PROJECT MANGEMENT PLAN EXAMPLES

Safety Integration - Hazardous and Radioactive Material Evaluations Examples

Example 18

6.03.08 Removal of Chemicals

Bulk chemicals that are usable in other facilities will be relocated. Transportation of chemicals to other facilities will be performed in accordance with applicable administrative requirements. Chemicals in good condition that have not been in radiological areas or that can be cleared by RCO will be listed on OSR 1-118. The form will be signed by the Lead Environmental Coordinator and the Chemical Coordinator and submitted to the Site Chemical Commodity Center (CCMC). Usable chemicals from radiological areas that are not needed at other SFSD facilities will be advertised to other divisions. Unusable chemicals will be reviewed by waste Subject Matter Experts (SMEs) and environmental compliance SMEs to determine the disposal method.

6.03.09 Removal/Stabilization of other Materials

Friable asbestos insulation and damaged building transite were identified during transition report walkdowns and have since been specifically identified by additional walkdowns of the excess facilities. The friable asbestos will be removed or stabilized. Significant damage to building transite will be repaired and/or sealed. Small transite holes in buildings may be left unrepaired.

Other materials such as batteries, fluorescent light bulbs, mercury or sodium vapor light bulbs will be removed. Lead shielding and a lead brick will be removed from the 772-D laboratory.

Example 19

6.01.01 Characterization and Hazards Identification

Accountable Nuclear Material

The inventory of nuclear material (i.e., enriched and depleted uranium) stored in the 322-M Metallurgical Laboratory has been removed (Reference #11). However, the book value for the 322-M Metallurgical Laboratory Material Balance Area (MBA) shows 36 kg of depleted uranium.

A radiological survey of the ductwork in the Process Exhaust Systems indicated a worse case accumulation of less than 15 grams of U-235 and 4.3 kilograms of U-238 (Reference #12). A radiological survey and video inspection of the Process Drain Lines detected deposits of depleted and 0.939% enriched uranium (Reference #13). Analyses from discrete sections of the lines were extrapolated to the entire drain system and indicated a worst case accumulation of 10.4 kilogram of U-238. The data obtained from these surveys demonstrates the absence of fissionable amounts of U-235 and therefore the deposits in the ducts and drains have no potential for producing a nuclear criticality event (Reference #14).

Based on the two inspections, 14.7 kg of the U-238 identified as being in the MBA is believed to exist in the Process Exhaust Systems and the Process Drain Lines. The balance is attributed to the accumulations of normal operating losses and measurement errors over the 34 years of operation of the facility (Reference #14).

Also, there is a low potential for a release of the U-238 in the Process Exhaust Systems and the Process Drain Lines to the environment. The 322-M Metallurgical Laboratory Process Drain Lines empty into the M-Area Process Sewer System and then flows to 341-M, the Dilute Effluent Treatment Facility (DETF), for processing. The majority of contamination in the Laboratory Process Exhaust System is in the ducts internal to the building and the high molecular weight of the contamination precludes its easy dispersion.

The following discussion of the 322-M Metallurgical Laboratory contaminated areas is based on Radiological Survey Log Sheets (RSLS) prepared at the time of the shutdown of the facility.

Exterior Radioactive Contamination Areas

Nine CAs exist on the exterior of the 322-M Metallurgical Laboratory. These nine CAs originally had transferable contamination ranging from 1600 to 120,000 dpm/100 cm^2 alpha and 4,000 to 300,000 dpm/100 cm^2 beta-gamma. Eight of the CAs are on the East side of the facility immediately adjacent to various Process Exhaust System blowers and HEPA filter housings. The other CA is on a building footing at the South end of the West side immediately outside of Room 127.

Of the eight CAs on the East side, all but one are associated with the footings and supports for the Process Exhaust System blowers and HEPA filter housings. The only exception is the CA that was caused by a leak in one of the two overhead lines that carry contaminated Process Waste and Process Coolant from 322-M to 340-M. The leak may also have contaminated approximately 10 ft. by 3 ft. area of soil immediately adjacent to the building.

After limited decontamination, the exterior CAs were painted with two coats of paint during FY95, with the base coat being a magenta color and the surfaces were then posted as fixed contamination areas.

