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

Supplement: Site Specific Activities and Accomplishments Fiscal Year 2010

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Safety Accomplishments and Activities at Major Defense Nuclear Sites

The discussion of safety accomplishments and activities at the defense nuclear sites in this appendix is organized by mission sponsor—Energy and Science or the National Nuclear Security Administration (NNSA)—and then by the responsible Department of Energy (DOE) field element as follows. Within the Energy and Science category, the Office of Environmental Management (EM) has responsibility for most of the relevant field elements, sites, and activities. However, the Office of Nuclear Energy (NE) is the lead program secretarial officer for Idaho Operations Office activities, and the Office of Science is the lead program secretarial officer for Oak Ridge Office activities.

A. Carlsbad Field Office
B. Idaho National Laboratory
C. L ivermore Site Office
D. Los Alamos Site Office
E. Nevada Site Office
F. Oak Ridge Office
G. Office of River Protection
H. Pantex Site Office
I. Richland Operations Office
J. Sandia Site Office
K. Savannah River Operations Office
L. Savannah River Site Office
M. Y-12 Site Office

For the Savannah River Site, NNSA and EM have primary management responsibilities for certain aspects of operations. Most site operations at the Savannah River Site, including cleanup efforts, are overseen by the Savannah River Operations Office under the auspices of EM. Tritium facility operations are overseen by the Savannah River Site Office under the auspices of NNSA.

The following information was gathered from the above identified field offices and is presented as submitted, with only minor editorial changes and corrections.

A. Carlsbad Field Office

The Carlsbad Field Office (CBFO) manages the Department of Energy's (DOE or Department) National Transuranic (TRU) Waste Program Office, the Waste Isolation Pilot Plant (WIPP) facility operations, and serves as an international center for the study of waste management. The CBFO coordinates the program for the permanent disposal of TRU radioactive waste at Department sites, national laboratories, and other participants.

WIPP, located in the desert of southeastern New Mexico, is a non-reactor nuclear facility providing safe and permanent disposal of defense TRU and TRU-mixed waste in subterranean salt beds 2,150 feet underground. Since its opening in 1999 for TRU waste disposal, WIPP has played an essential role by helping DOE meet its commitments to environmental cleanup around the nation. The WIPP's success has largely resulted from the integration of safety into its entire program mission: safe characterization, transportation, and permanent disposal of TRU waste.

Operational and Safety Accomplishments at the Waste Isolation Pilot Plant

WIPP continues to be a significant contributor to the Department's progress toward completing cleanup throughout the EM complex. WIPP has received more than 9,000 shipments and disposed of over 72,000 cubic meters of TRU waste since opening. Significant efforts were made by management and line workers at all levels, which resulted in the following operational and safety accomplishments:

- As of mid-November 2010, WIPP was on pace to receive more shipments of TRU waste in CY 2010 year than any previous year (more than 2006's high mark of 1,142 shipments).

- WIPP received its 9,000th shipment of TRU waste on October 5, 2010. In April, the WIPP transportation system surpassed 10 million loaded miles traveled to WIPP (20 million total), without a radiation-related incident.

- WIPP has safely received more than 400 shipments of remote-handled TRU waste. This effort involved close coordination of characterization, transportation, safety, quality assurance, security, waste handling, and engineering operations.

- In FY 2010, WIPP achieved a low Total Recordable Case Rate of 0.23, which included all participant organizations. WIPP did not have a single Days Away, Restricted, or Transferred case (4,083,753 exposure hours since the last injury causing Days Away from work).

- In CY 2010, WIPP was recertified at the Star level in DOE's Voluntary Protection Program (VPP). The DOE VPP promotes safety and health excellence through cooperative initiatives among employees, management and government at DOE contractor sites. The VPP Star Award is based on a three-year average compared with either of the most recent one-year averages from the Bureau of Labor statistics. WIPP's average was compared to the industry average. The first DOE site to receive VPP Star status in 1994, WIPP has continued at that level ever since. Star status is the highest level that can be achieved and is reserved for companies that demonstrate outstanding protection of employees' safety and health. Among other factors, a company must show continual improvement to receive Star status.

- In January 2010, WIPP resumed disposal operations following an extended maintenance outage for some extensive facility upgrades. Work was completed above and below ground without a single recordable injury occurring.

- WIPP celebrated 11 years of safe operations on March 26, 2010.

- WIPP was honored with a Best-in-Class for Alternative Fuels and Fuel Conservation award from DOE for cutting fuel usage for evaporation pond construction by 50 percent.

- Completed cleanup of the Vallecitos Nuclear Center in Sunol, California and the Lawrence Livermore National Laboratory Site 300, bringing the total number of sites cleaned up to 17.

Activities Related to Implementation of Board Recommendations

WIPP received two Defense Nuclear Facilities Safety Board (Board) team visits in FY 2010.

