Department of Energy Site-Specific Activities Relating to the Defense Nuclear Facilities Safety Board

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Introduction

The discussions of safety accomplishments and activities at Department of Energy (DOE) defense nuclear facilities presented here were submitted by the cognizant DOE site, field, and operations offices (Figure 1). The responsible Program Secretarial Offices, Lead Program Secretarial Offices, and Cognizant Secretarial Offices for specific sites, site facilities, or site programs can vary depending on the programmatic nature of the work being conducted.

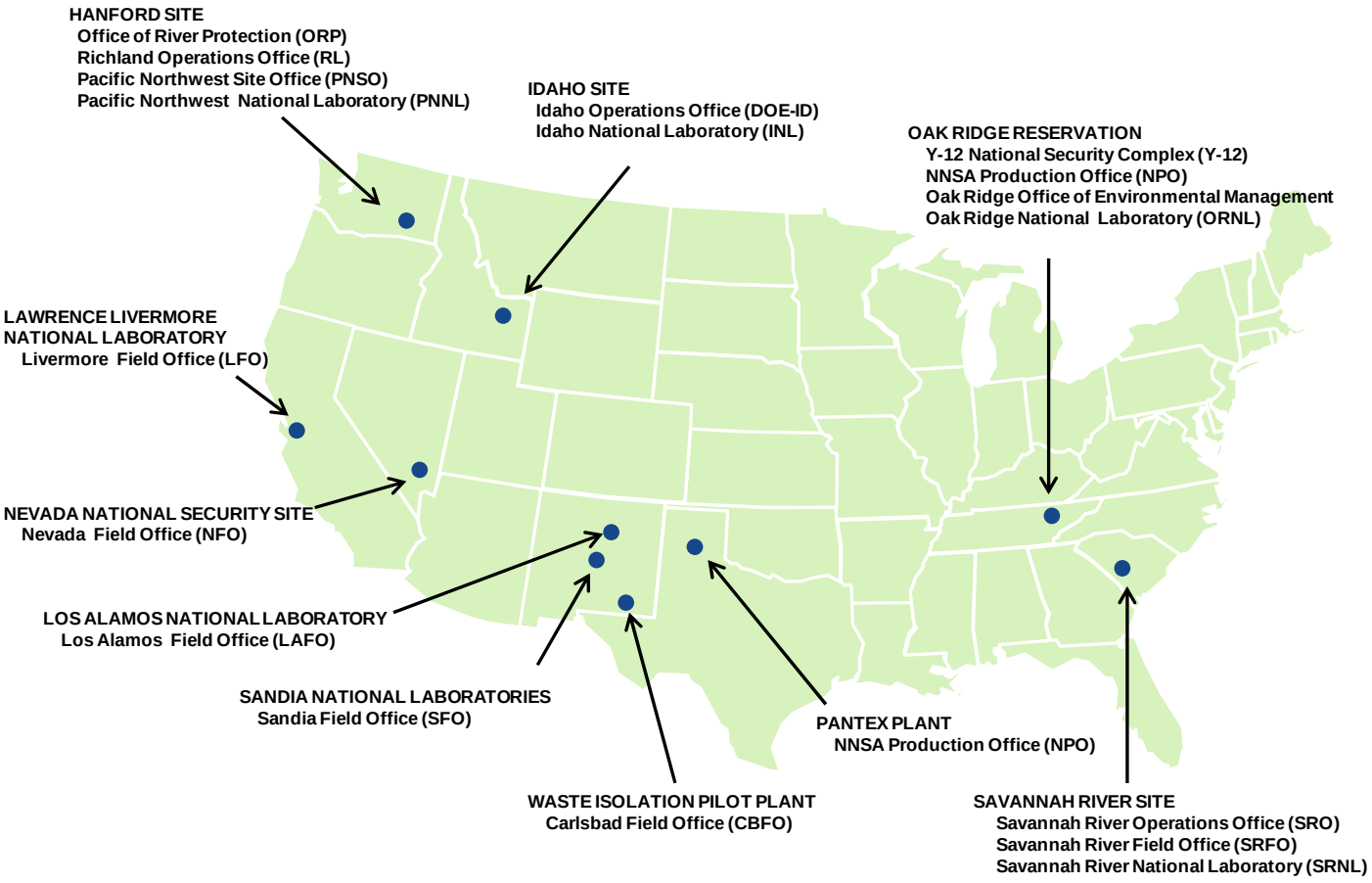


Figure 1. DOE Defense Nuclear Facility Sites

A. Carlsbad Field Office

The Carlsbad Field Office (CBFO) continues to be a significant contributor to Department of Energy's (DOE's) progress toward completing cleanup throughout the Office of Environmental Management (EM) complex. CBFO successfully facilitated the disposition of 5,081 cubic meters of transuranic (TRU) waste from multiple TRU waste generator sites (the goal was 4,500 cubic meters) in Fiscal Year (FY)13. CBFO also completed the approval and disposal of the first shipment of shielded containers in the Waste Isolation Pilot Plant (WIPP) repository.

Work Planning and Control

Work planning and control (WP&C) initiatives are being implemented at the WIPP site. The WIPP management and operating (M&O) contractor's operations organization hired a new Work Control manager from Hanford with many years of WP&C experience and involvement in the development of the URS Washington TRU Solutions (URS) WP&C standard. The WIPP M&O contractor utilized the combination of the leadership from the new WP&C manager, corporate reach-back, and internal temporary reassignment of Central Characterization Program staff to augment site staff and provide focused resources required to accelerate the WP&C initiatives to improve work document quality and implementation.

During the Defense Nuclear Facilities Safety Board (DNFSB) visit to WIPP on August 20 and 21, 2013, the DNFSB staff reviewed the progress and plans of the WIPP WP&C initiative implementation. Activities and plans were identified as positive and in line with expectations as corrective actions continue. URS Corporate conducted a Phase II assessment of the site WP&C program during a visit the week of September 22, 2013 and validated that the WIPP WP&C initiative implementation was meeting expectations.

Safety Culture

Nuclear Waste Partnership, LLC (NWP), the WIPP M&O contractor, was recognized for the Voluntary Protection Program (VPP) Legacy of Stars Award in August 2013. To earn the DOE Legacy of Stars designation, an organization must achieve the Star of Excellence Award for four consecutive years. NWP has maintained Star status through the continued pursuit of safety and health excellence, the implementation of outstanding outreach and mentoring efforts, and by maintaining a recordable injury rate that is 75 percent better than the average of comparable U.S. businesses.

CBFO and the WIPP M&O contractor continued to implement Safety Conscious Work Environment (SCWE) activities. In June 2013, the CBFO and WIPP M&O contractor senior leaders participated in a DOE National Training Center training course on SCWE. This course emphasized the importance of, and methods for, establishing and maintaining an open and collaborative work environment. CBFO and WIPP M&O contractor senior management continue to communicate safety expectations, to have a questioning attitude, and to provide timely feedback when safety concerns or issues are raised.

Contractor Oversight

CBFO utilized DOE EM resources and visits to WIPP by other complex site oversight personnel to improve the WIPP site contractor oversight program. EM provided resources to conduct an assessment of the WIPP Facility Representative Program. WIPP instituted measures, including a complete rewrite of the WIPP Facility Representative Manual, to strengthen contractor oversight.

Aging Facilities and Adequacy of Design

The WIPP facility condition and design are adequate to safely support the site mission. The WIPP site and facilities are 30 years old, exceeding the initial design life of 25 years. The WIPP is also experiencing issues with degradation due to corrosion from the environment produced by the salt mining process. The WIPP is managing these issues by upgrading equipment and facilities and improving infrastructure.

Fire Protection

The WIPP M&O contractor has taken action to improve the reliability of the WIPP fire protection system by replacing six post indicator valves this past year to increase reliability of the site fire water system. A total of twenty-three of the scheduled thirty-three post indicator valves for the site have been upgraded since 2009. Procurement actions have been taken for a new fire truck to provide back-up firefighting capabilities during offsite response and maintenance of the primary unit. The new fire truck is scheduled for delivery to the site in 2014. The fire suppression piping in the Waste Handling Building was reconfigured over the Contact Handled TRUDOCK cranes. This reconfiguration improved the efficiency of the fire suppression system and provided 10 C.F.R. Part 851, *Worker Safety and Health Program*, required clearances between cranes and the fire suppression system. In late fiscal year 2013, the WIPP M&O contractor began an update to the Fire Hazard Analysis document to align with the safety-related design features and specific administrative controls selected in revision 4 of the WIPP Documented Safety Analysis and to incorporate changes to orders, codes, and standards.

National TRU Program FY13 Accomplishments

- Dispositioned 5,081 cubic meters of TRU waste (the goal was 4,500 cubic meters).

- Supported 770 safe shipments to WIPP.
- Dispositioned 1,829 cubic meters of TRU waste from Los Alamos National Laboratory (the goal was 1,800 cubic meters).
- Completed the multi-year campaign to certify 4,954 cubic meters of legacy TRU waste from Savannah River Site by December 31, 2013.
- Completed the approval, certification, transportation and disposal of the first shipment of shielded containers (contained 9 shielded containers) from Argonne National Laboratory.
- Obtained Nuclear Regulatory Commission approval of TRUPACT-II and HalfPACT safety analysis report for packaging, Amendment 23, allowing single containment and the use of the criticality control over pack container, thus furthering the optimization of the TRU transportation program.
- Completed contract carrier surveillance audits and state contract carrier reviews without any findings.
- Completed 19 re-certifications, expansions and baseline characterizations.
- Completed 23 waste stream profile forms and 108 procedures and plan reviews for the TRU waste program, thus allowing the active TRU waste generator sites to continue TRU waste characterization, certification, and shipments to WIPP.

Adequate Available Resources and Succession Planning

CBFO is working to maximize resource efficiencies and mitigate risks common to an aging workforce. Cross-qualification and assignment of backup coverage have mitigated immediate concerns. Succession planning is under way to identify future risks and implement a plan for addressing these issues.

B. Idaho Operations Office

Advanced Mixed Waste Treatment Project

The Advanced Mixed Waste Treatment Project (AMWTP) is a cornerstone to the Department of Energy's (DOE's) commitment for complex-wide transuranic (TRU) waste cleanup. The AMWTP's mission is to process and disposition approximately 65,000 cubic meters of waste that have been historically managed as TRU. To date, the AMWTP has compliantly disposed of over half of the waste inventory. On October 1, 2011, the Idaho Treatment Group, LLC (ITG) assumed management of the AMWTP for DOE. ITG's project work scope includes retrieving waste from storage, characterization, treatment as necessary, certification, preparation, and loading shipments for transport out of the State of Idaho.

In addition to the TRU waste, ITG applies cost savings identified through process improvements to treat and dispose of alpha-contaminated mixed low-level waste (AMLLW) and mixed low-level waste (MLLW). AMLLW that cannot be shipped to Waste Isolation Pilot Plant (WIPP) is treated and disposed of at DOE or commercial facilities, providing the best value to the government. The AMWTP recently surpassed ten years and 15 million hours without a lost time injury of which 2.5 million hours have been during the ITG contract.

Defense Nuclear Facilities Safety Board and Waste Retrieval

The AMWTP has faced significant retrieval challenges. Plywood containers of pre-1971 waste stored in the Transuranic Storage Area Retrieval Enclosure were not coated with any type of preservative coating causing significant structural integrity issues. The degraded plywood boxes posed a hazard to workers and the environment from the potential spread of contamination as they were moved for characterization of the waste inside. Operations were delayed to ensure adequate controls and work processes were in place and certified. In April 2012, AMWTP resumed retrieval operations and successfully used the Inner Contamination Enclosure to retrieve degraded boxes in June 2013.

ITG supported four visits by the Defense Nuclear Facilities Safety Board (DNFSB) and staff during Fiscal Year (FY)13. The topics of these visits were: waste retrieval post start activities (October 2012); a review of the AMWTP's plan to address inorganic sludge processing (Drill-and-Drain) and future project plans to address cargo container unloading (January 2013); a review of progress to address rolling stock trends and level B suit events (February 2013); and oversight during the Integrated Safety Management System (ISMS) Phase II validation of AMWTP (July 2013). The DNFSB provided ITG with defense-in-depth recommendations to its Conduct of Operations Program.

Integrated Safety Management System/ Work Planning and Control

At the start of FY13, ITG management conducted a review of the AMWTP Work Planning and Control (WP&C) implementation plan and identified specific Energy Facility Contractors Group (EFCOG) recommendations on standards-based hazard assessment for implementation. The ongoing implementation includes revision to the WP&C program documents, development of a standards-based hazard assessment process, and focused attention on corrective maintenance activities followed by attention to planned maintenance activities.

In July 2013, DOE conducted an ISMS Phase II verification. The Phase II verification included a specific review of the WP&C improvements and progress to date, and the integration of these improvements into the workforce safety culture. The activities identified one concern, 15 findings, and 32 opportunities for improvement. Some of the identified areas for improvement were previously documented in ITG improvement plans. ITG established corrective action plans, which are currently being implemented.

Operational Events

During the first half of FY13, AMWTP experienced a series of lower consequence events and elected to address these events as recurring events in the Occurrence Reporting and Processing System. The events included a series of level B suit contamination breakthrough events, a series of Unanswered Safety Question implementation issues, and waste handling upset events. Additionally, ITG identified legacy errors associated with the waste container tracking system and experienced three Technical Safety Requirement (TSR) violations associated with controls recently implemented as a result of the legacy errors. ITG is addressing many of the underlying safety culture issues by developing improvement plans for Conduct of Operations, Contractor Assurance, and Safety Culture.

Safety Culture

During FY13, the ITG management team participated in the DOE-led Safety Conscious Work Environment (SCWE) training and conducted classroom workshops. These exercises resulted in development of the Safety Culture Improvement Plan (SCIP) to address aspects of the ITG President's "Key Expectations for the Safe Performance of Work" policy. The SCIP identifies safety culture issues, improvement opportunities, and targets three safety culture areas: Leadership, Employee/Worker Engagement, and Organizational Learning. These actions are in keeping with DOE's key safety initiatives for FY13.

ITG ended FY13 with a 17 percent improvement over its FY12 injury performance (first aids and recordable injuries). ITG recognizes that further improvement is needed to address the number of injury cases involving sprains and strains, which are AMWTP's top injury types. ITG is committed to

maintaining a robust safety culture and injury prevention program and continues to implement improvements to both.

Idaho Cleanup Project

The Idaho Cleanup Project (ICP) involves the safe environmental cleanup of the Idaho National Laboratory (INL) site, which is contaminated with legacy wastes generated from World War II era conventional weapons testing, government owned research and defense reactors, spent nuclear fuel reprocessing, laboratory research, and defense missions at other DOE sites. CH2M-WG Idaho, LLC (CWI) manages the cleanup effort for DOE. The project focuses on reducing risks to workers, the public, and the environment, and protecting the Snake River Plain Aquifer, the sole drinking water source for many Idaho residents.

Decontamination and Decommissioning

- Safely demolished 221 facilities and structures for a 2.2 million square foot reduction in footprint during performance of the ICP-1 contract to date.
- Completed sodium treatment for the Materials and Fuels Complex-799 (MFC-799) Day Tank A, Day Tank B and Sodium Storage Tank.
- Initiated Resource Conservation and Recovery Act (RCRA) closure documentation for MFC-799 & 799A.

Environmental Cleanup Activities

- A cumulative total of 3.11 acres of the 5.69 acres required by the Agreement to Implement US District Court Order dated May 25, 2006 for targeted waste exhumation at the Radioactive Waste Management Complex Subsurface Disposal Area has been completed to date.
- Modified an existing ICP RCRA permit to allow RCRA sludge repackaging in the ARP (Accelerated Retrieval Project) waste exhumation facility.
- Completed modifications to the Accelerated Retrieval Project-V (ARP-V) waste exhumation facility for repurpose as a RCRA sludge waste treatment process.
- Treated and repackaged 2,980 drums of RCRA sludge waste from the AMWTP within the ARP-V waste exhumation facility.
- Completed the construction operational readiness preparations for waste exhumation in the ARP-VIII waste exhumation facility.
- Resumed waste exhumation within the ARP III waste exhumation facility.
- Completed 73 shipments of remote-handled transuranic (RH-TRU) waste to the WIPP in FY13 for a total of 362 RH-TRU shipments to WIPP since May 2005.

