U.S. Department of Energy

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

Fiscal Year 2012

August 2013

United States Department of Energy
Washington, DC 20585

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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.

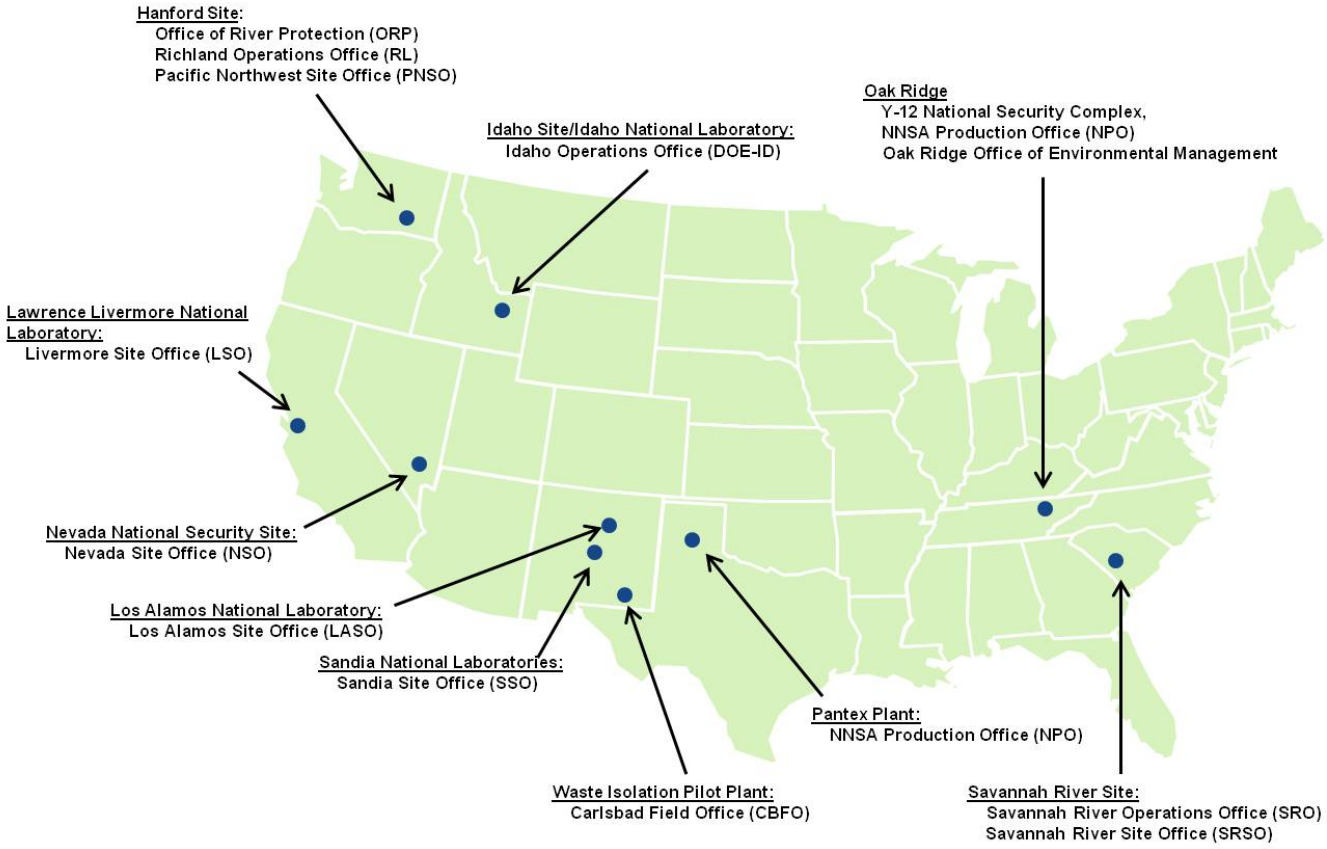

Figure 1. DOE Defense Nuclear Facility Sites

A. Carlsbad Field Office

The Carlsbad Field Office (CBFO) continues to be a significant contributor to DOE's progress toward completing cleanup throughout the Office of Environmental Management (EM) complex. CBFO successfully facilitated the disposition of 6,366 cubic meters of transuranic (TRU) waste from multiple TRU waste generator sites (the goal was 6,000 cubic meters). CBFO also completed the fabrication and use of six TRUPACT-III Nuclear Regulatory Commission (NRC) Type B packaging containers.

Work Planning and Control

Work planning and control (WP&C) initiatives are being implemented at the Waste Isolation Pilot Plant (WIPP) site. The WIPP management and operating (M&O) contractor's operations organization was reorganized to separate the WP&C group and the maintenance group. The reorganization allows the WP&C group to focus on the administrative aspects of WP&C, while the maintenance group focuses on maintenance tasks. The WP&C planners were trained and certified by the Procedure Professional Association and are currently writing and revising numerous work control documents in the Procedure Professional Association format.

During the week of October 17, 2011, URS Washington TRU Solutions Corporation (URS) conducted an independent assessment (Phase 1) of the implementation of the URS WP&C Standard at the WIPP facility. The assessment team concluded that WP&C program processes and procedures meet the requirements of the URS WP&C Standard with one exception, involving inconsistencies between the guidance for work release and the guidance of the Standard. A Phase 2 assessment is planned in Fiscal Year 2013 (FY13).

Safety Culture

CBFO and the WIPP M&O contractor have recently completed a Safety Conscious Work Environment (SCWE) initiative launched in response to a Defense Nuclear Facilities Safety Board (DNFSB) recommendation related to safety culture concerns at the Waste Treatment and Immobilization Plant at the Hanford Site, as well as EM direction included in the Annual Integrated Safety Management Declaration Guidance issued on September 26, 2012. WIPP SCWE training was conducted in groups of approximately 45 individuals that included contractor, subcontractor, and CBFO personnel. Sessions included senior managers, intermediate managers, and staff with the purpose of providing an "open and collaborative" environment to work through the case studies and support the premise of strength in safety culture.

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 mining process. The WIPP is managing these issues by upgrading equipment and facilities and improving infrastructure.

Adequate and Consistent Implementation of Safety Standards and Criteria

The WIPP M&O contractor has taken action to address DNFSB concerns about the default dry deposition velocity values used in the MELCOR Accident Consequence Code Systems (MACCS2) computer code and to address the recommendations of DOE Office of Health, Safety and Security Safety Bulletin 2011-02: *Accident Analysis Parameter Update*. The contractor has determined the site-specific deposition velocity value for unmitigated/unfiltered particulate releases and updated the appropriate parameters used in the MACCS2 code for its accident analysis in the documented safety analysis (DSA), Revision 4. The CBFO Safety Basis Review Team reviewed the WIPP DSA/technical safety requirement (TSR), Revision 4. and its comments were appropriately resolved. CBFO is considering the updated DSA/TSR. Revision 4 for approval through the safety evaluation report process.

A potential inadequacy in safety analysis was declared on August 16, 2012, when contact-handled bay sprinklers on the southeast TRUDOCK position were suspected to be noncompliant with National Fire Protection Association (NFPA) 13. The facility was then placed in a safe configuration. An engineering evaluation determined the sprinklers to be NFPA 13 compliant and were placed back in service on August 22, 2012. The Evaluation of Safety Situation was submitted by the contractor and approved by CBFO on August 23, 2012.

National TRU Program FY12 Accomplishments

- Dispositioned 6,366 cubic meters of TRU waste (the goal was 6,000 cubic meters).
- Supported 839 safe shipments to WIPP.
- Dispositioned 916 cubic meters of TRU waste from Los Alamos National Laboratory (the goal was 800 cubic meters).
- Received the 2012 DOE Secretary Honor Award for Argonne National Laboratory Footprint Reduction.
- Completed the fabrication and delivery of the full fleet of six TRUPACT-III NRC Type B packaging containers.
- Completed four TRUPACT-III shipments from Savannah River Site in one week.
- Submitted a new Draft National TRU Waste Management Plan for a complex-wide review.
- Closed a settlement agreement for a Compliance Order from 2004 on Idaho National Laboratory waste streams.
- Opened the Texas/New Mexico shipping corridor from Big Spring, Texas to WIPP (utilizing State Routes TX/NM 176, NM 18, and NM128), saving approximately 92 miles per trip.
- Completed contract carrier surveillance audits and state contract carrier reviews without any findings.

- Closed the southern shipping route from California to Albuquerque, New Mexico since it is no longer being used, saving approximately $150,000 annually. Cost savings were calculated by eliminating the need to provide funding to the affected states for emergency response support.
- Completed the review of 23 waste stream profile forms prior to submittal to the state of New Mexico, thus allowing 23 new waste streams to be dispositioned.
- Completed 11 site re-certification letters and expansions, thus allowing the active TRU waste generator sites to continue TRU waste characterization, certification, and shipment 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 mission of the Advanced Mixed Waste Treatment Project (AMWTP) is to process and disposition approximately 65,000 cubic meters of waste that has been historically managed as TRU waste. To date, the AMWTP has compliantly disposed of over half of this waste inventory. On October 1, 2011, the Idaho Treatment Group, LLC (ITG) assumed management of the AMWTP for the DOE Idaho Operations Office (DOE-ID). ITG's project work scope includes retrieval of waste from storage, characterization, treatment as necessary, certification, preparation, and loading shipments for transport to the WIPP.

In addition to 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. AMLLW that cannot be shipped to WIPP is treated and disposed of at DOE or commercial facilities, providing the best value to the government. The AMWTP recently surpassed nine years and 13 million hours without a lost time injury, of which 1.3 million hours has been during the ITG contract.

Defense Nuclear Facilities Safety Board and TRU Waste Retrieval

It was of particular interest to the DNFSB staff that AMWTP faced significant TRU waste retrieval challenges in FY12. Pre-1971 retrievable waste is partially buried and stored on an asphalt pad in a large building called the Transuranic Storage Area Retrieval Enclosure. The problematic waste is contained in plywood boxes. In many cases, the plywood is severely degraded, particularly where it is directly in contact with soil overburden. Special measures must be taken to retrieve the boxes intact if possible, including engineered controls and process changes for protecting workers and preventing the potential spread of airborne contamination. These methods have proven successful in the recent past. ITG continues to refine and improve upon retrieval methods for this problematic waste. The DNFSB staff remain engaged in observing progress in this area.

Work Planning and Control

At the start of FY12, ITG management utilized corporate resources in an Access-Improve-Modernize (AIM) approach to review the waste retrieval processes to support restart activities that were paused in late FY11. The AIM team identified needed improvements in conduct of operations (CONOPS) and radiological work practices. AMWTP focused on correcting these issues using engineered controls, resulting in the successful restart of waste retrieval in April 2012.

Using the same AIM approach, ITG reviewed the AMWTP WP&C processes and identified a need to better align those processes with EM Headquarters WP&C guidance. AMWTP issued a WP&C implementation plan in January 2012, with an expected completion date of summer 2013. This initiative is in keeping with the DOE Energy Facility Contractors Group (EFCOG) actions and the key DOE safety initiatives for FY12.

Adequate and Consistent Implementation of Safety Standards and Criteria

Integrated Safety Management System (ISMS) Phase I verification activities in February 2012 identified several areas for improvement. ITG established a corrective action plan and completed the corrective actions. The ISMS Phase II verification is expected to occur in calendar year 2013.

In the first half of FY12, AMWTP experienced a series of nuclear safety TSR violations. ITG used the corporate AIM resources to review the AMWTP nuclear safety program and DSA, and to streamline and simplify requirements where appropriate. The DSA and TSR documents were revised, approved by DOE, and effectively implemented. Additionally, ITG took this opportunity to raise the workforce's level of knowledge of TSR requirements by examinations and proficiency demonstrations. No safety basis violations have occurred since these actions were implemented in August 2012.

Safety Culture

ITG supported two visits by the DNFSB staff during FY12. One visit included a review of the waste retrieval restart activities noted above. In June 2012, the DNFSB staff conducted a review of the AMWTP's radiation protection program (RPP). During these visits and subsequent information exchanges, the DNFSB staff reviewed more than 3,000 pages of documents and identified opportunities for improvement in RPP documentation and implementation, and CONOPS.

