Section Four

ALARA Activities at DOE

In past years, the published annual report has included descriptions of ALARA activities at DOE for the purposes of sharing strategies and techniques that have shown promise in the reduction of radiation exposure. For 2006, these ALARA activity descriptions have been moved to the HSS REMS Web site to facilitate the dissemination among DOE radiation protection managers and others interested in these project descriptions. Readers should be aware that the project descriptions are voluntarily submitted from the sites and are not independently verified or endorsed by DOE. Program and site offices and contractors who are interested in benchmarks of success and continuous improvement in the context of integrated safety management and quality are encouraged to provide input.

4.1. ALARA Activities at the Fermi National Accelerator Laboratory

At the Fermi National Accelerator Laboratory (Fermilab), a policy consistent with integrated safety management and in accordance with 10 CFR Part 835 requirements is to conduct activities in such a manner that worker and public safety, and protection of the environment are given the highest priority. Fermilab senior management is committed, in all its activities, to maintain any safety, health, or environmental risks associated with ionizing radiation or radioactive materials at levels that are As Low As Reasonably Achievable (ALARA). Likewise, Fermilab management supports related work planning and review activities in support of Fermilab's ALARA program. Especially notable is the willingness to endorse cool-down periods and other scheduled modifications.

During CY2006, the primary activities at Fermilab that resulted in occupational radiation exposures were associated with maintenance activities of the accelerator. Nearly all dose to personnel was due to exposures to items activated by the accelerator beams. Many maintenance activities were necessary as the Fermilab accelerator complex was challenged to meet the scientific objectives of Tevatron Run II while simultaneously operating the proton beam needed for the Neutrinos at the Main Injector (NuMI) and Booster Neutrino (MiniBooNE) experiments. Fermilab safely accomplished many vital accelerator upgrades during a major shutdown of the accelerator carried out during the spring of 2006. These upgrades included a complex installation of new wide aperture quadrupole magnets to the Main Injector, Installation of an 8 GeV Booster beamstop, NuMI horn 2 pipe repair, Collider Detector Facility (CDF) radioactive source wire refurbishment, and delicate installation of the innermost layer of the silicon detector in the D Zero calorimeter. This work included extensive ALARA pre-job planning, implementation of specific ALARA activities during radiological work, and post-job analyses.

In preparation for this shutdown, an important ALARA action was taken by the Accelerator Division Head when he requested a reduction in the beam power to all machines one week in advance of the scheduled shutdown. This ALARA effort not only reduced the overall exposure during the planned work, but also reduced exposure to personnel as they prepared accelerator areas for initial entry. This key ALARA planning effort saved an estimated 2,000 person-mrem. About 50 people from other divisions and sections were assigned to shutdown tasks. The average collective weekly dose during the spring shutdown was approximately 1,000 person-mrem. This collective dose was consistent with expectations of shutdown planning.

The following activities highlight Fermilab's continued commitment to keeping exposures ALARA.

4.1.1. Installation of 8 GeV Booster Beamstop

The Booster is the first circular accelerator in the chain of accelerators at Fermilab. It takes 400 MeV negative hydrogen ions from the Linac and strips the electrons off, leaving only protons. The Booster accelerates these protons to 8 GeV. During the spring 2006 shutdown, a second beam shutoff device in the form of a beamstop was installed in the Booster to replace a vacuum valve. The vacuum valve seal had a recent history of routine failures due to radiation damage to an "O" ring seal. By replacing the vacuum valve with a beamstop, personnel dose will be avoided in the future because there will be no vacuum valve seals to repair. The estimated collective dose estimate for this job was 435 person-mrem and the dose received was 263 person-mrem.

4.1.2. Booster 400 MeV Girder Replacement

In March 2006, a 400 MeV girder and a septum were successfully replaced in the Booster tunnel *(see Exhibit 4-1)*. The work was performed in the region of the accelerator where 400 MeV protons from the Linac are injected into the 8 GeV Booster. A considerable amount of lead blanket shielding was added to the 400 MeV girder region of the Booster as an ALARA effort to significantly reduce personnel exposure. The estimated dose savings due to ALARA planning and allowing for cool-down of radioactivated components was about 1,500 person-mrem.