In June 2010, the Board reviewed electrical systems and the electrical safety program; in July 2010, the Board reviewed work planning and control in the performance of operations and maintenance. The June visit identified examples of areas in which WIPP's electrical safety program was not meeting the guidance in DOE's Electrical Safety Handbook and after the July visit the Board expressed concern that that Integrated Safety Management processes used to plan and control activity-level work at WIPP are not fully implemented. The Board noted that the safe conduct of operations and maintenance is of particular importance at WIPP because of its unique position as DOE's only operating facility for disposal of TRU waste.

The CBFO and WIPP welcome the perspective and comments of the Board and are committed to addressing the findings identified by the Board's staff in a timely manner.

B. Idaho National Laboratory Site Office

Bechtel BWXI Idaho (BBWI) Overview

The Advanced Mixed Waste Treatment Project (AMWTP) is a performance cornerstone to Department of Energy's (DOE) commitment for complex-wide transuranic (TRU) waste cleanup. The AMWTP's mission is to process and disposition approximately 65,000 m^3 of waste that has been historically managed as TRU. Managed by Bechtel BWXT Idaho, LLC (BBWI), safety and compliance are paramount to operations at the AMWTP. The AMWTP recently surpassed seven years and 11 million hours without a lost time injury. A truly world class safety mark, one that has never been achieved by a prime contractor at DOE's Idaho site and one that rivals nearly every site in DOE's complex. In addition, the AMWTP has compliantly disposed of over half of its inventory.

Summarized below are the 2010 safety initiatives and AMWTP accomplishments; specifically Defense Nuclear Facilities Safety Board (Board) Recommendations applicable to the AMWTP, recent AMWTP/Board interaction on waste retrieval, and related safety initiatives.

The Board and Waste Retrieval

The AMWTP faces significant retrieval challenges that the Board has reviewed and assisted on the path forward. In summary, pre-1971 waste stored at the Transuranic Storage Area/Retrievable Enclosures (TSA/RE) has not been coated with any type of preservative coating. The plywood, especially where in close proximity to the soil covering/side burden, has degraded significantly, leaving the structural integrity of the boxes in question.

In February of 2010, AMWTP reached these degraded plywood waste boxes on Cell 3, Pad 1. Initial attempts at retrieving, repairing, and over-packing these boxes were unsuccessful. Therefore, retrieval operations were suspended in July of 2010 awaiting engineering controls and process changes for protecting workers and preventing the potential spread of airborne contamination.

Status review and updates on the design, procurement, and construction of retrieval engineered controls, including Retrieval Contamination Enclosure, Inner Contamination Enclosure (ICE), and ancillary systems will take place in December 2010 and January 2011. The Board has supported the AMWTP in reviewing and commenting on the proposed path-forward.

BBWI Safety Initiatives

The AMWTP experienced unfavorable trends in injury performance through FY 2010. The OSHA Total Recordable Case Rate and Days Away, Restricted, or Transferred rates increased over the last 8 months. This resulted in rolling 12 month safety metric averages above the project goals, with the exception of the day away case rate; the AMWTP has maintained remarkable to-date performance of reaching seven years and 11 million hours without a lost time injury.

As a result of declining safety injury performance in FY 2010, the AMWTP developed and aggressively implemented several safety improvement plan actions and improvement opportunities related to safety performance to improve situational and safety awareness on the job, return safety performance to acceptable levels, and realign the AMWTP back on track to the goal of zero accidents and injuries. The FY 2010 safety improvement plan defined immediate actions that could be taken by employees, supervisors, and management to return safety performance to acceptable levels.

Expectations, goals, and initiatives implemented project-wide, as part of the plan, had a positive impact on injury rate occurrence. As a result of these actions, safety metrics of recordable accidents and worker restrictions both showed improvement. Performance is expected to continue to positively influence the injury metrics to trend within their desired goals through FY 2011.

The safety improvement plan included the following initiatives:

- Senior management redefined safety and compliance expectations and personal accountability for all supervisors and managers.

Employee and management engagement and commitment to safety using tools, procedures, and processes already in place on the project (e.g. Integrated Safety Management Systems, DOE's Voluntary Protective Program (VPP) principles, and Human Performance Improvement (HPI).

- Employee involvement through direct participation in the development and recommendation of safety improvement initiatives.

- A renewed strategy was developed to refocus management and employees in the completion of observations.

- Additional HPI training modules were developed. HPI role model training was introduced to help workers and supervisors supporting initiatives in the field.

Injury investigations to analyze the behaviors and latent weaknesses of the task involved in the injury and sharing the results of the analysis with the workforce through safety shares, project communication notes, and depending on the severity of the injury, through accident reconstruction videos.

Development of weekly HPI and Safety Shares tailored toward operational performance issues and shared with the workforce in staff meetings, shift changes, and pre-job briefings, as a means to engage workers in safer work practices and continually look for improvements in our safety performance.

Introduction of the Safety Task Analysis Risk Reduction Talk (STARRT) card to promote situational awareness on hazard recognition and the establishment of the Plant Operations Review Committee (PORC) to improve work control processes for addressing change in operational conditions to assure the activity can be performed safely and successfully.