In the summer of 2012, ITG developed and administered a Nuclear Safety Culture Employee Survey to assess the safety environment and identify enhancements or adjustments that could strengthen the AMWTP's safety culture. Of the approximately 650 AMWTP personnel, 514 individuals responded to the survey. Analysis included statistical results for 111 questions and sub-questions across three categories, including respondent demographics. Collectively, the AMWTP workforce identified strengths, weaknesses, and opportunities for improvement in the areas of management and supervision, workforce, and individual safety culture. Moving forward, ITG has employed both a top-to-bottom (safety leadership) and a bottom-to-top (employee input and questioning attitude) approach to ensure that employee-driven safety culture improvement initiatives and practices are used. These actions are in keeping with the key DOE safety initiatives for FY12 and are in alignment with DNFSB Recommendation 2011-1.

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.

FY12 Accomplishments

Decontamination and Decommissioning

- Completed Advanced Test Reactor Complex Hot Cells demolition.
- Completed treatment of sodium and sodium-potassium alloy in the Experimental Breeder Reactor (EBR)-II and Primary systems.
- Completed grouting of the 96,000 gallon EBR-II Primary Tank and removed all hazardous waste (lead, asbestos, etc.) to make Materials and Fuels Complex (MFC)-767 demonstration-ready.
- Completed demolition of Building MFC-793B.
- Completed 75 percent demolition and strip-out of the inside of Building MFC-799.
- Completed safe lay-up mode of MFC-766 (drying out piping and stabilizing affected piping).
- Completed removal, treatment, and disposal of rinsates from treatment of the EBR-II Primary Tank.
- Completed Resource Conservation and Recovery Act (RCRA) closure certification of the EBR-II Primary Tank, Secondary Sodium Drain Tank, and Container Storage Areas in MFC-767.

Construction and Operation of Accelerated Retrieval Project-VII (Pit 10E)

- Completed startup activities for Accelerated Retrieval Project-VII (Pit 10E) in February 2012 and exhumed 0.15 acres of targeted waste from the project footprint in FY12.

Sodium Distillation and Sodium Treatment

- Completed RCRA preliminary design of sodium distillation and sodium treatment systems for future treatment of remote handled TRU sodium contaminated waste streams.

Sodium-Bearing Waste Treatment Project - Integrated Waste Treatment Unit

- The Integrated Waste Treatment Unit (IWTU) received Critical Decision-4 and startup authorization in April 2012 after successful completion of a contractor operational readiness review in March 2012 and the DOE operational readiness review in April 2012; both reviews were observed by DNFSB staff.
- The DNFSB visited the IWTU on April 19, 2012, to discuss lessons learned on the project.
- The DNFSB staff visited the IWTU in August 2012 to review recovery planning activities subsequent to the June 16, 2012, pressure event and to discuss the event investigation report and recommendations. The DNFSB continues to monitor recovery actions and plant modifications.

High Level Waste Calcine Disposition Project

- Completed and issued the revised Calcine Disposition Project (CDP) Technology Maturation Plan. The revised technology maturation plan reflects the results of a technology readiness assessment conducted by a DOE Headquarters team during 2012.
- Completed and issued the revised CDP Waste Form and Technology Readiness Strategy following a review by DOE Headquarters. The plan will be used to support waste form development.
- Completed and issued the revised historical processing model report, *Calcined Waste Storage at the Idaho Nuclear Technology and Engineering Center*. The historical processing model contains comprehensive information on the chemical and radioactive constituents of the high level waste calcine inventory stored at INL.
- Completed CDP design in support of RCRA Part B Permit application and submitted to DOE-ID.

Safety Culture

CWI is a Star certified DOE voluntary protection program (VPP) participant. Consistent with VPP program guidance, in November 2012, CWI conducted a VPP self-assessment. The criteria used during the self-assessment included many of the SCWE attributes contained in DOE guidance. At the time of this report, the self-assessment report was being compiled.

In addition, CWI utilizes the "Changing Our Behavior Reduces Accidents" (COBRA) approach to provide a behavioral observation and feedback process in which employees routinely observe one another while performing daily work activities. COBRA is the observation and feedback aspect of the Total Safety Culture program, a worker-driven process that has proven highly effective in reducing injuries and illnesses in the workplace and at home.

Work Planning and Control

CWI experienced a number of WP&C program issues in FY12, including self-identified and DOE-identified work control issues. Corrective action plans continue to be developed, including both improved field implementation of program requirements and program revisions.

Adequate and Consistent Implementation of Safety Standards and Criteria

- The ICP has continued to reduce recordable injuries and injury rates compared to previous contract years. CWI continues to set aggressive goals, engage employees and subcontractors through year-round safety activities, actively pursue hazard reduction and mitigation, and encourage and recognize safe work practices by employees.

C. Livermore Site Office

The National Nuclear Security Administration (NNSA) Livermore Site Office oversees Lawrence Livermore National Laboratory (LLNL) in Livermore, California. LLNL is managed and operated by Lawrence Livermore National Security, LLC. During FY12, LLNL and the NNSA completed or made continued progress on several safety-related issues of particular interest to the DNFSB, including: (1) LLNL facility and program safety enhancements; (2) a review of LLNL and NNSA safety basis development, review, and approval processes; and (3) a review of selected Plutonium Facility (Building 332) safety systems. Each of these areas is discussed below.

Facility and Program Safety Enhancements

Facility and program safety enhancements included: (1) completion of special nuclear material (SNM) inventory reductions, and (2) development of a new criticality safety training facility.

SNM inventory reduction in Building 332 was completed as scheduled in September 2012. The total SNM inventory slated for removal has been shipped off site to other secure DOE locations. The goal of SNM inventory reduction is to significantly reduce the security risks and cost associated with SNM, as well as eliminating surplus material at risk for certain potential accident scenarios.

LLNL continued development of the Inherently Safe Subcritical Assembly (ISSA), a training facility centered on surplus Omega West fuel assemblies in a subcritical tank assembly. The objective of ISSA will be to provide training in criticality safety and reactor physics to a broad audience (no security clearance will be required), as well as support for research and development. The training will be designed such that an inadvertent criticality is not possible, allowing the students to handle fuel and load the assembly. Each fuel element contains approximately 230 grams of highly enriched uranium. The fuel is in a configuration that has been determined to be less than a Category IV quantity (attractiveness level D). LLNL plans to begin conducting classes during FY13.

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 TSRs for an inoperable safety class system. In response to NNSA's concerns, LLNL plans to conduct a management self-assessment of the safety basis development process in FY13. NNSA will review the results of this assessment, including the improvements committed to above, to ensure that it measures the effectiveness of the LLNL process.

Plutonium Facility Safety System Improvements

On December 13, 2011, the DNFSB issued a report highlighting concerns about two specific safety systems at the Plutonium Facility: the glovebox system, and weakness in the fire detection and alarm system caused by a support system. The DNFSB report also included an appended list of

some additional quality problems with facility safety system and supporting safety basis documentation.

On June 13, 2012, LLNL transmitted a report, *Options for Upgrades of Glovebox Housekeeping HEPA Filters in the Plutonium Facility*, which fulfilled LLNL's commitment to evaluate various options for upgrading existing wood-enclosed housekeeping high efficiency particulate air (HEPA) filters. The report provided a preferred approach to ensuring the confinement function of the filter housings, a list of gloveboxes prioritized for filter upgrades, and a list of gloveboxes requiring work before removal from the facility. NNSA is currently evaluating options proposed by LLNL but has not yet determined a final path forward.

In addition, LLNL completed a commitment to change the priority of the fire alarm announcement to prevent the sitewide evacuation voice/alarm system (a non-credited safety system) from defeating the fire detection and alarm system under certain limited conditions.

D. Los Alamos Site Office

The NNSA Los Alamos Site Office 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 to DOE. Safety accomplishments and ongoing actions for FY12 are discussed below.

Plutonium Facility

On October 26, 2009, the DNFSB issued Recommendation 2009-2 on Plutonium Facility (PF-4) seismic safety. This recommendation was motivated by DNFSB concerns involving one of the 20 accident scenarios analyzed in 2008, particularly the post-seismic fire event. NNSA has completed all the actions in its implementation plan and made extensive structural modifications; however, additional actions are being pursued to ensure that seismic concerns are thoroughly addressed, especially efforts to better understand and model responses of the PF-4 structure to seismic events that could be linked to building collapse.

The contractor's major revision to the PF-4 safety basis was approved in October 2011, and two minor revisions were approved in 2012. In September 2012, LANS submitted a major safety basis revision, focused primarily on improving PF-4's seismic safety posture. On November 5, 2012, NNSA responded to DNFSB concerns about the PF-4 safety basis. In essence, NNSA shared the DNFSB's perspective on the importance of PF-4, as well as ensuring that it has a quality safety basis and ensuring continuous improvement in PF-4's nuclear safety posture.

Emergency Response

On Saturday, August 25, 2012, LANL discovered contamination in an experimental area of the Los Alamos Neutron Science Center accelerator facility. LANS quickly determined that contamination had spread offsite, and response teams were immediately brought in. The prompt response stopped further spread of contamination offsite. The contamination was later determined to be technetium-99, a low energy beta particle emitter. While the radiation doses to individuals as a result of this event are not expected to exceed 1 millirem (compared to an average of over 360 millirem per year from natural and manmade sources), the event was preventable, and the handling of the event does not meet NNSA or LANS expectations. On October 18, 2012, NNSA released an accident investigation report on the event, identifying a number of necessary corrective actions that are under way.

Also in FY12, NNSA followed up on DNFSB concerns about emergency preparedness for a major seismic event. In March 2012, the site conducted an Emergency Operations Center functional exercise based on a scenario involving a seismic event that caused bridge damage, impassible major roads, partial power loss, fire, and other major infrastructure disruption. In May 2012, the site conducted an exercise based on a seismic scenario involving PF-4 and other local nuclear facilities.

The site is committed to continuing to consider accident scenarios that challenge the site's response capabilities.

Nuclear Material Stabilization and Packaging

LANS has been stabilizing and repackaging nuclear materials in response to DNFSB Recommendations 94-1, 00-1, and 05-1. In FY12, LANS effected the disposition of 176 kg of plutonium-239 equivalent and processed, repackaged, or disposed of plutonium-239 non-standard containers. LANS has fire-tested five container designs, demonstrating damage release fractions of about 1 percent. Overall, the site is working toward a graded approach to nuclear material stabilization and packaging that minimizes vault space, worker material handling risks, and the repackaging scope.

Project Management

The current plan for the Chemistry and Metallurgy Research Replacement nuclear facility defers the project for at least five years. During FY12, NNSA approved a preliminary documented safety analysis (PDSA) for the project as part of this phase's closure.

Cognizant of input from the DNFSB, the Radioactive Liquid Waste Treatment Facility Upgrade Project has changed its strategy and is pursuing a design based on separating low level and TRU liquid waste treatment operations. Compared to prior efforts, this approach more expeditiously addresses issues in the existing facility's low level waste treatment operations. During FY12, NNSA approved a safety design strategy for the new approach.

The Transuranic Waste Facility (TWF) Project design is nearly complete and site preparation work is under way, having benefited from input from the DNFSB. At the end of FY12, NNSA was reviewing LANS's proposed TWF PDSA. In an October 9, 2012, letter, NNSA responded to TWF safety issues raised by the DNFSB earlier in the year.

E. Nevada Site Office

The NNSA Nevada Site Office (NSO) maintains the capability at the Nevada National Security Site (NNSS) and other remote facilities to implement NNSA initiatives in stockpile stewardship, crisis management, waste management, environmental management, non defense research and development, and work for others, as well as supporting other NNSA programs. Major non-reactor nuclear facilities at the NNSS include the Device Assembly Facility (DAF), National Criticality Experiments Research Center (NCERC), and the Joint Actinide Shock Physics Experimental Research (JASPER) facility. The U1a Complex is not categorized as a nuclear facility; however, limited duration experiments are conducted there 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 DOE weapons laboratories. 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 provide the infrastructure that enables implementation of the NNSA Waste Management Program. The associated Low Level Waste (LLW)/Mixed Low-Level waste (MLLW) sub-projects provide disposal services and facilities for DOE and Department of Defense generators at the NNSS and across the United States. During FY12, the sub-projects safely accepted and disposed of 785,579 cubic feet of LLW in 950 shipments and 41,531 cubic feet of MLLW in 97 shipments at the NNSS Area 5 Radioactive Waste Management Complex.

Device Assembly Facility

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.

Strategic initiatives included receipt of uranium-233 shipments to support the NCERC. During FY12, the DAF management team supported initial startup of NCERC, execution of the Castor confirmatory experiment, and ongoing counterterrorism and criticality safety training activities.