Exhibit 4-1:
Booster Tunnel.

Photo courtesy of Fermilab

4.1.3. Main Injector Quadrupole Magnet Replacement

In order to reduce exposure rates, improve beam transmission, reduce beam losses, and increase beam intensity throughput, seven quadrupole (quad) magnets associated with the lambertson extraction locations in the Main injector were replaced with newly-built wide aperture quadrupoles *(see Exhibit 4-2)*. These larger quadrupoles will be able to handle higher intensity beams with much less beam loss and, as a byproduct, help reduce beam losses in the future. Motivated by ALARA considerations, the installation of the new magnets in the areas having the highest levels of residual radioactivity was delayed for one month after the start of the shutdown. This allowed further cool-down of these areas as well as more "practice" for the workers in the lower radiation fields found at other locations. The estimated dose saved was approximately 1,000 person-mrem. The collective dose estimate for this job was 1,000 person-mrem and the actual collective dose was 670 person-mrem.

Exhibit 4-2:
End View of Wide Aperture Quadrupole Magnet.

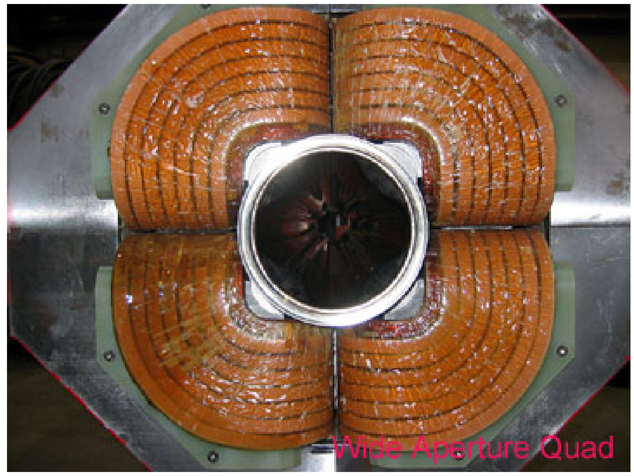

Photo courtesy of Fermilab

4.1.4. Installation of Booster Corrector Low Conductivity Water (LCW) Piping Manifolds

In March of 2006, several Booster Corrector LCW copper piping manifolds were installed throughout the Booster. First, one inch piping clamps were installed. Next, 20 foot section piping manifolds were installed in the Booster enclosure. Each 20 foot section was brazed

Exhibit 4-3:
Shield Wall Used During Installation of Booster Piping Manifolds.

Photo courtesy of Fermilab

Exhibit 4-4:
Shield Wall Used During Installation of Piping Manifolds in Booster Tunnel.

Photo courtesy of Fermilab

to the existing 1 inch pipe and cap assembly. The first ALARA action taken to reduce personnel exposure was to delay the installation of the piping to allow for maximum cool-down of nearby accelerator components. Secondly, rolling lead blanket shield walls *(see Exhibits 4-3 and 4-4)* were positioned to reduce exposure to workers. The ALARA job estimate was 964 person-mrem and the actual collective dose received for five workers was 851 person-mrem. Use of portable shield walls and cool-down of activated components saved approximately 1,000 person-mrem.

4.1.5. Neutrinos at the Main Injector (NuMI) Horn 2 Leaking Ceramic Pipe Joint Repair

When operating at highest intensity, the NuMI beam line transports 20,000 billion protons every two seconds to a graphite target. The target converts the protons into bursts of particles. Like a beam of light from a flashlight, the particles form a wide cone when leaving the target. A set of two special focusing devices, called horns are used to focus the high intensity particle beam. As a result, these horns become intensely radioactive. During the spring 2006 shutdown, a relatively complex task was undertaken to cut and remove a leaking two inch water pipe on the NuMI horn 2 *(see Exhibit 4-5)*. The work was completed by replacing the leaking pipe with a ceramic joint *(see Exhibit 4-6)*. The exposure rate where the work had to be done was 3,600 mR/hr at one foot. Not only was the job difficult due to the extremely high exposure rate, but also because the cut needed to be exceptionally straight and smooth to allow connection of the replacement pipe. Many hours were spent planning and conducting dry-runs for this job with a mockup located outside of the radiation area. The job was well choreographed among 8 workers with each worker knowing exactly their role and function. Special tools were fabricated to minimize the production of activated chips and dust. An extension for the cutting tool was also made which allowed the workers to stand behind a 1.5 foot thick concrete shield wall while cutting the pipe. The shield wall erected next to the horn and the work cell had a specially made "rifle-slit" to maximize shielding. The actual exposure time to accomplish this task was less than one minute. This work could not have been accomplished in such a short amount of time without rigorous planning, mock-ups, and dry-runs. The collective dose estimate was 277 person-mrem for the job. The dose received was 244 person-mrem.