By the conclusion of FY 2010, the majority of the metrics trended positive. While indications are that the AMWTP is progressing, BBWI senior management has initiated a FY 2011 safety improvement plan that will continue to utilize and implement the above aspects and maintain the positive achievements reflected in safety performance as a result of the FY 2010 safety improvement plan.

Idaho Cleanup Project (ICP) Safety Initiatives

The Idaho Cleanup Project (ICP) involves the safe environmental cleanup of the INL site, 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 (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.

During 2010, the American Recovery and Reinvestment Act (ARRA) funding continued the acceleration and risk mitigation work efforts at the ICP. The ARRA work scope includes: demolition of 89 facilities and structures; receiving, transporting, processing and disposing of remote-handled transuranic and other wastes; constructing one new waste retrieval enclosures, the Accelerated Retrieval Project VI (ARP VI); beginning exhumation in ARP VI at the subsurface disposal area (SDA) of the Radioactive Waste Management Complex (RWMC) ; and in-situ grouting in the SDA. These initiatives are well underway at the end of FY 2010 and many will be continuing through FY 2012.

Risk Reduction

- The transfer of all 3,186 fuel handling units of spent nuclear fuel from CPP-666 pool storage at the Idaho Nuclear Technology and Engineering Center (INTEC) to dry storage was completed in June 2010. This completed the scope of wet to dry fuel transfers as required in the ICP contract.

- CWI loaded and shipped a total of 12 Large Cell Casks containing Navy Fuel from storage at INTEC to the Naval Reactors Facility at the INL in 2010.

- Received and unloaded seven Advanced Test Reactor (ATR) casks were received and unloaded from the Reactor Technology Complex (RTC) in FY 2010.

- Three NAC-LWT casks of spent nuclear fuel (SNF) from a southern California research reactor and an additional NAC-LWT cask of SNF from the University of Wisconsin – Madison were received and unloaded by ICP. The Nuclear Regulatory Commission and the state of California had identified the California SNF as a high risk for terrorism. The University of Wisconsin SNF is part of NNSA's program to convert research reactors to lower uranium fuel as part of the nuclear threat reduction initiative.

- Characterization and shipment of more contact handled TRU (CH-TRU) waste drums (from Waste Area Group 7 exhumation) was completed than in any previous year; nearly 7,500 drums of CH-TRU shipped to the Waste Isolation Pilot Plant (WIPP). The backlog of CH-TRU drums ready to ship has been reduced by nearly 1,000 drums over the final six months of the fiscal year.

- 11,332 yd3 of waste material from a total of 16,783 yd3 from ARP-IV was exhumed by the RWMC.

- In situ grouting of 2168 holes at 95 locations in the SDA was completed at RWMC to limit the subsurface movement of contamination.

Safety Performance

- The ICP has continued to make reductions in recordable injuries for the fourth straight year on the project. By setting aggressive goals and continuing to foster and encourage employee involvement, in FY2010 ICP reduced the number of recordable injuries by

over 1/3. The overall company TRCR rate, with the Integrated Waste Treatment Unit (IWTU) included was 0.84 (compared to 1.28 in FY2009). Outside of the IWTU construction workforce, the CWI workforce also reached a significant challenge goal by CWI President John Fulton by achieving 1,000,000 safe work hours without a recordable injury.

- Throughout FY 2010 the ICP prepared for, and then successfully re-certified its Star status under the DOE VPP. This was the third year in a row that the ICP was recognized with the VPP Star of Excellence, which qualified and earned for ICP's workforce the DOE Legacy of Stars award. Strengths noted during the re-certification assessment were a management team that clearly supports safety as a core value contributing to an atmosphere of trust within the fully engaged workforce.

- ICP continues to maintain registration of its Environmental Management System to the ISO 14001 standard, with the most recent surveillance audit conducted in October 2010. Two strengths noted in the most recent audit was the early completion of activities under the Voluntary Consent Order with the state of Idaho. Another was the excellent work planning involved in the demolition project for the Experimental Breeder Reactor-II at MFC.

- ICP continues its environmental stewardship performance including no Notice of Violation or regulatory fines since the start of the contract with over 29 inspections conducted by regulatory agencies in every media (air, water, the Resource Conservation and Recovery Act (RCRA), the Comprehensive Response Compensation and Liability Act, and the Toxic Substances Control Act.

- Implemented significant improvements in Work Planning and Work Control processes to address deficiencies identified by internal and external assessments including one performed by the Board staff in 2009. Two Project Evaluation Board effectiveness reviews of the Work Control Improvement Plan have been conducted and no programmatic deficiencies were identified. A closeout review was held with the Board staff.

Sodium-Bearing Waste (SBW) Treatment Project

- In the September 2010 Board Periodic Report to Congress which provides progress and status of issues the Board tracks relative to progress in new DOE facilities, there were no open issues being tracked for the SBW Treatment Project. The project has continued to respond to Board inquiries and document requests as the Board staff conducts their review of the draft Safety Basis documents submitted for DOE approval.