- Completed repackaging 16 RH-TRU containers resulting in 54 product drums for characterization and future shipment to WIPP.
- Completed shipment of 37 suspect RH-TRU waste containers from AMWTP to the Idaho Nuclear Technical and Engineering Center (INTEC) for repackaging and characterization.
- Completed shipment of 171 drums of uranium-233 waste from AMWTP for future treatment and disposal.
- Completed disposition of Naval Nuclear Propulsion Program sludge pan container and transuranic vault waste.
- Completed shipment of 87 m^3 (420 drums) of retrieved buried contact-handled transuranic (CH-TRU) waste to WIPP in FY13 for a total of 5,584 m^3 (26,846 drums) since May 2005.
- Completed over 1100 miles of pedestrian survey transects looking for munitions and explosives of concern (MEC) for the Arco High Altitude Bombing Range and the Twin Buttes Bombing Range. These were the last areas on the INL to be surveyed for MEC, completing over 20 years of ordnance investigation at the site. The items discovered during the walk-downs were detonated in the Mass Detonation Area.
- Performed all the site-wide groundwater monitoring, collecting over 1100 samples over 10 sampling events.
- Treated 25 M gallons of trichloroethylene (TCE) contaminated groundwater at Test Area North.
- Removed and treated 1,862 pounds of volatile organic compounds from the subsurface at the Radioactive Waste Management Complex.
- Identified and isolated anthropogenic leaks eliminating 18.0 million gallons of perched water recharge at the INTEC.

Sodium Distillation and Treatment

Completed the design, fabrication, and testing of the sodium distillation system for future treatment of sodium-contaminated RH-TRU waste.

Sodium-Bearing Waste Treatment Project - Integrated Waste Treatment Unit (IWTU)

- DNFSB staff visited the IWTU on October 18, 2012, and again on January 23, 2013, to evaluate progress toward recovery actions resulting from the June 2012 pressure event. No issues were identified.
- The DNFSB visited the Radioactive Waste Management Complex as well as IWTU on February 21, 2013, to tour the facility, and to review the status of pressure event corrective actions, facility modifications, path forward, and schedule. No issues were identified or follow-on actions requested by the Board.

- Recovery actions and required plant modifications resulting from the June 16, 2012, pressure event have been completed. Testing activities are currently on-going. The Contractor Readiness Assessment was completed in early FY14 in preparation for the DOE Readiness Assessment.

Idaho Nuclear Technology and Engineering Center (INTEC)

- CWI loaded and shipped a total of 11 Large Cell Casks containing Navy spent nuclear fuel from storage at INTEC to the Naval Reactors Facility at the INL in FY13.
- Received and unloaded 15 Advanced Test Reactor spent nuclear fuel (SNF) casks from the Reactor Technology Complex in FY13.
- ICP received and unloaded one NAC-LWT cask of SNF from an Austrian research reactor.
- Performed the first ever retrieval of slightly used nuclear fuel from the Irradiated Fuel Storage Facility and shipped it to Austria for use in their research reactor.
- Shipped three casks of Experimental Breeder Reactor II (EBR-II) SNF from storage at INTEC to the MFC at the INL in FY13.

Safety Culture

- CWI participated in many specific SCWE Activities in FY13.
  - Senior managers within CWI were trained by the DOE National Training Center on SAF- 200 SCWE.
  - CWI employees and subcontractors participated in two employee surveys in FY13. The first was conducted by DOE Idaho Operations Office (DOE-ID) as part of their annual oversight assessment of the CWI Employee Concerns Program. The second was conducted as part of CWI's Self-Assessment of SCWE. The surveys had a very high return rate of 81 percent and 70 percent, respectively.
  - The SCWE Self-Assessment was conducted according to an approved review plan to fulfill a commitment made by DOE to the DNFSB in the Implementation Plan for DNFSB Recommendation 2011-1, "Safety Culture at the Waste Treatment and Immobilization Plant." The assessment at CWI concluded that the focus areas and attributes of CWI's SCWE were implemented and effective. Most employees felt a strong commitment by the company to improve the safety culture, and had no reservations about raising concerns at any level within the company without fear of retaliation. Moreover, most employees felt there was a significant focus on improving the safety culture, specifically the Sodium-Bearing Waste Treatment Project since the operational event at the facility in June 2012.
- ICP has continued to reduce recordable injuries and injury rates compared to previous contract years. The overall company Total Recordable Injuries Rate (TRCR) for FY13 was 0.48 which is a

47 percent reduction from the rate last year and a 70 percent reduction from 1.59 experienced in FY06, our first full contract year.

- The DNFSB staff visited ICP on February 25-28, 2013, to perform an assessment of the CWI Radiological Control program. While there were a number of issues identified, they were not deemed significant. All open items were closed to the satisfaction of the DNFSB Radiological Control staff.
- ICP continues to maintain certification of its Environmental Management System to the International Organization for Standardization (ISO) 14001 standard. Surveillance audits were conducted in November 2012 and May 2013 with the auditor stating that "CWI's Environmental Management System conforms to ISO 14001-2004 with no nonconformities and is recommended for continued certification. There is strong management support and evidence of adherence to internal procedures throughout the system."
- ICP continues its environmental stewardship performance including no regulatory fines since the start of the ICP-I contract in 2005 with 42 inspections conducted by regulatory agencies in every media (air, water, the Resource Conservation and Recovery Act), the Comprehensive Response Compensation and Liability Act, and the Toxic Substances Control Act. Four regulatory inspections of ICP operations occurred in FY13 (1 air, 2 hazardous waste, and 1 wastewater) with no potential violations noted.

Work Planning and Control

CWI implemented a revision to STD-101 (MCP-101) that directly mirrors guidance provided by EFCOG Contractor Guide 2012-0001, “Energy Facility Contractors Group Work Planning and Control Program Guideline Document.” This will allow CWI to align with the current planned DOE Handbook for Activity Level Work Planning and Control.

C. Livermore Field Office

The National Nuclear Security Administration (NNSA) Livermore Field Office oversees Lawrence Livermore National Laboratory (LLNL) in Livermore, California. LLNL is managed and operated by Lawrence Livermore National Security, LLC. During Fiscal Year (FY)13, LLNL and the NNSA completed or made continued progress on several safety-related issues of particular interest to the Defense Nuclear Facilities Safety Board (DNFSB), including: (1) LLNL facility and program safety enhancements; (2) a review of LLNL and NNSA safety basis development, review, and approval processes; (3) a review of selected Plutonium Facility (Building 332) safety systems; and (4) completion of Safety Conscience Work Environment (SCWE) assessments. Each of these areas is discussed below.

Facility and Program Safety Enhancements

Facility and program safety enhancements included:

- Refurbishment of safety equipment;
- Removal of low quality Tritium items;
- Achieving Transuranic (TRU) Waste Repackaging goals; and
- Initial Installation of the new Consolidated Waste Processing Line (CWPL).

LLNL completed refurbishment of the Laboratory's Plutonium Facility safety-significant argon and nitrogen supply systems. The refurbishment effort improves overall safety system reliability. In the area of material and waste management, LLNL reduced the inventory of low quality tritium items through waste shipments to the Nevada National Security Site. The items contained tritium in quantities and form unsuitable for recovery. LLNL was also able to meet Waste Management Goals by repacking 80 TRU waste containers in support of a FY16 TRU waste shipment campaign. LLNL also initiated installation of the new CWPL which is currently scheduled for operation in FY14. The CWPL will optimize future waste repackaging efforts.

LLNL Nuclear Facility Safety Basis Improvements

On August 30, 2012, the DNFSB issued a letter highlighting concerns about safety control strategies at LLNL nuclear facilities. The letter noted specific concerns about three safety basis actions: (1) Tritium Facility operations; (2) a classified experiment performed in the Plutonium Facility; and (3) a temporary deviation from the Plutonium Facility's technical safety requirements for an inoperable safety class system. In response to the concerns, LLNL and NNSA conducted external reviews of their safety basis development process in FY13. The reviews identified opportunities for improvements and recommendations. Corrective actions based on the recommendations are underway.

Plutonium Facility Safety System Improvements

On December 13, 2011, the DNFSB issued a report highlighting concerns about specific safety systems at the Plutonium Facility. NNSA and LLNL completed various related actions in FY13 including the development of criteria for use in determining when existing glovebox wood-enclosed housekeeping high efficiency particulate air (HEPA) filters warranted upgrades to newer designs.

Safety Culture Assessments

Both LLNL and the NNSA LFO completed SCWE self-assessments consistent with the DOE developed guidance.

Since the completion of the LLNL SCWE Self-assessment, LLNL has developed follow-up actions to ensure the SCWE results are used to strengthen and improve LLNL's safety culture and safety conscious work environment. The follow-up actions developed fall into two categories; short-term and long-term.

Short-term follow-up actions focused on communication. The final un-edited LLNL SCWE Self-assessment/Survey Report was made available to all personnel working at LLNL by prominently posting it on the LLNL "My LLNL" website. A News On-line article was published informing LLNL personnel of the availability of the report and provided an easy imbedded web link to the report. One of the key actions was to provide personalized SCWE result briefings to organizations across site. Ten organizations have received their personalized SCWE briefings and an eleventh briefing has been scheduled. Rounding out the short-term actions, the LLNL FY14 "Environment, Safety, and Health Annual Briefing" includes key SCWE topics and also reiterates the responsibility and empowerment of each LLNL worker to employ their stop work authority as needed.

Long-term follow-up actions were designed with the expectation that time would be needed to identify the right people, provide information in a usable format, develop value-added tools, and ultimately work enduring solutions to address key SCWE areas needing strengthening. The long-term actions focused on a One Laboratory approach to a strong LLNL safety culture.

Identifying the right people. The LLNL Director chartered a SCWE Follow-up team be established. The team is being assembled and will include LLNL SCWE self-assessment team personnel and a mixture of representative workers from across both the LLNL main site and Site 300.

Providing information in a usable format and develop a value-added tool. A detailed SCWE interview spreadsheet was maintained during the SCWE self-assessment interview process to capture specific feedback from those interviewed. The spreadsheet is being prepared (i.e., sanitized to protect anonymity, correlated to like group responses, etc.) as a practical tool for follow-up team use.

Identifying best use of resources. The LLNL SCWE self-assessment report results in combination with the specific SCWE interview spreadsheet feedback are being evaluated to identify the top three or four topics for the focus of the follow-up team.

D. Los Alamos Field Office

The Los Alamos Field Office (LAFO) oversees the Los Alamos National Laboratory (LANL), a multi-discipline National Laboratory with 13 nuclear facilities (5 of which are nuclear environmental sites). Los Alamos National Security, LLC (LANS) manages LANL under contract with the Department of Energy (DOE). Safety accomplishments and ongoing actions in Fiscal Year (FY)13 are discussed below.

Formality of Operations and Criticality Safety

On June 27, 2013, as a precautionary measure the LANL Director paused all Plutonium Facility (PF-4) programmatic operations, because of shared laboratory and federal concerns with conduct of operations and implementation of criticality safety controls. Operations are resuming after corrective actions are completed and resumption is reviewed by the LAFO and authorized by the LANL Director or his designated senior manager. Key improvements being made involve ensuring criticality safety limits are in procedures; evaluating procedures for "use every time"; validating that the procedures function as written; ensuring criticality safety documentation are available to operators; validating that postings are clear and under configuration management; ensuring material is appropriately labeled; and providing refresher training to fissile material handlers.

Also, during FY13, LANL recommended and received federal concurrence in the level-of-confidence in the criticality safety limits established for most fissile material operations on site. The exceptions involve solutions and high-fissile-mass operations, which will receive higher scrutiny as part of PF-4 resumption. LANL also began an aggressive campaign to increase qualified criticality safety staffing during FY13 and thereby address earlier attrition. These efforts are on-going.

Plutonium Facility Seismic Safety

The LANL PF-4 was designed to the best available earthquake information when it was constructed in the 1970s. On October 26, 2009, the Board issued Recommendation 2009-2 on the PF-4 seismic safety, which was motivated by Board concerns involving one of the 20 accident scenarios analyzed in 2008, particularly the post-seismic-fire event. National Nuclear Security Administration has completed all the actions in its implementation plan and made extensive structural modifications; however, additional modifications and other actions are being pursued to ensure that seismic concerns are thoroughly addressed.

In particular, a September 2012 LANL re-evaluation determined that PF-4 could collapse in a severe earthquake (one with peak ground motion that could occur on the order of once in eight thousand years or more); these results were reviewed and a path-forward developed in 2013. Actions taken to

date have both reduced the potential for collapse of PF-4 and reduced the magnitude of release that may occur. The 2012 analysis showed that the facility provides its intended confinement safety function and is within DOE allowances for existing facilities, but PF-4 does not meet the DOE criteria for new buildings. Also, because of the way PF-4 was built, the margin between loss of confinement and onset of collapse is small. Therefore, DOE is pursuing additional PF-4 seismic upgrades, which are expected to be completed within the next two to three years. Also, in consultation with the DNFSB, DOE is pursuing an alternate seismic analysis of PF-4 to augment previous analyses and provide assurance that all structural elements that require upgrading are identified.

Emergency Operations

In February 2013, LANS conducted a series of tabletop exercises focused on collapse of nuclear and other higher hazard facilities during a seismic event. Emergency response personnel from DOE, LANS, state, county, tribal governments, and other federal organizations participated. Lessons learned are being used to improve emergency planning and preparation for large catastrophic events that disrupt communications and transportation lifelines.

Nuclear Material Packaging

Plutonium-238, which is used as a power source for deep space probes and other applications, is also one of the dominant radiological hazards in PF-4. During FY13, LANS tested and qualified a heat-source plutonium container design to establish that it has less than 1 percent leakage during a worst-case fire.

Transuranic Waste Operations

During FY13, LANL developed, received approval, and implemented the first safety basis upgrade for the Area G waste storage facility since 2003. This upgrade included several nuclear safety enhancements. LANL and the Carlsbad Field Office contractor also made 187 shipments of transuranic waste to the Waste Isolation Pilot Plant, reducing the risks associated with the large onsite inventory. LANS expanded operations and made significant improvements to waste remediation facilities to support meeting a commitment to the New Mexico Environmental Department for disposition of 3,706 cubic meters of waste by June 2014. At the end of FY13, LANS had dispositioned 2,745 cubic meters and was slightly ahead of schedule.

Project Management

During FY13, LANL updated its execution strategy for PF-4 safety-related upgrades. The Technical Area 55 Reinvestment Project completed installation of new air dryers that ensure appropriate atmosphere for most PF-4 glove-box operations. The project also installed new confinement doors

that would reduce building leak-rates in the event of a major plutonium release. Safety Design Strategies (SDS) were established for the Transuranic Waste Facility (TWF) Project and the Radioactive Liquid Waste Treatment Facility Upgrade Project (RLWTF-UP). The TWF SDS formalized strategies for addressing the freeze protection system for the safety-significant fire suppression system, and providing a safety class control to mitigate a larger than a 10,000 pound vehicle from impacting the storage facilities. The RLWTF-UP SDS formalized a strategy for separating (as standalone facilities) the radiological Low Level Liquid Waste Facility from the Hazard category 3 Transuranic Liquid Waste Facility.

E. Nevada Field Office

The National Nuclear Security Administration (NNSA), Nevada Field Office (NFO) maintains the capability at the Nevada National Security Site (NNSS) and other remote facilities to implement DOE initiatives in stockpile stewardship, crisis management, waste management, environmental management, non-defense research and development, and work for others, as well as supporting other Department of Energy (DOE) programs. Major non-reactor nuclear facilities at the NNSS include the Device Assembly Facility (DAF), National Criticality Experiments Research Center (NCERC), Joint Actinide Shock Physics Experimental Research (JASPER) Facility, and the Area 3/5 Radioactive Waste Facilities. The U1a Complex is not categorized as a nuclear facility; however, limited-duration experiments are conducted as nuclear activities.

The NNSS management and operating contractor, National Security Technologies, LLC (NSTec), is responsible for managing and operating all facilities at the NNSS, including facilities previously managed by the National Weapons Laboratories. Defense Nuclear Facilities Safety Board (DNFSB) related activities and accomplishments associated with NNSS nuclear facilities and projects are discussed below.

Environmental Management Activities

The NNSS Area 3/5 Radioactive Waste Facilities enable implementation of the NNSA Waste Management Program. The Hazard Category 2, non-reactor nuclear facilities provide the critical infrastructure and services necessary for disposal of Low Level Waste (LLW)/Mixed Low-Level waste (MLLW) generated by DOE and Department of Defense generators at the NNSS and across the United States. During Fiscal Year (FY)13, the NNSS safely accepted and disposed of 990,476 cubic feet of LLW and 108,442 cubic feet of MLLW at the NNSS Area 5 Radioactive Waste Management Complex. All activities are conducted in a manner which adheres to environmental protection standards and applicable regulations to safeguard the public, workers and the environment from any existing or potential contamination. Ongoing activities include environmental planning, compliance and monitoring.

Device Assembly Facility (DAF)

The DAF is a Hazard Category 2, non-reactor nuclear facility. Under NSTec management, the DAF continued supporting NNSA and work-for-others missions throughout the year.

During FY13, the DAF management team supported the Pollux subcritical experiment assembly, JASPER target assemblies, and ongoing counterterrorism and criticality safety training activities.