Exhibit 4-5:
NuMI Horn 2.

Photo courtesy of Fermilab

Exhibit 4-6:
Ceramic Pipe Joint Repair on NuMI Horn 2.

Photo courtesy of Fermilab

The highest dose to any one person was 55 mrem. The success of this task was the result of many hours of careful ALARA planning, dry-run practice, fabrication of innovative tools, and custom-built shielding.

4.1.6. CDF Radioactive Source Driver Wire Source Refurbishment

In April of 2006, a total of four source driver wires containing Cobalt-60 sources were removed from the large CDF detector to be refurbished. These source wires needed to be refurbished because the inner keeper wire was made of iron and magnetic fields within the detector caused these wires to function improperly. The task involved replacing the inner keeper wires with new stainless steel wires. The source driver wires consisted of a 30 foot long flexible stainless steel tube sealed at one end. A very small 3 millicurie Cobalt-60 source seed was inserted into the open end and pushed toward the sealed end using a thin wire. Once fully inserted, this wire acted as a keeper wire to hold the source seed in place. Since the keeper wire was in direct contact with the source seed, radioactive contamination was a possibility. For this reason, a glove bag system was used to remove the old keeper wire *(see Exhibit 4-7)*. The unsealed end of the source wire was inserted into the glove bag, and then the old keeper wire was pulled out inside the glove bag. New keeper wires were successfully installed in each of the four Cobalt-60 source driver wire sources. ALARA contamination control techniques were effectively implemented to prevent the spread of potential contamination. The technician involved has experience with asbestos removal where a similar glove bag is commonly used. This transfer of skills from one area of safe work practice to another is a positive reflection on Fermilab's implementation of Integrated Safety Management Systems (ISMS).

Exhibit 4-7:
Keeper Wire Being Removed from CDF Cobalt-60 Wire Sources.

Photo courtesy of Fermilab

4.1.7. Cutting a Radioactive Surveyor's Plug

In order to conduct a tritium leachate test on radioactive steel, approximately three inches of steel was cut off the end of a surveyor's plug in May of 2006 *(see Exhibit 4-8)*. The exposure rates on the end of the surveyor's plug were approximately 100 mR/hr on contact and 8 mR/hr at one foot. Rather than cutting with a portable hand band saw, the cut was completed using an automatic band saw *(see Exhibit 4-9)*. Using an automatic band saw provided easier control of metal filings which came loose from the plug during the cut. Metal filings dropped into a catch pan attached to the saw. This pan made clean-up after the cut reasonably simple. Exposure to personnel was further reduced because technicians left the immediate area after placing the plug on the saw. The cut took approximately ten minutes, whereas cutting using a portable hand band saw would have taken about twenty to thirty minutes. A portable hand band saw would have required the person completing the cut to be approximately one foot from the most radioactivated end of the plug. This could have resulted in a whole body dose of 4 to 5 mrem. The estimated collective dose saved was approximately 5 person-mrem.

Exhibit 4-8:
Keeper Wire Being Removed from CDF Cobalt-60 Wire Sources.

Photo courtesy of Fermilab

Exhibit 4-9:
Antiproton (Pbar) Target Rotation Mechanical Failure and Design Modification.