- The SBW Treatment Project has been implementing an agreed upon approach for applying ANSI/ISA-84.00.01 requirements to the safety-significant process control functions associated with the Integrated Waste Treatment Unit (IWTU). During FY 2010, the project completed all design and supporting analyses for the safety significant instrumented systems and provided to the Board staff for review. After final resolution

of comments received, the design has been finalized and is being installed to allow testing of the system in early FY 2011.

Deactivation and Decommissioning (D&D)

- Completed D&D of CPP-601/CPP-640 Fuel reprocessing facility and head end plant.

- Completed D&D of TRA-604 Laboratory Facility while leaving the basement intact to support ATR operations.

- Removed thermal shields and graphite from the Material Test Reactor (MTR) reactor monolith, allowing for reactor removal in November 2010.

- Completed demolition of CPP-630 Laboratory Facility.

- Completed Major System Acquisition and performed in-situ treatment of elemental sodium in EBR-II systems.

- Completed asbestos removal in MFC-766 Sodium boiler building, which amounted to over 1.4 linear miles.

- Completed demolition of all remaining Tank farm facilities not supporting the SBW treatment process.

- Accomplished D&D for 11 industrial facilities, 11 nuclear facilities, and 19 radioactive facilities in FY 2010.

- Disposed of 15,134 m^3 of remediation waste from D&D and cleanup activities in the ICDF.

Environmental Cleanup Activities

- In December 2010, DOE published a record of decision for the treatment of High Level Waste Calcine using hot isostatic pressing technology within the IWTU facility at INTEC. In January the project initiated activities to develop a conceptual design in support of a new CD-1 submittal in accordance with DOE-O-413.3B and DOE-STD-1189 requirements. A Technology Readiness Assessment was conducted and a revised Technology Maturation Plan was developed. By the end of 2010 a conceptual design package had been completed.

- Accelerated Retrieval Project-IV (ARP-IV) crews and equipment began retrieving targeted waste – plutonium-contaminated filters, graphite molds, sludges, and oxidized uranium material – in January of 2010 at the RWMC. Operations commenced after a thorough Contractor Readiness Assessment was completed.

- Construction for the waste exhumation facility in Pit 5 (ARP IV) at RWMC was completed with a planned startup assessments schedule for early FY 2010.

- Completed recovery and relocation of 109 containers of remote-handled TRU (RH TRU) waste (largely consisting of Hot Fuel Examination Facility (HFEF) canisters and ANL-E canisters) from MFC to INTEC, leaving only 21 left to retrieve and relocate.

- Completed Building CPP-666 hot cell construction, Management Self Assessment and both Contractor and DOE Readiness Assessments; received startup authorization in January 2010 to begin processing RH TRU canisters from MFC.

- Processed and repackaged 100 HFEF-5 and ANL-E cans producing 216 RH TRU drums. Completed characterization on 156 of the 216 drums as a precursor to shipment to WIPP.

- Received EPA Tier 1 waste stream approval and completed 24 shipments (72 drums) of HFEF-5 canister waste to WIPP.

- Received EPA Tier 1 approval on two "target scope" waste streams (ANL-E drums and MFC drums) and completed shipment to WIPP of all 20 drums in these two waste streams.

- Completed RCRA closure on four Voluntary Consent Order tank systems (67 total to date of 68 under CWI). This completed all Voluntary Consent Order scope at INTEC, bringing all of the legacy RCRA non-compliances issues into compliance.

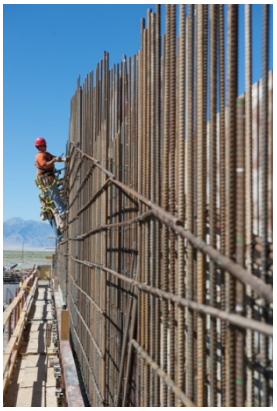
- Dispositioned 40 of 65 U-233 waste canisters (un-irradiated light water breeder reactor pellets and rods) to the Nevada National Security Site.

- Dispositioned 804 m^3 of low level and mixed low level waste offsite.

- Completed environmental restoration of 19 release sites (118 total to date under CWI).
- Completed abandonment of 97 retired monitoring wells (536 total to date under CWI).

Worker welds substructure for the roof of a newly erected fabric-lined building where crews will unearth buried Cold War weapons waste at the Department of Energy's Idaho Site. Once excavated, repackaged, and characterized the transuranic waste will be sent to the Waste Isolation Pilot Plant in New Mexico for permanent disposal.

Worker installs processing equipment at the Integrated Waste Treatment Unit (IWTU) construction project. When completed, the IWTU will treat 900,000 gallons of liquid waste stored in three underground tanks at the Department of Energy's Idaho Site.



Tying rebar atop the Integrated Waste Treatment Unit (IWTU) construction project. When completed, the IWTU will treat 900,000 gallons of liquid waste stored in three underground tanks at the Department of Energy's Idaho Site.

