer and transferred the resin to another building, which contains high-integrity containers (HICs) used to store spent resins from the filtration system. The emptied demineralizer was rinsed and packaged in a waste container for disposal.

Weir Decontamination

The weir, which is a trough in the wall between the CUP and FRS pool, was decontaminated by manually scrubbing the concrete trough with long-handled brushes, draining the water to the pool, and spraying the sides and bottom with fixative. Radiological surveys taken after applying the fixative confirmed that surface contamination levels were below targeted limits. The weir was then covered with plywood to provide a working surface for safely changing out pool filters.

Pool Water Removal

In an earlier phase of work, pool water draining was initiated on August 30, 2002, and completed on September 19, 2002. During this time, approximately 180,000 gallons of pool water (6 feet) was treated and discharged to the on-site Low-Level Waste Treatment Facility 2 (LLW2). This reduced the pool water from an initial level reading of 504 inches to 429 inches.

Fig. 2. Removing Used Filters From the FSP for Packaging.

The pool walls were manually scrubbed prior to draining and rinsed with demineralized water after draining. Strippable coating was also applied to sections of the original water level around the pool. Although these techniques effectively reduced contamination levels on the pool walls, a fixative was applied to meet surface contamination limits. The fixative, called Polymeric Barrier System™ (PBS) from Bartlett Nuclear Inc., was applied to the decontaminated pool walls after draining the water. This fixative was effective in fixing the remaining contamination below DOE limits for high contamination. There were no indications of migration of radioactivity in subsequent smears taken of decontaminated and fixed surfaces.

The PBS was tinted with blue dye/paint in order to readily distinguish between treated and untreated surfaces. The only drawback from using tinted PBS is that the overspray from the pressure sprayer used to apply the PBS caused the pool water to become discolored, affecting visibility. Mechanical filtration and/or treatment through the pool water demineralizer system were effective in removing the discoloration.

Further draining of the pool was temporarily placed on hold after draining the first six feet of water while efforts were focused on removing additional equipment and solid debris from the pool, CUP, and tunnel connecting the FRS to the Process Mechanical Cell.

Draining of the FSP resumed on March 18, 2003, and was completed on April 13; CUP draining followed and was completed on May 20, 2003. More than 600,000 gallons of water were drained from the pools during this second phase at a rate of up to 30 gallons per minute (gpm). The total volume drained does not include the volume of water added to the pools during decontamination activities.

Pool Water Treatment

The pool water was treated first through one-micron cartridges, then sent through an ion exchange system to remove cesium before being released to the interceptor and LLW2. Part of the ion exchange system was located in the Water Treatment Area, a 29-foot-deep dry pit, which held equipment from the original system that was used until 1994 to process pool water. The target concentration for cesium (3.0 x 10^6 ΦCi/ml) was achieved using a temporary ion exchange column loaded with C-249 (from Sybron Chemicals, Inc.), T-42 (from QualiChem Inc.), and IE-95 resins (from UOP).

A second ion exchange column loaded with TIE-96 (from UOP) was added to the ion exchange system to remove plutonium and to ensure that the final processed water was under New York State Pollution Discharge Elimination System (SPDES) limits for discharge. Decontamination factors of 5 for alpha contamination and 1,000 for beta contamination were achieved through the FRS ion exchange system.