As documented in the DNFSB 2011, and 2012 Annual Reports to Congress, a significant safety-related infrastructure issue is the ongoing degradation of the DAF fire suppression water tank and fire suppression system lead-in piping. The piping is susceptible to corrosion and its reliability is compromised. The facility is currently managing these vulnerabilities with an NNSA/NFO-approved Justification for Continued Operation and associated compensatory measures to ensure adequate safety. With respect to fire suppression system corrective actions, a conceptual engineering design was selected and is being fully developed to support the official start of Title II Design. Initial funding for the new project did not materialize due to the restrictions for new project starts under the Continuing Resolution. However, maintenance funding is being used to begin work in FY14 toward repairing the two confirmed leaking lead-in pipes. NSTec will continue replacing additional lead-in piping starting in FY15.

Another DAF safety-related infrastructure issue involves vulnerabilities associated with High Efficiency Particulate Air (HEPA) Filtered Ventilation System (HFVS). The HFVS Test Project has successfully completed necessary modifications, acceptance testing and in-place leak testing of the HFVS in eleven affected buildings. Configuration Management documentation activities of the HFVS modifications are complete or in progress. Design modifications and testing of the remaining systems continues into FY14. Replacement of aging HEPA filters is being planned and coordinated with other related HFVS corrective maintenance activities.

Other DAF-related issues of concern to the DNFSB include vulnerabilities associated with fire penetration seals and resolution of previously identified gaps in Configuration Management. NSTec began repairing fire penetration seals and continues making progress toward closure of issues identified during facility walk-downs performed in support of the configuration management project. These issues and others are being managed in accordance with NSTec's integrated strategic plan developed earlier in FY13. NNSA/NFO continues to provide the DNFSB staff with periodic progress updates related to the safety system vulnerabilities and associated resolution.

National Criticality Experiments Research Center

The National Criticality Experiments Research Center (NCERC) is a unique activity within the DAF where general research and hands-on training related to nuclear safeguards, criticality safety, and emergency response is conducted using Security Category I level nuclear materials. All four critical assembly machines (CAMs); Comet, Planet, Flattop and Godiva, were fully operable during FY13.

NNSA/NFO maintained open communications with the DNFSB to support routine oversight activities and resolution of previously identified safety basis issues of concern identified in a DNFSB August 5, 2010 letter to the NNSA. Limited-scope safety basis improvements were implemented through Change Notice updates. NNSA/NFO and NSTec continued discussions with the DNFSB Staff related to

the resolution of all remaining technical issues. Closure of the remaining open issues is being addressed in Change Notice 4 to the Critical Experiment Facility Addendum to the Device Assembly Facility Documented Safety Analysis, with approval and implementation planned in FY14.

Joint Actinide Shock Physics Experimental Research Facility

The JASPER Facility is a Hazard Category 3, non-reactor nuclear facility operated by NSTec. The associated experimental program is conducted by the Lawrence Livermore National Laboratory (LLNL). The JASPER Facility enables scientific research associated with the acquisition of high-quality performance data involving nuclear and surrogate materials. A high-velocity gas gun and associated diagnostics designed for shock physics experiments provide equation-of-state data to better understand phase change relationships of weapons materials under varying pressures and temperatures. The data from this facility is also used to either validate or update computer models of material response for weapons applications.

The JASPER Facility received its authorization to operate as a nuclear facility on August 25, 2011. FY13 marked the second full year of operation as a Hazard Category 3 non-reactor nuclear facility. Activities throughout the year included six surrogate shots and seven plutonium shots. All shots were performed safely and provided LLNL scientists with the precise equation-of-state data to further refine computer codes used to certify the U.S. nuclear weapons stockpile. NNSA/NFO maintained open communications with the DNFSB Staff throughout efforts to re-categorize the JASPER Facility, based on new information related to the existing confinement strategy. NNSA concluded these activities and determined that the existing JASPER Facility hazard categorization is appropriate for the facility and associated activities. The experimental program for this facility is expected to continue until at least FY16.

U1a Complex

The U1a Complex supports the nation's Stockpile Stewardship Program and provides an underground experimental test bed for the conduct of subcritical experiments using high-explosives and special nuclear materials. The U1a Complex is comprised of several support buildings and trailers, and an extensive series of underground drifts and experimental alcoves 965 feet below ground level. Although the U1a Complex is not categorized as a full-time nuclear facility, specific subcritical experiments may be classified as Hazard Category 3 nuclear activities, and therefore the U1a Complex is considered a "facility of interest" to the DNFSB. Discrete nuclear activities are performed in accordance with the existing NNSA-approved safety basis.

The U1a Complex continued providing support to NNSA programs through FY13. The Gemini Project sponsored by the Stockpile Stewardship Program was conducted by the Los Alamos National Laboratory and NSTec. The Gemini Project, designated by the NNSA Defense Programs Deputy

Administrator as a high-priority demonstration, was a first-of-a-kind demonstration of two integrated experiments. The initial "surrogate" (Castor) experiment, conducted underground at the U1a Complex in FY12, was performed without special nuclear material. This was followed by a subcritical experiment (Pollux) using special nuclear material. Pollux was safely executed in the first quarter of FY13 and provided unprecedented mission-relevant data in support of the Stockpile Stewardship Program.

The next surrogate experiment utilizing the Gemini platform, Leda, is scheduled for completion by the fourth quarter of FY14. The LEDA experiment will augment existing Castor and Pollux data, enable maintaining facility and staff readiness for performing subcritical experinments, and will continue the evolution of manufacturing and inspection processes for scaled components to support the future subcritical experinments.

The U1a Advanced Fielding Dynamic Experiment (AFDE) Project is proceeding with the design and construction of additional experimental areas to support a variety of experiments to improve the understanding of plutonium behavior under extreme laboratory conditions. The Out Years SCE Preparation Project is upgrading the U1a Complex diagnostics and associated infrastructure systems to support these future SCEs.

Fire protection at the U1a complex is an ongoing issue of concern to the DNFSB. Accordingly, NNSA/NFO and NSTec have worked closely with the DNFSB Staff to address specific underground fire protection concerns in the absence of applicable regulations. During a review of the Fire Protection Program and related requirements, it was determined that the existing DOE design and operating requirements do not specifically address the unique aspects encountered in subterranean facilities, including the U1a Complex. Consequently, a key element of the long-term fire protection strategy for the U1a Complex was the development of an "Underground Safety and Health Program Description," that would become the basis for assessing the adequacy of the U1a life safety and fire protection features, exemptions, and equivalencies. The NNSS Underground Safety and Health Program Description, was developed by NSTec and approved by NNSA/NFO in FY13.

NNSS Activity-Level Work Planning and Control

The DNFSB's staff reviewed activity-level work planning and control (WP&C) activities conducted by NSTec for defense nuclear maintenance and operation activities at the NNSS. This review focused on actions taken to respond to the Board's letter of March 28, 2011 and other actions related to use of the Energy Facility Contractors Group (EFCOG) WP&C Guideline document.

Work planning and control processes were reviewed by assessing the following essential programmatic elements: 1) define the scope of work; 2) identify and analyze hazards for worker protection; 3) develop and implement controls to protect the worker; 4) perform and manage work

within controls; and 5) provide feedback and make improvements. The review included discussions of the Manuals and Codes of Practice used for the planning and control of activity-level work by all organizations and personnel involved with the work, including non-facility personnel and facility users. This was followed by discussions with responsible individuals and the observation of work activities in progress. Additionally, the staff evaluated field implementation of WP&C processes in NNSS facilities, including the DAF, NCERC, JASPER Facility, U1a Complex, and Radioactive Waste Facilities. The staff also reviewed NNSA/NFO federal oversight of NSTec WP&C implementation.

Safety/Security Culture Assessment

In June of 2013, a Safety/Security Culture Assessment was performed to determine the current health of the safety and security culture across the Nevada Enterprise (NvE), which comprises the group of organizations responsible for management, oversight, and operation of the NNSS. Specifically, the NvE Safety/Security Culture is defined as the values and behaviors modeled by NvE leaders and internalized by its members, which serve to make safe and secure performance of work the overriding priority to protect the workers, the public, and the environment.

The assessment team was composed of representatives from across the NvE, including NNSA/NFO, NSTec, Navarro-Intera, and WSI-Nevada. In addition, two advisors served on the team, as well as a representative from the NNSA Office of Safety and Health (NA-SH-1) and a safety culture subject matter expert. The team acquired data through personnel interviews, evaluation of employee surveys, document reviews, and facility walk-downs. The assessment process evaluated the topical areas of Leadership, Employee/Worker Engagement, Organizational Learning, and Performance Measures and Contract Incentives.

Overall, the assessment team determined that while work is being accomplished in a safe and secure manner, stressors to the overall culture were identified that could preclude NvE from achieving organizational excellence. Therefore, the overall expectations associated with a robust safety/security culture were only partially met. NNSA/NFO and the NvE contractor community are implementing appropriate actions as necessary to address weaknesses and opportunities for improvement.

F. NNSA Production Office

The National Nuclear Security Administration (NNSA) Production Office (NPO) has responsibility for both the Pantex Plant and the Y-12 National Security Complex. NPO provides routine oversight of contractor performance through walkthroughs, operational checks, assessments, and surveys. On a quarterly basis NPO evaluates the collective significance of issues, looks for trends or "faint signals" from oversight data, and considers systemic impacts of issues. A focus area for Fiscal Year (FY)13 has been nuclear safety culture. NPO adopted the Institute of Nuclear Power Operations (INPO), "Traits of a Healthy Nuclear Safety Culture". NPO uses one of the INPO traits as a monthly theme and weekly discusses different attributes of that trait. The message is communicated through posters, weekly staff meetings, and all hands meetings. NPO has employee teams that provide input to the Leadership Team for consideration and action. The NPO Leadership Team is committed to the journey of continually embodying the traits of a healthy nuclear safety culture in all that NPO does. NPO maintains an effective relationship with the Defense Nuclear Facilities Safety Board (DNFSB).

Pantex Plant

Nuclear Safety Culture

In FY12, two assessments of the Babcock & Wilcox (B&W) Pantex, the site contractor, safety culture were performed. One was performed with Texas Tech University as the Pantex Plant self-assessment to determine the progress made by the plant in becoming a High Reliability Organization. The second safety culture assessment was performed independently by the DOE Office of Health, Safety and Security (HSS). Although conducted separately, these two surveys identified similar areas in need of attention in the Pantex safety culture. These areas included a respectful work environment, safety communication, and a safety conscious work environment (SCWE). The Pantex plant created a joint NPO, Pantex, Y-12 Safety Culture Policy; prepared a Safety Culture Communication Plan, developed a cross-functional safety culture focus team; improved the Quality of Life for plant employees; trained plant senior and department managers in SCWE; benchmarked other nuclear facilities with success in safety culture development; and adopted the INPO Traits of a Healthy Nuclear Safety Culture (INPO 12-012) into plant operations.

Pantex established the Nuclear Safety Culture Monitoring Panel (NSCMP), which was chartered based on the guidance provided in Nuclear Energy Institute Publication 09-07 (draft). The purpose of the NSCMP was to monitor the plant inputs to determine whether safety culture trends were developing. Shortly after the panel's formation, it sponsored the development of the Pantex Safety Culture Improvement Plan (SCIP), which was initially released on May 30, 2013. The SCIP is based on a gap

analysis between the survey results and the INPO traits, identifies the short- and long-term actions for the senior managers to further strengthen the safety culture at the Pantex Plant. Overall, the Pantex Plant has been working diligently to improve safety culture in FY13 including dedicated investments to improve the quality of work life for the employees at Pantex.

Nuclear Explosive Safety

In 2012, the DNFSB wrote several letters addressing a Nuclear Explosives Safety (NES) issue at the Pantex Plant and expressing concerns about the independence and authority of the NES organization and the Board's belief that the contractor NES change control process. Corrective actions and improvements began in FY12 and have continued into FY13. For example, the NES Department was reassigned to report directly to the Office of the General Manager, the contractor NES change control process was modified to improve the rigor and documentation of NES reviews, and detailed performance demonstration cards were implemented to minimize the gap between work-as-imagined and work-as-performed. In April 2013, B&W Pantex completed a full causal factors analysis of the specific event that led to the initial DNFSB concerns and the surrounding factors. Several Judgments of Need were identified and corrective action plans were developed. In April 2013, a NES Master Study identified a pre-start finding concerning the falling man analysis for the Special Tooling Program at Pantex. (The falling man analyses models the potential impacts of a worker in a high consequence environment falling into energetic material.) B&W Pantex evaluated the concerns and identified proposed compensatory measures to address the finding. In the August 2013 approval memo, NNSA designated one part of the finding as a pre-start finding and concurred that the proposed compensatory measures would adequately address the pre-start. The approval memo determined that the remaining items may be treated as post-start actions. In order to address the remaining issues, B&W Pantex has contracted with Virginia Tech University to conduct a detailed study on the falling man scenario. This study will serve as the basis for the methodology for future falling man analyses at B&W Pantex.

Emergency Management

The Pantex Emergency Management Program made changes during FY13 focused on improving areas of performance that were the subject of concerns expressed by NPO and B&W Pantex senior leaders. Efforts focused on upgrading the level of experience for management personnel, the execution of the drill and exercise program, and the content of the site's hazard analyses. In particular, B&W Pantex restructured the Emergency Management Department through personnel reassignments and hiring of new staff that provided additional expertise in critical areas. In addition, a renewed emphasis was applied to drill and exercise planning and execution by ensuring that the objectives are specifically linked to individual events in the sequence list being used by the controllers. Reviews for overall quality and technical accuracy of drill and exercise plans were also instituted to enhance their realism

and achieve maximum benefits. In the area of emergency response, the emergency operations center was updated with significantly improved technology for displaying and processing event information. All personnel assignments to the Emergency Response Organization were reviewed, changes were made to make better use of the available assets, and an intensive training program for the Executive Team was initiated. This effort will continue into the next year and was tested during an exercise in January 2014. Other FY13 accomplishments included developing a comprehensive technical basis document to set forth the methodology by which the site's emergency hazards surveys and analyses were developed as well as preparing revisions to these documents that more clearly explain the process used to gather and analyze the data and produce end products that support decision-makers as they act to minimize the consequences of potential emergency situations. NPO has identified concerns with preparation and execution of drills and exercises. Also, NPO is encouraging a more self-critical evaluation of performance during drills and exercises.

Documented Safety Analysis (DSA)

Both B&W Pantex and NPO recognize that improvements in DSA documentation are required. B&W Pantex has taken action to address issues in the quality of the DSA. A DSA Improvement Plan (DSAIP) was submitted and executed that addressed achieving consistency and simplification as well as resolving legacy issues in the DSA. The DSAIP established a plan to incrementally improve the DSA while completing routine deliverables as opposed to rewriting the DSA in a module by module approach. Areas addressed by the DSAIP include simplification of accident scenarios, reducing the reliance on probabilistic estimates, ensuring adequacy of DSA calculations, and ensuring configuration management of the safety basis reference documentation. An increased focus was placed on identifying and promptly resolving emerging issues. Both B&W Pantex and NPO briefed DNFSB on programmatic pauses associated with the B61 and the W76. The DSA change package review and approval process was modified to increase its formality and rigor and improve the quality of submittals. B&W Pantex has developed and implemented Nuclear Safety Indicator metrics to evaluate performance and identify areas needing additional attention.

Fire Protection

The DNFSB issued a letter on February 25, 2013, regarding the fire protection program at Pantex. The letter expressed concerns with management of known deficiencies within the fire systems, the timeliness of actions to correct deficiencies and maintaining operability and reliability of the safety class fire protection system. NNSA and B&W Pantex met the 90 day reporting and briefing requirement. The high pressure fire loop (HPFL) project to replace part of the safety class fire system underground piping finished early in the year. The HPFL pumps and tanks were started up in December 2013. Three Fire Protection piping lead-ins in nuclear facilities were also finished in December. The lead-ins are scheduled on a priority basis and are carefully scheduled to allow

adequate facility availability for production work. B&W continues to monitor and trend replacement parts for the fire alarm panels. A new agreement with the fire alarm manufacturer has been reached to continue support for repairs till December 2015. Design is working on a new system with installation planned in 2014. Fire penetration seals have all been replaced in the majority of the nuclear facilities to meet 2 hour fire barriers. These improvements (HPFL, replaced lead-ins, fire penetration seals, and fire alarm panel replacement) significantly enhance this critical safety system and add redundancy for reliability.