As documented in the DNFSB September 23, 2011, periodic Report to Congress and again in its third periodic report to Congress dated October 31, 2012, the ongoing degradation of the DAF fire suppression water tank and fire suppression system lead-in piping is a significant safety-related infrastructure issue. The piping is susceptible to corrosion failure and cannot be relied on to provide fire suppression system water during a fire in the DAF. The facility is currently managing these vulnerabilities with an NNSA-approved justification for continued operation and associated compensatory measures to ensure adequate safety. With respect to corrective action, an

engineering design was selected and is being fully developed. NSTec plans to begin replacement of the lead-in piping in about FY14.

Other DAF-related issues of concern to the DNFSB include vulnerabilities associated with the HEPA filter ventilation system, fire penetration seals, and resolution of previously identified gaps in configuration management. NSTec prepared an integrated strategic plan for FY13 to address these deficiencies in a coherent manner that ensures adequate protection of the public, workers, and the environment. NNSA continues to provide the DNFSB staff with periodic progress updates related to the vulnerabilities and associated resolution.

National Criticality Experiments Research Center

The NCERC is a unique hazard category 2 non-reactor nuclear facility where general research and hands-on training related to nuclear safeguards, criticality safety, and emergency response are conducted using Category I nuclear materials. During FY12, the safety basis continued to be improved through change notice updates. Three of the four critical assembly machines (CAMs) – Comet, Planet, and Flattop – achieved critical operations in FY12.

Interactions with the DNFSB consisted primarily of discussions related to the resolution of previously identified issues, and observation of operations and troubleshooting of an operational anomaly in two of the four CAMs. Concerns conveyed in the DNFSB's August 5, 2010, letter are being addressed in Change Notice 4 to the Criticality Experiments Facility addendum to the DAF DSA, with full implementation planned in FY13.

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 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 nuclear facility on August 25, 2011. FY12 marks the first full year of operation as a hazard category 3 non-reactor nuclear facility. FY12 activities included six plutonium shots and four surrogate shots. The annual DSA update was delayed until early FY13 to allow reconsideration of the final hazard categorization based on new information about dispersion of available material at risk. NNSA briefed the DNFSB staff on preliminary methodologies associated with the categorization effort. The experimental program for this facility is expected to continue until at least FY16.

U1a Complex

The U1a Complex comprises several surface support buildings and trailers and an extensive series of underground drifts and experimental alcoves 965 feet below NNSS ground level. The U1a Complex

supports the nation's Stockpile Stewardship Program and provides an underground experiment test bed for the conduct of subcritical experiments using high explosives and SNM. Although the U1a Complex is not categorized as a nuclear facility, specific subcritical experiments may be classified as hazard category 2 or 3 nuclear activities; therefore, the DNFSB considers the U1a Complex a "facility of interest."

Minor safety basis changes are being developed, as necessary, to incorporate differences in SNM and high explosive quantities required for the execution of Gemini experiments within hazard category 3 limits. Validation of continued readiness for U1a was demonstrated via the Castor confirmatory experiment, a high fidelity surrogate experiment that demonstrated operational capabilities and provided assurance that the Pollux experiment can be safely executed while meeting regulatory requirements.

Fire protection at the U1a Complex is an ongoing issue of concern to the DNFSB. DNFSB staff visited the NNSS during the week of April 23, 2012, to attend a briefing on U1a Complex underground fire protection requirements and observe implementation of the requirements (e.g., fire suppression, life safety, and fire fighting capabilities in the underground areas). The U1a Complex and its operating environment have transitioned from active mining operations to the completed tunnels and drifts that make up the infrastructure supporting experimental activities. During a review of the fire protection program and related requirements, NSO and NSTec 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 is the development of an "NNSS Underground Safety and Health" document that will become the basis for assessing the adequacy of the U1a life safety and fire protection features, exemptions, and equivalencies. A permanent exemption from specific fire protection requirements of DOE Order 420.1B, *Facility Safety*, was approved in FY12.

NNSS Activity-Level Work Planning and Control

DNFSB staff members periodically reviewed NSTec activity-level WP&C processes and their implementation at the NNSS. The DNFSB staff is monitoring implementation of the action plan associated with NNSA's letter to the DNFSB dated June 6, 2011, "NNSA/NSO RESPONSE TO DNFSB LETTER OF MARCH 28, 2011 – ACTIVITY LEVEL WORK PLANNING – NEVADA NATIONAL SECURITY SITE." During FY12, NNSA and NSTec completed the remaining action items specified in the action plan.

Line Oversight/Contractor Assurance Systems Affirmation/Review

NNSA and NSTec attained NNSA certification of the line oversight and contractor assurance system in FY12. DNFSB staff members observed the certification process.

F. Oak Ridge Office

The mission of the DOE environmental management program at Oak Ridge is to carry out coordinated Oak Ridge Reservation-wide cleanup that resolves health and environmental risks and supports and protects DOE vital missions.

Transuranic Waste Processing Center

During FY12, the Transuranic Waste Processing Center (TWPC) continued to safely and systematically reduce the inventory of 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 (BBA) processing lines. Approximately 87 percent of the total CH inventory has been repackaged. The repackaged waste has been certified as LLW/ MLLW and shipped to the NNSS, shipped as TRU waste to WIPP, or staged as TRU waste awaiting final certification by the Central Characterization Project (CCP) upon CCP's return to TWPC in FY14. In April 2012, TWPC completed drum venting activities for 55- and 79-gallon unvented, overpacked CH waste drums as a precursor to repackaging in the glovebox or BBA. Approximately 70 of these drums with configurations that could not be processed in the Drum Venting System remained unprocessed. To deal with these uniquely configured unvented, overpacked drums, TWPC placed into service in the BBA a remote drum opener device designed to vent by mechanical puncture; processing is now under way. The remaining inventory of CH waste containers generally consists of "difficult to process" containers having free or containerized liquids greater than one gallon in volume, scaled sleeves, and other unique/specialty containers. The DSA and TSRs continue to be revised before processing of these waste containers.

During FY12, remote-handled (RH) repackaging activities continued and are approximately 38 percent complete, with most of the waste processed this FY being characterized as CH waste. The remaining approximately 70 casks known to contain RH waste will be processed in the hot cell upon CCP's return to the site in early FY14. RH concrete waste casks were processed in the hot cell and in an alternative RH waste processing line called the Cask Processing Enclosure (CPE) placed in service in July 2012.

Since FY10, most of the RH waste repackaged in the hot cell has been found to actually meet CH criteria upon characterization, resulting in the removal of the CH waste from the hot cell and redirecting it to the CH characterization process. Additionally, wear and fatigue issues in the hot cell equipment from processing casks containing CH waste in a highly specialized processing line prompted the project to install the CPE, which allows the processing of approximately 180 RH casks known to contain CH waste using supplied breathing air, similar to the existing CH BBA processing line.

Transuranic Waste Storage

TRU waste at Oak Ridge National Laboratory (ORNL) is stored and transferred to TWPC for characterization and processing prior to disposal. Twenty-six drums of SNM that were declared waste in the mid-1980s are included in the stored inventory. Activities completed in FY12 included demonstration of the retrieval operations to support future retrieval, 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.

Tank W-1A Project

The Tank W-1A project at ORNL involved an empty, abandoned tank buried approximately eight feet below ground and surrounded by highly contaminated soils. These soils contributed to a release of radioactive contaminants to groundwater, which subsequently discharged to a down-gradient stream. The project scope included excavation; size reduction as required; packaging and transport for disposal of approximately 316 B-25 boxes of contaminated soil, the tank shell, the concrete pad, and tank supports; and characterization of the area along the pipeline north of the tank to delineate further soil to be removed. Soil excavation began in September 2011, and the project was completed in the spring of 2012. The project generated no TRU waste.

Uranium-233 Project

The uranium-233 project began executing the recommendations contained in Phase I of the Alternative Analysis, which was endorsed by the Deputy Secretary of Energy in 2011. By October 2012, 126 Zero Power Reactor plates had been dispositioned to the DAF at NNSS, and 10 items of certified reference material were safely and securely transferred to ORNL for programmatic reuse. Preparations for shipping the Consolidated Edison uranium solidification project inventory are in progress, and shipment is to begin in FY13.

Phase II of the Alternative Analysis, which provided a more detailed evaluation of processing options for the inventory that cannot be directly dispositioned, was approved by EM and the DOE Office of Science and endorsed by the Secretary of Energy in July 2012. Conceptual design activities are to begin in FY13.

G. Office of River Protection

The 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. Some of the tanks have leaked in the past, putting an estimated 1 million gallons of waste into the soil. The SSTs have been "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 remain 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.

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 2012, the WTP project was 66 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 FY12. The "percent complete" numbers are reported against the project baseline that was in effect prior to the re-plan/rebaseline activity now under way. Upon completion of these efforts, the numbers will shift to reflect the actual remaining work scope that is to be completed versus the work that is complete at the time the rebaseline is approved.

Table 1. Status of WTP Completion by Facility though End of Fiscal Year 2012

Facilities	Total Facility	Design	Procurement	Construction
Low Activity Waste	60%	76%	83%	58%
Analytical Lab	64%	72%	81%	75%
Balance of Facilities	51%	75%	60%	69%
High Level Waste	62%	89%	81%	43%
Pretreatment	56%	85%	56%	43%

Through September 2012, approximately 224,000 cubic yards of concrete; 20,500 tons of structural steel; 888 tons of heating, ventilation, and air conditioning ducting; 338,000 linear feet of piping; and 322,000 linear feet of cable and wire have been installed at WTP.

The Tank Farms project made the most single-year retrieval progress in Tank Farm history, including completing retrieval activities in tanks C-108, C-104, and C-109; beginning preparations for waste retrieval activities in C-101 and C-102; and planning for the installation of the vacuum Mobile Arm Retrieval System in C-105. In addition, WRPS maintained DOE VPP Merit status and passed five million hours without a lost workday injury.

Recent Board Recommendations

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*, for which DOE is currently preparing a response. This DNFSB 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. ORP is working closely with DOE Headquarters to respond to this DNFSB recommendation.

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

On December 17, 2010, the DNFSB issued Recommendation 2010-2, *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*, which the DOE accepted on February 10, 2011. This recommendation documented the DNFSB's position that testing and analysis completed to date have been insufficient to establish, with confidence, that the pulse jet mixing (PJM) and transfer systems at the WTP will perform adequately at full scale, and that incomplete mixing has safety implications. The DNFSB identified five unresolved technical concerns and seven sub recommendations. These were being addressed by the Department's DNFSB Recommendation 2010-2 Implementation Plan (IP), which the Secretary of Energy submitted to the DNFSB on November 10, 2011. Since submittal of the IP, DOE has provided routine quarterly updates to the DNFSB on deliverables and efforts to resolve technical issues. However, in May 2012 DOE informed

the Board that, based on scoping test data, revisions to the IP would be required. In August 2012, the Secretary assembled a group of independent technical experts to assess WTP black cell design technical issues. The assessment involved the plant's capability to detect equipment failure and to repair failed equipment inside the WTP Pretreatment Facility. Based on the scoping data findings and the ongoing plant analyses by technical experts, the Secretary informed the Board that as the Department gains a better understanding of the plant design verification strategy, DOE will be in a position to develop a revised IP for this recommendation. Core teams of subject matter experts have been formed to address the technical issues and devise an integrated strategy for completing this vital project. In a letter dated November 8, 2012, from the Secretary of Energy to DNFSB Chairman Winokur, the Department informed the DNFSB that a revised IP will not be completed by the end of the calendar year as initially planned.

Recommendation 2011-1, *Safety Culture at the WTP*

On June 9, 2011, the DNFSB issued Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant,* which stated the DNFSB position that both DOE and contractor project management behaviors reinforce a subculture at WTP that deters the timely reporting, acknowledgement, and ultimate resolution of technical safety concerns. In September 2011, the DOE Deputy Secretary chartered a Headquarters 2011-1 Response Team and DOE revised DOE Guide 450.4-1C, *Integrated Safety Management System Guide*, to define safety culture and identify safety culture focus areas and associated attributes. DOE issued the IP for DNFSB Recommendation 2011-1 in December 2011, along with the Secretary of Energy's memorandum, "Nuclear Safety at the Department of Energy," establishing the Department's expectations for a robust safety culture.

In January 2012, the DOE Office of Health, Safety and Security (HSS) released the HSS report *Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant*. The ORP Manager directed BNI to amend its Nuclear Safety and Quality Culture Plan to include the HSS recommendations (completed in May 2012), and ORP developed its own safety culture IP in April 2012.