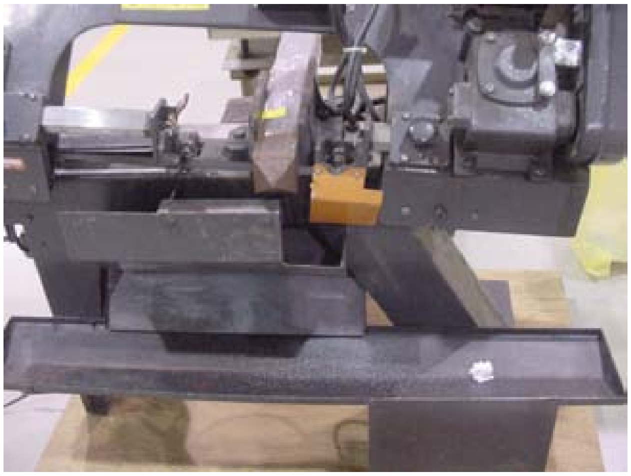

Photo courtesy of Fermilab

4.1.8. Antiproton (Pbar) Target Rotation Mechanical Failure and Design Modification

At Fermilab, antiprotons are made by aiming a 120 GeV proton beam from the Main Injector onto a metallic target at the Antiproton Source. When the protons hit the target, antiprotons, along with numerous other particles are produced. A lithium lens collects negatively charged particles of a certain energy. The antiproton (Pbar) target consists of a large module assembly with the target itself attached to the bottom of the module. The antiproton target normally rotates during beam-on target operation in order to eliminate "burn-through" damage. The rotation is provided by a long shaft with a drive motor on the top, and the target on the bottom *(see Exhibit 4-10)*. Within a two week span in December of 2006, the target rotation stopped twice due to mechanical failure of the rotation components. The first repair restored functionality to the rotation mechanism by replacing the drive motor, thrust bearing assembly with a laboratory built thrust bearing cage, and a shear pin. The thrust bearing assembly is a ball-bearing assembly that is part of the rotation system *(see Exhibit 4-11)*. A few weeks later, the target rotation failed again. It was discovered that the ball-bearing thrust assembly worked much better (less torque required to turn the shaft) without a ball-bearing cage assembly. With additional ball-bearings and removing the cage component, the target rotation required less torque *(see Exhibit 4-12)*. Assuming a rotation failure once per month for a year without the cage bearing modification, with about 150 person- mrem per repair, it is estimated that a collective dose of 1,800 person-mrem per year has been saved as a result of this design modification.

Exhibit 4-10:
Antiproton Source, Accumulator, and Debuncher.

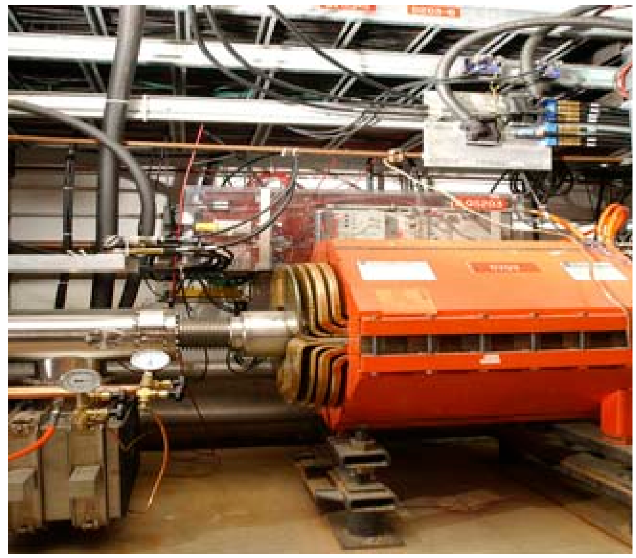

Photo courtesy of Fermilab

Exhibit 4-11:
Antiproton Rotation Thrust Assembly with Bearing Cage.

Photo courtesy of Fermilab

Exhibit 4-12:
Re-Designed Antiproton Rotation Thrust Assembly with No Cage.

Photo courtesy of Fermilab

4.2. ALARA Activities at the Savannah River Site

4.2.1. Installation of 8 GeV Booster Beamstop

In 2006, the Savannah River National Laboratory (SRNL) safely and successfully completed remediation of 240 Transuranic (TRU) waste drums for the Waste Management Area Project (WMAP). The remediation consisted of removing Waste Isolation Pilot Plant (WIPP)-prohibited items and returning the processed drums and segregated items back to solid waste. This remediation will allow future shipment of the drums to WIPP.