Vacuuming of FRS Pool and CUP

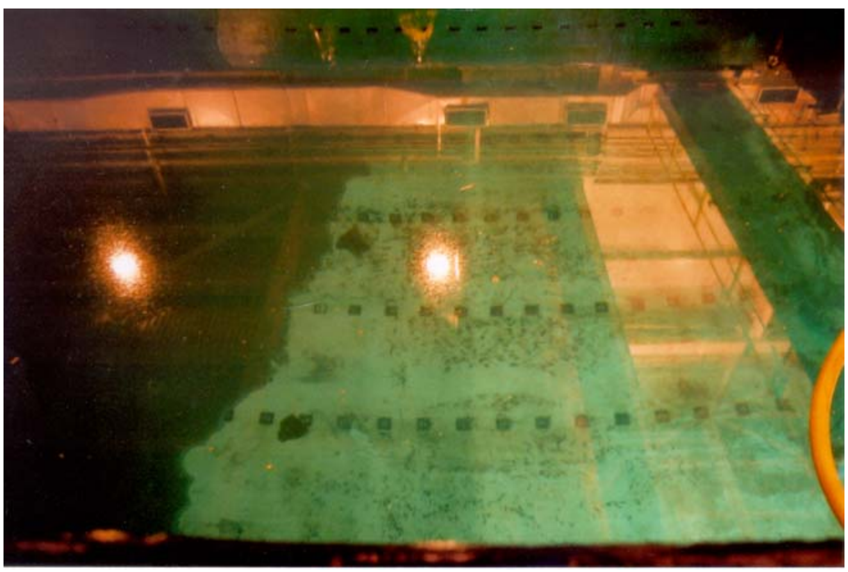

Fig. 2 FSP floor; lighter area has been vacuumed; darker area has not

D&D operators remotely cleaned the floor of the FSP and CUP using a vacuum system. To prepare for vacuuming, one-micron filters were obtained and two test vacuum evolutions, each involving 75 square feet of the FSP floor, were conducted. The entire FSP floor area (40 feet by 75 feet) contained up to three inches of sediment and was cleaned in nine shifts; conversely, in 1987 it took 30 shifts to complete the same work.

The CUP was vacuumed at both the 29-foot and 45-foot levels. The CUP took longer to vacuum than the FSP because the sediment was up to one foot thick at the 45-foot level and because vacuuming was started prior to removing all of the hardware debris from the bottom of the CUP.

Furthermore, additional debris was uncovered as the vacuuming progressed. The debris was segregated, collected, and packaged. Nevertheless, initial vacuuming of the CUP was completed in 9 shifts as compared to the 24 days that it previously took to vacuum just the 29-foot level of the CUP. Final vacuuming of the CUP was completed on May 13, 2003.

A pool filtration system that was identical to the pool vacuuming system was operated in parallel with pool cleanup activities and did an excellent job of maintaining visibility in the pool. During vacuuming of the CUP, it was necessary to relocate the pool filtration system to the CUP to maintain visibility. Also, air-operated diaphragm pumps attached to filters were used in later CUP vacuuming efforts.

The solids removed from the pool floors during the vacuuming process were captured by filters. Loaded filters generally had dose rates of between 8 mR/hour and 500 mR/hour; a limited number of filters, however, were greater than 1 R/hour, with one recorded at 6 R/hour.

Some of the waste containers that were used to package the pool filters for storage were shielded with lead or steel plates prior to loading. The WVDP conducted a mock-up of packaging the loaded pool vacuum and filtration filters. Bags for containing the filters were custom-fabricated based on the results of the initial mock-up. A final mock-up for packaging of the loaded pool vacuum filters was completed in the FRS before operations began. A total of 457 filters were generated from pool floor vacuuming and loaded into unshielded and shielded waste containers.

The number of curies removed during vacuuming of the pool floors was estimated to be 16.7 based on filter dose rates. The effectiveness of vacuuming in removing radioactively contaminated solids can also be seen in the general reduction in dose rates on the bottom of the pool as vacuuming progressed.

Sealing of Process Mechanical Cell (PMC) Hatch

The FRS interface to the Main Plant is via an underwater tunnel to the Process Mechanical Cell (PMC). The tunnel is 3 feet wide by 30 feet long. The PMC receiving hatch was above the water level, and lowering the water level (from pool draining) breached the ventilation seal between the pool water and the roof of the transfer tunnel, allowing air to flow from the FRS into the PMC.

When the pool water level was lowered to below the roof of the tunnel, a decrease in negative pressure in the PMC was observed as expected. A video inspection of the underside of the PMC hatch revealed that the gasket material under the bulkhead that the hatch sits on was torn and loose in several locations. In addition, the hatch appeared to have been removed at some point and not properly reseated. Ventilation barriers temporarily installed in the FRS side of the tunnel were successful in restoring the negative pressure in the PMC to a workable level until the hatch could be permanently sealed.

WVNSCO placed a subcontract with a nuclear diving company in November 2002 to permanently seal the PMC hatch, and remove sludge and debris that had accumulated inside the tunnel. Before beginning the work, the diving contractor completed personnel training and delivery of diving gear and vacuuming equipment. Mock-ups were performed for hands-on training of the divers in foaming the hatch. The mock-ups facilitated the selection of the type of foam to be used and checkout of remote tooling. Lessons learned on the operation of the foaming system were incorporated into the work documents.