In addition to these fixed contamination areas, all the HEPA filter housings and the duct that runs into the building are posted as having internal contamination. These postings are based on readings taken of the HEPA filters when the blowers were shutdown and the HEPA filters removed. These readings ranged from 400 to 6,000 dpm/100 cm^2 alpha and 4,000 to 300,000 dpm/100 cm^2 beta-gamma.

Interior Radioactive Contamination Areas & RBAs

There are three Radiological Buffer Areas (RBAs) in the facility:

- The first RBA is comprised of Rooms 131, 132, 133, 134, 136, 137 & 138 where high enriched uranium samples were prepared for examination. Room 131 contains two hoods, a cutoff saw with a glove box and a Mott Filter System, and most of the room is posted as a CA.
- The second RBA is comprised of the Rooms 107, 108 & 109 where depleted uranium samples were prepared for examination. The Southeast corner of Room 109 contains two saws, two grinders, a lathe and miscellaneous tools, and is posted as a CA. Room 108 has a 2-ft. by 2 ft. fixed contamination area located on the counter top between the two hoods.
- The third RBA is the Contaminated Metal Preparation Area (Rooms 123, 124 & 125).
- In addition to the three RBAs with their CAs, two other contaminated areas exist within the 322-M facility:
- A trench approximately 6 in. wide and 6 in. deep along the entire West wall and part of the North and South walls of Room 128 is posted for internal contamination.
- A 2-ft. by 2 ft. fixed contamination area is located on the North side of Room 112.

Though not the case recently, at one time or another radioactive material was handled in most of the laboratory rooms of the original 1956 section of 322-M. Over the years these rooms were "rolled back" to clean areas. For this reason, it is prudent to assume that the sub-flooring and walls behind the baseboards of these rooms may be contaminated. Therefore, the appropriate ESH&QA precautions should be taken when activities are initiated in these rooms that disturb the sub-flooring and the wall behind the baseboards.

Laboratory Hoods

There are twenty-three laboratory hoods and two glove boxes in the 322-M Metallurgical Laboratory. The first RBA, comprised of Rooms 131, 132, 133, 134, 136, 137 & 138, has seven hoods and one glovebox. The second RBA, comprised of Rooms 107, 108 & 109, has three hoods. The third RBA, comprised of Rooms 123, 124 & 125, has six hoods and one glovebox. Outside of the RBAs there are two hoods in Room 112, four hoods in Room 127 and one hood in Room 128. With the exception of one of the four hoods in Room 127 (the Chemical Milling and Micro Etching Laboratory) which is not contaminated, all have been sealed and labeled as contaminated.

Radiological surveys determined that twelve of the hoods had contamination levels originally from 400 to 200,000 dpm/100 cm^2 alpha and 10,000 to 1,500,000 dpm/100 cm^2 beta-gamma. Most of the transferable contamination in these hoods was removed, the internal surfaces double-painted, and the inside posted as having internal/fixed contamination. These hoods were then closed, sealed, and posted on the outside for known internal contamination.

The remaining ten hoods with a radiological history were sealed and posted on the outside as having internal contamination as a conservative measure in the event that with the passage of time contamination in the hood ducting might migrate down into the hood. The sealing of all laboratory hoods makes the migration of hood residual contamination out of the facility and into the environment a remote possibility.

Excluding the hoods in Room 125 (the hot cell room), hoods with flexible hoses for ducting have been disconnected from the Process Exhaust System and the ends of the ducts sealed with tape. Hoods with metal ducting (Room 112 and Room 127) have been isolated by closing their dampers. For minimal long-term care, the taped ends of the exhaust ducts will need to be replaced with a more robust closure since the tape may eventually come loose in the environment of the closed facility.

Glove Boxes

The two glove boxes in the facility are connected to equipment. One glove box is in Room 125 and is a pass-through glove box connected to the East side of the Hot Cell. The other glove box was used in conjunction with the cutoff saw in Room 131. Based on the operational history of these glove boxes, both are posted as having internal contamination.