C. Livermore Site Office

The Livermore Site Office (LSO) oversees Lawrence Livermore National Laboratory (LLNL) in Livermore, California. LLNL is managed and operated by Lawrence Livermore National Security, LLC (LLNS). During FY 2010, LLNL completed or made continued progress on several safety-related issues of particular interest to the Defense Nuclear Facilities Safety Board (Board), including: LLNL facility and program safety enhancements, integrated safety management system (ISMS) and work control improvements, and review of tritium facility operations. Each of these areas is discussed below.

Facility and Program Safety Enhancements

Facility and program enhancements included: continued progress on special nuclear materials (SNM) inventory reductions: Building 695 facility changes: and, three transuranic (TRU) waste inventory reductions.

SNM Inventory Reductions

SNM inventory reduction in Building 332 remains ahead of schedule with completion targeted for the end of 2012. Approximately 80 percent of the total SNM inventory slated for removal has been shipped off-site to other secure Department of Energy (DOE) locations. The goal of SNM inventory reduction is to significantly reduce its vulnerability to terrorist attack and to render any potential accidents incapable of posing a significant risk to the public.

Facility Enhancements for the Building 695 Portion of the Decontamination and Waste Treatment Facility

LLNL successfully transitioned the Building 695 Portion of the Decontamination and Waste Treatment Facility from a single DOE Standard 1027 Hazard Category 3 nuclear facility to two radiological facilities, Building 695 and Building 696S. A separate safety basis was prepared by LLNL and approved by the DOE Site Office for each of the two facilities, and robust controls have been implemented to ensure that radioactive material inventories are maintained below the DOE Standard 1027 Hazard Category 3 threshold values. The new configuration will ensure that activities in these facilities are safely performed and risk to facility workers and the public is minimized while maintaining LLNL's ability to support DOE's defense nuclear mission.

TRU Waste Inventory Reductions

LLNL's Site 300 successfully completed the repackaging of its TRU waste. All TRU waste was removed and transported offsite. On June 28, 2010, LLNL completed its second TRU Waste shipment campaign for the main Laboratory (Site 200). This was the culmination of a year-long effort to characterize the waste sufficiently for transportation in TRUPACT-II containers. The campaign entailed close coordination with NA-50, NA-70, DOE/CBFO, DOE/Idaho, and the states of California and Nevada. The campaign consisted of 6 shipments, totaling 214 55-gallon drums, to DOE/Idaho for final characterization and certification for disposal at the Waste Isolation Pilot Plant. Collectively, these TRU waste inventory reduction activities ensure that LLNL will maintain sufficient capacity to store and process additional TRU waste, as necessary and appropriate.

ISMS and Work Control Improvements

In October 2007, LLNS became the operating contractor for LLNL. As part of contract transition, both the LSO and LLNS acknowledged the need to improve the site's ISMS, including its institutional work control processes. This decision was based largely on past performance deficiencies associated with specific site occurrences and events that occurred prior to and shortly following contract transition. As a result of these deficiencies, LLNS developed and proposed to LSO a more comprehensive approach to improve the site's ISMS and work control processes.

LLNL and LSO ISMS recertification was completed in April 2010. The LLNL and LSO ISMS Phase I/II reviews, which included senior Office of Health, Safety and Security and National

Nuclear Security Administration (NNSA) team leaders and staff, were completed in March 2010. The Phase I/II teams reviewed institutional work planning at LLNL, including actions taken by LLNL to improve work planning and control of specific activities and programs. The reviews concluded that improvements had been made in institutional work control processes.

In March 2010, the Board staff had conducted a more limited review of work planning and control processes of LLNL defense nuclear facilities against the NNSA document, *Activity Level Work Planning and Control Processes: Attributes, Best Practices, and Guidance for Effective Incorporation of Integrated Safety Management and Quality Assurance*, dated January 2006. The Board staff review also included oversight of activity-level work planning and control by the LSO. Board staff observations concerning areas of needed improvement included:

- LLNL nuclear facilities work planning and control process should be fully aligned to a standards-based approach as outlined in the new and improved *LLNL Institution-Wide Work Control Process Requirements Document*. Implementation of this change should be verified.

- LSO should institutionalize the NNSA Criteria and Review Approach Documents (CRADs) and conduct additional focused reviews of activity-level work planning utilizing subject matter experts.

LLNS key efforts towards improving work control at nuclear facilities have focused on implementing a more prescriptive work control process with additional work planner instructions and hazard control training that: (1) clarifies expectations and requirements for work scope definition in work control documents, (2) clarifies expectations and requirements for when detailed work instructions are needed to perform laboratory activities, (3) integrates task-based hazard and control tables in Operational Safety Plans using a prioritized schedule, and (4) revises the Superblock Work Control Manual accordingly.

Immediate actions have also been taken to: (1) ensure currently performed work using current LLNS work control processes have adequate work scope definitions and controls, (2) institute an interim work control review and approval process until LLNS work control processes have been appropriately revised and implemented, and (3) incorporate lessons learned from an analysis of recent site events.