Y-12

During FY13 the NPO and B&W Y-12, the site contractor, made significant progress in improving overall safety and operations of the Y-12 site by focusing on: a) Consolidating and integrating on-going site initiatives into an Aging Management Program (AMP) to ensure safe operation of several aging nuclear weapon production facilities, and b) continued improvement of work planning and execution to address DNFSB concerns and establishing a continuous training program to maintain nuclear process operation Conduct of Operations (ConOps) improvements

Oversight and Line Management Attention to Ensure Safe Operation of Aging Nuclear Weapon Production Facilities

The NNSA's long-term plan to meet its enriched uranium (EU) processing requirements is to replace Y-12's aging EU processing facilities with a new Uranium Processing Facility (UPF). UPF is in design and will undergo a phased construction/start-up with initial operations to support the 9212 Complex processes in the mid-2020s, and full operations in the 2030s. Responding to Board concerns in 2007, B&W Y-12 initiated a regimen of increased vigilance and close observation that regularly assesses the physical condition of the 9212 Complex to support safe operations and is performed by the 9212 Continued Safe Operability Oversight Team (CSOOT).

Taking into account: (a) the change in UPF project strategy resulting in delaying transition of Building 9215 and 9204-2E EU missions to UPF until at least the 2030s; (b) the 9204-2E and 9215 facility risk review (FRR) recommendations calling for periodic evaluation of progress on completing FRR recommendations and baseline FRR assumptions as the UPF project schedule continues to evolve; and (c) the importance of independent evaluation and oversight by line management, B&W Y-12 and the NPO expanded the CSOOT responsibility in calendar year 2013 to include Buildings 9215 and 9204-2E in addition to the 9212 Complex. The expanded CSOOT role was given a tasking similar to the original effort for the 9212 Complex.

During FY13 the production organization promulgated a Facilities and Infrastructure Aging Management Strategy (AMP) and Y-12 site AMP procedure. The application of the AMP on Production Facilities and Infrastructure will be a graded approach for all Y-12 missions with a focus on

the EU nuclear facilities. The objective of the AMP is to integrate the various aging management processes already underway, including the system health program, and assure that risks for continued safe operations are identified, gaps in gathering data to evaluate risk for continued safe operations are identified, and management is informed when the risk for continued safe operations is not acceptable.

In FY13 B&W Y-12 began to implement a system health reporting program as an enhancement to existing Y-12 AMP management tools, which include the CSOOT and facility-specific operations plans. The purpose of the system health reporting program is to improve the information used to reflect the overall health of key production and safety-related systems by not only tracking system availability, but also defining a common set of metrics to better characterize system sustainability. Examples of these metrics include critical spare part availability, support system availability, and the status of preventive maintenance activities. To date, B&W Y-12 has developed system health reports for 22 systems and plans to continue to expand the program until reports have been developed for all key systems. Attendant with the implementation of the system health reporting program, B&W Y-12 created facility-level and plant-level health committees to provide a structured approach to the oversight of system issues. The committees perform two key functions: (1) identifying recommendations to address system issues; and (2) translating raw system health reporting data (and other sources of system information) into capability confidence ratings—a qualitative representation of the risk that the site could lose certain core production capabilities (e.g., component assembly, enriched uranium purification) within the next several years. The plant health committee provides these ratings to the B&W Y-12 General Manager and NNSA stakeholders in order to ensure that senior management is informed of the systems that present the greatest risks to the sustainment of safe performance of core Y-12 capabilities. The plant health committee also informs senior management where funding shortfalls could limit the site's ability to take action to mitigate these risks

The CSOOT report and brief to NNSA and the DNFSB that addressed the annual CSOOT evaluation of Buildings 9212, 9215, and 9204-2E performance indicators, facility system and process condition assessments, and operations and safety data for the period June 2012 to June 2013 identified no imminent safety issues that would currently provide reason for limiting operations. Individual system and component aging degradation did, however, result in management actions to place facilities in safe condition and effect repairs. Line management reacted promptly to aging issues identified with respect to several 9212 processes and has continued work to remediate and repair important safety-related fire suppression systems, to include end-of-life sprinkler heads and identified piping and valve corrosion issues in dry-pipe systems. These events validated the current oversight's and infrastructure's ability to respond to aging issues and to ensure risks remain acceptable for continued safe operations in the 9212 Complex and Buildings 9215 and 9204-2E.

Continued Improvement of Conduct of Operations and Work Planning and Controls

During FY13, Y-12 completed all actions on the B&W Y-12 Production Division's ConOps improvement plan that reinforced the basic fundamentals that result in safe and efficient nuclear operations and addressed the DNFSB's letter of 25 August 2011 which had noted a number of continuing and unresolved weaknesses in ConOps and technical procedures which have an adverse impact of safety of nuclear operations. In April 2013, Y-12 briefed the Board on Y-12 ConOps improvements and the Board concurred that Y-12 had made progress and is continuing efforts to further improve ConOps performance. Key areas of Y-12 ConOps improvement were noted as on-going efforts to revise and improve procedures with worker involvement being a key attribute and the institutionalization of a continuing training program focused on practical ConOps hands on training and training sessions with workers and supervisors focused on their understanding of the "why" behind procedure and safety requirements.

The DNFSB letter of December 29, 2011 identified a number of weaknesses in work planning and control (also noted in a Board letter dated January 22, 2009). These recurring weaknesses indicated that oversight of work planning and control by B&W Y-12 and the site office had been less than effective. In response to the Board's concerns, Y-12 has issued a series of work planning and control performance improvement plans. The first of these focused on weaknesses associated with planning process procedures. This has resulted in some improvements to the work package product delivered to the work team, and has made solid gains in workers proactively suspending work at the point of execution when the work package had a weakness.

B&W Y-12, however, still found too many issues with work packages that failed to identify all hazards and controls and that failed to provide an integrated work package to workers on the floor. Additional root cause analysis identified deeper challenges in increasing the knowledge, leadership, and experience of the planner work force, and fully integrating the Subject Matter Experts conduct of job walk downs to identify job hazards and controls. In addition constantly changing work scheduling inefficiencies caused planners to be under constant pressure to expedite work package development which contributed to inadequate planning. Based on these continuing issues, Y-12 revised the work planning and control improvement plan focusing on these deeper latent organizational weaknesses by providing specific actions to ensure sustained improvement. The focus areas of the revised plan are:

- Professionalizing the planner workforce to improve performance and reduce personnel turnover;
- Implementing Integrated Scheduling processes and tools;
- Improving the effectiveness of planning walk downs through better integration of supporting disciplines (environment, safety and health, system engineers, etc.);
- Refining the Senior Maintenance Management Watch program to increase line management performance observations and improve feedback mechanisms.

As of September 2013, progress has been noted in addressing the remaining work planning and control issues.

Criticality Safety Program Performance

In 2012 there were a series of nuclear criticality safety (NCS) infractions that had NCS implementation as one of the contributing factors. While these infractions were self-identified, there was a concern that these issues may indicate weaknesses in some NCS Program implementation requirements and in specific areas of performance. Following correspondence between the NPO and B&W Y-12 senior management regarding concerns about the implementation of the NCS Program at Y-12, the B&W Y-12 Deputy General Manager of Operations directed a performance review to evaluate the identified underlying causes and bases, the corrective actions taken to date, and any additional corrective actions required based on performance review results. The performance review completed in March 2013 did not identify any significant gaps or omissions in the current Y-12 NCS Program. However, the review concluded there was a need to enhance certain program efforts in the following areas: criticality safety evaluation (CSE) implementation procedures, roles and responsibilities of the criticality safety officer (CSO) and nuclear criticality safety engineers and scope and requirements of periodic reviews. B&W Y-12 initiated an action plan to evaluate the extent of conditions and identify required corrective actions. The first phase of the NCS Implementation plan was recently completed and actions are underway to revise the criticality safety evaluation implementation procedures and add more specific requirements for periodic CSE reviews by CSOs and nuclear criticality safety engineers. The NNSA Office of Infrastructure and Operations (NA-00) performed a review of Y-12 criticality safety operational review process in coordination with DOE Criticality Safety Support Group and NPO in July 2013. The review noted as a noteworthy practice that senior Y-12 management had initiated and fully supported the NCS Implementation Review Plan. The review also identified similar areas noted in the implementation review plan that required improvements which are now being initiated by B&W Y-12.

Emergency Planning for Severe Natural Phenomena Events

In February 2012, HSS conducted an Independent Oversight Targeted Review of Site Preparedness for Severe Natural Phenomena Events at Y-12. While the report found that Y-12 had a robust emergency management program and identified no findings that indicate specific emergency management requirements are not being met, several opportunities for improvement were noted to improve response to a severe event. The last action associated with the opportunities for improvement was closed on July 31, 2013. To strengthen response and short-term recovery activities for a severe or catastrophic event at Y-12 the Emergency Management Organization developed document EMPO-900, Y-12 National Security Complex Severe Event Emergency Response Plan. This plan provides an operational framework for responding to low-probability, high-consequence events that could have

significant and widespread impact on the site and surrounding community. Key elements addressed by the plan include: incorporating critical planning objectives for event response, prioritized in order of saving lives; safeguarding and securing special nuclear material; protecting public health and safety; restoring critical infrastructure and critical services; mitigating future property and environmental damage; and facilitating the integration of state and Federal resources and capabilities in support of site response.

G. Oak Ridge Office of Environmental Management

The mission of the Department of Energy (DOE) Environmental Management Program at Oak Ridge is to carry out coordinated reservation-wide cleanup that resolves health and environmental risks, and that supports and protects DOE vital missions.

Transuranic Waste Processing Center

During Fiscal Year (FY)13, the Transuranic Waste Processing Center (TWPC) continued to safely and systematically reduce the inventory of transuranic (TRU) waste at Oak Ridge. TWPC continued with repackaging of contact-handled (CH) waste drums and boxes in the glovebox and the box breakdown area processing lines. Approximately 91 percent of the total CH inventory has been repackaged to-date. The repackaged waste has been certified and shipped to the Nevada National Security Site (NNSS) as low level radioactive waste/mixed low level radioactive waste, to the Waste Isolation Pilot Plant as TRU waste, or is staged as TRU waste awaiting final certification by the Central Characterization Project upon its return to TWPC in FY14. In FY13, the TWPC continued to vent and repackage overpacked CH waste drums using a remote drum opener device. The remaining inventory of CH waste containers consists of typically difficult to process containers involving free or containerized liquids greater than one gallon in volume, scaled sleeves, and other unique/specialty containers. Revisions continue to be made to the Documented Safety Analysis and Technical Safety Requirements prior to processing these waste containers.

During FY13, Remote Handled (RH) waste repackaging activities continued and are now approximately 54 percent complete. Since FY10 the majority of the RH waste repackaged in the hot cell has, upon characterization, been found to actually meet CH criteria. This resulted in the removal of the CH waste from the hot cell and redirecting it for processing as CH waste.

In FY13, 62 RH concrete waste casks were processed in the hot cell and in the additional CH processing line placed in service last year, the Cask Processing Enclosure.

Transuranic Waste Storage

TRU waste at Oak Ridge National Laboratory (ORNL) is stored and transferred to the TWPC for characterization and processing prior to disposal. Twenty-six drums of special nuclear material declared waste in the mid-1980s are included in the stored inventory. Activities completed in FY13 included: preparation of the retrieval operations to support FY14 retrieval and transfer of this waste to TWPC and revision of the schedule to facilitate compliance with Site Treatment Plan milestones for

processing the waste at TWPC. A total of 820 cubic meters of RH and CH TRU waste was transferred to TWPC. This included 349 CH TRU drums, 52 RH TRU drums, 12 CH boxes, and 71 RH TRU casks.

Oak Ridge National Laboratory

Uranium-233 Project

The U-233 Project completed the preparations for the potential shipment of the Consolidated Edison Uranium Solidification Project (CEUSP) material to NNSS. Shipment of the CEUSP material to NNSS has not been initiated pending resolution of issues with the state of Nevada.

The conceptual design for the Processing Campaign, which will focus on processing and disposal of the remainder of the U-233 inventory, was initiated in FY13. Several Processing Campaign planning documents have been received from the contractor and are in review by DOE.

H. Office of River Protection

The Department of Energy (DOE), Office of River Protection (ORP) is responsible for retrieving and treating for disposal the 56-million-gallons of chemically complex radioactive waste that resulted from more than six decades of plutonium production. The waste is stored in 177 underground tanks on the Hanford Site. Working together with prime contractors Bechtel National, Inc. (BNI) and Washington River Protection Solutions LLC (WRPS), ORP's mission is to remove the waste from the tanks, design and construct the Waste Treatment and Immobilization Plant (WTP) to treat the waste for long-term storage and ultimate disposal, and close the tank farms.

ORP and its contractors remain focused on efforts to safely manage and treat the tank waste. There are 149 single-shell tanks (SST) and 28 double-shell tanks (DST) located on the Hanford Site. The past leaks of SSTs resulted in an estimated 1-million gallons of waste entering the soil. The SSTs have been "interim stabilized" by transferring pumpable liquids to DSTs, reducing the environmental risk. Removing the waste from the tanks and treating it to standards that are protective of human health and the environment remains a top priority for ORP.

ORP continues to focus on safely completing the design, construction, and commissioning of the WTP at Hanford. The WTP Project has resolved numerous technical challenges and completed major portions of construction on this first-of-a-kind plant while maintaining safety rates that are superior to construction industry averages. On September 24, 2013, DOE released the Hanford Tank Waste Retrieval, Treatment, and Disposition Framework, which serves as a guide for discussion regarding efforts to resolve remaining technical issues in consultation with the State of Washington.

Waste Treatment and Immobilization Plant Project Status

Continued ORP emphasis on the integration of the WTP and Tank Farms Projects is critical to ensuring successful startup, commissioning, and eventual operation of WTP. The goal of this integration is to create a "one-system" model for delivery of WTP and elements of the Tank Farms Project associated with feed stream delivery, and acceptance of WTP products as an integrated system to ensure efficient, consistent waste feed, waste processing, and product delivery during operations.

As of November 2013 the WTP project was 67 percent complete, with engineering 87 percent complete, procurement 73 percent complete, and construction 62 percent complete. Table 1 displays the project design, procurement, and construction status of each of the five WTP facilities at the end of Fiscal Year (FY)13. Facility percent complete is current for the Low-Activity Waste Facility, Analytical Laboratory, and Balance of Facilities. Facility percent complete for the High-level Waste (HLW) Facility and Pretreatment (PT) Facility has been frozen as of September 2013 due to the incorporation of a

two year interim work plan. Once the technical issues have been resolved and the project has a defined path forward, a new baseline will be established and total project percent complete will be reported.

Table 1. Status of Waste Treatment and Immobilization Plant Completion by Facility though End of Fiscal Year 2013

Facilities	Total Facility	Design	Procurement	Construction
Low-Activity Waste	66%	78%	86%	69%
Analytical Laboratory	70%	77%	86%	85%
Balance of Facilities	59%	79%	73%	78%
High-Level Waste	62%	89%	81%	43%
Pretreatment	56%	85%	56%	43%

Through September 2013, approximately 227,000 cubic yards of concrete; 21,000 tons of structural steel; 1,790 tons of heating, ventilation, and air conditioning ducting; 340,500 linear feet of piping; and 571,300 linear feet of cable and wire have been installed at WTP.

During FY13 the Tank Farms Project, for only the second time, cut a 55-inch hole into an active underground radioactive storage tank in preparation for the installation of the vacuum Mobile Arm Retrieval System in C-105. In addition, WRPS maintained DOE's Voluntary Protection Program Merit status and passed seven-million hours without a lost workday injury.

Recent Defense Nuclear Facilities Safety Board Recommendations

Recommendation 2010-2, Pulse Jet Mixing at the Waste Treatment and Immobilization Plant

On December 17, 2010, the Defense Nuclear Facilities Safety Board (DNFSB) issued Recommendation 2010-2 focusing on the need for large-scale testing of pulse jet mixing systems to demonstrate the performance of mixing and transfer systems using representative simulants. DOE submitted its Implementation Plan, Department of Energy Plan to Address Waste Treatment and Immobilization Plant Vessel Mixing Issues, on November 10, 2011, and the DNFSB accepted it on January 19, 2012. Subsequently, DOE's testing program generated results that were inconsistent with an important assumption in the implementation plan. As a result, in a November 9, 2012 letter, the Secretary of Energy informed the DNFSB that a full-scale testing program would become the new technical basis for implementing recommendation 2010-2. This change in strategy resulted in the need to complete a major revision to DOE's implementation plan. Technical teams of independent

technical experts were formed by the Secretary of Energy to assess WTP technical issues including those issues specific to pulse jet mixing at the WTP.

During FY13, technical teams also completed an evaluation of the vessel testing program approach to demonstrate mixing and transfer system performance. This evaluation provided input into revision of the vessel testing and analysis program to allow for directly closing issues associated with nuclear safety hazards. As a result, issue closure approaches will thereafter use a combination of pulse jet mixing control system testing and analysis and testing of large-scale vessels to confirm the effectiveness of required safety controls. In addition, DOE is considering a tank waste characterization and staging capability to ensure that waste provided to the WTP meets acceptance requirements. On January 28, 2014, the Board closed Recommendation 2010-2.

Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant

In January 2013, ORP conducted an Integrated Safety Management System Safety Conscious Work Environment (SCWE) Self-Assessment. ORP staff provided suggestions to further improve the organizational culture, safety culture, and a SCWE. Comments and suggestions for improvement were obtained from employees through individual interviews and focus group sessions to aid in ORP identifying the next set of focused improvement actions. The self-assessment report was issued in February 2013 to fulfill Criterion 7 of the declaration report and Action 2-5 of the Implementation Plan for DNFSB Recommendation 2011-1.

On April 30, 2013, ORP completed Deliverable 2 of Action 1-8 of the DOE Implementation Plan for DNFSB Recommendation 2011-1, by transmitting a letter to the DNFSB stating that ORP had completed the safety culture action plan by April 2013. ORP completed nine near-term safety culture improvement actions that were identified by the DOE Office of Health, Safety, and Security (HSS), in its 2011 *Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site WTP* report.

In May 2013, the ORP Safety Culture Team completed a validation and effectiveness review of the nine near-term safety culture improvement actions contained in the April 2012 ORP Safety Culture Improvement Plan. The review was conducted from May 13 through 17, 2013, and was required by Action 1-9 of the DOE Implementation Plan for DNFSB Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant*. The review also reported on the status of BNI actions to improve the nuclear safety and quality culture at the WTP. By May 2013, BNI completed 27 of the 50 nuclear safety and quality culture improvement actions.

To sustain its ongoing organizational and safety culture improvement efforts, ORP updated the ORP Safety Culture Improvement Plan during August through September 2013. The plan consists of four near-term improvement actions that were identified by ORP staff from the 2012 Federal Employee

Viewpoint Survey, 2012 Hanford Organizational Climate and SCWE Survey (Speak-Up), ORP 2013 SCWE self-assessment, ORP senior management, and the ORP Organizational and Safety Culture Improvement Council. The plan was issued in October 2013.

HSS is scheduled to conduct a follow-on assessment review on the WTP safety culture. The follow-on review will be similar to the independent oversight review of safety culture for WTP that was conducted in 2011, based on the January 30, 2012, letter to the Board, in which the senior advisor to DOE Environmental Management Office committed to having HSS conduct a WTP safety culture progress assessment approximately 12 to 18 months from the issuance of the HSS WTP Safety Culture 2012 Report.

Recommendation 2012-2, Hanford Tank Farms Flammable Gas Safety Strategy

On September 28, 2012, the DNFSB issued Recommendation 2012-2, *Hanford Tank Farms Flammable Gas Safety Strategy*. The DNFSB's recommendation documented their position that DOE needs to upgrade the DST ventilation systems and other instrumentation systems used for safety-related functions at the Hanford tank farms.

On June 6, 2013, DOE delivered the Implementation Plan for Recommendation 2012-2 to the DNFSB. DOE has agreed that the DST ventilation system should be designated as safety-significant and has committed to taking a phased approach to upgrading the ventilation and associated instrumentation systems to safety-significant. Phase 1 involved completing the implementation of the upgraded tank farms Documented Safety Analysis. This included supplementing the flammable gas monitoring control with a new control that will measure ventilation flow through each tank on a periodic basis. The Documented Safety Analysis also establishes priorities for DST primary tank ventilation system maintenance, commensurate with the importance of maintaining active ventilation on these tanks. DOE notified the DNFSB that Phase 1 was completed on February 21, 2013. An evaluation of air flow meters to be used to monitor DST ventilation is near completion. Once complete, the selected air flow meter will be installed and used to monitor DST ventilation exhaust flow in real time.

Other Board Interactions

ORP also continues to work toward improving technical interactions with the DNFSB. DNFSB on-site reviews were supported by ORP and contractor staff in areas associated with WTP fire protection systems in the Low-Activity Waste Facility, Analytical Laboratory and Balance of Facilities and existing ventilation systems in the Tank Farms. In addition, discussions were held with the DNFSB on various topics including, WTP ammonia hazards, LAW Hazard Categorization, LAW instrumentation and control, Tank Farms Waste Transfer System, SST level changes, WTP Spray Leak, WTP Full-Scale Testing, Tank AY-102, and WTP Aerosol Entrainment Coefficient Testing.

Status of and Progress on Various Waste Treatment and Immobilization Plant and Tank Farm Technical Issues

WTP Technical Issues

- *Hydrogen in piping and ancillary vessels (HPAV)* – At the advice of the DNFSB, a 12-member HPAV Independent Review Team (IRT) was assembled and chartered in May 2012 to review the proposed approach to use a quantitative risk analysis (QRA) for analyzing and designing piping that has the potential to accumulate hydrogen and be exposed to detonations during the life of the plant. The HPAV IRT concluded that the design approach for HPAV piping, ancillary vessels, and components (e.g., pumps, valves, jumpers, etc., made of high strain rate materials, such as austenitic stainless steel and Hastelloy) are acceptable if BNI resolves its findings and recommendations. The HPAV IRT issued its final report in early January 2012, accepting all project responses and revised calculations and reports. In February 2012, DOE's detonation consultant, Dr. Shepherd of the California Institute of Technology, identified additional questions and concerns regarding the final calculations and reports. Project reports were revised in October 2012 documenting the results of the additional analyses requested by Dr. Shepherd.
    - The project has been demonstrating use of the new processes and procedures for conducting piping analyses in accordance with the QRA processes for piping systems in both the PT and HLW Facilities. The processes and QRA results will continue to be reviewed with the DOE and then the DNFSB staff in advance of using them to support routine production design work. Authorization to continue the routine engineering work forcasted to resume for the PT Facility in the summer of 2015. The results from the PT piping design analyses will be used as input for a similar design analysis for HLW, and to provide operations and design information to support the environmental and nuclear safety hazards analyses of the respective WTP piping systems necessary to complete the nuclear safety bases for the two facilities.
- *Erosion and Corrosion: Design Wear Allowances for Vessels, Piping, and Pulse Jet Mixer Nozzles* – On January 20, 2012, the DNFSB transmitted a letter expressing concerns about the design wear allowances for vessels, piping, and pulse jet mixer nozzles. The design must include wear allowances that ensure components located in the black cells (which will be unreachable after operations begin) will reliably function for the 40-year design life of the facility. The potential for inadequate wear allowances for piping, vessels, and pulse jet mixer nozzles could result in component failures before the completion of the mission or the design life of the facility. Premature failure would jeopardize safety functions and could stop waste processing for indefinite periods, resulting in significant delays in accomplishing the ORP mission.
    - A series of comprehensive erosion, corrosion, and synergistic erosion/corrosion tests encompassing process conditions applicable to both the HLW and PT Facilities will be conducted starting in FY13 and completing in FY15. The erosion and corrosion test results combined with additional engineering evaluations will be used to establish a basis for erosion and corrosion design criteria specific to WTP process conditions, and allow the

design activities related to piping and process systems impacted by this issue to be completed.

- *Formation of Sliding Beds in Process Piping* – On August 8, 2012, the DNFSB transmitted a letter expressing concerns related to pipeline plugging and engineering design considerations for the centrifugal slurry pumping systems. The DNFSB is concerned that the design of the WTP slurry transport system has a substantial number of safety issues that require resolution. DOE is in the process of preparing a response to this letter.
- *Other Open WTP Technical Issues or Concerns* – The WTP Project is also working with the DNFSB to close out the following technical issues:
  - Spray leak methodology inadequacies (2011);
  - Instrumentation and control (2011);
  - Heat transfer analysis for process vessels (2011);
  - Ammonia controls (2011);
  - Electrical distribution system (2012).

The DNFSB has also monitored DOE's progress in resolving technical issues with BNI in the areas of cathodic protection system performance, high efficiency particulate air filter loading due to entrainment, and facility hazards categorization. DOE and BNI continue to provide additional details and status on resolution of these issues to the DNFSB staff upon request.

The previously open issue related to validation of Computational Fluid Dynamics Models (2012) has been closed by the DNFSB after DOE informed the DNFSB that it no longer intended to use such modeling techniques as a component of performing design verification of WTP pulse jet mixer vessels that contain large concentrations of solids.

Tank Farm Technical Issues

- *Conduct of Operations* – In FY13, WRPS has implemented and continuously evaluated the DOE O 422.1, Conduct of Operations Matrix. Continuous improvement areas for FY13 included restructuring the Conduct of Operations Council, particularly the field excellence captains and performance of human performance improvement laboratory training topics (communications and hazardous energy control), and interfacing improvements to the work control process described below. WRPS continued to complete Field Execution Oversight Team actions to improve both management field oversight effectiveness and reinforce field work supervisor performance. In FY13, WRPS chartered an external review team to evaluate overall WRPS stewardship, including conduct of operations. The team identified a variety of improvement opportunities, including five collectively significant issues. Opportunities to improve control of equipment status, communications, and presence of error traps in procedures/work instructions remain. WRPS transfer processes continue to show continuous improvement, although retrieval/closure procedures have not shown the same level of maturation.
- *Work Planning and Control* – During FY13, the URS Corporate (URS) work control standard was revised to align with the Energy Facility Contractors Group work control standard. WRPS

implemented procedure and program changes to comply with the URS work control standard revision. In late FY13, URS completed a work control standard Phase II verification that met all objectives and identified five issues for continuous improvement. ORP has identified weaknesses in hazard identification and rigor in control implementation in instructions, although overall program maturation has occurred.

- *Probabilistic Seismic Hazard Analysis (PSHA)* – DOE (with the ORP Tank Farms Project as lead) is currently in year three of a three-year project to update the seismic portion of the natural phenomena hazards assessment required by DOE O 420.1C, Facility Safety, using the PSHA process. Pacific Northwest National Laboratory is the DOE contractor performing the PSHA. The PSHA is scheduled to be complete in August 2014. The use of the PSHA process is driven by a process recommended by the Senior Seismic Hazard Analysis Committee that is specified in a national consensus standard of the American Nuclear Society, which was specifically developed for determining the seismic hazard to nuclear facilities. The PSHA process utilizes two basic principles to guide the work: inputs should represent the composite distribution of the informed technical community, and the PSHA analysts must establish ownership of the inputs. Data collection and the development of the preliminary hazard input document were completed during FY13. Hazard calculations and the completion of the PSHA document are scheduled for FY14. The DNFSB is participating in the PSHA process as an observer during the formal workshop meetings. ORP, the Richland Operations Office, and the Energy Northwest commercial nuclear power plant are joint sponsors of the PSHA and are sharing equally in the cost of the $8.7 million dollar project.
- *Tank AY-102* – Monitoring of the annulus leak in Tank AY-102 continued in FY13. The waste is contained in the secondary liner. Robotics will be deployed to further investigate the condition of the primary and secondary tanks, as well as the leak detection system. Robotic inspection of the leak detection system is scheduled for the first quarter of FY14 and subsequent inspections of the tanks will take place in FY14. Extent of condition evaluations of six tanks with similar designs, age, and operating histories were completed in FY13 and construction histories of the remainder of the 28 DSTs will be complete in FY14. Laboratory testing began in FY13 to better understand the corrosiveness of the waste in the secondary containment. The testing is guided by a panel of experts that oversee the DST chemistry control program. DNFSB staff participated in a panel meeting in Richland, Washington in FY13. An independent panel of experts was formed and will be providing recommendations on AY-102 and the DST integrity program. The first session held in September 2013 focused on AY-102 and was attended by DNFSB staff. A plan to empty the contents of the tank was prepared and submitted to the Washington State Department of Ecology and work to implement the plan has started.
- *SST Level Evaluations* – In-depth evaluations of waste levels in all 149 SSTs were performed in FY13. The evaluations identified 20 tanks whose levels indicated possible water intrusions and 12 of those tanks were visually inspected with cameras inside the tank. The remainder of the 20 with suspect intrusions will be visually inspected in FY14. Another 20 tanks were also identified to have historic level trends that were decreasing. Of the 20 tanks identified with decreasing levels, six of those could not readily be explained by evaporation or other mechanisms and the waste surfaces and level monitoring equipment were visually inspected with cameras. One of the six tanks identified was Tank T-111, which was determined to be

leaking. Results of all level evaluations performed in FY13 were documented and released in early FY14. The results determined that 19 of the 20 SSTs showing decreased liquid levels are not actively leaking. The one tank previously identified as leaking, T-111, appears to be stabilizing.

ORP remains focused on working collaboratively with the DNFSB to resolve technical issues and enable the tank waste cleanup mission to move forward safely and successfully.

I. Pacific Northwest Site Office

Building 325 also called the Radiochemical Processing Laboratory (RPL), a Hazard Category 2 nuclear facility which is operated by the Pacific Northwest National Laboratory (PNNL). Building 325 is located in the 300 Area on the Hanford Site, Richland, Washington.

Fiscal Year (FY)13 Activities Supporting Key Department Safety Initiatives

- Department of Energy (DOE) Order 420.1C, *Facility Safety*, was evaluated for impact and an implementation plan developed for its use. This included the associated Technical Standards DOE-STD-1066, Fire Protection, and DOE-STD-1020, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*.
- In response to DOE Office of Health, Safety and Security (HSS) OE-1: 2013-01, *Improving DOE Capabilities for Mitigating Beyond Design Basis Events*, PNNL is working with the Hanford Site contractors and DOE Field Offices to define expected actions for emergency preparedness and develop a coordinated implementation plan.
- In May 2013, an evaluation of PNNL's Safety Conscious Work Environment (SCWE) was conducted following the SCWE Self-Assessment Guidance (rev G) issued by the DOE in response to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2011-1. The Pacific Northwest Site Office (PNSO) and the Office of Science (SC) also conducted a SCWE review and issued its report in August 2013. Although the DNFSB commitment was limited to RPL, PNSO/SC chose to assess the culture holistically with an emphasis on the nuclear facility. This review supplemented and in many cases validated the results and planned actions in PNNL's Operational Culture Evaluation Report issued in March 2013. The review found an overall strong Safety Conscious Work Environment with some areas for improvements noted. Strengths included worker engagement, accountability, and efforts to improve health and safety.
- Comments were provided to the Environmental Impact Statement (EIS) for a project to expand and extend a natural gas pipe line to the verification facility on the Hanford Site. The route has the natural gas pipe line passing within 1000 feet of Building 325. Installation parameters for pipeline size, pressure, and valve spacing limitations necessary to avoid having a positive Unreviewed Safety Question (USQ) due to a potential gas cloud explosion were provided to the EIS project team.
- In response to a proposed land transfer of about 900 acres of the Hanford Site to private development in the vicinity of the RPL, an evaluation was performed to determine potential impacts to RPL operations. This evaluation resulted in identifying a "Federal Buffer Zone" necessary to maintain the current safety basis risk profile.
- The expert-based USQ process was implemented for use at RPL.

FY13 Safety Accomplishments

- A Potential Inadequacy of the Safety Analysis was declared, when construction activities revealed two additional fire sprinkler heads were not consistent with the Fire Suppression System design as documented in the safety basis. The Unreviewed Safety Question Determination (USQD) was negative. However, while DNFSB staff interest and subsequent discussions determined the conclusions were appropriate, it also revealed the documentation in the USQD was incomplete and/or unable to support the results. This led to DOE reviewing and issuing two findings against the contractor's USQD document. The review determined that although the USQD correctly concluded that no USQ existed, the document failed to meet DOE'S expectations for documentation as stated in DOE Guide 424.1-IB. A corrective action plan to address the findings is being developed.

- DOE performed Safety System Oversight assessments of the Fire Suppression System and Criticality Alarm System, along with a triennial program review of the Nuclear Maintenance Management Program. All three concluded that functional system operation, configuration management, and program implementation were appropriately managed with no Level 1 / 2 findings reported. Strengths noted that RPL's facility maintenance program enables continued operations through 2026 and system engineer responsibilities exceed program requirements.

- The "North Storage Pad," a large concrete foundation pad remaining from Hanford 300 Area closure activities, was transferred to PNNL management and added to the RPL facility footprint in its safety basis documentation. The pad will provide needed equipment, materials, and waste storage space to alleviate congestion in and around the facility and provide an added capability for staging and management of radioactive material shipping casks.

- The GENII 2.10.1 radiological dispersion and consequence code maintained by PNNL was approved by DOE-HSS for addition to the DOE Central Registry of Safety Software (DOE Toolbox).

- Aging Facilities and Adequacy of Design: Several Infrastructure investments for RPL were started in FY13.

    - Work started for installing a new liquid retention process sewer collection, monitoring and disposal system within RPL. This system establishes the capability to collect potentially contaminated waste water prior to discharging to the City of Richland's sewer system. RPL will then disconnect from the old Hanford site system and allow earlier Decontamination and Decommissioning (D&D)/removal to meet DOE regulatory commitments with the Washington State Department of Health.

    - The B-Cell (hot cell) shield window refurbishment within the High Level Radiochemistry Facility (an Annex to RPL) was started this year. The seals for this 9000 lb. window had failed and are being replaced. Individual window panes were removed and a new window is being designed and fabricated.