Room 109 High Contaminated Area

Located immediately inside door to Room 109 to the South is a LeBlond Dual Drive metal lathe (EP 10714) with contamination levels of ND dpm/100 cm^2 alpha and 750,000 dpm/100 cm^2 beta-gamma. It is posted as a High Contamination Area (HCA).

Room 125 Hot Cell

The Hot Cell in Room 125 is also an HCA with contamination levels of 1000 dpm/100cm^2 alpha and 20 mrad/100 cm^2 beta-gamma. This level of radioactivity could result in a contact extremity dose rate of 1155 mrem/hr at 5 cm, a wholebody dose rate of 5 mrem/hour at 30 cm and a skin dose rate of 69 mrem/hour at 30 cm. Cell contents such as broken saw blades, plastic & paper trash, pieces of bar stock, hand tools and fines from the top of the cell table were removed in FY95 to the extent practical without a major D&D effort. The cell cask and vacuum cleaner were left in place with their lids removed to facilitate future visual surveillance. The inner cell door, the inlet ventilation duct, the manipulator penetrations, the glove box access and all interior seams were sealed. The exterior cell door was tack welded shut.

Room 125 Radioactive Material Area

Located in the Southeast corner of Room 125 is a small RMA with miscellaneous equipment and supplies collected from the RBA comprised of Rooms 123, 124 and 125.

Hazardous Energy

Chilled water, process water, domestic water and plant air (100 psi) are isolated exterior to the facility. The steam supply has been double isolated from the facility; at the main line to the facility and on the two steam manifolds for the facility. Electrical power continues to be supplied to the facility. This electrical power is fed into the facility via two major load centers (Rooms 121 & 147) located in the Northwest corner of the facility.

Fire

Metal fines from grinding and lathe operations were a Class D fire concern during operations, but are no longer present in significant quantities which makes a Class D fire an incredible event. All readily removable paper, wood and oil were removed during FY95. Wood studs and ceiling rafters in the 1956 and 1961 sections still remain and are covered by sheet rock on the interior which minimizes the potential for a fire in an interior room to spread to the wooden structures in the attic. However, as long as power is fed to the load centers in 322-M for lighting and general purpose 120 volt AC the possibility of a Class A fire still exists, primarily in the attic where the wood is exposed.

FDD applies a graded approach to fire protection in the inactive facilities it manages. The *FDD Fire Protection Plan* (Reference #15) describes how FDD implements its graded approach while remaining in compliance with the WSRC Procedure Manual 2Q, *Fire Protection Program*. Due to it's non-occupied and non-operational state with no current or future mission, a Fire Hazard Analysis is not required for 322-M. The *322-M Fire Control Preplan* (Reference #16) delineates the information available to the WSRC Emergency Response personnel in responding to a fire. When deactivation of 322-M is complete, the *322-M Fire Control Preplan* will be revised to reflect the post-deactivation status of the facility.

Structural

The steel frame structure and exterior transite panels and steel panels are structurally sound. The roof shows no obvious signs of roofing failure. All exterior doors to the facility are intact and locked.

Asbestos

- Transite paneling was used for exterior sheathing on the original section of 322-M Metallurgical Laboratory and the 1961 addition. Duct and pipe insulation in the facility has been inspected for asbestos and has been properly labeled.
- There is no identified friable asbestos in 322-M. Other potential sources of asbestos containing material (ACM) in 322-M include:
- Floor tile
- Steam line insulation
- Mastics
- Equipment gaskets
- Water heater insulation
- Some installed piping
- Waste characterization during the final decommissioning phase will identify whether any of these materials are ACM.

Fluorescent Light Bulbs

All fluorescent light bulbs in 322-M remain installed.

Polychlorinated Biphenyl (PCB)

PCB is an EPA-regulated substance under the Toxic Substance Control Act (TSCA). The major liquid sources of PCB (transformers, lube oil, etc.) were removed from 322-M in the mid-eighties as part of a site-wide PCB clean-up program. PCB may still be present in the fluorescent light ballasts, in residual oil films on equipment, and in the paint applied to equipment or components prior to 1982.

Equipment and other material from the facility will need to be surveyed and sampled prior to removal for disposal to verify that a concentration of PCB over the EPA limit does not exist. This verification is necessary since no low level radioactive waste disposal site will accept items that exceed the EPA PCB limit. Disposal sites are available, however, for solid waste contaminated with PCB that is not also a radioactive waste.