On March 22, 2012, ORP and its contractors participated in a DNFSB public meeting in Kennewick, Washington concerning the status of actions related to unresolved technical issues in the design of the WTP, including DOE's IP for DNFSB Recommendation 2010-2, as well as the status of actions related to DOE's IP for DNFSB Recommendation 2011-1. A supplemental session was held in Washington, D.C. on May 22, 2012, to allow the DNFSB to receive testimony from DOE Headquarters management.

In June 2012, the Richland Operations Office and ORP, along with their contractors, conducted an organizational climate and SCWE survey, with approximately 6,500 of 10,500 personnel responding (62 percent). Analysis results from an independent survey firm were provided in October 2012, and each organization is evaluating the results and will be planning further improvement actions. This survey will also constitute part of the SCWE self-assessments that Hanford Federal and contractor organizations will perform.

On September 14, 2012, DOE provided to the DNFSB an addendum to the DOE IP for DNFSB Recommendation 2011-1, specifying a series of BNI-to-ORP and ORP-to-EM briefings to track progress on safety culture improvement actions. The first briefings were conducted in October and EM has provided other scheduled updates on the IP as well as corrective action plans.

In accordance with the implementation plan, ORP and BNI will complete their near-term safety culture improvement activities by April 2013 and will provide an effectiveness review to the DNFSB by May 2013. HSS will conduct a follow-on safety culture review of ORP and BNI in October-November 2013, with a report to be issued by January 2014.

Other Board Interactions

ORP also continues to work toward improving technical interactions with the DNFSB. Several DNFSB onsite reviews were supported by ORP and contractor staff in areas associated with WTP and Tank Farms, including Conduct of Operations at Hanford Tank Farms, Tank Waste Retrieval and Transfer, Waste Feed Delivery and Tank Waste Strategies, Conceptual Design for Tank Waste, Supplemental Treatment Project, Tank Farms DST Ventilation System Safety Classification/Flammable Gas Control Strategy and Follow-up on Safety Basis Issues, WTP Spray Leak, HLW HEPA Loading and Aerosol Entrainment Coefficient Testing, LAW Hazard Analysis, Instrumentation and Control Design for the Hanford WTP LAW Facility, WTP Emergency Power System and supporting Emergency and Turbine Design Progress. Over the past year, ORP has also taken steps to address the issues and concerns identified in the four letters received from the DNFSB. In addition to the DOE's response to the letters, ORP and contractor staffs continue to engage in a dialogue with DNFSB Staff to provide additional information and clarifications regarding technical issues.

Status of and Progress on Various WTP and Tank Farm Technical Issues

WTP Technical Issues

- *Structural Issues* – Based on successful completion of this effort and Peer Review Team (PRT) Quarterly Reviews, the DNFSB staff, in December 2010, concluded that all the issues relating to composite steel behavior/structural steel design issues on WTP are closed. Additionally, through DOE PRT Quarterly Review discussions of the System for Analysis of Soil-Structure Interaction (SASSI) Computer Code on the application of SASSI - Subtraction and Direct Methods on WTP's HLW foundation, DOE WTP and BNI documented a comparative and reliable technical justification between the stated methods. This justification document was reviewed by the DOE PRT, and results were reported in 2012. The final versions of the summary structural engineering reports will be issued during 2012/2013 at the completion of WTP structural design, while incorporating required interim updates requested by the DNFSB staff. DOE ORP has been actively providing quarterly updates on the DOE ORP PRT input. The last PRT Quarterly Review for 2012 findings was provided to the DNFSB staff.

- *Hydrogen in Pipes and Ancillary Vessels (HPAV)* – At the recommendation of the DNFSB, a 12-member HPAV Independent Review Team (HIRT) 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 to be exposed to detonations during the life of the plant. The HIRT 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 the findings and recommendations. The team identified 37 findings and 38 recommendations that were resolved by the project. To support the HIRT's final review, in early August 2011 the project formally issued all the calculations, reports, and summary response sheets that provided details of how each finding and recommendation was resolved. Following review of the responses and updated calculations and project reports, additional questions by the HIRT and QRA PRT were identified. The final updates to calculations, reports, and summary response sheets were completed in late December 2011. The HIRT and QRA PRT 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. Dr. Shepherd accepted the project responses in June 2012 after the project provided additional analyses, including clarifying sensitivity analyses, and following several reviews. Project reports were revised in October 2012, documenting the results of the additional analyses requested by Dr. Shepherd.

The project has been executing the new processes and procedures for conducting piping analyses in accordance with the QRA processes. This work is being conducted on an example WTP route to demonstrate the quality and configuration management processes for evaluating a piping system and deal with design system changes if required as a result of the analyses. The processes and QRA results are being reviewed with the DOE and DNFSB local representatives in advance of using them to support routine production design work tentatively scheduled to resume in mid-2013, and to provide additional operations and design information to support the environmental and nuclear safety hazards analyses of the respective WTP piping systems necessary to complete the authorization bases for the impacted facilities.

- *Erosion and Corrosion: Design Wear Allowances for Vessels, Piping, and PJM Nozzles* – On January 20, 2012, the DNFSB transmitted a letter expressing concerns about the design wear allowances for vessels, piping, and PJM 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 PJM nozzles could result in component failures before the completion of the mission or the design life of the facility. Premature failure jeopardizes safety functions and could stop waste processing for indefinite periods, resulting in significant delays in accomplishing the ORP mission.

  This issue is part of the ongoing work of the design completion core team and technical sub-teams which have been established to address remaining technical issues.

- *Slurry Transport/Line Plugging* – 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 staff members are currently working with BNI to respond to this concern.

- Other Open WTP Technical Issues or Concerns – the WTP project is also working with the DNFSB to close out the following technical issues identified by letter in the last year or in previous years:
  - Spray Leak Methodology Inadequacies (2011)
  - Instrumentation and Control (2011)
  - Heat Transfer Analysis for Process Vessels (2011)
  - Ammonia Controls (2011)
  - Computational Fluid Dynamics Model (2012)
  - Electrical Distribution System (2012).

Responses prepared by DOE and BNI have been formally transmitted to the DNFSB. DOE is awaiting further responses or dispositions from the DNFSB, at which time DOE will consider the issue or concern addressed and closed.

The DNFSB has also monitored DOE's progress in resolving technical issues with BNI in the areas of cathodic protection system performance, HEPA 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.

Tank Farm Technical Issues

- *Conduct of Operations* – In FY12, ORP approved the DOE Order 422.1 compliant Conduct of Operations Matrix, and WRPS has implemented the associated requirements. Continuous improvement areas for FY12 included the restructured Conduct of Operations Council, improved management self-assessment of field operations, initiation of human performance improvement lab training topics (communications and hazardous energy control), improved performance indicators for lockout/tagout and management oversight results, restructuring of waste transfer procedures to promote consistency and clarity, and the interfacing improvements to the work control process described below. At the end of the second quarter of FY12, WRPS instituted a Field Execution Oversight Team (FEOT) to improve both management field oversight effectiveness and reinforce field work supervisor performance. This team oversight resulted in improved operations, and areas for continued improvement were transitioned to the WRPS Conduct of Operations Council at the end of the fiscal year to drive ongoing improvements. During the April 2012 DNFSB visit, the DNFSB team identified noticeable improvements in the control of work by field work supervisors, pre-job briefings, radiological work permit management, and shift turnovers, while some improvement was noted with respect to housekeeping in the Tank Farms. The DNFSB team was unable to assess the recent overhaul and restructuring of the Conduct of Operations Council. Opportunities to improve work documents, control of vehicles in the Tank Farms, on-shift training, the required reading program, labeling, and shift routines and operating practices were identified by the DNFSB team. ORP oversight

has witnessed progress in WRPS management oversight through the FEOT and overall improvements in the discipline of operations across the Tank Farms, as evidenced by the reduction in both significant events and ORP-identified issues. This improvement was also observed in the effectiveness of retrieval operations and the level and rigor of waste transfer operations.

- *Work Planning and Control* – During FY12, WRPS implemented procedure and program changes to comply with the URS work control standard. WRPS successfully completed the URS Corporate Phase 1 assessment of the work control program and has remained engaged with the EFCOG work planning team and associated standard. WRPS developed a field observation checklist to improve the consistency of management oversight and developed a data collection method and metric to evaluate causes of work package changes following approval. WRPS implemented an electronic work order review and approval application for documenting subject matter expert review and approval, consolidated the work control template library to promote standardization and developed Joint Review Group screening criteria to broaden the effectiveness of the evaluation. ORP oversight has identified periodic weaknesses in work planning rigor and work instruction compliance; however, the improvements in waste transfer instructions and the recognition of the need to stop and revise work instructions when necessary indicate a more mature implementation of the WRPS work planning process. The overall WRPS work control culture has improved throughout FY12, and completion of the FEOT improvements and the scheduled URS Phase II work control standard assessment are expected to drive additional improvement.

- *Ventilation System Status* – During the first quarter of FY12, the new exhauster skids destined for SY and AP farms were tested, calibrated, and packaged for transport to the 200 East Area for storage. The ventilation upgrade project for the new AY/AZ exhauster system was completed through the 70% design level by the end of FY12. Operational acceptance testing has been completed for the new control systems for the 702-AZ and AW DST primary ventilation systems. Exhaust flow measurement ports are installed in each of the exhaust ducts for all 28 DSTs, and procedures are being drafted to periodically take these measurements.

- *Safety Basis* – In FY12, the Tank Farms safety basis was upgraded as a result of technical discussions with DNFSB technical staff. Upgrades include:
  - The Tank Farms safety basis was revised to allocate safety significant ventilation as a control for flammable gas to the DSTs in support of mixer pump operations. The upgrades needed to qualify the existing systems as safety significant were documented as planned improvements.
  - A new TSR-level control was added as an administrative control key element that requires terminating waste transfers and evacuating personnel from the DST farms (and any other farm with an ongoing waste transfer) after a detected seismic event to provide additional protection against waste transfer leaks and induced flammable gas releases.
  - Required leak tests in the TSRs for waste transfer primary piping systems were revised to include all such piping systems and Hose-in-Hose Transfer Line primary hose assembly connections that are unmade and remade. This requirement is above and beyond piping code requirements that require leak tests only on initial installation.

- *Probabilistic Seismic Hazard Analysis (PSHA*) – DOE (with the ORP Tank Farms project as lead) is currently in year two of a three-year project to update the seismic portion of the natural phenomena hazards assessment required by DOE Order 420.1B, using the PSHA process. Pacific Northwest National Laboratory is the DOE contractor performing the PSHA, which is scheduled to be complete in August 2014. The use of the PSHA process is driven by a recommendation 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. 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 $7.5 million dollar project.

- Tank AY-102 – During routine DST integrity inspection of Tank AY-102 in August 2012, material was discovered in the tank annulus space. Through subsequent monitoring and sample analysis, ORP identified a slow leak of chemical and radioactive waste in the annulus space – the first identification of a DST leak from the primary tank into the annulus. There is no indication of waste in the leak detection pit outside the DST. ORP is working with the Washington State Department of Ecology to determine the path forward. Since the discovery of the material, ORP has kept DNFSB staff updated on the status of Tank AY-102 and will continue to do so.

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.

H. Pacific Northwest Site Office

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

FY12 Safety Accomplishments and Activities

- PNNL completed substantial cleanout of the Building 325 B-Cell (hot cell) in preparation for refurbishment and replacement of the shield window in FY13. The shield window and a new working deck will be installed in support of the ongoing research mission.
- Key significant Building 325 maintenance activities were completed, including the ten-year replacement of the final stage HEPA filters and the five-year NFPA fire suppression system riser inspections.
- Safety system oversight assessments of the fire suppression system, criticality alarm system, confinement system, natural phenomena hazards mitigation, and nuclear maintenance management program were completed in FY12 and concluded that functional system operation, configuration, and program management and implementation are maintained at Building 325.
- An instrumentation upgrade for the Building 325 High Level Radiochemistry Facility hot cells was completed in January 2012. This project removed abandoned 1960s and '70s vintage instrumentation and upgraded the remaining tank level monitoring equipment with modern digital instrumentation.
- Construction work to refurbish and modernize four laboratories within Building 325 was completed. These laboratories provide contemporary, modular, and flexible research capability through the use of standardized casework and fume hoods, coupled with reconfigurable support components.
- Agreement was gained with the Hanford Site closure contractor to utilize a large concrete pad to the north of Building 325. The pad will provide needed storage space for equipment, materials, and waste to alleviate congestion in and around the facility and provide an added capability for staging and management of radioactive material shipping casks.
- In response to an informal DNFSB staff inquiry, PNNL provided technical details of GENII v 2.10 (radiological dispersion and consequence code) model parameters that affect particle deposition velocity.
- Directives Reform:

- Pacific Northwest Site Office (PNSO) approved the PNNL-revised unreviewed safety question (USQ) procedure for Building 325 in accordance with 10 CFR 830, which includes provisions of expert-based USQ reviews. This procedure is planned to be implemented in FY13.