Even though this was a temporary job, a permanent approach was taken to protect the workers and the facility. The design team visited facilities already performing drum remediation to observe the work methods in order to fully understand the hazards.

Several controls were implemented to minimize the risk of contamination events and internal exposure:

- Glovebox Gloves: Polyurethane/hypalon glovebox gloves were installed to provide more puncture resistance than neoprene or plain hypalon gloves. In addition, overgloves were used to prevent punctures and cuts from cutting tools and sharp objects.
- Ergonomic design: The glovebox was ergonomically designed to mitigate overreaching, strenuous activities and thereby reduce stress on the glovebox gloves *(Exhibits 4-13, 4-14 and 4-15)*. Oval gloveports were installed to allow more lateral movement in the gloves to further minimize stress.
- Separate confinement zones: Two work stations *(Exhibit 4-16)* were designed to separate the (higher risk hazard) drumming operations from the sorting operations. A solid wall and confinement zone was used to separate these stations. Temporary modifications were installed to allow the building's process ventilation systems to exhaust the confinement zones. The glovebox was exhausted by the 773-A Off Gas Exhaust (OGE) system. An open-face exhaust system was installed to provide localized exhaust during drum lid removal through the 773-A Process Hood Exhaust (PHEX) system *(Exhibit 4-17)*.

There were no radiological intakes or personnel contamination events associated with this high-hazard project.

The mission statement was to safely and successfully remediate Transuranic waste drums for the Waste Management Area Project for future shipment to WIPP, which involved staff from Engineering, Operations, Radiological Control, and Construction.

The radiological concerns were airborne radiological contamination and internal exposure resulting from glovebox glove failures or puncture wounds.

The cost of the ALARA effort was approximately $950K for design, installation, and testing of the ALARA safeguards (i.e., containment hut, glovebox, ventilation). The impact on work processes by the additional radiological safety controls that were implemented had a minimal negative impact on timeliness of work execution.

Exhibit 4-13: Gloveboxes inside hut.

Photo courtesy of Savannah River.

4.2.2. FB-Line Use of Fire Retardant Foam

The 200-F Area B-Line (FBL) Facility is a 50-year-old plutonium processing facility that has fulfilled its mission. Left behind were substantial levels of contamination throughout the facility. Deactivation activities were performed beginning with the minimum hazard tasks before progressing to the maximum hazard tasks but were complicated due to 12 months of fulfilling operational commitments and deactivation activities occurring simultaneously. This required attention to details in respect to planning and scheduling.

After rooms and process cabinets were deactivated and before the process HEPA filters were removed, the schedule required the ventilation systems to be isolated to minimize the spread of contamination and to protect from vermin intrusion. The ventilation system duct work was to be separated and prefabricated flanges installed at 12 to 15 locations. Due to high levels of alpha contamination in the duct work, a radiological containment hut would have been required at each location. Personnel would have been required to wear air-supplied plastic suits and a full set of protective clothing (PC) for each entry. Each location would have taken days to complete and would have generated drums of TRU waste per hut constructed, at the same time requiring a day and night shift operation. Because of the decommissioning activities, each entry would have created its own set of industrial hazards in addition to radiological hazards.

The ALARA activity initiated was the use of Flame Retardant FOAM to isolate the ducts to eliminate the need to install duct blanks, build scaffolds, and use plastic suits. Additionally, it eliminated the need to create, package, and dispose of TRU waste. Total savings for labor and material was approximately $125,000 which included personal protective equipment and glove bag material. A total of 300 mrem occupational radiation exposure was saved. This does not include minimizing entrances into other rooms to access the duct.

The Ventilation Modification Schedule was completed 1 month ahead of schedule and allowed team members to be reassigned to other facilities earlier than anticipated.

Exhibit 4-14:
Gloveboxes used to sort waste.

Photo courtesy of Savannah River.

Exhibit 4-15:
Bag out end of gloveboxes.

Photo courtesy of Savannah River.

Exhibit 4-16:
SRNL TRU HUT.

Photo courtesy of Savannah River.

Exhibit 4-17:
TRU Drum Lid Removal/Bag in sleeve installation station.