Lead

Lead patches were used to seal some openings in the Transite paneling and lead-headed screws were used to fasten the Transite to the steel beams. The word "LEAD" has been painted on the patches. In addition, poured lead was used in the Sanitary Sewer line joints.

Batteries

Nickel-Cadmium (Ni-Cd) batteries discovered during de-inventory were removed and managed as hazardous waste. Lead batteries discovered during de-inventory were also removed from service and managed appropriately when the related equipment was no longer needed.

Mercury Vapor Light Bulbs

All mercury vapor light bulbs in 322-M remain installed.

Other Hazardous Materials

The only other known hazardous materials used in 322-M were laboratory chemicals that have already been removed from the facility.

Freon®

Freon was purged from all major HVAC equipment and collected for recycling. With the exception of three window air conditioning units, no Freon exists in refrigeration equipment in 322-M. The three window air conditioning units remaining in the facility are likely to be removed for reuse (with the Freon intact) before deactivation is completed.

Tritium

There are no process sources of tritium remaining in the facility. There are some exits signs containing tritium sources still in place.

Miscellaneous Controlled Materials

Oils and coolants were drained, to the extent practicable, from process equipment remaining in the facility and disposed of in accordance with SOP 300-263, *Used Oil Management* . Therefore, only residual amounts of hydraulic oil, lubricating oils, saw coolants, and grease should remain in or on equipment.

6.01.02 Hazard Controls

1. Definition of the Work

Characterization

Walkdowns will be performed, as necessary, to supplement the existing characterization information. Spaces and systems to be examined will be selected and a detailed inspection list generated. These inspections will identify hazards and understand the conditions in the facility in sufficient detail that the work activities needed to meet the deactivation endpoints can be performed in a safe and controlled manner.

Property Management and Disposal

Non-contaminated personal property may be removed and disposed in accordance with the WSRC 3B Manual. This involves removing the items for re-use at SRS or transferring excess material to WSRC Property Management for re-use, resale, or donation to a federal program. Personal property includes items such as computers, desks, chairs, tables, hot water tanks, and etc. The majority of these items were removed in 1995-1996 when the facility was shutdown.

Non-contaminated equipment declared abandoned may also be removed for disposal to preclude cross-contamination or physical degradation that would make disposal more costly during ultimate decommissioning. Such removal will be handled within the scope of the Deactivation Project Plan. Specific end points to remove personal property, equipment and material are identified in Appendix C.

Equipment and personal property that is not removed and disposed will fall into one of three categories:

- Equipment to support surveillance & maintenance
- Equipment to support ultimate decommissioning
- Equipment to be abandoned in-place

There is no identified equipment or personal property in 322-M that falls into either of the first two categories. The equipment remaining in the building has no identified opportunity for re-use, re-sale, or donation to a federally funded program and will be identified in the appropriate site databases used to support work control and property management. Declaration of Excess forms will be completed, approved, and submitted to WSRC Property Management for all significant pieces of equipment declared abandoned. This action will communicate the availability of the equipment to potential users and buyers at SRS, around the DOE Complex, various State programs, Economic Outreach and Development, and other Government Agencies. However, there are no plans to protect or mothball this equipment until a specific need is identified and approved through site management. If such a need is identified, funding must be provided by the requesting source to complete the radiological and hazardous material survey, export control review, disconnection, and physical removal. This work would be handled outside the scope of the Deactivation Project Plan.

Safety Evaluations, Documentation, and Plans

The facility history and hazards evaluation in the Transition Report for 322-M (Reference #1), combined with the verification of completion of the deactivation end points specified in section 4.05 of this deactivation plan, meet the intent of the inspection requirement in Procedure 51 of the WSRC 8Q Manual for discontinued equipment and facilities. No additional inspections are required to be in compliance with Procedure 51.

The JCO for M-Area will be reviewed biennially and amended when necessary. However, no changes are anticipated solely as a result of 322-M deactivation. Appropriate notifications have been made that the fire protection for the facility is permanently disabled, per WSRC 2Q, Procedure 5.6. The *322-M Fire Control Preplan* (Reference #16) will be revised to reflect the post-deactivation status of the facility. Procedures and other plant operating documents pertaining to the facility will be revised or canceled as appropriate to reflect the deactivated status of the facility.