LSO improvements have focused on implementing an integrated oversight approach that involves an overall technical lead with day-to-day support at the activity level from facility representative, safety system oversight staff, and subject matter experts. LSO's continuing efforts include institutionalizing the NNSA guidance document on activity-level work planning and control, and the associated CRADS, and providing additional staff training.

Tritium Facility Operations

LLNL's Tritium Facility (Building 331) successfully completed a readiness review of its new tritium processing station (TPS). TPS will be used to develop tritium targets for NNSA's National Ignition Facility for the purposes of laser fusion research activities. TPS is currently

authorized for operations and the summary below describes key issues and their resolution over FY 2010.

In September 2009, Board staff observed the NNSA readiness assessment (RA) for startup of the TPS as well as related aspects of the Building 331safety basis and operational activities. LSO lead the assessment. The RA team identified two key post-start findings concerning derivation and clarity of glovebox functional requirements and adequacy of operating instructions. The Board staff identified similar issues, further expanding on the two NNSA RA findings.

In response to the above safety basis concerns, LLNL implemented an NNSA-approved Justification for Continued Operations (JCO) establishing interim hazard controls (i.e., compensatory measures) limiting potential facility worker risk for the scenarios of concern until a revised safety basis can be prepared, approved, and implemented. The JCO compensatory measures include controls to ensure operable tritium room monitors, fire detection and alarm systems, and additional operations oversight by the LLNL Nuclear Materials Technology Program, which operates B331.

Consistent with prior commitments to address the NNSA Readiness Assessment (RA) and Board staff concerns, LLNL has recently completed and submitted a revised safety basis for B331, including a new hazards analysis and updated control set. Improvements include additional analysis and scenario development for fire, explosion, and tritium leak type hazards and events. The revised safety basis is currently under review for approval by the LSO. Upon approval of the new safety basis and subsequent implementation of any new controls, the JCO will terminate.

LLNL has also developed actions to address NNSA RA and Board staff concerns about Conduct of Operations. The process for developing and approving TPS dynamic system alignments has been formalized and incorporated into a procedure that establishes the appropriate level of formal review and approval for actions taken for controlling tritium flow paths and material at risk in the glovebox. A formal operating procedure is being used to ensure the proper execution of inventory calculations. The Corrective Action Plan from the NNSA RA addressed the issue concerning use of formal operating instructions/procedures. Operating procedures currently attached to the Operational Safety Plan (OSP) have been separated into stand-alone procedures. The OSP development procedure is being revised to ensure programmatic operating procedures are appropriately identified and utilized in accordance with Conduct of Operations requirements for DOE Facilities.

D. Los Alamos Site Office

The Los Alamos Site Office (LASO) 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 a contract with the Department of Energy (DOE). Safety accomplishments and ongoing actions during FY 2010 are discussed below.

Nuclear Material Stabilization and Packaging

- Two commonly used storage containers were fire-tested to establish a damage ratio based on a National Nuclear Security Administration (NNSA)-accepted test plan establishing fire temperatures and durations. The pool fire had an engulfed container temperature about 1300-1400 ^{o}F and lasted 30-40 minutes before self extinguishing. Furnace and drop testing were also performed on the containers. This work supports refined accident analysis and the protection of Material at Risk (MAR) available to be acted on during an accident.

- 378 kg of plutonium equivalent material was repackaged into robust containers, or otherwise dispositioned. This exceeded the combined base and stretch goals of 350 kg. In addition to eliminating MAR available to be acted on during an accident, this effort was complementary to improvements in support of worker safety and previous Board Recommendations (94-1, *Improved Schedule for Remediation*; 2000-1, *Prioritization for Stabilizing Nuclear Materials; and* 2005-1, *Nuclear Material Packaging*), each of which addresses stabilizing and repackaging nuclear material.

At the Radiological Liquid Waste Treatment Facility (RLWTF), LANS reduced risk associated with Room 60 operations by removing the legacy bulk hazardous Transuranic (TRU) material in the degraded tank TK-7, estimated at ~7 Curies of TRU sludge. Due to degradation of TK-7 (corrosion pitting through the wall has occurred in one location) removal of the bulk legacy TRU material reduces the potential for release of TRU materials within Room 60. To increase the capacity of RLWTF processing, the sludge was removed and treated offsite.

The target date for transitioning from the existing Chemistry and Metallurgy Research (CMR) Building to the new Chemistry and Metallurgy Research Replacement (CMRR) Facility is 2021. The overarching strategy for operating CMR until CMRR is available is documented in the CMR

Facility Consolidation and Risk Mitigation Program Execution Plan (CMR PEP). Operating strategy, as described in this document, is to continuously reduce the amount of MAR, associated with CMR operations, over time. The CMR PEP establishes a series of activities designed to reduce the quantity of MAR required to perform key mission activities in CMR. In FY 2010, 40 kg (Pu-239 equivalents) was removed from the CMR floor wells and shipped to TA-54.