- PNNL participated in the HSS Red Team review of DOE Order 420.1C, *Facility Safety*, and associated Standards DOE-STD-1066, *Fire Protection,* and DOE-STD-1020, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*.

- Federal Competency:

  - PNSO staff continued to become qualified under DOE Order 426.1, *Federal Technical Capability*, for Senior Technical Safety Manager and Nuclear Safety Specialist competencies.

- Operational Safety:

  - PNNL implemented an upgraded nuclear criticality safety program in compliance with American National Standards Institute/American Nuclear Society 8 Technical Standards and DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities.*

  - PNNL participated in the 2012 DNFSB review of the Hanford Site emergency management programs by providing requested information and an overview of the PNNL emergency preparedness program.

  - PNSO continues participation on the Integrated Safety Management Champions Council.

  - PNSO continues to promote the PNNL initiatives to strengthen laboratory culture, individual accountability, and employee engagement through participation as a DOE VPP Star site over the past ten years and establishment and implementation of Directorate Safety & Operations Councils and the Laboratory Zero Accident Committee.

I. Pantex Site Office (now part of the NNSA Production Office)

The Pantex Plant was one of the locations where HSS performed an extent-of-condition review of the safety culture during the summer months; the final report was distributed in November 2012. Correction of the areas in need of attention is a top priority for management at the Plant, and they began to take action to address the issues cited in the report even before the report was published. B&W Pantex, the Pantex Plant operator, took responsibility for improving several general categories: SCWE, communication between management and the workforce, management attention to employee concerns, and the work environment. Both the NNSA Production Office (NPO) and B&W Pantex generated a joint corrective action plan that is being executed. Priority short term actions that have been completed are: train all senior leadership in SCWE; consolidate all stop/pause work policies into a single clearly communicated policy; highlight and communicate the importance of the differing professional opinion process; relocate the employee concerns process to report to the General Manager to provide emphasis and attention. B&W Pantex identified $2M to be used for workplace enhancements and established a 15 person team representing all segments of the plant population. The 15 person team has two objectives. The first is to decide how the $2M can best be spent to improve the work environment. The second objective is to identify how best to communicate and advocate for a strong safety culture. The Federal and contractor senior leadership recognizes that this effort will require continued attention and evaluation, and they are actively engaged.

The DNFSB has written several letters addressing nuclear explosive safety (NES) issues at the Pantex Plant, expressing concerns about the independence and authority of the NES organization in the production environment. They believe that there is a need to improve the NES change control processes and clarify the directives addressing these processes. B&W Pantex completed a causal analysis study in May 2012, and NNSA completed an independent review of the contractor NES change control process in September 2012. Corrective actions were addressed to B&W Pantex, the NPO, and NNSA Headquarters. Corrective actions are being implemented. In January 2013, the Administrator assigned NES Policy and independent oversight responsibilities to the Associate Administrator for Safety and Health. This includes responsibilities for the NES Senior Technical Advisors. NNSA is also conducting a top-down review of the standards and other directives that guide the NES process. The objective is to reduce variability in NES change control and other processes.

Two emergency management exercises were conducted in FY12. One was a full participation exercise with offsite state and local agencies and was the largest exercise conducted at Pantex in six years. The scenario exercised the full range of emergency management operations: full incident response, activation of the operations center, emergency public information operations, security and hazardous material considerations, and all regulatory notifications. The other exercise scenario was a beyond design basis event including a cascading event. This was a site response to an earthquake including a chemical release. Corrective actions resulting from both scenarios have been placed in the site corrective action tracking system. Based on the exercises, improvements have been made to establish a single point of contact for drill coordination and planning,

standardize drill packages, update the emergency planning hazards analysis,and establish an expanded building warden program.

B&W Pantex has taken action to address issues in the quality of the DSA. Both B&W Pantex and NPO recognize that improvements in DSA documentation are required. To date, progress to gain sustained, effective, and timely documentation has been slow despite several corrective action plans. This issue is a management problem, combined with the inability to obtain the right level of experienced resources. Areas being addressed include the adequacy of DSA calculations, the configuration management of the safety basis reference documentation, and application of probabilistic estimates. The overarching concern is integrating all of the issues that need to be addressed, including anomalous units, probabilistic assessments, upgrades, NES change control, normal operations, and new tooling, so that identified safety issues are addressed while improvements are being made. B&W Pantex has made management changes, placed a priority on obtaining additional trained and qualified workers, and is developing key metrics to encourage the authorization basis department to be proactive.

Infrastructure improvements continued throughout the year. The high pressure fire loop (HPFL) project to replace part of the safety class fire system piping, pumps and tanks is ahead of schedule and under budget. Some corroded piping lead-ins have been replaced as part of the HPFL project when identified. Additional lead-ins are planned for replacement in 2013. These are scheduled on a priority basis and are carefully scheduled to allow adequate facility availability for production work. B&W has purchased all available fire panel replacement parts and established agreements with the vendor to continue to refurbish parts upon availability. Fire panels are continuously monitored and if a failure occurs operations are stopped. The first fire panel replacement is planned for 2013. The improvements (HPFL, replaced piping lead-ins, and fire panel replacement) will significantly enhance this critical safety system and allow much more flexibility in operations, as well as redundancy for reliability.

B&W Pantex has taken the initiative to evaluate CONOPS throughout the Plant based on several maintenance and manufacturing performance weaknesses. Several incidents in the areas of performing work beyond the authorization level, hazardous energy control, and fire protection maintenance led to a close evaluation of how work is executed. The review found that uniform CONOPS standards were needed. CONOPS and WP&C are being made consistent across the organization in a graded fashion by changing the work planning documentation, training the workforce, and taking measures to enhance accountability for work on or affecting safety systems.

J. Richland Operations Office

The DOE Richland Operations Office (DOE-RL) is making progress on its plan to reduce the active footprint of the 586 square mile Hanford Site to 75 square miles by the year 2015. This 2015 Vision for Hanford Cleanup will not only reduce the active cleanup footprint, but will also free up resources, reduce risk, and most importantly, demonstrate measureable progress toward cleanup of the site.

Aging Facilities and Adequacy of Design

In October of 2011 DOE-RL participated in an assessment of the Waste Encapsulation and Storage Facility (WESF) and Canister Storage Building that resulted from a DNFSB staff review of WESF in July 2011. This assessment confirmed the six topical areas where the DNFSB had concerns:

- Monitoring of Design Features – Design features associated with nuclear operations are periodically reviewed/verified to ensure functionality of the design feature.
- Compliance with Procedures – Procedures used to support nuclear operations and ensure satisfactory equipment and system operation are adhered to in the execution of daily operations and maintenance activities.
- Execution of Work – Work includes preventive and corrective maintenance and facility modifications and routine operations.
- Quality of Procedures – Procedures are used to execute nuclear operations, including operating procedures, preventive and corrective maintenance instructions, and supportive administrative documents.
- Facility-Specific Training – Training is provided to maintenance craft staff to support their work in the performance of maintenance tasks related to Safety Equipment List systems, structures, and components.
- Contractor Oversight Program – Assessment activities are conducted at the project level, program level, and independent assessment.

An extent-of-condition review was carried out within CH2M HILL Plateau Remediation Company (CHPRC), and more issues were discovered. From these assessments, CHPRC developed a comprehensive corrective action plan that was approved by DOE-RL. In February 2012, DOE-RL reported to the DNFSB on the status of the corrective actions and the basis for concluding that the corrective actions were effective. As part of the WESF recovery, CHPRC commissioned a Nuclear Safety Performance Evaluation Board (NSPEB) to look at all of its facilities/programs. DOE-RL has shadowed the NSPEB on several of their assessments and concluded that the NSPEB process is an effective tool for improving the performance of nuclear facilities. Additionally, DOE-RL, working with all of its major contractors, developed a maintenance policy that applies to both nuclear and non-nuclear facilities. The policy implements a graded approach for prioritizing maintenance for systems and components to ensure that the important systems and components receive proper

attention and care commensurate with their importance. This policy was placed in the contractors' contracts for implementation.

New Facilities and Adequacy of Management – Integration of Safety into Facility Design

The DOE-RL sludge treatment project (STP) implements the DOE-STD-1189 processes for all activities. The Knock-Out Pot (KOP) disposition subproject successfully used the design phased hazards analysis, accident analysis, and control decision process and involved the STP safety design integration team (SDIT) in each phase. Operators and field personnel provided detailed input as part of full-scale mockup equipment operation. The engineered container sludge removal subproject completed a preliminary safety design report (PSDR) and has completed the hazards and accident analysis for final system design in preparation for the PDSA, with full involvement of the STP SDIT. Documentation has evaluated compliance with DNFSB Recommendations 2002-3, 2004-2, 2008-2, 2010-1 as applicable to a major modification of a hazard category 2 nuclear facility. The DNFSB staff has reviewed accident analyses and control decisions at each phase of the design.

Safety Culture

DOE-RL pursued two avenues in FY12 to better understand the state of its safety culture. DOE-RL chose to perform a safety culture survey by the use of an independent contractor and to perform a field evaluation to gather good practices that lead to good safety behaviors.

The design objective of the safety culture survey was to evaluate the current state of DOE-RL's (and Hanford's) organizational climate, safety culture, and SCWE. The survey was developed around DOE Guide 450.4-1C, *Integrated Safety Management System Guide*, with a focus on SCWE. The survey was designed and administered by a contractor who specializes in this type of process and also added an independent, outside perspective. The survey contractor reviewed external literature and concluded that the focus areas, as specified in DOE Guide 450.4-1C, were appropriate and would serve DOE adequately. In addition, the survey contractor compared DOE-RL and its prime contractors to three external industry norms: U.S. National Norm, U.S. Transitioning Companies Performance Norm, and U.S. Engineering and Construction Norm. In general, DOE-RL and its prime contractors scored in the low 4's (out of 5.0 total), except in areas such as alternate problem identification process, job characteristics, staff retention and development, and internal avenues of redress. Of these lower-scoring factors, the lowest was 3.66.

In addition to the safety culture survey, DOE-RL performed a safety culture good practices evaluation to: (1) gather "good practices" in safety culture at DOE-RL, and (2) perform a "first look" at DOE-RL and its prime contractors as a follow-on to the June 2012 DOE sitewide safety culture survey. The team interviewed over 250 individuals, reviewed 500 documents, and attended more than 70 meetings and/or work evolutions in the field.

The evaluation concluded that DOE-RL and its prime contractors generally have a healthy respect for safety that is not compromised by production, budget, or schedule priorities. Most of the personnel interviewed believe in always doing work safely, and they were found to embrace the concepts and precepts of safety culture, ISMS, the VPP, and a variety of company/organization-specific practices that serve to improve safety behaviors.

The safety culture at Hanford under the DOE-RL purview has matured and continues to grow. The evaluation team believed that most of the personnel interviewed at DOE-RL understand the value and importance of a robust safety culture and are eager to offer ways of performing work better and safer. Most felt they had the freedom, support, and expectation to raise issues to supervisors and management without fear of retaliation. Although there were a few "pockets" where personnel interviewed had not raised issues, those instances were identified and turned over to the appropriate organization.

Work Planning and Control

DOE-RL provides oversight of contractor WP&C processes through various means (e.g., assessments, surveillances, and operational awareness reports). For FY12, DOE-RL performed a comprehensive site wide assessment and issued numerous operational awareness reports on WP&C. The assessment concluded that the contractors generally had adequate programs, although numerous findings and observations were cited. It is important to note that the Assessment Plan Lines of Inquiry were developed directly from the draft EFCOG Work Planning and Control Program Guidance document. In addition, a Surveillance Guide for upcoming maintenance management surveillance was developed using the recently approved EFCOG document.