During the period when the facility is being deactivated, a long-term Surveillance and Maintenance Plan will be prepared and approved. Following deactivation, a Deactivation Project Completion Report will be prepared in accordance with the provisions of WSRC C2.1, Procedure 1.01.

Housekeeping and General Cleanup

All non-installed combustible materials will be removed from the facility and disposed according to site procedures.

Stabilization of Contaminated Areas

Openings in laboratory hoods, gloveboxes and enclosures were closed and sealed during the FY95 deactivation work, as were the open ends of duct inlets and outlets. These seals will be inspected during the deactivation project and upgraded as necessary. Of particular concern will be the process ventilation ducts that were cut and taped over. A more robust sealing method will probably be required.

The ventilation components outside the building will be inspected and covered with a weatherproof sealant when required to reduce corrosion and prevent entry of rainwater. Deteriorated sections of ductwork will be removed or repaired/resealed. Penetrations through the roof will be sealed and flashing will be renewed where necessary.

Although not specified as an end point, if sufficient funding is available, a limited amount of decontamination may be performed to minimize the potential of contamination migration. The primary effort would be to roll back the CA and eliminate the HCA in Room 109, the Metal Preparation Laboratory.

Isolation of Services

All services will be isolated outside the 322-M building envelope at the nearest feasible point. Fire Protection, Chilled, Domestic, and Process Water systems will be isolated by installing plugs or blind flanges in the lines just before they enter the building. Steam will be isolated at the pressure reducing stations on either side of the North end of the building.

Electric power to the facility will be double-isolated, both by opening all the circuit breakers inside the building and terminating the connections to the building at the 352-4M transformer. These actions will minimize the fire risk due to a lightning strike or deteriorated insulation on the electrical wires.

Connections to drainage systems will be plugged to prevent any liquids from downstream backing up into the unattended building.

Sealing Against Intrusion

All entrances will be locked with the keys controlled by the facility custodian. The entrances at the North and South ends of the building along the main corridor will be used for S&M.

2. Hazards Identification and Characterization

Characterization walkdowns were performed and evaluated prior to preparing Section 6.01.02. These evaluations provided a systematic way to identify the hazards in the facility.

3. Develop and Implement Hazard Controls

Hazard controls have been developed and will be implemented using the existing site procedures that are listed in 6.01.03.

4. Perform Work Within the Controls

WSRC maintains an Integrated Standards Based Safety Management (ISBSM) Program. The ISBSM Program is defined in WSRC 1-01 *Management Policies Manual*, Policy 1.22, *Integrated Standards Based Safety Management Program* . The objective of the ISBSM Program is to systematically integrate safety into management and work practices at all levels of the organization so that missions are accomplished while protecting the public, the worker, and the environment.

The ISBSM Program applies to all segments of WSRC, its partners and subcontractors. The ISBSM Program satisfies all requirements of the Department of Energy Plan for Safety Management. Company-level policies/programs are used to implement required standards, control hazards through mitigation techniques, provide uniformity, and enhance WSRC's Operational Imperatives - Safety, Disciplined Operations, Continuous Improvement, and Cost Effectiveness.

Implementation of the ISBSM Program is embodied in the WSRC corporate manuals, which prescribe methods and procedures for complying with all requirements, including both those that are related to health and safety and those that are administrative in nature. The health and safety requirements enumerated in the S/RIDs (Reference #10) are translated into direction for workers via the corporate manuals. The linkage between S/RIDs and the corporate procedures is documented in the CAIRs, and will not be repeated here.

5. Provide Feedback and Continuous Improvement

Feedback mechanisms to be used on this deactivation project will include monitoring, weekly team meetings and multifunctional walkdown teams. Work performance will be monitored and measured against FDD and SRS ESH&QA indices. Self-assessment of the ESH&QA program will be performed periodically. This will include an evaluation of both management commitments and worker involvement. Key lessons learned will be identified and documented in the Deactivation Project Completion Report.