WVNSCO conducted the following activities to ensure readiness for diving activities in the FRS pool:

- Remote tooling fabrication and mock-up of the filters/pump inlet strainer changeout.
- Two mock-ups of a diver donning/doffing his diving suit.
- Survey and video inspection of the tunnel area and PMC hatch.
- Full-scale mock-up of PMC hatch foaming. This significantly reduced worker time and radiation exposure on the project.
- Two dry runs for survey and decontamination of a diver exiting the water.
- A management readiness self-assessment.

The nuclear divers successfully completed the first dive on December 10, 2002. A minimum of 15 dives were planned. Because of extensive preparations and planning, all planned work was completed after only five dives. This resulted in a total personnel exposure of approximately one-third the total planned for the work.

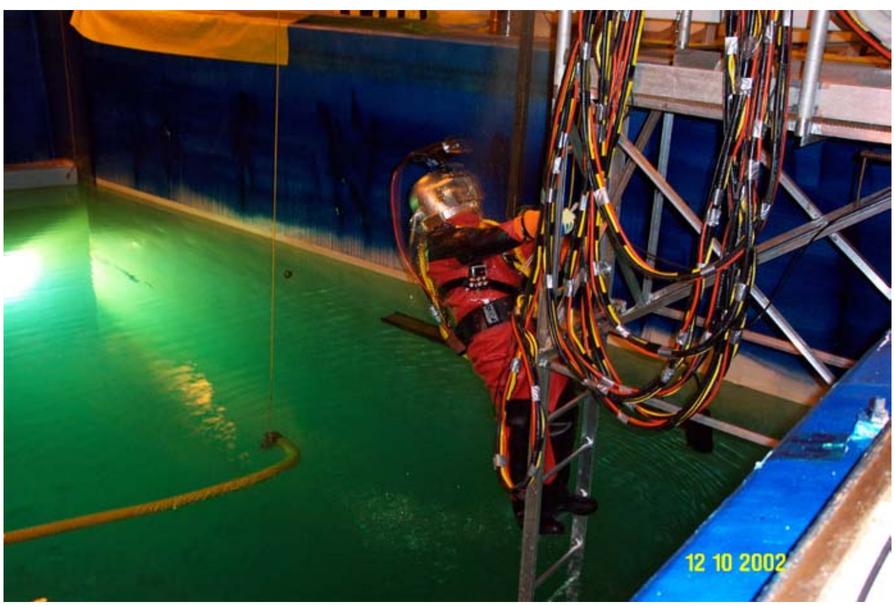

Fig. 3 A nuclear diver enters the FSP to perform work in the tunnel connecting the pool to the PMC.

The divers performed the following tasks in five days and five dives, at an average of three hours per dive:

Vacuumed a two-inch-deep layer of sediment from the floor of the tunnel.
Divers used a system consisting of a vacuum intake hose, 300 gpm pump, pump inlet, strainer basket, and bank of four, 10-micron filters to vacuum the tunnel. A similar system of one-micron filters was used to maintain pool water clarity. Divers placed a step ladder at the entrance to the tunnel to stand on and limit exposure during initial vacuuming operations. Dose rates on the bottom of the tunnel initially ranged between 1 to ~2 R/hour. A radiation monitor probe was placed at the end of the vacuum hose to aid in monitoring exposure. Vacuuming of the tunnel was completed in three dives. The 10-micron filters were changed when they reached an indicated dose rate of
2 R/hour. The actual filter dose rates measured in air were lower.

Sealed the PMC hatch by spraying the underside with foam.
The diver used a 28-foot-long aluminum extension ladder to stand on. A two-component polyurethane foam system (preheated to 73°F) was used to apply the foam with a 10-foot-long spray gun with modified fan-tip type nozzle. After each application, the diver moved to a low dose area to allow five minutes for the foam to cure and cool. Foam was also applied to the walls from the hatch down about three feet to the area just below the historical water level. The negative pressure in the PMC after foaming was acceptable at -0.68 to -0.74 inches of water.

Removed loosened paint from the canal walls.
Loose paint chips were removed from the tunnel walls and floor. The walls above the waterline were sprayed with PBS up to the foam layer to fix surface contamination. After removal of the plywood above the tunnel, the contamination levels were surveyed to verify that the levels were below 20,000 dpm/100 cm^2 beta-gamma and 2,000 dpm/100 cm^2 alpha.

Test vacuumed a section of the FSP floor to determine filter loading by pool sludge.
One additional dive was performed to conduct a test vacuum of the southwest corner of the fuel pool floor to determine the feasibility of vacuuming the pool using 10-micron filters. An area of 80 square feet was vacuumed using one set of 10-micron filters. This was the same amount of surface area that the WVNSCO operators later demonstrated they could vacuum remotely using one-micron filters before the filters loaded up on solids.