RPL is in the process of transitioning to an Electrical Distribution System supplied by the City of Richland. The transition to the city from Washington Closure Hanford (WCH) will support WCH D&D

of the 300 Area electrical substation. The completion of the upgrades is scheduled for November. The upgrade activity includes installing new transformers and automatic and emergency switching.

J. Richland Operations Office

DEPARTMENT SAFETY INITIATIVES AND ACTIVITIES

Aging Facilities and Adequacy of Design

Waste Encapsulation Storage Facility (WESF): In November 2012, a Safety Evaluation Report was submitted for the Evaluation of Safety Situation for WESF Degradation of Pool Cells Concrete Positive Unreviewed Safety Question. The Safety Evaluation Report cited available degradation studies and explained the current conditions that exist at WESF. From the evaluation it was determined the WESF pool cell concrete has sufficient strength to withstand a design basis earthquake.

In early February 2013, Department of Energy (DOE)-Richland (RL) and CH2M Hill Plateau Remediation Company (CHPRC) held a conference call with Defense Nuclear Facilities Safety Board (DNFSB) technical staff for the purpose of discussing the Thermal Analysis of the WESF Pool that was included in the annual update of the Documented Safety Analysis. The Thermal Analysis showed that by completing the capsule redistribution effort, thermal loading has been distributed so that gamma exposure to pool cell concrete was mitigated by placing higher emitting capsules in position further away from the pool cell walls.

DNFSB staff visited WESF twice in August 2013. The first visit consisted of a review of the Hanford Ventilation Systems and Supporting Programs which included the ventilation systems at WESF. The scope focused on the evaluation of configuration and condition of ventilation systems and included walk downs and discussions of maintenance. The scope also included evaluation of the implementation of the cognizant system engineer and safety system oversight programs as they relate to confinement ventilation systems and evaluation of quality assurance and inspection practices of High-efficiency particulate air (HEPA) filters. DOE-RL has been working to determine a path forward for ventilation maintenance at WESF that will address today's needs a well as support future disposition in the safest and most fiscally responsible way possible. A letter was sent from DOE-RL to Environmental Management-Headquarters (EM-HQ) outlining a new path forward to address the WESF 2004-2 needs outlined by the DNFSB in a letter dated November 30, 2012. A resolution path for this issue has not yet been selected.

The second DNFSB Technical Staff visit to WESF in August 2013 conducted a follow-up review of WESF Conduct of Maintenance. The follow-up visit consisted mainly of shadowing CHPRC Assessment Staff who were conducting the Effectiveness Review of corrective actions from the October 6, 2011 DNFSB letter.

Plutonium Finishing Plant: The transition of the Plutonium Finishing Plant (PFP) from plutonium process to demolition requires the operation of its Confinement Ventilation System (CVS). During work to decontaminate and remove legacy contaminated equipment, this essential safety system prevents release of radioactive material by directing contaminated air through its high efficiency filtration system prior to release to the environment. As it dates from the 1940's plant design and construction, the PFP CVS is beyond its design life. Moreover, due to plant expansion and system maintenance, it is predictably comprised of equipment and components ranging in age from the early Cold War era to the present. For the last two decades, the retirement date of the PFP CVS has been incrementally pushed into the future, presenting unplanned life extension challenges. The CVS is currently projected to be required into 2016. The DNFSB and staff regularly monitor the operability of the essential nuclear safety system, in addition to evaluating risk mitigation strategy and implementation via site visit (August 2013), inquiry, and through local DNFSB representatives.

Due to the recent increase in the rate of age-related component failures at the PFP exhaust ventilation facility (291-Z), DOE-RL and CHPRC have selected and implemented life extension strategies to both lower the chance of component failure and to mitigate the consequences (worker safety) should failure occur.

The following are actions taken to lower the chance of component failure:

- Implemented an Enhanced Maintenance Program using a predictive maintenance philosophy for the 291-Z exhaust ventilation system components.
- Implemented an immediate inspection and monitoring program to identify components near failure and take early action. This requires an unplanned resource reassignment to maintenance activities. The program includes periodic inspection of the six remaining exhaust fan assemblies for age-related defects (four are original 1949 installations).
- Implemented two strategies to reduce the likelihood of a component failure by identifying and reducing sources of vibration:
    - Reduced mechanical looseness (tighten, align, repair or replace components) and;
    - Identified and reduced flow instability to improve/balance inlet air flow to/within each exhaust fan.

The following are actions being taken to reduce the consequence from exhaust fan failure:

- Installing automated shut-off switches that cut power to the fans if bearing temperature or vibration exceeds a set limit. This feature may also protect workers in the fan vicinity from a potentially catastrophic exhaust fan failure.
- Predictive and preventive maintenance performed on the stream-powered exhaust ventilation fans which provide emergency exhaust ventilation in the event the electric exhaust fans discontinue operating.

Integrated Safety Management at the Activity Level: Work Planning and Control

DOE-RL had two individuals directly involved with the Special Integrated Safety Management Champions Workshop (Optimizing Activity Level Work Planning and Control) and associated teams supporting response to DNFSB/TECH-37*, Integrated Safety Management at the Activity Level: Work Planning and Control*. Specifically, one individual was the co-chairperson and one attended the workshop. In addition, DOE-RL provided feedback and information to EM-HQ to support response to DNFSB/TECH-37 (e.g., comments to Energy Facilities Contractors Group (EFCOG) Work Planning and Control (WP&C) Program Guidance Document, coordination of contractor document reviews, input to workshop presentations, corrective actions, contractor and DOE-RL oversight performed and planned, etc.). Also in support of DNFSB/TECH-37, DOE-RL sent letters to their contractors titled "Sustained Federal and Contractor Oversight of Effectiveness of Activity-Level Work Planning and Control" identifying the need for oversight in the subject area. Contractor Fiscal Year 2014 Integrated Evaluation Plans are forthcoming.

DOE-RL provided documented oversight of contractor WP&C processes through various means (e.g., surveillances, operational awareness reports, and approval of subject corrective actions). In FY13, DOE-RL performed comprehensive site wide surveillances on contractor maintenance and developed a specific Surveillance Guide that used Lines of Inquiry from the EFCOG WP&C Program Guidance document. The surveillances specifically evaluated maintenance programs and work packages and procedures; and observed maintenance work activities. The surveillances concluded that the contractors generally had adequate programs, although numerous findings and observations were cited. In addition, DOE-RL provided day-to-day oversight of contractor WP&C, which was documented in Operational Awareness Reports (see Oversight section). DOE-RL also provided oversight of the following significant contractor activities related to WP&C: URS Phase II review of Washington Closure Hanford, LLC (WCH) WP&C; Implementation of WCH Integrated Work Control Program, Revision 10; and WCH Performance Oversight Evaluation Team WP&C reviews and corrective actions. In addition, EM-42 (Operational Safety) performed WP&C oversight of specific CHPRC facilities identified by RL.

In the FY14 Integrated Evaluation Plan, DOE-RL has scheduled an assessment of all contractors in the area of WP&C. The assessment will include an evaluation of the corrective actions associated with DNFSB/TECH-37. In addition, DOE-RL initiated a process to specifically assess and evaluate contractor's implementation of Integration Safety Management WP&C (e.g., define the scope, identify the hazards, etc.) on a defined frequency to ensure it is in the forefront of all oversight.

Emergency Preparedness (Follow up of Lessons from Fukushima and Beyond Design Basis Events)

DOE-RL received five site visits by the DNFSB and staff during 2012 and early 2013 relating to emergency preparedness and responded to numerous additional information requests on this topic. DOE-RL committed to conduct exercises involving damage to multiple facilities from a severe event.

CHPRC committed to conduct additional analysis and revise procedures relating to water loss in the WESF pool cells. WESF has been identified by DOE-RL as a facility having the potential for significant radiological consequences from a severe earthquake.

During FY13, DOE-RL initiated actions as part of its continuing response to the lessons learned from Fukushima to be better prepared for responding to Beyond Design Basis Events. Some of these actions were identified in response to the DOE HSS Bulletin, "Events Beyond Design Safety Basis Analysis," issued in 2011, and the Operating Experience Level 1, 2013-01, "Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events," published by DOE HQ in April 2013.

A tabletop exercise was conducted in March 2013, with observers from the DNFSB staff. The scenario involved a severe event affecting multiple facilities, infrastructure, and cascading events that affected the response actions.

In August 2013, DOE-RL conducted a field exercise using the scenario of a severe event resulting in emergency classifications from four Hanford hazardous facilities and one classification from the nearby nuclear power plant, Columbia Generating Station. Communication systems, utilities, and roadways were affected by the postulated scenario. The scenario stressed the response capability requiring prioritization of response resource. The evaluation report was issued to site contractors and provided to DNFSB staff.

DOE-RL continues to monitor CHPRC actions regarding its understanding of, and ability to responsed to, loss of water at WESF. The emergency planning hazards assessment was revised to include the dose consequences of a long term release. CHPRC also revised facility-specific response procedures to more fully address loss of WESF pool cell water events to include alarm response and mitigation activities.

During April and May 2013, a DOE-HQ evaluation team reviewed the Hanford Emergency Management Program with specific emphasis on severe event planning and response. DNFSB staff observed this assessment and received a copy of the final assessment report.

SITE ACTIVITIES

K-Basins: The containerized sludge staged in K-West Basin requires retrieval, treatment, packaging, and ultimately shipment to a national repository. The goal for the Sludge Treatment Project (STP) is to remove all the sludge materials from the K West Basin by 2018, at which point the basin will be deactivated and then removed. However, recent fiscal considerations are expected to delay this project by up to five years, as funds are directed to other priorities.

Removal and treatment of engineered container sludge will be completed in two phases. The first phase involves removing the sludge from K-West Basin to T-Plant (located on the Central Plateau) for

interim storage and is scheduled for completion by December 2018. The second phase involves sludge treatment and packaging and its subsequent shipment to the appropriate facility for final disposal. In 2013, the engineered container sludge removal project completed a Preliminary Documented Safety Analysis and the hazards and accident analysis for the final system design with full involvement of the STP Safety Design Integration Team (SDIT). Documentation demonstrates that DNFSB Recommendations 2004-2 and 2008-1 are applicable to themajor modification of a Hazard Category 2 nuclear facility. The DNFSB staff reviewed the final design accident analyses and control decision.

In 2013 a new issue concerning flammable gas production, storage, and release from the sludge in K-Basins was declared to be an Unreviewed Safety Questions. Such release has the potential for serious worker safety impacts, as well as radiological release. As of the beginning of FY14, this issue is being worked but is not resolved.

618-10 and 618-11 Burial Grounds: 618-10 and 618-11 Burial Grounds: The 618-10 and 618-11 Burial Grounds, located north of Hanford's 300 Area, operated from 1953 to 1967 in support of 300 Area fuel fabrication, fuel examination, and research and development activities. The burial grounds received both low and high-activity waste that was disposed of in trenches, vertical pipe units, and caissons (618-11 burial ground only). Remediation of the 618-10 Burial Ground started in April 2011, and significant progress was made during FY12. The project was suspended for approximately nine months from December 2012 to August 2013 due to an upgrade in the final hazard categorization from below Hazard Category 3 to Hazard Category 3. The project continued to refine the remediation technology for the 618-10 vertical pipe units (e.g., five 55-gallon drums welded end to end, corrugated pipe and schedule-40 pipe). Methods testing are planned in FY14 and field deployment in FY15. The 618-11 Burial Ground is located adjacent to the Columbia Generating Station (CGS), an operating commercial nuclear power plant, and remediation is planned to start in mid-2016. An amendment to the CGS operating license is required prior to start of operations because the burial ground is located within the CGS emergency planning zone. Energy Northwest, the CGS owner, is scheduled to submit the license amendment in early Calendar Year 2014. Remediation of the two burial grounds is being performed in series to allow lessons learned from remediation of the 618-10 Burial Ground to be applied to the work at 618-11.

Monthly conference calls were held throughout FY13 that discussed safety basis development, potential evolution of vertical pipe unit remediation design, Safety Design Integration Team (SDIT) activities, planning for testing and mockups for vertical pipe unit (VPU) remediation at the 618-10 Burial Ground, and the status of open DNFSB requests for information. DNFSB staff conducted an onsite review June 2013 of the integration of safety into design of the vertical pipe unit remediation. There were two unresolved issues identified during the review that resulted in follow up discussions with DNFSB staff: 1) potential NaK (sodium/potassium alloy mixture) reaction in the auger tool

enclosure, and 2) appropriate respirable release fraction for fire scenarios involving VPU remediation waste. The DNFSB site representative participates in some of the SDIT meetings and took an active role in the Readiness Review for 618-10 trench remediation.

324 Chemical Engineering Building/Radiochemical Engineering Complex: The 324 Building is a Hazard Category 2 nuclear facility located in Hanford's 300 Area that contains the Radiochemical Engineering Complex hot cells. A significant historical leak of radioactive cesium and strontium (waste site 300-296) was discovered in 2010 below the Radiochemical Engineering Complex B-Cell, delaying the planned deactivation and demolition of the facility and necessitating life extension and repairs to building ventilation and safety systems needed to support remediation of the waste site. During FY13, aging Zone II HEPA filters were replaced, exhaust fan dampers and bearings were maintained, historical deficiencies in fire suppression systems were identified and corrected, and improvements to configuration drawings were implemented. A procurement activity was initiated for the remediation of the highly contaminated soil in waste site 300-296 underlying B-Cell, with award and design efforts planned in FY14.

Bi-monthly conference calls between DNFSB staff, DOE-RL, and WCH personnel were held throughout FY13. Topics discussed during the conference calls include: project status, ongoing minimum safe activities, and infrastructure upgrades.

340 Waste Neutralization Facility: The 340 Waste Neutralization Facility operated from 1953 to 1998, collecting radioactive liquid waste in support of 300 Area fuel fabrication, fuel examination, and research and development activities. Waste was accumulated in two below-grade stainless steel 15,000 gallon tanks located in a vault east of the building. During FY13, the vault containing the tanks (grouted to stabilize and prepare for removal) was excavated and preparations were initiated for lifting and transportation as a monolith to the Environmental Restoration Disposal Facility.

In early April 2013, during installation of a 36” diameter steel casing under the north central portion of the vault, an area of highly radioactively contaminated soil (later measured up to 17 R/hr through a closed-end steel probe tube driven through the area) was encountered. Contamination and radiation control measures in the work package, implemented as a lessons learned from contamination encountered under the 324 Building, were successful in preventing a spread of contamination or excessive personnel exposure. Characterization of the newly identified contamination, modification of the Final Hazard Categorization (FHC) document to allow continued activity as a below Hazard Category 3 facility, revision to the 340 air emissions calculation, and development and implementation of enhanced radiological controls for safe excavation of the contaminated soil caused significant impacts to the schedule for 340 Vault removal. At the end of FY13, removal of the most highly contaminated portion of the soil was completed. Installation of lifting system components and disposal of the vault are planned through early Calendar Year 2014.

Interactions with DNFSB staff regarding 340 Facility consisted of an overview of the heavy lift plans with the site representative and discussions with the site representative and DOE-RL nuclear safety staff regarding the revised FHC document and application of the adjusted (based on credible release fractions) threshold quantity methodology to below Hazard Category 3 facilities.

Oversight: DOE-RL performed its oversight in accordance with the requirements of Richland Integrated Management System (RIMS), Contractor Integrated Performance Evaluation (CIPE) processes. The system defines how oversight is planned (e.g., Integrated Evaluation Plans), executed (e.g., Assessments, Surveillances, Operational Awareness Reports), and follow up (e.g., corrective action management, Conditional Payment of Fee).

The Assistant Manager for Safety and Engineering (AMSE) performs primary safety oversight for DOE-RL in accordance with the office RIMS CIPE processes. The AMSE organization is made up of Facility Representatives, Safety and Health Professionals, Environmental Management personnel, Radiological Protection Subject Matter Experts (SMEs), Quality Assurance, Nuclear Safety and other Engineering SMEs. The AMSE organization completed a total of 55 formal surveillances that included Training, Maintenance, Facility Safety Basis, Chemical Management, Fire Safety, Hoisting and Rigging, Radiological Controls, Fall Protection, and Corrective Action Management. In addition, AMSE staff completed over 4,800 Operational Awareness Report entries resulting in more than 700 Observations and 400 Findings of necessary improvements in Contractor operations and safety programs.

K. Sandia Field Office

The Department of Energy /National Nuclear Security Administration (DOE/NNSA) Sandia Field Office (SFO) is the management office providing oversight of Sandia National Laboratories (SNL). Sandia Corporation (Sandia), a wholly-owned subsidiary of Lockheed Martin Corporation, manages and operates SNL for the DOE/NNSA. Sandia designs all non-nuclear components for the nation's nuclear weapons and performs a wide variety of energy research and development projects in support of the National Security Mission. The following sections summarize significant interface activities with the Defense Nuclear Facilities Safety Board (DNFSB) and staff during Fiscal Year (FY)13.