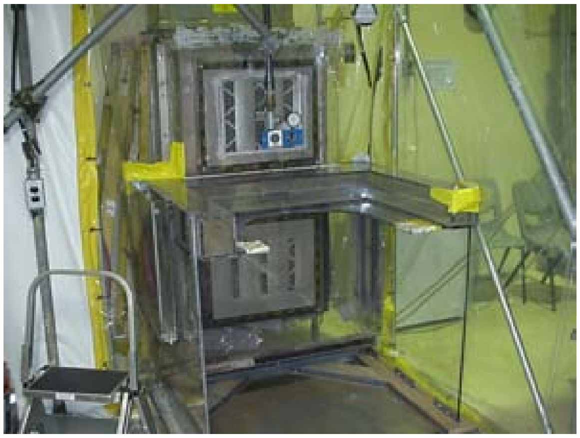

Photo courtesy of Savannah River.

4.2.3. F-Tank Farm: FDB-2 Jumper Valve Actuator Repair

The F-Area Tank Farm is an outside facility and the majority of the radiological work is performed in containment huts and windbreaks. These containment huts and windbreaks are designed for the specific jobs in conjunction with engineering controls incorporated into the work package, which is of utmost importance.

F-Area Tank Farm was designed for waste processing. Liquid waste is stored in waste tanks and processed to reduce the volume. Waste transfers between tanks are made through diversion boxes that include jumpers and valves with actuators for directing the waste transfers. Manipulation of the valve actuators are made through port plugs, which are installed in concrete cell covers weighing approximately 22,000 lb. The concrete cell covers provide shielding during waste transfers.

The initial plan included removal of the concrete cell covers, installation of a containment hut over the cell opening, and deployment of a mechanic into the cell area for the actuator repairs. The broken valve dose rate was 96 R/hr.

During the review of the initial plan, the radiological and safety concerns were identified, which included confined space entry, and individual exposure and contamination controls.

The plan was revised, providing the following controls to reduce the potential for the spread of airborne contamination.

- After an initial flush of the diversion box cell area, allowing time to dry, and followed by an application of Encapsulation Technology Glycerin Solution (ETGS) Invisible Blue® was applied to the diversion box to reduce the potential for airborne contamination.

- A windbreak was installed around the diversion box. A wind speed limit of 8 mph was maintained during the job.

- Upon the removal of the concrete cell covers, temporary covers (e.g., Lexan Plates) were installed over the opening to minimize the opening. This engineering control increased the amount of negative airflow into the diversion box. A small opening was made in the cover to allow access for the cutting tool.

- Exposure reduction was achieved utilizing a cutting tool *(Exhibit 4-18)* that was assembled on an extension rod to cut the valve actuators from a distance *(Exhibit 4-19)*. Mockups were performed for handling the cutting tool to get a feel of the weight. The mechanic performing the cutting of the actuator was positioned on the remaining cell covers. A shielding bridge was staged and ready for installation over the open diversion box area, pending radiation surveys with the working rates on the cell covers. Exposure was tracked using the Teletrak system. The total exposure for the job was 140 mrem with no airborne activity detected. The original man-rem estimate was 1 rem, with an estimated dose avoidance of 860 mrem.

- After the actuators were removed, a T-Handle was fabricated to allow manipulation of the valves through the original port opening with the cell covers reinstalled.

- This major scope of work was staffed by a total of 24 workers (e.g., Rigging & Heavy Equipment, Rad Con Inspectors, Operators & Maintenance Mechanics) with 4 first line managers. Approximate labor cost $17,000 (estimated 250 man-hrs.).

- The Impact on the work process was F-Area Tank Farm's limited ability to transfer liquid waste to H-Area Tank Farm due to broken valve actuators.

For additional information on this work activity, contact Charles M. Cothran,

F-Tank Farm ALARA Coordinator, at 952-2098.

4.2.4. Decommission of 804-F Tank

The tanks (800 Series) are located in underground concrete vaults at 211-F. They received high-level waste from 772-F Central Laboratory (Tanks C and D). The 804-F tank is a 10-foot diameter by 11-foot high tank within a cell *(Exhibit 4-20)*.