DOE-RL was also involved in EM's review of the EFCOG Work Planning and Control Program Guidance document and provided comments. In general, DOE-RL found the document to be well written and a useful guide. DOE-RL has determined that most of the contractors' WP&C processes are adequately defined and that problems primarily exist in implementation (e.g., failure to follow the processes, interpretation, stretching applicability, and judgment). These issues are viewed as a management problem rather than a process problem.

In addition, DOE-RL has performed oversight of contractor WP&C assessments, such as URS's evaluation of Washington Closure Hanford's work management (Phase I), corporate independent review of the effectiveness of CHPRC's Integrated Corrective Action Plan in the area of work management, and numerous CHPRC NSPEB reviews.

FY12 Highlights

Plutonium Finishing Plant (PFP) Closure Project

During FY12, progress continued on what is the most challenging and complex cleanup project within the DOE complex. Accomplishment highlights include completing the demolition of the Plutonium Vault Storage Complex and 17 gloveboxes from the Remote Mechanical A and Remote Mechanical C lines in the 234-5Z building. Additionally, throughout the course of the year, PFP has significantly strengthened the following key operational focus areas: conduct of operations, radiological controls, work management, preventive and predictive maintenance, productivity, efficiency of field crews, and waste management. In FY12, these improvements were apparent in the contractor's key performance metrics; the facility has experienced only a single intake event at PFP while isolating, prepping, and separating complex, highly contaminated gloveboxes, and has had no skin/clothing contamination events. A surveillance of the non-destructive assay (NDA) program at PFP was initiated in the latter part of FY12 in accordance with DNFSB Recommendation 2007-1,

which included a recommendation to conduct periodic assessments to ensure that NDA programs are using the best available technology. Field interviews have been completed, and a draft report is in preparation. Continued stability of the craft workforce remains an essential element for safety and progress toward completing the demolition of the PFP complex to slab-on-grade by the end of FY16.

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 STP is to remove all of the sludge materials from the K West Basin by 2015, at which point the basin will be deactivated and then removed. The STP is subdivided into two subprojects:

- The KOP Disposition Subproject: In FY12, the KOP sludge was packaged into multi-canister overpacks and transferred to the Canister Storage Building for interim storage, pending its disposal with other spent nuclear fuel. The KOP disposition subproject successfully used the design phased hazards analysis, accident analysis, and control decision process and involved the STP SDIT in each phase. Operators and field personnel provided detailed input as part of full-scale mockup equipment operation.

- Engineered Container/Settler Tank: 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 2015. The second phase involves sludge treatment and packaging and its subsequent shipment to the appropriate facility for final disposal. In 2012, the engineered container sludge removal subproject completed a PSDR and the hazards and accident analysis for final system design in preparation for the PDSA, with full involvement of the STP SDIT. Documentation demonstrates compliance with DNFSB Recommendations 2002-3, 2004-2, 2008-2, 2010-1 as applicable to a major modification of a hazard category 2 nuclear facility. The DNFSB staff reviewed accident analyses and control decisions at each phase of the design.

Remediation of the 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 trenches started in April 2011, and significant progress was made during FY12. Through FY12, 76,000 cubic meters of waste have been remediated and 92,700 tons of waste disposed of at the Environmental Restoration Disposal Facility. The project also continued development of a technology for remediation of the vertical pipe units (five 55-gallon drums welded

end-to-end) that contain remote handled waste. A proof-of-concept test was successfully performed at a vendor facility in FY12, and additional testing and field deployment are planned for 2014. 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 late 2014. An amendment to the CGS operating license will be required prior to start of operations because the burial ground is located within the CGS emergency planning zone. 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.

Waste Encapsulation and Storage Facility

The DNFSB staff performed an emergency management program review in January 2012, focusing on Hanford emergency preparedness hazard analyses, emergency action levels, protective actions, notification, mechanisms to assure preparedness, relation to the safety basis, implementing procedures, assessments and corrective actions, drills and exercises, and training and qualification. The DNFSB staff observed a WESF Beyond Design Basis full-up drill in April 2012, focusing on a facility walkdown of WESF, discussions of the schedule and disposition plan for capsules, and observation of preparation and performance of the full-up drill. The DNFSB staff performed an emergency management follow-up review July 31- August 2, 2012, focusing on specific aspects of the Hanford emergency management program and application at certain facilities. In regard to WESF, the DNFSB focused on potential opportunities for improvement identified during the April drill and the status of related actions, how emergency response personnel will access the facility in the immediate aftermath of a beyond design basis seismic event and during the recovery phase, and what capability exists for monitoring the beyond design basis seismic event (as well as alternative monitoring systems currently in place or being considered in support of response and event classification). The DNFSB staff performed DOE-RL project reviews September 24 - October 2, 2012, focusing on a tabletop drill and post-drill activities performed at WESF. During this time, they also met with DOE-RL project staff and discussed the WESF Critical Decision-0 Mission Needs Statement.

On June 14, 2012, CHPRC completed the rearrangement of 1,936 cesium and strontium capsules, which contain about a third of the radioactivity at the Hanford nuclear reservation. Hanford workers rearranged the highly radioactive capsules under about 13 feet of water in a storage pool to redistribute the heat load generated by the capsules at the WESF and to protect workers and the environment from radiation. The work was completed six months earlier than the year-long movement schedule. The redistribution of the heat load provides a much better safety margin in the unlikely event that the storage pool loses its water due to a beyond design basis incident, such as a severe earthquake. With the capsules in the new configuration, it would be several months, rather than several days, before one of the capsules might possibly rupture due to overheating. Crews could be expected to restore water to the basin within a several-month time period to prevent capsule rupture.

Waste Receiving and Processing Facility

The Waste Receiving and Processing Facility (WRAP) was placed in standby status; full operations may occur at some future date. The WRAP Layup Transition and Maintenance Plan was

implemented and served as a guide to prepare WRAP for layup and to maintain its ability to recover from the layup period. The plan:

- Minimizes the mortgage costs for WRAP until restart of the facility
- Maintains facility safety and environmental compliance until restart of the facility
- Ensures that an adequate number of Waste and Fuels Management Project personnel are available to conduct required inspections/surveillances and to respond to events or operating equipment/system failures.

Low Level Burial Ground

The transition to the "minimum safe" condition at the Low Level Burial Ground (LLBG) involved transfer of retrieved waste containers to the Central Waste Complex (CWC), reburying the remaining unretrieved containers, placing LLBG structures (including Accelerated Process Lines) in a layup status, removing heavy equipment, and removing all debris and combustible materials. The mixed waste trenches will continue to receive waste for disposal.

Central Waste Complex

Normal operations will continue at the CWC, which will transition to a minimum safe state. No new procedures will be required. CWC will perform its basic mission of receiving and storing waste from onsite waste generators based on existing waste acceptance criteria. Routine surveillances are performed to identify containers that have degraded during storage at CWC. Degraded containers are managed using approved operational procedures.

T Plant

T Plant was transitioned to a minimum safe state by cleaning out and shutting down the Perma-Con modular containment structures and by removing radioactive waste containers to the CWC for long-term storage.

K. Sandia Site Office

The NNSA Sandia Site Office is the management office providing oversight of Sandia National Laboratories (SNL). Sandia Corporation, a wholly-owned subsidiary of Lockheed Martin Corporation, manages and operates SNL for the NNSA. SNL designs all non-nuclear components for the nation's nuclear weapons, performs a wide variety of energy research and development projects, and works on assignments that respond to national security threats. The following sections summarize significant interface activities with the DNFSB and staff during FY12.

Overview

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

- Annular Core Research Reactor Facility (ACRR)
- Sandia Pulsed Reactor Facility/Critical Experiments
- Gamma Irradiation Facility
- Manzano Nuclear Facility
- Auxiliary Hot Cell Facility (AHCF)

The DNFSB and its staff have provided oversight and assurance of safe and compliant activities at SNL nuclear facilities through regular correspondence with NNSA and SNL staff via conference calls, information/ documentation requests, and formal site visits. Through constant, open interaction with the DNFSB and the cognizant DNFSB staff engineer, SNL and NNSA continue to achieve outstanding performance and mission success through the integration of nuclear safety principles into the business process. SNL and NNSA continue to support formal DNFSB recommendations, requests for information/briefings, site visit requests, and the corresponding DOE implementation plans authored as a result of formal DNFSB correspondence.

ACRR Documented Safety Analysis

In a letter dated February 28, 2012, NNSA received official correspondence from the DNFSB related to concerns about the ACRR facility's DSA. The letter was generated after a year-long review conducted by the DNFSB staff that consisted of two week-long site visits and several documentation requests (approximately 2,500 pages of material). The letter and Staff Issue Report discussed:

- Issues in the overall safety analysis (e.g. conservatism, design basis accidents, beyond design basis accidents)
- Reliability of instrumentation and control systems
- NNSA's 90-day reporting and formal briefing requirements to address the concerns.

NNSA met all reporting and briefing requirements to address this correspondence. Following careful analysis by SNL and NNSA, an ACRR Improvement Plan was authored prior to receiving official correspondence that addressed all documented concerns. NNSA will monitor and validate this three-year plan to ensure that milestones are met.

ACRR Quality Assurance and Software Quality Assurance

In a letter dated April 18, 2012, NNSA received official correspondence from the DNFSB related to concerns about quality assurance and software quality assurance at the ACRR facility. The letter was generated after a year-long review conducted by the DNFSB staff that consisted of two week-long site visits and several documentation requests (approximately 2,500 pages of material). The letter and Staff Issue Report discussed:

- Issues in independent assessments
- Concerns about quality consensus standards invoked in the DSA
- Software quality assurance concerns related to the application of Nuclear Quality Assurance (NQA) -1 and the assignment of software practice levels
- SNL/NNSA's 90-day reporting and formal briefing requirements to address the concerns.

NNSA met all reporting and briefing requirements to address this correspondence. The ACRR Improvement Plan consists of improvement actions that address all documented concerns. NNSA will monitor and validate this three-year plan to ensure that milestones are met.

Other Interactions

Other notable activities, accomplishments, interactions with the DNFSB and DNFSB staff include:

- Oversight of NNSA's line oversight and contractor assurance system (LOCAS)
- Oversight of NNSA's review of implementation of DOE-NA-STD-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations*
- Orientation of new DNFSB staff engineer with responsibility for NNSA oversight
- Orientation of new DNFSB member.

Site Visits

The DNFSB and its staff completed five site visits, including a site visit by the full DNFSB on August 16, 2012. These visits focused on implementation of DOE Standard 3016, LOCAS affirmation, tours of SNL nuclear facilities, orientation of the new DNFSB cognizant engineer and DNFSB member, responses to FY12 formal correspondence, AHCF Campaign No. 9 activities, and the progress of the ACRR Improvement Plan.

L. Savannah River Operations Office

The Savannah River Site (SRS) performs activities for DOE EM and the NNSA. Activities performed by the site contractors – Savannah River Nuclear Solutions, LLC (SRNS); Savannah River Remediation, LLC; 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 FY12 for the EM-specific facilities/projects at SRS are summarized below.

Safety Programs

Work Planning and Control

In November 2011, DNFSB staff members conducted an activity-level WP&C review of SRNS procedures and processes. The staff also evaluated DOE-SR's oversight of WP&C. This review, part of a series that evaluated the implementation of integrated safety management at the activity level, identified weaknesses in hazard analysis and identification of controls, as well as in DOE oversight.

At the time of the review, the DNFSB staff recognized that both DOE-SR and SRNS were in the process of revising procedures and improving the process for activity-level work planning. Since the staff's review, SRNS has:

- Completed a gap analysis between the existing site requirements and the EFCOG WP&C guidelines and addressed the identified gaps by revising SRNS WP&C manuals and procedures.
- Strengthened the use of team planning and walkdowns.
- Strengthened the requirement to develop draft work control documents for use in developing the hazard analysis.
- Provided additional training for the breakdown of work activities to specific tasks.

DOE-SR has:

- Reassigned an individual with responsibility for the ISMS and WP&C program.
- Developed specific WP&C programmatic and field activity assessments.
- Briefed Facility Representatives on increasing activity-level WP&C assessments.
- Briefed subject matter experts on increasing programmatic assessments of hazard analysis activities.

In addition, the DNFSB issued technical report DNFSB/TECH-37, *Integrated Safety Management at the Activity Level: Work Planning and Control*, in August 2012. DOE Headquarters is developing the response and path forward, and DOE-SR is committed to assisting if requested. DOE-SR will continue to improve the oversight of the WP&C process and ensure that site contractors continue to enhance their existing programs.