Sandia Crest at Sunset

Overview

Sandia operates the following nuclear facilities that are within the scope of DNFSB oversight:

- Annular Core Research Reactor Facility (ACRR);
- Auxiliary Hot Cell Facility (AHCF);
- Manzano Nuclear Facility;
- Sandia Pulsed Reactor Facility/Critical Experiments;
- Onsite Transportation of Hazard Category 3 Radioactive Materials.

The DNFSB and its staff have provided oversight and assurance of safe and compliant activities at SNL nuclear facilities through regular interaction with SFO and Sandia staff via conference calls, information/documentation requests, and formal site visits. Sandia and SFO staff continue to support

DNFSB analysis and assurance activities, recommendations, and the corresponding DOE implementation plans generated as a result of formal DNFSB correspondence.

The following major activities were conducted during FY13 that involved DNFSB oversight and interaction.

Aerial View of Sandia National Laboratories, Technical Area-V Nuclear Facilities

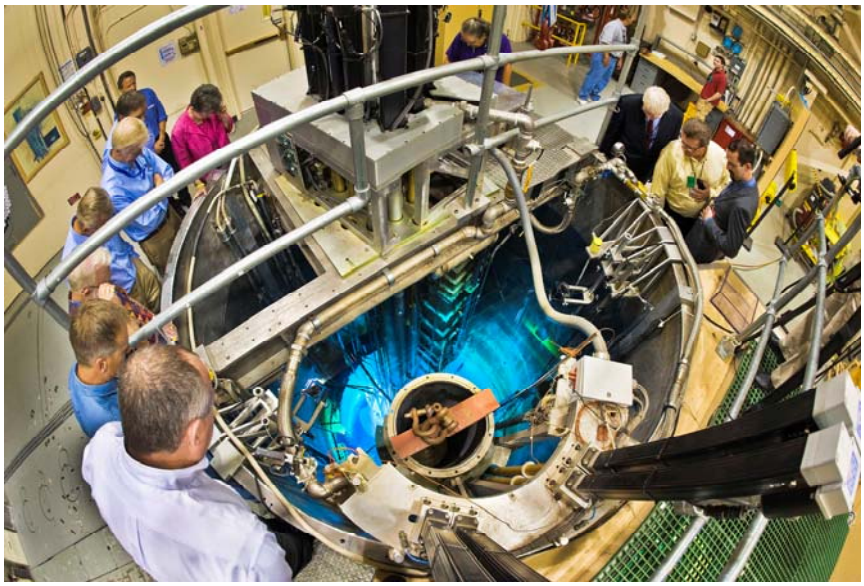
Site Visit

DNFSB Members conducted a site visit to SNL in August 2013 for operational awareness purposes. Sandia and SFO staff supported the visit, provided briefings, logistics, and facility tours.

ACRR Improvement Plan

Sandia continued to execute the ACRR Improvement Plan that was initially approved in January 2012. The Improvement Plan, which was proactively initiated to address issues documented in 2012 DNFSB correspondence (February 2012 and April 2012, respectively), primarily focuses on improvements in the ACRR Safety Basis, Instrumentation and Control, and Quality Assurance.

Sandia and SFO staff provide periodic updates to the DNFSB on the status of the ACRR Improvement Plan, deliver Improvement Plan revisions when necessary, and provide documentation as each plan milestone is completed. As of September 30, 2013, 56 percent of the Improvement Plan's milestones have been completed. All other commitments are in process and on schedule.



Overhead view of the Annular Core Research Reactor during a pulse

ACRR Reactivity Control System Modifications

As a result of an event in January, 2013, (DOE Occurrence Report SS-SANDIA-1000-2013-0001, Control Rod Movement Anomaly), Sandia chartered a project to upgrade ACRR's Reactivity Control System and key interfaces with the goals of reducing complexity, improving systems integration, gaining system performance knowledge, and enhancing overall system reliability. A cross-functional team was commissioned to perform forensics to identify the root cause of the rod movement anomaly, and propose, test, and execute a sustainable solution to the issue to prevent recurrence while also improving the overall system reliability. In coordination with SFO staff, the team methodically executed the project plan, which included causal analysis, engineering evaluation, system test plans, and a formal readiness assessment. In addition, an external team of experts led by staff from Lawrence Livermore National Laboratory evaluated the project and concurred with Sandia's recommendations. System modifications were implemented and ACRR returned to operational status in May 2013. Sandia and SFO staff provided periodic updates to the DNFSB on the status of the Reactivity Control System Modification Project, and provided clarifying documentation per the request of DNFSB staff.

Reduction of Nuclear Facility Footprint

Sandia continues activities related to reducing its nuclear footprint and enhancing the management of nuclear materials. Sandia is currently executing project plans to repackage and disposition No Defined Use Hazard Category 3 nuclear materials in coordination with DOE's Waste Isolation Pilot Plant (WIPP) and Idaho National Laboratory (INL). In FY13, Sandia completed the relocation of all Hazard Category 3 radioactive material to Technical Area-V. This will enable Sandia to reduce the Manzano Nuclear

Facility to a radiological facility status and eliminate the Onsite Transportation of Hazard Category 3 Radioactive Materials activity. Sandia has also implemented material management processes to prevent the unnecessary accumulation of nuclear material.

Safety Culture

In partnership with SFO and the Office of the Associate Administrator for Infrastructure and Operations (NA-00), a joint, focused review was conducted on implementation of Integrated Safety Management at SNL and SFO. DOE's Safety Conscious Work Environment Self-Assessment Guidance was used as the framework for the review, which was intended to assist in identifying how organizational culture influences the safety of operations. The review team, co-led by NA-00 and Sandia, consisted of staff members from NNSA, DOE's Office of Health Safety and Security, SFO, and Sandia. The review was conducted over a two-month period and a formal report was delivered to SFO and Sandia Leadership. The methodology and execution of the review supports the implementation plan for DNFSB Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant.

Emergency Preparedness and Response

A formal review of Sandia's and SFO's Emergency Management Program was conducted via videoconference in June 2013. The purpose of the review was to assess the current state of emergency preparedness and response at SNL, including the ability to prepare and respond to severe events. Three members of the DNFSB staff were involved in the review, which was conducted over the period of three days and included several documentation requests. Topics addressed included SFO Oversight, Sandia self-assessment and corrective action processes, preparedness for severe events, drill and exercise programs, and the SNL Radiological Control/Protection Program.

Other Interactions

Other notable FY13 oversight activities and interactions with the DNFSB and DNFSB staff include:

- W76 Weapon Response discussions;
- Sandia Executive Management Briefing to the DNFSB on Implementation of Engineered Safety at SNL, July 22, 2013;
- Sandia Support to Pantex Plant, and
- Sandia Attendance at Pantex Plant Public Hearing, March 14, 2013.

L. Savannah River Operations Office

The Savannah River Site (SRS) performs activities for the Department of Energy (DOE) Office of Environmental Management (EM) and the National Nuclear Security Administration (NNSA). Activities performed by the site contractors – Savannah River Nuclear Solutions, LLC (SRNS); Savannah River Remediation, LLC (SRR); and Parsons Infrastructure and Technology Group, Inc. (Parsons) – in support of EM are overseen by the DOE Savannah River Operations Office (DOE-SR) and include nuclear materials stewardship and environmental stewardship. Major activities and accomplishments in Fiscal Year (FY)13 for the EM-specific facilities/projects at SRS are summarized below.

Safety Programs

Work Planning and Control (WP&C)

DOE-SR has continued to strengthen the activity level work planning and control process through improvements to the federal and contractor programs and has implemented specific WP&C programmatic and field activity assessments based on the guidance of the Energy Facility Contractors Group (EFCOG) WP&C document. The contractors have implemented the EFCOG WP&C guide or equivalent URS Corporation WP&C guide for their day-to-day operations. DOE-SR determined that, in general, the contractors have developed and implemented a program which will improve the WP&C process; however, issues are still being identified with execution of the program. The majority of issues being identified are related to hazard identification and control implementation. This will continue to be a focus area for DOE assessments.

DOE-SR participated on a team for the development of WP&C oversight guidance in response to the Defense Nuclear Facilities Safety Board (DNFSB) Technical Report DNFSB/TECH-37, "Integrated Safety Management at the Activity Level: Work Planning and Control." Through daily oversight, DOE-SR will continue to improve the oversight of the WP&C process and ensure site contractors continue to enhance their existing programs.

Atmospheric Dispersion Modeling

Following the issuance of Safety Bulletin 2011-02 "Accident Analysis Parameter Update," SRS proactively evaluated the entirety of methodology of atmospheric dispersion modeling. As a result, SRNS proposed recommendations to improve SRS dispersion modeling.

DOE assessed the final report issued by SRNS on meteorological data processing and found it adequate. The contractors are preparing to apply these methodologies to their dose calculations and update Documented Safety Analyses (DSAs) starting in FY14.

Recommendation 2004-2 (Active Confinement Systems)

In 2013, Savannah River National Laboratory (SRNL) made progress toward addressing the highest priority gaps, as noted below:

- Section B/C, Off Gas Exhaust (OGE) Standby Fan Auto start (J-MT-A-00005) addressing DNFSB 2004-2 Gap 21. New Section B/C OGE system controls were operational by the end of August 2012, with the completion of B Punch List items at the end of September 2012. Closeout of the Modification Traveler was completed in FY13.

- Section B/C, Central Hood Exhaust (CHEX) High Efficiency Particulate Air (HEPA) Bank Blanks (LF1096). Three sets of blanks were installed in FY13. Four sets remain to be installed in FY14 and FY15.

- E-Wing, Ventilation Project (Y646). Installation of field modifications, system start-up, and decontamination and removal of old equipment were completed in FY13. Closeout of the Modification Traveler is planned for FY14.

- E-Wing Supply and Exhaust Interlocks (J-MT-A-00006). Field work was completed in FY13. System testing and Modification Traveler close-out are planned for FY14.

- Section B/C Supply and Exhaust Interlocks Preliminary Design received DOE-SR approval for alternate scope from baseline established in FY11. No work was completed in FY13. Funds were used to complete E-Wing, Supply, and Exhaust Interlocks (J-MT-A-00006). Modification Traveler is planned for development in FY14.

- Replace B/C CHEX Tape-In-Place HEPA Filter Housings Pilot received DOE-SR approval for alternate scope and a Modification Traveler and specification for HEPA filter housing procurement were completed in FY13. Procurement of 10 HEPA filter housings is planned for FY14.

Nuclear Materials Storage and Disposition

The DNFSB and staff continue to show interest in activities involving plutonium and spent (used) fuel storage and disposition. SRS also made progress with Implementation Plan milestones associated with Recommendation 2012-1.

F-Area

The DNFSB staff has continued to show interest in the technical basis for the credited F/H Laboratory leak path factor and alternatives analysis for the laboratory's ventilation system. The staff has been closely tracking an upcoming DSA revision which addresses this issue.

Transuranic (TRU) waste repackaging activities that utilized portions of F-Canyon have been completed. High activity Legacy TRU waste was repackaged to meet Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria.

H-Area

Progress has been made regarding preparations for the processing of plutonium for NNSA's Mixed Fuel Fabrication Facility/Mixed Oxide (MOX) facility, dissolution of spent (used) nuclear fuel, additional and/or potential material streams, and infrastructure needs to ensure H-Canyon and HB-Line facilities can safely perform missions over the expected operational lifetime of the facilities.

H-Canyon dissolved two additional batches of plutonium for subsequent processing by HB-Line to produce plutonium oxide for MOX feed (incrementally funded by NNSA). Readiness assessments (RAs) were conducted by SRNS and DOE for the HB-Line startup. During the DOE RA, DOE became concerned with the rigor of disciplined operations within the HB-Line facility and suspended the DOE RA for Conduct of Operations; other functional areas were judged satisfactory for startup. SRNS has developed and is implementing a Corrective Action Plan in HB-Line to address the issues. The recently revised HB-Line Documented Safety Analysis has been prepared in accordance with DOE-STD-3009-94 (*Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*) and is ready for implementation after completion of the RA. HB-Line startup for production of MOX plutonium feed is expected in March/April 2014.

Sodium Reactor Experiment (SRE) fuel was identified as vulnerable to extended storage in the L-Area basin and H-Canyon began a SRE processing campaign in August 2012. Through September of 2013, two of six batches of SRE campaign fuel have been dissolved. The SRE will be dispositioned through the Defense Waste Processing Facility for vitrification in glass (no uranium recovery). At the completion of the SRE campaign, H-Canyon will transition to the disposition of a limited portion of fuel from L-Basin. The Highly Enriched Uranium (HEU) will be recovered, purified, and blended to Low Enriched Uranium to meet Tennessee Valley Authority specifications. HB-Line down blended a small amount of HEU oxide from Y-12 in FY13. The down-blended material will be shipped to WIPP in the future. Additional material is expected from Y-12 (and Los Alamos National Laboratory) in FY-14 for similar disposition.

TRU waste repackaging activities that utilized portions of H-Canyon are complete. High activity Legacy TRU waste was repackaged to meet WIPP Waste Acceptance Criteria.

The DNFSB and staff have specifically shown interest in the H-Canyon infrastructure (including the process air exhaust tunnel) and the functional classification of the HB-Line ventilation system. "Pole Camera" inspections were conducted in FY13 to determine if any significant deterioration of the process air exhaust tunnel has occurred since last inspected. In addition to the exhaust tunnel inspections, other infrastructure items addressed include: repair of six degraded pier supports used to support H-Canyon cell covers and repair of several wall locations with concrete degradations. H-Canyon has also initiated repairs to the Acid Recovery Unit and initiated procurement of some critical spare parts. Within six months of HB-Line startup, SRNS has committed to prepare a DSA revision to upgrade the diesel generator and vessel vent system to Safety Significant.

K-Area

There is continued DNFSB interest in fire water system upgrades and repairs. The diesel fire pump was replaced. The electric fire pump will be replaced in FY14. Painting of the interior of the water storage tank has been deferred.

L-Area

There is continued DNFSB interest in the surveillance and disposition/stabilization of spent (used) nuclear fuel. Needed infrastructure improvements and activities associated with an Augmented Monitoring and Condition Assessment Program issued last year continue to be worked: the +91 and +148 roofs were repaired; Structural Integrity Program inspections of several basin walls were completed; remapping of the bacterial growths ("cobwebs") was completed; ultrasonic testing of oversized cans was completed; and sampling and analysis of water from extended basin storage bundles was completed. No significant vulnerabilities have surfaced. A new system has been installed for future removal of the "cobwebs". Shipments of SRE campaign fuel to H-Canyon begun in FY12 continued in FY13. SRE fuel is considered vulnerable for continued long tern storage.

SRS developed and submitted a Supplement Analysis addressing a limited portion of fuel from L-Area to be processed in H-Canyon. This Supplement Analysis involved the processing of up to 1000 bundles of Material Test Reactor fuel (Facility Risk Review) and up to 200 cores of High Flux Isotope Reactor fuel over 4 years. An Amended Record of Decision for this Supplement Analysis was approved in March 2013. The Department's decision to process a limited quantity of fuel in accordance with the Amended ROD will free-up sufficient storage such that there is room for all anticipated future receipts in L-Basin. Shipments of fuel to H-Canyon are expected to begin the 3rd quarter of FY14.

Radioactive Liquid Waste Operations

The injury/illness rate goals established for FY13 represented a 21% reduction in Total Recordable Case (TRC) rates and a 9% reduction in Days Away, Restricted, and Transferred (DART) rates over the

FY12 goals. Excellent safety performance led to actual rates that were 32% below TRC goals and 86% below DART goals, setting fiscal year record lows in both indicators for SRR over the life of the contract.

High-Level Waste Tank Farms

In FY13 Tank Farm activities focused on improving the Tank Farm infrastructure. Significant improvements were made in the configuration management of Tank Farm components. Priority was placed on the tank purge system improvements (such as replacements of duct piping with stainless steel and replacing re-heaters and fan motors), reduced work backlog, and identified and reduced the number of legacy configuration management issues in the oldest parts of H and F Tank Farm via the Control Room Consolidation projects. The 1F and 74F control rooms were consolidated into the 3H control room thus retiring a control room that had been in continuous service since the 1950's. Reductions in the deferred Preventive Maintenance, overall maintenance backlog, and number of Temporary Modifications in the facility have been achieved.

The key infrastructure in many of the most important areas of the Tank Farm are located underground and very difficult or impractical to repair (steam, well water, process flush water, chromate cooling water, instrument air, plant air, breathing air, etc.). In FY13, SRR initiated design for relocating key critical services above grade.