The underwater vacuum equipment continued to be used to maintain pool water clarity. Filters were changed semi-remotely based on predetermined dose rates and decreased flow rates through the filters.

Removing/Fixing Surface Contamination

The WVDP used a number of different methods to reduce surface contamination levels on the pool walls. A strippable coating was applied to the historical water line where the contamination levels were the highest. The first six feet of walls in the pool and CUP were manually scrubbed using long-handled brushes. It was planned to use a remotely operated brush mounted to one of the canister bridges below six feet, but the brush seized up. A spray manifold hooked up to a high-pressure sprayer was installed to decontaminate the remainder of the walls in the pool and CUP. Portions of the CUP and tunnel were manually decontaminated using a spray lance suspended from an overhead crane.

The FSP and CUP floors were vacuumed a minimum of three times each to remove sediment as previously discussed. Three rinses of the FSP were performed prior to grouting to remove loose particulate and rinsed to the CUP. The CUP floor was vacuumed to remove loose particulate prior to grouting the 45-foot level.

WVDP personnel evaluated the use of grout to fix any remaining contamination in the pool using the U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response (OSWSER) Memorandum of August 31, 1982, as a best management practice. As previously reported, PBS was applied to the walls of the fuel pool to fix surface contamination as the pool was being drained. The PBS was effective in fixing the contamination below DOE limits for high contamination.

The WVDP placed an approximate 4-to 6-inch grout mat on the pool floor to aid in fixing any remaining contamination and provide a smooth working surface on the pool floor. A new technology, referred to as "self-consolidating grout," was used. The product consisted of sand, cement, flyash, water and high-range, water-reducing agent to produce a free-flowing material that keeps the sand aggregate in suspension while the product spreads, self-consolidates, and self-levels. This characteristic allowed the grout to be introduced to the pool at only two locations on one side of the pool, and flow to the opposite side of the pool without any manual assistance. Furthermore, due to the nature of the product and the rates that the product was introduced to the pool, a slight slope from the north side of the pool (the grout introduction side) to the south side of the pool was achieved. This slope aided in collecting rinse and bleed water by diverting it to the CUP through the opening between the FSP and the CUP.

Two mock-ups were conducted at the grout vendor's batch plant to ensure that the grout was going to spread the full width of the pool, and to test slope creation from one side of the pool to the other. The mock-ups allowed the grout to be dropped approximately 29 feet to simulate the condition in the FRS pool, and spread a distance of 44 feet. Both mock-ups demonstrated that the product was going to meet project needs. The mock-up also confirmed that the WVDP would need only two introduction points for the grout and that the grout would have to be introduced to both points at the same time.

Grouting of the FSP took approximately three hours to complete, after which the grout was allowed to cure. Approximately five days after placement, the surface of the grout was sprayed with a sealing compound. Approximately six inches of grout was subsequently placed in the 45-foot level of the CUP and allowed to cure/seal. Bleed water that remained on the grouted surfaces after the grout had cured was absorbed with dry cement.

Final radiological surveys confirmed that the pool was decontaminated to less than 20,000 dpm/100cm^2 beta-gama, and 2,000 dpm/100cm^2 alpha.

Final Radiological Inventory Report

The final radiological inventory report provided a conservative estimate of the curie inventory of the FRS building for use with performance assessment modeling. The sum total of performance assessment radioisotopes was approximately 65 curies, the majority of which are located in areas outside of the pools. The characterization approach and resulting radionuclide inventory reflect the final conditions of the FRS building following decontamination of the pools.

The approach used to evaluate the FRS and generate the inventory estimate involved the following steps:

- Collection and evaluation of existing/historical information and data on the unit.
- Determination that analytical data/distributions existed to develop appropriate scaling factors.
- Determination that additional dose rate measurements and collection of additional survey data were needed.
- Collection of necessary survey data.
- Preparation of dose-to-curie computer models.
- Application of radioisotopic scaling factors to the modeling results to develop a conservative curie inventory.

Waste Summary

The FRS Decon Project Team worked over the course of the project to plan for the packaging and characterization of the waste generated. Items that were required to be packaged included activated metals with contact dose rates of more than 100 R/hr before they were placed in the 1-13 liner. As a result of the waste planning, specific containers were able to be ordered and received in time to package the waste as it was generated. Waste containers included standard B-25 boxes; B-25 boxes lined with 1/2 inch of lead; Ed-PACKS which are site-designed, shielded containers; 2-inch, lead-lined drums; and specially made liners for activated metals. The waste was packaged with proper shielding to meet on-site storage requirements.