As of February 2005, the tank stored (sludge and liquid) up to1,530 grams of plutonium *(Exhibit 4-21)*. Agitation of the tank's contents cannot occur. All piping, except Recycle Vessel Vent, has been isolated. No material (including water) could enter or be transferred out of the tanks. Nuclear Criticality Safety Evaluation concluded a criticality is not credible. Initial surveys by the F-Closure Project (FCP) detected 2 million dpm alpha and 40 mrad/hr beta-gamma in the cell.

Ventilation of the tank/cell, high transferable contamination levels, dose rates, personnel exposure, containment, and radiological release to the environment were all radiological concerns for the job.

FCP applied fixative to walls and grout to floor which significantly reduced the radiological hazard.

The mission statement was to safely and effectively remove and disposition TRU waste material from the 804-F underground tank for the F-Area Completion Project tank closure.

Prep Work and Tank Cleaning

A work platform was constructed and installed on top of 804-F Tank. Tank exhaust was established with double HEPA filtration, ~150 linear feet per minute at the tank entrance/work location. At the tank bag-out location was a unique 4-ft high shoot constructed with a bag-out assembly and sliding drawer.

All tank top interferences were removed. All tank stingers were removed (~13), size reduced in a glove bag inside a certified hut, and then loaded into a Standard Waste Box (SWB). There was no spread of contamination to the workers or environment. The agitator was removed from tank via total containment with heavy sleeving, placed in a top-loading Sealand®, size reduced, and loaded into SWB for disposal.

Exhibit 4-18:
Diversion Box Valve Actuator & Cutting Tool.

Photo courtesy of Savannah River.

Exhibit 4-19:
Actual Cutting Activity.

Photo courtesy of Savannah River.

Extended tools were utilized to minimize exposure of radiological contamination to the workers (Exhibit 4-22). After each cleaning attempt, mops and collection tools were placed in a bucket and winched up into a shoot, placed in the drawer, and bagged out. The bucket was then placed in a 5-gallon pail and transported to the Non Destructive Analysis (NDA) Lab for assaying *(Exhibit 4-23)*. Buckets were then loaded into Transuranic (TRU) drums under a drum hood and placed into storage to await shipment.

Exhibit 4-21 shows pictures of the sample from Tank 804. The sample was very thick and contained a slight amount of free liquid. When personnel turned the sample cup on its side, the sample did not run out of the cup. When personnel placed a pipette into the cup, it stood up but was tilted. When they filled the pipette with slurry, it drained very slowly.

Results

- Maximum of~15,000 dpm/100 cm2 alpha contamination detected in the work area on top of the Tank.
- ~250 cuts of waste bagged from tank.
- No detectable air activity in the work area.
- 465 entries on RWP, 165 mrem total exposure for tank cleaning
- Seven RWPs were used. Estimated dose was 27.330 rem, actual dose was 0.255 rem, and the highest individual dose was 0.018 rem.
- Containment hut and all connecting Contamination Areas remained no detectable contamination throughout tank cleaning.
- No impact on work processes for the evolution.

Exhibit 4-20:
804 (Series) Tank.

Photo courtesy of Savannah River.

Exhibit 4-21:
Tank 804 Sludge.

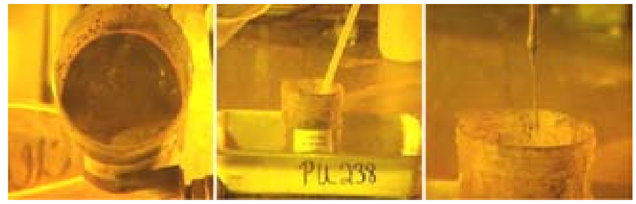

Photo courtesy of Savannah River.

Exhibit 4-22:
Peters Handling Tools.

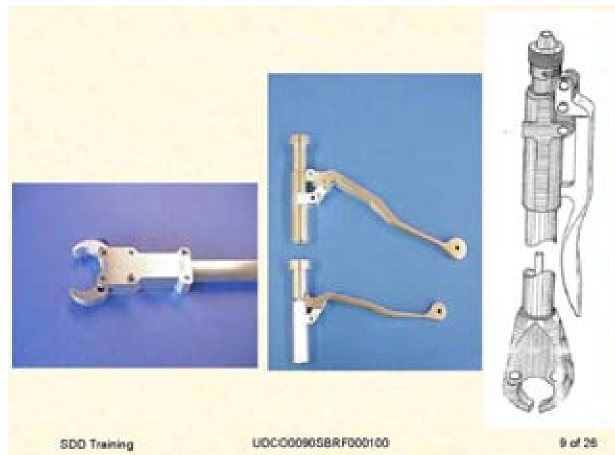

Photo courtesy of Savannah River.