Emergency Preparedness

As a follow-on activity for HSS Safety Bulletin 2011-01, *Events Beyond Design Safety Basis Analysis*, Site Emergency Management successfully planned and conducted an area-wide evaluated exercise based on a scenario involving a major seismic event that damaged multiple facilities, resulting in simultaneous radiological releases from Tritium and H-Tank Farm. Planning and conduct of the exercise were coordinated with Tritium, H-Tank Farm, and H-Canyon. Facility-level drills continue to focus on incorporating lessons learned from both the exercise and the preparatory activities prior to the exercise.

In response to DNFSB Recommendation 2012-1, *Savannah River Site Building 235-F Safety*, Site Emergency Management is assisting with the development of the implementation plan. Planned activities include a review of pertinent plans and procedures, development of a drill plan to enhance the knowledge and performance of personnel during emergencies, and routine conduct of training and drills to identify areas for improvement.

Recommendation 2004-2 (Active Confinement Systems)

In 2012, 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) addresses 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 is planned for FY13.

- Section B/C, Central Hood Exhaust (CHEX) HEPA Bank Blanks (LF1096) addresses DNFSB 2004-2 Gaps 1 and 5. Baseline Change Proposal CR11MO149 was approved to establish the project baseline. SRNL developed the model design and work package for installing blanks and the TSR mode change process to integrate TSR Limiting Condition for Operation 3.2.2, Administrative Control 5.7.2.5, and Design Feature 6.7 requirements. Two sets of blanks were installed. Two additional sets of blanks are planned for installation in FY13.

- E-Wing, Ventilation Project (Y646) addresses DNFSB 2004-2 Gaps 35, 36, 37, 38, 39, 40, and 42. Final design was issued. Engineered equipment was set in the field, including the installation of electrical power. Site preparation work and outside demolition and removal were completed. Installation of outside ductwork was initiated. Inside and balance of outside work to support startup are planned in FY13.

- E-Wing, Supply and Exhaust Interlocks (J-MT-A-00006) addresses DNFSB 2004-2 Gaps 26, 28, 29, 30, 31 and 32. Final design was approved. Long-lead materials and bulk materials were ordered. Work package to install raceways was initiated. No work was planned for FY13.

- Section B/C, Supply and Exhaust Interlocks Preliminary Design addressing DNFSB 2004-2 Gaps 3, 9, and 13 received DOE-SR approval for alternate scope from baseline established in FY11. Modification Traveler is planned for development in FY13.

- Replace B/C CHEX Tape-In-Place HEPA Filter Housings Pilot addressing DNFSB 2004-2 Gap 4 received DOE-SR approval for alternate scope from Baseline established in FY11. Modification Traveler and Data Sheet for HEPA filter housing procurement are planned for FY13.

Nuclear Materials Storage and Disposition

The DNFSB and staff have continued to show interest in plutonium and spent (used) fuel storage/disposition plans. The DNFSB also issued Recommendation 2012-1 regarding residual plutonium-238 holdup in 235-F. Key areas of interest and activities included:

F-Area

- The DNFSB and staff have shown continued interest in 235-F (formerly a plutonium-238 processing facility). The DNFSB and staff toured the facility in March 2012 and have visited SRS several times to discuss risk reduction and safety basis plans. On May 9, 2012, the DNFSB issued Recommendation 2012-1, which urged DOE to take action to remove and/or immobilize the residual contamination within 235-F and to also take actions to more effectively prevent a major fire in 235-F. Taking these actions would reduce potential dose consequence associated with a radiological release to collocated workers and the public. DOE accepted the recommendation on July 10, 2012, and prepared an implementation plan to address the issues in the recommendation, in particular: demonstrate that no unacceptable risks are posed to the public, workers, or the environment; ensure that combustibles are controlled, a reliable fire detection system is maintained and operated for the Plutonium Fuel Form cells; an F-Area drill program is implemented to protect collocated personnel.

- The DNFSB staff has shown interest in the technical basis for the credited F/H Laboratory leak path factor and alternatives analysis for the lab's ventilation system.

H-Area

- Progress has been made in 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, DSA support for the plutonium mission, 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 began dissolution of plutonium for subsequent processing by HB-Line to produce between 3 and 4 metric tons of plutonium oxide for MOX feed. Preparations for oxide

production in HB-Line are expected to be completed in the third quarter of FY13; implementation of the recently revised HB-Line DSA (DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*) is critical path. Oxide production would occur through FY17.

- H-Canyon began the Sodium Reactor Experiment (SRE) processing campaign in August 2012. The SRE fuel was identified as vulnerable to extended storage in the L-Area basin. DOE is preparing to repatriate highly enriched uranium (HEU) liquid for processing in H-Canyon. Following shipment and loading preparations, plans are to process and down-blend the HEU to low enriched uranium in H-Canyon beginning in the fourth quarter of FY14. H-Area is also preparing for the receipt of a small quantity of HEU oxide from Y-12 for processing in FY13.

- The DNFSB and staff have specifically shown interest in the process air exhaust tunnel for H-Canyon and the functional classification of the HB-Line ventilation system.

K-Area

- There is continued DNFSB interest in fire water system upgrades and repairs, particularly fire water tank inspection and fire water pump replacements. The fire water tank was inspected and silt removed. Required maintenance is up to date. The fire pumps have been received and are being replaced. Impairments associated with the shuffler fire water supply system are being addressed. All items are expected to be completed by the fourth quarter of FY13.

L-Area

- There is continued DNFSB interest in the surveillance and disposition/stabilization of spent (used) nuclear fuel. An augmented surveillance and monitoring strategy was developed to further evaluate degradation mechanisms and corrosion rates in L-Basin, demonstrate safe extended storage of fuels in isolation cans, and strengthen demonstration of structural integrity of the L-Basin structure. Additionally, a Processing Priority document was created that considers several factors, including fuel vulnerability (risk associated with extended storage). Fuel thus far identified as vulnerable (SRE) is being shipped to H-Canyon for processing.

Liquid Waste Operations

The liquid waste disposition program made significant progress in FY12 in safely treating and dispositioning high level wastes and reducing risk. This program at SRS has continued to communicate to the DNFSB and staff through monthly conference calls and senior management briefings that address critical DNFSB areas of interest:

- Recommendation 2001-1 and Tank Space Management
- Tank 48
- Saltstone
- Defense Waste Processing Facility (DWPF)

- Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU)
- Tank Closure.

Recommendation 2001-1 and Tank Space Management

Recommendation 2001-1 was closed on December 7, 2011. The remaining commitments regarding Tank 48 treatment and DWPF recycle initiatives will continue to be tracked through routine processes. The liquid waste system continues to store liquid radioactive wastes in a safe and environmentally sound manner, while using the space to remove and treat all waste through DWPF and Saltstone. The old style tanks with leakage histories are being retrieved and closed. SRS will continue to monitor the nuclear waste stabilization process output with the availability of storage space for HLW in the new style tanks to ensure adequate contingency storage space is maintained.

Tank 48

Tank 48 contains approximately 26,000 kg of organic tetraphenylborate, which currently precludes the permanent disposition of the waste in its current form. A copper-catalyzed peroxide oxidation (CCPO) process has been investigated as a cost effective alternative to fluidized bed steam reforming to treat the legacy organics. A series of laboratory experiments (utilizing simulants), flow-sheet analyses, and preliminary safety analyses were completed. The results of these experiments and analyses suggest that the CCPO process is a viable technology for treatment of the Tank 48 waste in preparation for permanent disposition. Given its viability, it was recommended that the technology maturation continue with experiments on real waste to confirm the simulant test results and to begin establishing parameters of operation.

Saltstone

Saltstone is the disposal facility for low level waste in a grouted waste form. One of the key areas of DNFSB interest is the reliability of Saltstone and the improvements necessary to meet the system plan requirements. During FY12, Phase 1 of the enhanced low activity waste disposition program was completed to prepare the Sodium Process Facility to accommodate increased throughput. Improvements include redesign of components to increase operating margin, improve process control, and ensure timely upset recoverability. In addition, obsolete components were replaced with current components, and spares were procured. Upon resuming operations following the outage, Saltstone processed over 1 million gallons of low level waste over a seven-week period in September and October. In accordance with the current operating strategy documented in the Saltstone Reliability Plan, Saltstone will enter a maintenance outage to allow accumulation of sufficient feed to sustain another series of daily operations. Using 24/7 staffing levels, a production capacity of 232,000 gallons per week is projected as necessary to support the volumes expected during the 2nd through 4th years of operations at the Salt Waste Processing Facility (SWPF). Recently, approximately 255,000 gallons were processed during a consecutive seven-day period, by day shift operations only. These operations indicate that production systems, which were upgraded during the outage, improved reliability and that future production rates during 24/7 operations are therefore achievable.

Defense Waste Processing Facility

The DWPF has been the focus of DNFSB interest, particularly regarding melter performance with enhancements, e.g. bubblers. In FY12, DWPF produced 275 canisters, with a monthly maximum of 37 canisters in January 2012. The DWPF recycle stream continues to be managed with beneficial reuse and water management initiatives in the chemical process to minimize the tank space impacts, a key focus of the DNFSB.

Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit

The DNFSB and staff continue to show a great deal of interest in the operation and life extension of ARP/MCU, given the continuing need for its operations. ARP/MCU started up in 2008 and has processed over 2.75 million gallons of salt solution since initiating radiological operations. Decontamination factors of the salt solution have averaged well above the design basis of 12. The ARP/MCU continues to provide critical information to SWPF while meeting the needs of the system plan. ARP/MCU spent most of FY12 in an outage to extend its life and prepare to demonstrate increased throughput. Preparations for extended operations have included plans to upgrade process equipment, improve availability of spare parts, and adjust the preventive maintenance program through increased performance monitoring during life extension. The primary throughput enhancement identified the rate-limiting steps and implemented necessary improvements to enhance throughput. A phased operational demonstration approach was developed and is being implemented.

M. Savannah River Site Office

The NNSA Savannah River Site Office oversees activities related to tritium programs at SRS. These include nuclear weapons stockpile stewardship and operation of the Tritium Facilities. NNSA activities at SRS are performed by the site contractor, SRNS. The major activities and significant accomplishments in FY12 associated with the NNSA tritium programs included:

- All required reservoirs and other limited-life components were delivered to military customers on schedule. This effort included planning and executing without incident the Reservoir Acceleration project, completing four months of reservoir loading commitments in a single month (November 2011).
- The SRS Tritium Facilities met FY12 requirements in support of the stockpile stewardship program. Gas transfer systems were successfully function tested, and the resulting data was provided via formal reports to the design agencies in support of the annual stockpile certification.
- The Tritium Extraction Facility completed extraction of the Cycle 10A tritium producing burnable absorber rods ahead of schedule and without incident. When not in extraction mode, SRNS successfully transitioned to "Responsive Operations," a cost effective strategy that involves assigning cross-trained personnel to work in additional facilities.
- Several accomplishments advanced the Tritium Responsive Infrastructure Modifications initiative, which is relocating and right-sizing the remaining functions from 1950s and '60s vintage process facilities into the more modern facilities. For example, startup of one project enabled centralized control of the Tritium Extraction Facility from the H-Area New Manufacturing (HANM) facility. Another project relocated the helium-3 recovery and bottling process from the legacy 236 H facility into HANM. Construction of the new Tritium Engineering and Process Support buildings is also nearing completion.
- Facility sustainment was also a focus area in FY12. SRNS completed a major outage to address corrosion issues in the HANM process stripper/zeolite bed recovery system and resumed regeneration of the zeolite beds, which are essential to facility operations. The installation of the HANM Uninterruptible Power Supply Bypass project enabled subsequent replacement of obsolete uninterruptible power supply systems in HANM without having to shut down the entire facility. Mechanical completion was also achieved for replacement of a degraded supply fan in the 238-H Reclamation Facility. A conceptual design to replace the current safety significant glovebox oxygen monitors with more robust technology was completed.
- The nuclear disaster caused by an earthquake and tsunami in Fukushima, Japan brought to light the importance of an integrated response to natural phenomena hazards (NPH). SRNS Tritium personnel led the site in arranging and conducting integrated site emergency preparedness drills that simulated NPH incidents affecting multiple facilities, involving multiple contractors and both Federal offices. The magnitude of these drills was unprecedented at SRS and resulted in an improved response capability for NPH events.