Plutonium-238 Operations

LANS has achieved safety-class encapsulation of the existing inventory of Russian Product Containers. One hundred and three containers were encapsulated, 87 of them into the new generation Fuel Storage Outer (FSO) containers, and 16 into the old generation FSO containers. Both container types are safety-class containers. This accomplishment significantly improved the safety posture of the Plutonium Facility and received recognition from the Board for timely completion.

TRU Waste Operations

LANS shipped approximately 3,500 TRU waste containers (approximately 18,000 Plutonium equivalent curries) to the Waste Isolation Pilot Plant.

Fire Protection

The NNSA-Los Alamos County cooperative agreement for fire department emergency services, signed on September 30, 2008, continued through FY 2010. In support of this agreement, LASO, LANS, and Los Alamos County sustained the enhanced fire department training program initiated in FY 2009. FY 2010 training for firefighters included unique materials fires and ventilation equipment/system fires. A new LANL course, focusing on nuclear facility hazards for fire department command staff, was also developed and delivered. Emergency responder radiological training practical exercises were completed. To improve pre-incident planning and emergency response effectiveness, familiarization tours of the Weapons Engineering Tritium Facility (WETF), Waste Compaction Reduction and Repackaging Facility (WCRR), TA-48 radiological facilities, Dual-Axis Radiographic Hydrodynamic Test Facility and other high hazard facilities, were continued during FY 2010. Multiple emergency drills/exercises at nuclear, radiological and hazardous facilities, that included fire department participation, were completed.

Actions to address recommendations contained in the 2009 updated Baseline Needs Assessment (BNA) continued. NNSA and LANS discussed progress on fire department training initiatives and actions taken in response to BNA recommendations with the Board staff during a February 23, 2010 teleconference and provided a presentation to a Board Member in March, 2010.

Formality of Operations

Efforts in FY 2010 focused on implementation of Conduct of Maintenance and Conduct of Engineering at WETF and development/revision of priority drawings at TA-55. TA-55 completed a subset of 147 priority drawings for Conduct of Engineering implementation. These safety management programs continued to mature at nuclear facilities. TA-55, CMR, Radioassay Nondestructive Test facility, WCRR, and Area G completed system health monitoring basis documents and system health reports for all Vital Safety Systems, increasing confidence in the operability of credited safety systems.

Plutonium Facility

On October 26, 2009, the Board issued Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safet*y, which was motivated by Board concerns involving one of the 20 accident scenarios analyzed in the 2008 Documented Safety Analysis (DSA), particularly the post-seismic-fire event. In December 2009, LANS submitted an update to the safety basis that improved both the understanding of the risk and the selection of controls for this accident scenario. LANS has been aggressively pursuing actions to address this recommendation, and meet the commitments specified in the implementation plan. Progress during FY 2010 included the following:

- An inventory was completed for glove-box ignition sources. Those ignition sources that were no longer needed to meet current mission deliverables were removed, locked out, or rendered inoperable.

- Conceptual designs were developed to create additional fire-rated barriers within the facility.

- Legacy deficiencies in the H-wall fire barrier were assessed and repaired. The H-wall serves as the main fire separation between the north and south halves of the facility.

- A design for an automatic seismic shutdown of laboratory room process electrical power was completed. This design would minimize the potential for electrically initiated fires following a seismic event, and would remove the power from heat generating devices. Installation activities will be completed by the second quarter of FY 2011.

- Conceptual designs were completed for systems that will provide fire suppression within glove-box enclosures. Testing was completed at a nationally recognized testing laboratory for one system that could provide relatively inexpensive glove-box fire suppression for the complex.

- Six safes were procured and installed to be used for special nuclear material storage. The safes were installed with anchors that meet Performance Category 3 (PC-3) seismic

requirements such that they will maintain safe storage following the design basis accident.

- The scope was established for seismically upgrading the fire suppression system to support conceptual design for a safety class confinement ventilation system in FY 2011.

- The scope was established for seismically upgrading key active confinement ventilation subsystems, to support conceptual designs for an active safety class confinement ventilation system in FY 2011.

- Design and installation of additional fire risers to supply sprinklers within the facility were completed. This work greatly improved the hydraulic performance of the Fire Suppression System.

Nuclear Criticality Safety

A significant number of criticality infractions occurred in PF-4 during the last half of FY 2010. LANS subsequently initiated a program to assign Criticality Safety Group Engineers to the plutonium facility to enhance their interaction with personnel on the operating floor. This had impact on the number of Criticality Safety Evaluations (CSEs) that could be completed and documented. Even so, the LANS Criticality Safety Group documented over 100 CSEs during FY 2010. While the pace of updating older CSEs was not as fast as desired, this represents significant progress; nearly 60 percent of the highest risk level legacy CSEs have now been updated.

Significant criticality safety support was provided to the Critical Experiment Facility operated by N-2 at the Device Assembly Facility. CSEs were performed for a number of key programs and activities. Criticality safety issues were apparent during the Operational Readiness Review performed by NNSA in July 2010. The LANL Criticality Safety Group has interfaced with NSTec and N-2 to resolve the pre- and post-start findings documented in the report.