Exhibit 4-23:
Waste Collection Container and Associated Equipment.

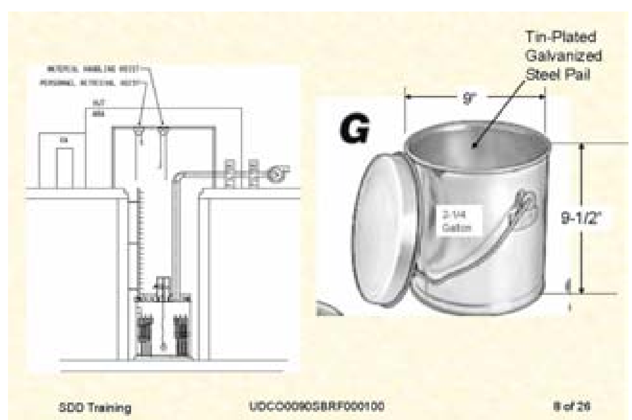

Photo courtesy of Savannah River.

4.3 Submitting ALARA Project Descriptions for Future Annual Reports

Individual project descriptions may be submitted to the DOE Office of Corporate Safety Analysis through the REMS Web site. The submittals should describe the process in sufficient detail to provide a basic understanding of the project, the radiological concerns, and the activities initiated to reduce dose. The Web site provides a form to collect the following information about the project:

- Mission statement
- Project description
- Radiological concerns
- Total collective dose for the project
- Dose rate to exposed workers before and after exposure controls were implemented
- Information on how the process implemented ALARA techniques in an innovative or unique manner
- Estimated dose avoided
- Project staff involved
- Approximate cost of the ALARA effort
- Impact on work processes, in person-hours if possible (may be negative or positive)
- Figures and/or photos of the project or equipment (electronic images if available)
- Point-of-contact for follow-up by interested professionals

The REMS Web page for the ALARA project descriptions can be accessed on the Internet at

http://www.hss.energy.gov/CSA/analysis/rems/rems/ALARA.cfm

4.4 Lessons Learned Process

DOE has a mature lessons learned process that was initially developed in 1994. The current DOE lessons learned process is described in DOE-STD-7501-99. [9] The purpose of the DOE lessons learned process is to facilitate the identification, documentation, sharing, and utilization of lessons learned from a review of actual operating experiences throughout the DOE complex. This is accomplished by sharing lessons among DOE sites through a common corporate database. A recent review of the lessons learned process has led to a redesign of the process to add a more corporate component to the process. This new corporate component, modeled after the Institute of Nuclear Power Operations Significant Event Evaluation and Information Network program, has introduced an additional corporate role in the review of DOE site performance and crosscutting operating experience and has started to provide additional lessons learned information to the DOE community in addition to that already provided by DOE field sites.

The collected information is currently located on a Web site. This system allows for shared access to lessons learned across the DOE complex. The information available on the system complements existing reporting systems presently used within DOE, which is taking this approach to enhance those existing systems by providing a method to quickly share information among the field elements. Also, this approach goes beyond the typical occurrence reporting to identify good lessons learned. DOE uses the Web site to openly disseminate such information so that not only DOE but also other entities will have a source of information to improve the health and safety aspects of operations at and within their facilities. Additional benefits include enhancing the workplace environment and reducing the number of accidents and injuries.

The Web site contains several items that are related to health physics. Items range from off-normal occurrences to procedural and training issues. Documentation of occurrences includes the description of events, root cause analysis, and corrective measures. Several of the larger sites have systems that are connected through this system. DOE organizations are encouraged to participate in this valuable effort.

The specific Web site address may be subject to change. Information services can be accessed through the Office of Health, Safety and Security Web site as follows:

http://www.hss.energy.gov