An Independent Tank Integrity Review was performed in May 2013 which concluded that the SRR Waste Tank Integrity Program is a mature program and that all major program elements and activities necessary to maintain the structural integrity of the waste tanks throughout the desired service life are being executed. Furthermore, systems necessary to provide condition assessment of the tanks (leak detection systems and In-Service Inspection program) are in place. Risk is further mitigated/reduced by System Plan activities which have focused on waste removal from the Type-I Tanks (approximately 90% of the sludge in the Type-I Tanks has been removed).

In the tank farm, 1,222 waste transfers were performed moving nearly 21.5 million gallons of waste with zero inadvertent transfers for the year. The replacement high level waste (3H) Evaporator recovered 910,000 gallons of space in FY13; the highest space recovery for the 3H system since FY04.

Feeds to the Defense Waste Processing Facility (DWPF) vitrification facility were prepared, by qualification of sludge batch #8 in Tank 51 and compilation of sludge batch #9. Feeds to interim salt waste processing in the Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU) process were prepared by compilation and qualification of Salt Batch 7.

Tank Closure

During FY13, DOE worked closely with the South Carolina Department of Health and Environmental Control (SCDHEC) and the Environmental Protection Agency to streamline the tank closure documentation development, review and approval process. Achieved over a year of schedule acceleration in obtaining regulatory approvals to commence grouting for final closure of Tanks 5 and 6, and culminated in SCDHEC approval of the Tanks 5/6 Closure Module. In FY13, grouting of Tanks 5 and 6 was initiated and over 200,000 gallons of grout were placed in each tank. Tank 16 will enter into the final sampling and analysis phase prior to Tank Closure. Chemical cleaning of Tank 12 in the H-Area Tank Farm was safely completed, resulting in a significant reduction of residual solids and allowing initiation of the transition of the waste tank into the closure process.

Actinide Removal Process / Modular Caustic Side Solvent Extraction Unit

Interim salt processing at ARP/MCU set new daily, monthly and annual production records. The MCU life extension project was completed and the Next Generation Solvent was approved for implementation in the facility.

Defense Waste Processing Facility

The DWPF overcame a number of significant technical challenges in FY13 by implementing recommendations of an independent team of nuclear processing experts from across the world. The team conducted an extensive review of DWPF operations and programs to identify and leverage improvements in facility performance along with planned facility improvements led to the facility producing a record breaking 40 canisters in the month of August, the highest number of canisters ever produced during a month.

Saltstone

The Saltstone Facilities processed a new annual record of over 2 million gallons of decontaminated salt solution, for a total of nearly 13 million gallons since startup in 1990. Saltstone Disposal Units (SDU) 3&5 were constructed and obtained approval for radioactive operations. The contract was awarded for SDU 6 construction.

Developed the SDU Sampling Program directed towards establishing a comparison of the key properties for simulated saltstone processed and cured in a controlled laboratory environment versus actual saltstone processed in the Saltstone Production Facility, and subsequently emplaced and cured in SDU. This program supports interaction with the Nuclear Regulatory Commission on the technical understanding, assurance, and adequacy of long-term performance assessment modeling of saltstone disposal.

Salt Waste Processing Facility (SWPF)

DOE has made significant progress in FY13 with regard to completion of the SWPF facility which will provide the key high volume salt decontamination capability necessary to facilitate completion of the DOE-SR liquid waste clean-up mission. DOE and the SWPF contractors have continued to maintain a highly constructive relationship with the DNFSB that has resulted in timely issue identification and resolution and facilitated a strong posture with regard to the integration of safety into the facility design. Specific noteworthy accomplishments in FY13 related to DNFSB items of interest include:

- The SWPF project resolved DNFSB questions related to Air Pulse Agitator mixing of waste. Closure of this issue was documented in the DNFSB December 2012 Quarterly Report to Congress.
- The SWPF project resolved DNFSB questions related to flammable vapor protection and control. Closure of this issue was documented in DNFSB July 2013 Quarterly Report to Congress.
- The SWPF project hosted a DNFSB staff review of the plant's Safety Instrumented System in March 2013. The detailed DNFSB staff review identified no significant technical issues and the project's design and path forward for the Safety Instrumented System were favorably received.

M. Savannah River Field Office

The Savannah River Field Office (SRFO) oversees tritium programs related to National Nuclear Security Agency (NNSA) activities at the Savannah River Site (SRS). These include nuclear weapons stockpile stewardship and operation of the Tritium Facilities. NNSA activities at SRS are performed by the site contractor, Savannah River Nuclear Solutions (SRNS). The activities and accomplishments in Fiscal Year (FY)13 associated with the NNSA tritium programs included:

- All required reservoirs and other limited-life components were delivered to military customers.
- The SRS Tritium Facilities exceeded FY13 requirements in support of the Stockpile Stewardship Program. Gas transfer systems were successfully function tested (123 Function Test Equivalents vs. 98 required), and the resulting data were provided via formal reports to the design agencies in support of the annual stockpile certification.
- The Tritium Extraction Facility (TEF) completed extraction of the Cycle 10b Tritium-Producing Burnable Absorber Rods ahead of schedule and without incident. Tritium-Producing Burnable Absorber Rods from Cycles 11a and 11b were also received and stored for future extraction. When not in extraction mode, SRNS successfully transitioned to "Responsive Operations" – a cost-effective strategy that involves utilizing cross-trained personnel to work in additional facilities.
- All required (four) cylinders of helium-3 – the scarce and valuable radioactive byproduct of tritium decay – were successfully filled with gas that met or exceeded purity specifications from the new process in the H Area New Manufacturing (HANM) facility.
- In addition to these mission deliverables, major non-routine elements of scope were safely completed:
    - Full support was provided to the B83 Alt 353 program, with delivery of all FY13 milestones. Several emergent technical issues and funding challenges were overcome to preserve NNSA's FY19 First Production Unit option.
    - Capping an effort that has been under way since October 2006, SRNS Operations formally accepted the replacement Automated Reservoir Management System ("ARMS II") – a mission-critical computer system that is embedded in every aspect of gas transfer system processing and serves as the Nuclear Security Enterprise (NSE) record of assembly.
- Facility sustainment was a focus area in FY13.
    - Implementation of ARMS II required a five-week outage in June and July, which was coordinated with the Department of Defense and all NSE partner sites. This downtime was utilized to address many facility needs (e.g., replaced zeolite

beds/valves and stripper blowers in the HANM Secondary Stripper system, installed a turbo pump in the Container Management Facility, upgraded automatic leak detector electronics, replaced stripper valves in a glove box to improve reliability, and performed annual system outages for five critical systems). This complex outage was coordinated effectively and executed safely despite extensive open-glove box maintenance work.

- Multiple fronts were pursued to ensure long-term operability of Safety Significant HANM glove box oxygen monitors: 1) Initiated a project and completed design of a replacement oxygen monitor, which will utilize a new technology that has been tested and shown to have increased reliability; 2) Repaired and tested existing damaged oxygen monitor circuit boards, which increased availability of critical spare components; and 3) Completed design for an interim modification, allowing spare parts to be obtained from existing monitors.
- A multi-tiered path forward is also being pursued to develop a replacement for the unique Normetex vacuum pump needed for gas processing (59 currently in Tritium service), which is no longer manufactured by the French vendor: 1) Procure a similar pump from a new start-up company; ordered pumps (expected delivery is early in FY14), 2) Develop a second domestic supplier; (selected vendor and conducted an initial design review on their completed design to date); and 3) Procure commercially available off-the-shelf vacuum pumps and modify them for tritium service; (procured a pump, removed its standard polymer, and started testing).

- Many accomplishments advanced the Tritium Responsive Infrastructure Modifications Program, which is relocating and right-sizing the remaining functions from 1950s- and 60s-vintage process facilities into the more modern facilities. For example, the new Engineering and Process Support buildings were constructed and occupied, the 1966 vintage Helium-3 facility was safely shut down, a three-module hydroburst hood assembly was fabricated and delivered to HANM (prerequisite to deactivation of the 238-H Reclamation facility), and Scoping Studies/Estimate Input Documents were developed supporting relocation of ten processes. By accomplishing the FY13 scope, the SRS Tritium Facilities (TF) remained on schedule to be ready to execute the Tritium-Centric Operations Project when it starts in FY17.

- SRS Tritium Facility personnel continued to proactively lead SRS in preparing for emergency events that affect multiple facilities, involving multiple contracts, and both Federal offices (NNSA and Environmental Management (EM)). These types of events are more realistic scenarios than isolated events affecting only a single facility. Building on the FY12 success of piloting beyond-design basis natural phenomenon hazard scenarios, drills were developed to test multi-facility response to malevolent security acts and interfaces with security forces. The first such drill was performed successfully – in part due to early planning efforts, table-top simulation, and walkthroughs of the drill scenario.

- All required FY13 Authorization Basis (AB) scope was completed. The TEF AB was modified to enable extraction of additional helium-3 from spent hydride beds. The TF Annual Update was submitted, supporting removal of the HANM diffuser check valve to improve efficiency in processing byproduct waste gas and allowing receipt of aluminum and valved

reservoirs, thereby supporting Sandia National Laboratories research and development and Los Alamos National Laboratory de-inventory.

- Tritium Engineering shared its AB expertise with EM facilities, leading an assessment of methods used to manage Technical Safety Requirements (TSRs). A report was developed and issued that outlines improvement opportunities for consistent management of TSRs across SRS.

- SRNS has completed the development of input parameters for the MACCS2 dispersion model (deposition velocity, surface roughness, stability class, etc.). Questions had been raised by the DNFSB about the conservatism of several of the currently used parameters. As a result, SRNS agreed to review all the inputs. Nationally recognized experts in the field were consulted to develop the various parameters. Concurrence was obtained from the organizations involved to include NNSA, EM, and Office of Health, Safety and Security. All recommendations were approved by the Central Technical Authority without comments or changes. Unit dose calculations for each radionuclide are currently being developed using the MACCS2 input. This information will be used in individual facility accident analysis calculations.

List of Acronyms and Abbreviations

AB	Authorization Basis
ACCR	Annular Core Research Reactor Facility
AHCF	Auxiliary Hot Cell Facility
AIM	Access-Improve-Modernize
AMLLW	Alpha-Contaminated Mixed Low Level Waste
AMP	Aging Management Program
AMSE	Assistant Manager for Safety and Engineering
AMWTP	Advanced Mixed Waste Treatment Project
ARMS II	Automated Reservoir Management System
ARP	Accelerated Retrieval Project
ARP/MCU	Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit
ARP-V	Accelerated Retrieval Project-V
B&W Y-12	Babcock & Wilcox Technical Services Y-12, LLC
BNI	Bechtel National, Inc.
CAM	Critical Assembly Machine
CBFO	Carlsbad Field Office
CCPO	Copper-Catalyzed Peroxide Oxidation
CDP	Calcine Disposition Project
CEUSP	Consolidated Edison Uranium Solidification Project
CFR	Code of Federal Regulations
CGS	Columbia Generating Station
CH	Contact-Handled
CHEX	Central Hood Exhaust
CHPRC	CH2M HILL Plateau Remediation Company
CIPE	Contractor Integrated Performance Evaluation
COBRA	Changing Our Behavior Reduces Accidents
ConOps	Conduct of Operations
CSE	Criticality Safety Evaluation
CSO	Criticality Safety Officer

CSOOT	Continued Safe Operability Oversight Team
CVS	Confinement Ventilation System
CWC	Central Waste Complex
CWI	CH2M-WG Idaho, LLC
CWPL	Consolidated Waste Processing Line
DAF	Device Assembly Facility
DART	Days Away, Restricted, and Transferred
D&D	Decontamination and Decommissioning
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE-ID	DOE Idaho Operations Office
DOE-RL	DOE Richland Operations Office
DOE-SR	DOE Savannah River Operations Office
DSA	Documented Safety Analysis
DSAIP	Documented Safety Analysis Improvement Plan
DST	Double Shell Tank
DWPF	Defense Waste Processing Facility
EBR	Experimental Breeder Reactor
EFCOG	Energy Facility Contractors Group
EIS	Environmental Impact Statement
EM	Office of Environmental Management
EU	Enriched Uranium
FEOT	Field Execution Oversight Team
FHC	Final Hazard Categorization
FRR	Facility Risk Review
FY	Fiscal Year
HANM	H-Area New Manufacturing
HEPA	High Efficiency Particulate Air
HEU	Highly Enriched Uranium
HIRT	HPAV Independent Review Team
HLW	High Level Waste
HPFL	High Pressure Fire Loop

HPAV	Hydrogen in Pipes and Ancillary Vessels
HSS	Office of Health, Safety and Security
ICP	Idaho Cleanup Project
INL	Idaho National Laboratory
INPO	Institute of Nuclear Power Operations
INTEC	Idaho Nuclear Technical and Engineering Center
IP	Implementation Plan
IRT	Independent Review Team
ISMS	Integrated Safety Management System
ISO	International Organization for Standardization
ISSA	Inherently Safe Subcritical Assembly
ITG	Idaho Treatment Group, LLC
IWTU	Integrated Waste Treatment Unit
JASPER	Joint Actinide Shock Physics Experimental Research
KOP	Knock-Out Pot
LAFO	Los Alamos Field Office
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LAW	Low-Activity Waste
LLBG	Low Level Burial Ground
LFO	Livermore Field Office
LLNL	Lawrence Livermore National Laboratory
LLW	Low-Level Waste
LO/TO	Lockout/Tagout
LOCAS	Line Oversight and Contractor Assurance System
M&O	Management and Operating
MACCS2	MELCOR Accident Consequence Code Systems
MEC	munitions and explosives of concern
MFC	Materials and Fuels Complex
MLLW	Mixed Low Level Waste
MOX	Mixed Oxide
NCERC	National Criticality Experiments Research Center

NCS	Nuclear Criticality Safety
NDA	Non-Destructive Assay
NES	Nuclear Explosive Safety
NFO	Nevada Field Office
NFPA	National Fire Protection Association
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPH	Natural Phenomena Hazards
NPO	NNSA Production Office
NRC	Nuclear Regulatory Commission
NSCMP	Nuclear Safety Culture Monitoring Panel
NSE	Nuclear Security Enterprise
NSO	Nevada Site Office
NSPEB	Nuclear Safety Performance Evaluation Board
NSTec	National Security Technologies, LLC
NvE	Nevada Enterprise
NWP	Nuclear Waste Partnership, LLC
OGE	Off Gas Exhaust
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORP	Office of River Protection
Parsons	Parsons Infrastructure and Technology Group, Inc.
PDSA	Preliminary Documented Safety Analysis
PF-4	LANL Plutonium Facility
PFP	Plutonium Finishing Plant
PNNL	Pacific Northwest National Laboratory
PNSO	Pacific Northwest Site Office
PRT	Peer Review Team
PSDR	Preliminary Safety Design Report
PSHA	Probabilistic Seismic Hazard Analysis
PT	Pretreatment
QRA	Quantitative Risk Analysis

RA	Readiness Assessment
RCRA	Resource Conservation and Recovery Act
RIMS	Richland Integrated Management System
RH	Remote-Handled
RLWTF-UP	Radioactive Liquid Waste Treatment Facility Upgrade Project
RPL	Radiochemical Processing Laboratory
RPP	Radiation Protection Program
QRA	Quantitative Risk Analysis
SASSI	System for Analysis of Soil-Structure Interaction
SCDHEC	South Carolina Department of Health and Environmental Control
SCIP	Safety Culture Improvement Plan
SCWE	Safety Conscious Work Environment
SDIT	Safety Design Integration Team
SDS	Safety Design Strategies
SDU	Saltstone Disposal Units
SFO	Sandia Field Office
SME	Subject Matter Expert
SNF	Spent Nuclear Fuel
SNL	Sandia National Laboratories
SNM	Special Nuclear Material
SPWF	Salt Waste Processing Facility
SRE	Sodium Reactor Experiment
SRFO	Savannah River Field Office
SRNL	Savannah River National Laboratory
SRNS	Savannah River Nuclear Solutions, LLC
SRO	Savannah River Operations Office
SRR	Savannah River Remediation, LLC
SRS	Savannah River Site
SST	Single Shell Tank
STP	Sludge Treatment Project
TEF	Tritium Extraction Facility
TF	Tritium Facilities

TRC	Total Recordable Case
TRU	Transuranic
TSR	Technical Safety Requirement
TWF	Transuranic Waste Facility
TWPC	Transuranic Waste Processing Center
UPF	Uranium Processing Facility
URS	URS Washington TRU Solutions
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination
VPP	Voluntary Protection Program
WCH	Washington Closure Hanford
WESF	Waste Encapsulation and Storage Facility
WIPP	Waste Isolation Pilot Plant
WP&C	Work Planning and Control
WRAP	Waste Receiving and Processing Facility
WRPS	Washington River Protection Solutions, LLC
WTP	Waste Treatment and Immobilization Plant
Y-12	Y-12 National Security Complex