- SRNS completed all required FY12 authorization basis scope, including development and implementation of various annual updates and upgrades, and revision of supporting consolidated hazards analyses. The response to a letter from the DNFSB citing concerns about Tritium's authorization basis was developed, including a Tritium-specific deposition velocity, which is being used as a part of the site-level response to MELCOR Accident Consequence Code Systems (MACCS2) dispersion code modeling issues. Site-specific dispersion modeling parameters were developed and submitted to NNSA. Approval by NNSA is expected in FY13, and incorporation of the new parameters into facility safety basis calculations will be managed in accordance with safety basis document update schedules.

- SRNL earned a National Security Agency certification letter approving its wireless sensor network design for transmission of classified wireless data. When adopted in future facility designs, this accomplishment will enable significant cost savings across the nuclear security enterprise.

- Automated Reservoir Management System II post project scope was executed efficiently in FY12, with three major deliverables accomplished. One key milestone achieved was implementation of the first operational function – H1616 shipping container management.

N. Y-12 Site Office (now part of the NNSA Production Office)

During FY12, the NNSA Y-12 Site Office and B&W Y-12, the site contractor, continued work to improve the overall safety and operation of the Y-12 site by focusing on: (1) close oversight and line management attention to ensure safe operation of several aging nuclear weapon production facilities, (2) continued improvement of CONOPS and WP&C, (3) engineering and nuclear safety, and (4) integration of safety into the design of the Uranium Processing Facility (UPF).

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

Until the UPF can be constructed and become operational, enriched uranium operations will depend on continued operations within Building 9212 (portions of which are over 60 years old), 9204-2E, and 9215. Because of their age, these buildings are costly to keep operating and do not meet current design requirements for hazard category 2 nuclear facilities. NNSA responded to two 2005 DNFSB letters noting the urgency for construction of UPF by completing facility risk reviews (FRR) for these facilities and initiating required actions to ensure continued safe operations until UPF is operational. In addition to taking actions identified in the FRR reports for Building 9212, the oldest of the three enriched uranium processing facilities, Y-12 initiated a regimen of increased vigilance and close observation that regularly assesses the physical condition of Building 9212 to support safe operations by the Continued Safe Operability Oversight Team (CSOOT).

The CSOOT provides quarterly updates to senior management on their evaluations and recommendations regarding the adequacy of Building 9212 to support continued reliable and safe operations. In addition, the CSOOT is required to provide an annual written report and briefing to NNSA and the DNFSB. The CSOOT's FY12 evaluation of Building 9212 performance indicators, facility system and process condition assessments, and operations and safety data identified no safety issue that would currently provide a reason for limiting operations. Increased line management attention reacted promptly to aging issues with respect to important safety-related fire suppression systems – end of life sprinkler heads and identified corrosion issues in dry pipe systems. Replacement efforts were promptly implemented in both cases to facilitate continued safe operation. The additional planned FRR funding supported the response. These events validated the current oversight and infrastructure's ability to respond to aging issues and to ensure that risk remains acceptable for continued safe operation.

The DNFSB has been particularly concerned as the schedule for UPF changed, requiring the Building 9212 complex to operate until at least 2021. Taking these concerns into consideration, a February 14, 2012, memorandum from the NNSA Deputy Administrator for Defense Programs outlined an accelerated UPF project strategy to start transitioning enriched uranium processes out of Building 9212 in 2019.

The FRR results for the follow-on evaluation of Buildings 9204-2E and 9215 identified the following positive observations: the material at risk in both facilities has been greatly reduced and is ahead of

projected targets; and B&W Y-12 line management is implementing FRR 9204-2E recommendations to address degradation of the Kathabar systems, upgrades to the environmental room and house machine vacuum system, and relocation of 9204-2 highly enriched uranium processes to 9204-2E. The FRR also noted that establishment of Operation Plans for 9204-2E and 9215 has provided line management with an effective tool to manage near-term and mid-term maintenance and improvement activities.

The team's proposed recommendations to account for changes in the UPF project schedule included a list of selected prioritized projects to address the risks of continuing safe operations in 9204-2E and 9215 until 2030. The highest priority projects are replacement of multiple motor controllers, switchgears, and electrical panels; increased maintenance resources and critical spare parts; refurbishment/replacement of key process equipment and support systems; and replacement of safety significant fire system sprinkler heads when they reach 50 years old. The team recommended further development and maturation of Operation Plans and the automated tool set for determining the system health of critical processes. Of particular interest is the expansion of the Operation Plan scope to the 2030 timeframe. In response to a recommendation that B&W Y-12 and NNSA management establish a process to evaluate and periodically report the progress and current status of 9204-2E and 9215 FRR , the CSOOT Charter has been expanded to include 9215 and 9204-2E.

Continued Improvement of Conduct of Operations and Work Planning and Control

To establish a resilient and reliable CONOPS program, B&W Y-12's Production Division implemented a CONOPS Improvement Plan that reinforces the basic fundamentals that result in safe and efficient nuclear operations while addressing DNFSB concerns noted in a 2011 letter. The CONOPS Improvement Plan was issued in September 2011, and improvement actions are under way. The CONOPS fundamentals that the improvement plan focus on are: (1) increasing line management involvement and oversight of operations on the floor; (2) simplifying work processes that plan and control work safely and efficiently (procedures); (3) improving personnel's understanding and acceptance of their accountability and responsibility at the line manager, supervisor, and worker level; (4) instituting focused practical operational training; and (5) shifting to a more performance based assessment program. NPO and NNSA reviews in 2012 have noted significant progress in improving CONOPS performance.

In a December 2011 letter, the DNFSB noted concerns about Y-12 WP&C. B&W Y-12 was already working to address several identified WP&C issues and updated its improvement plan to ensure that all DNFSB concerns were being addressed. In June, an evaluation was conducted by NPO internal and independent review teams to assess B&W Y-12's progress in improving activity-level WP&C. Assessment criteria were developed that correlated directly to the DNFSB concerns related to job scope specificity, task-specific hazard identification, and general workability of the packages. The teams determined that while progress is being made, the process is not fully developed or uniformly executed. During the field assessments conducted by NPO, greater supervisory and support organization participation was observed, and it appeared that this involvement was having a positive effect on work documentation compliance. As problems are identified, the contractor has consistently adapted to meet the program objectives. However, problems with coordination of

repair and maintenance activities with operations personnel continue and are being addressed by B&W Y-12 management.

The WP&C improvement efforts remain a work in progress. B&W Y-12 has experienced a number of lockout/tagout (LO/TO) problems during the past six months that are closely intertwined with work execution and control. B&W Y-12's response to the LO/TO problems has resulted in an initial suspension and subsequent deliberate and controlled return to work involving LO/TO. Actions have been progressing to improve LO/TO and further strengthen the changes in activity-level work control. NPO assessment activities have expanded to include reviews of the LO/TO recovery actions.

Engineering and Nuclear Safety

In October 2011, the DNFSB staff conducted a review of Y-12's criticality safety program, focusing on: (1) follow-up on B&W Y-12's improvement plan progress to address criticality safety program weaknesses identified by NNSA and DNFSB in the 2008/2009 timeframe, and (2) the implementation of criticality safety controls. The staff concluded that progress was being made in completing the Y-12 Criticality Safety Improvement Plan and that the effort to date was worthwhile. The plan was fairly detailed, B&W Y-12's development and implementation of the criticality safety evaluation (CSE) writer's guide was positive, and the prioritization of CSEs and working off the prioritized list constitute the right path. The DNFSB staff was impressed with tracking of CSE administrative controls from CSE to implementation plan to procedures.

Integration of Safety into UPF Design

On April 2, 2012, the DNFSB sent a letter to the NNSA concerning the UPF preliminary design and integration of safety into the design. That letter identified specific concerns, including concerns about: (1) UPF's confinement strategy following a design basis seismic accident; (2) systems, structures, and components required to avoid an inadvertent criticality during or following a seismic event; (3) the need for thorough evaluation of unmitigated hazard and accident scenarios; (4) the need to identify controls to protect the public against small fires that have the potential for significant offsite toxicological consequences; and (5) the need to use reasonably conservative values to calculate dose consequences for several accident analyses that may require safety class controls. The DNFSB requested a report and briefing to describe NNSA's approach for demonstrating adequate integration of safety in the preliminary design. On May 2, 2012, the NNSA responded that the project remains committed to the principles in DOE-STD-1189 and transmitted (along with a briefing to the DNFSB on May 7, 2012) an initial report addressing several of the specific concerns, with a commitment to follow up the report with a comprehensive report within 60 days. On June 27, 2012, the NNSA transmitted the 60-day comprehensive report.

The UPF project has been working closely with the DNFSB staff and has taken actions identified in the NNSA 60-day comprehensive report to improve the integration of safety into the design. In September 2012, the UPF project submitted a revised PSDR and associated support safety documents to the NPO to address specific concerns identified by the NPO and the DNFSB. Changes to the UPF design include upgraded seismic qualification of selected systems, structures, and components related to nuclear safety, including criticality safety and confinement capability,

enhanced evaluations of hazard and accident scenarios, and an updated evaluation of fire scenarios. In addition, the B&W Y-12 PSDR submittal letter recommended that safety class structure and fire barriers be considered as a risk mitigation strategy to address current (and any future) concerns resulting from design changes or safety analysis conservatism. These documents are undergoing review to ensure that the concerns have been addressed. Additionally, longer-term corrective actions are being implemented as outlined in the 60-day report; the effectiveness of these actions is being monitored by the site office.

List of Acronyms and Abbreviations

ACCR	Annular Core Research Reactor Facility
AHCF	Auxiliary Hot Cell Facility
AIM	Access-Improve-Modernize
AMLLW	Alpha-Contaminated Mixed Low Level Waste
AMWTP	Advanced Mixed Waste Treatment Project
ARP/MCU	Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit
B&W Y-12	Babcock & Wilcox Technical Services Y-12, LLC
BBA	Box Breakdown Area
BNI	Bechtel National, Inc.
CAM	Critical Assembly Machine
CBFO	Carlsbad Field Office
CCP	Central Characterization Project
CCPO	Copper-Catalyzed Peroxide Oxidation
CDP	Calicine Disposition Project
CFR	Code of Federal Regulations
CGS	Columbia Generating Station
CH	Contact-Handled
CHEX	Central Hood Exhaust
CHPRC	CH2M HILL Plateau Remediation Company
COBRA	Changing Our Behavior Reduces Accidents
CONOPS	Conduct of Operations
CSE	Criticality Safety Evaluation
CSOOT	Continued Safe Operability Oversight Team
CWC	Central Waste Complex
CWI	CH2M-WG Idaho, LLC
DAF	Device Assembly Facility
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
DST	Double Shell Tank
DWPF	Defense Waste Processing Facility
EBR	Experimental Breeder Reactor
EFCOG	Energy Facility Contractors Group
EM	Office of Environmental Management
FEOT	Field Execution Oversight Team
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
HPAV	Hydrogen in Pipes and Ancillary Vessels
HSS	Office of Health, Safety and Security
ICP	Idaho Cleanup Project
INL	Idaho National Laboratory
IP	Implementation Plan
IRT	Independent Review Team
ISMS	Integrated Safety Management System
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
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LAW	Low-Activity Waste
LLBG	Low Level Burial Ground

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
MFC	Materials and Fuels Complex
MLLW	Mixed Low Level Waste
MOX	Mixed Oxide
NCERC	National Criticality Experiments Research Center
NDA	Non-Destructive Assay
NES	Nuclear Exposive Safety
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
NSO	Nevada Site Office
NSPEB	Nuclear Safety Performance Evaluation Board
NSTec	National Security Technologies, LLC
OGE	Off Gas Exhaust
ORNL	Oak Ridge National Laboratory
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
PJM	Pulse Jet Mixer
PNNL	Pacific Northwest National Laboratory
PNSO	Pacific Northwest Site Office
PRT	Peer Review Team

PSDR	Preliminary Safety Design Report
PSHA	Probabilistic Seismic Hazard Analysis
QRA	Quantitative Risk Analysis
RCRA	Resource Conservation and Recovery Act
RH	Remote-Handled
RPP	Radiation Protection Program
QRA	Quantitative Risk Analysis
SASSI	System for Analysis of Soil-Structure Interaction
SCWE	Safety Conscious Work Environment
SDIT	Safety Design Integration Team
SNL	Sandia National Laboratories
SNM	Special Nuclear Material
SPWF	Salt Waste Processing Facility
SRE	Sodium Reactor Experiment
SRNL	Savannah River National Laboratory
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SST	Single Shell Tank
STP	Sludge Treatment Project
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
VPP	Voluntary Protection Program
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