The filters generated from vacuuming the sludge from the bottom of the pool were preliminarily characterized as either mixed low-level waste or mixed Transuranic waste. The wastes were packaged in final containers to the maximum extent possible. The vacuum filters were packaged to enhance storage configuration and minimize the risk and handling required to repackage the waste, if necessary. This also provided maximum flexibility for future decisions, as the filters are uniquely identified and can be repackaged individually, compacted, or potentially disposed of as packaged.

ALARA Summary

WVNSCO used As Low As Reasonably Achievable (ALARA) principles throughout the fuel pool decontamination project to achieve a total project dose rate that was under budget. Noteworthy practices used included:

- Performing pressure washing of equipment to reduce contamination underwater and using a low-pressure rinse to reduce contamination above the water.
- Using fixatives during the decontamination project and during removal of FRS debris.
- Removal of the stainless steel 1-13 liners from the CUP. The 1-13 liners were used to hold activated metals. Actual liner removal operations were completed remotely using cameras and remote radiological monitoring (electronic dosimeters) to provide real-time dose readings. Packaging filters for storage/disposal.
- Pool water was used to shield the divers during sealing of the PMC hatch.
- Conducting extensive mock-ups, including grout placement at the vendor's batch plant.
- Requiring respiratory protection during the removal of the FRS debris.

Decontamination of the CUP proved to have a higher degree of difficulty than anticipated. Water clarity became a major obstacle during debris removal and required lowering of the water level in the CUP to perform the work, resulting in higher dose rates. Hot spots were found at the 45-foot level of the CUP. These hot spots were the result of fixed contamination that was found along the north edge of the CUP.

FINAL LESSONS LEARNED

Following are highlights of lessons learned during the FRS decontamination project:

Diving Operations

The WVDP has had good success with the use of commercial nuclear divers for performing decontamination activities underwater that otherwise would have required design and development of remote technologies. For example, divers were used to seal the PMC hatch from below because of inadequate access from the cell side. The method used to seal the hatch—foaming—required a great amount of dexterity and control that would have made remote application of the foam extremely difficult. The divers were also able to vacuum and spray fixative in the tunnel between the pool and the PMC, an area the WVDP could not access.

An added benefit of bringing in commercial nuclear divers was that this afforded the opportunity for the WVDP to use the vacuum system to vacuum the FSP and CUP.

Lift Rack Removal

During initial spraying of contaminated components with high-pressure water above the water surface in May 2002, the WVDP learned that this created the potential for generating airborne contamination. The WVDP completed subsequent component decontamination with high-pressure water below the water surface, rinsed components with low-pressure water above the pool surface when removing them, sprayed fixative and/or wrapped components with Herculite® after removal, and monitored and evaluated conditions in the pool for potential changes.

The WVDP evaluated the need for respiratory protection when working with high contamination levels outside of the pool containment. After May 10, 2002, elevated beta activity was detected

only four times (when deconning the weir, when cutting up a piece of equipment called a swing arm, when size-reducing a cask liner, and when deconning the pool floor after draining).
Full-faced filtered respirators were worn all four times.

WVNSCO has not detected an increase in overall airborne activity, nor has the company detected an increase in alpha activity relative to beta activity since implementing the above actions.

CONCLUSION

The Fuel Pool Decontamination Project was safely and successfully completed on May 23, 2003, five weeks ahead of schedule. Since the start of the project in July 2002 (preparatory activities), The WVDP removed equipment and debris from the CUP; decontaminated the weir, the trough between the FSP and CUP; removed approximately 800,000 gallons of pool water (Phase 1 and 2), treating it through ion exchange and the on-site water treatment system before discharging the water to New York State SPDES permit specifications; vacuumed both the FSP and CUP; sealed the PMC hatch and vacuumed the tunnel between the FSP and PMC; fixed all surface contamination; and packaged the wastes generated during the course of the project. Final radiological surveys conducted in the pools demonstrated decontamination to less than 20,000 dpm/100cm^2 beta-gamma and 2,000 dpm/100cm^2 alpha.

FOOTNOTE

The views expressed by the authors are their own and do not necessarily represent the views of the U.S. Government, the U.S. Department of Energy, the State of New York, or any of its agencies. This document has undergone Export Control Review and has been approved for general release.