Project Management

The TA-55 Reinvestment Project (TRP) Phase I received Critical Decision-4 (CD-4) in June 2010. The project was completed 3 months ahead of schedule and under budget. TRP Phase II

Phase A and Phase B received a CD-2 decision in November 2009 and June 2010, respectively. The final phase of TRP II, Phase C, is on schedule to receive a CD-2 in May 2011.

NNSA and LANL completed several Integrated Nuclear Planning workshops in FY 2010. Following the most recent one, which built on the conceptual design work done in support of Recommendation 2009-2, the scope for TRP III was clarified. At this stage the focus is on upgrades needed to achieve an active safety class ventilation system, and to replace the aging fire detection system.

The TRU Waste Replacement Project was placed on hold in early FY 2009 pending completion of additional enduring waste management planning. This project was down-scoped to the TRU Waste Facility Project by eliminating TRU waste processing and preparation for offsite shipping. A Conceptual Safety Design Report) was submitted and approved to support approval of CD-1.

E. Nevada Site Office

The Nevada Site Office (NSO) maintains the capability at the Nevada National Security Site (NNSS) and other remote facilities to implement Department of Energy (DOE) initiatives in stockpile stewardship, crisis management, waste management, environmental management, non-defense research and development, and work-for-others, as well as supporting other DOE programs. Major non-reactor nuclear facilities at the NNSS include the Device Assembly Facility (DAF), Criticality Experiments Facility (CEF), and Joint Actinide Shock Physics Experimental Research (JASPER) Facility. The U1a Complex is not categorized as a nuclear facility; however, certain limited-duration experiments may be conducted as nuclear activities.

FY 2010 was the second year that the NNSS management and operating contractor, National Security Technologies, LLC (NSTec), maintained full responsibility and accountability for managing and operating all facilities at the NNSS, including facilities previously managed by the National Weapons Laboratories. Activities and accomplishments associated with NTS facilities and projects are discussed below.

Environmental Management Activities

The Low-Level Waste (LLW)/Mixed Low-Level Waste (MLLW) sub-projects provide disposal services and facilities for DOE and U.S. Department of Defense generators at the NNSS and across the United States. During FY 2010, the sub-projects safely accepted and disposed of 2,347,052 cubic feet of LLW in 3,306 shipments and 68,769 cubic feet of MLLW in 102 shipments at the Nevada Test Site Area 5 Radioactive Waste Management Complex.

Area 3 LLW Pit

Device Assembly Facility

The DAF is a Hazard Category 2, non-reactor nuclear facility. The facility supported the National Nuclear Security Administration (NNSA) and work-for-others missions throughout FY 2010. The DAF management team supported the conduct of the Criticality Experiments Facility Operational Readiness Review (ORR) with closure of pre-start findings projected for December 2010. Other programmatic accomplishments include DAF support of the receipt of the second shipment of the Lawrence Livermore National Laboratory (LLNL) Nuclear Counter Terrorism material. DAF management also supported the Barolo and Bacchus subcritical experiments and continues to support counterterrorism and criticality safety training.

To enhance the safety of the ongoing and future DAF operations NSTec has established projects for procuring a new fire suppression water tank, and another to procure and install a stand-alone unit (SAU) for fire suppression in one building. The new water tank will be procured to meet the requirements of a safety class system and replace the existing tank. The SAU is a stand-alone water mist system designed to suppress a fire in the incipient stage. The contract was awarded in July 2010 and NSTec expects the system will be installed and operational by June 2012. NNSA/NSO also continues pursuing line-item funding for addressing the corrosion in the fire suppression lead-in lines.

DAF Assembly Room

The CEF Project includes modification of a dedicated portion of the existing DAF to accommodate the installation of four critical assembly machines and operations infrastructure so that the previous Los Alamos National Laboratory (LANL) Technical Area (TA)-18 mission can be relocated to the NNSS. The scope of the project also includes modifications of the critical assembly machines and their associated control and safety systems. The critical assembly machines being relocated as part of the CEF project are Comet, Planet, Flattop, and Godiva IV. Completion of the project is currently scheduled for FY 2011.

A Contractor Operational Readiness Review (CORR) was conducted in December 2009. The outcome of the CEF CORR did not confirm full operational readiness of the CEF Project. Consequently, the CEF CORR had to be re-performed with a tailored focus on the functional areas that were not demonstrated to be ready. A supplemental CORR was successfully completed on June 11, 2010. NNSA conducted an ORR from July 19 to July 29, 2010. The ORR team recommended that CEF commence with critical assembly machine operations upon correction of the pre-start findings. The project is in the process of addressing the pre-start findings and developing corrective action plans for the post-start findings. On August 5, 2010, NNSA received a Defense Nuclear Facilities Safety Board (Board) and staff report expressing concerns about a number of deficiencies in the accident analysis, control set, and safety system design for CEF. NNSA will provide responses to the Board's concerns by February 11, 2011.

Flattop Reflectors

Planet Critical Assembly Machine

Godiva Critical Assembly Machine

Joint Actinide Shock Physics Experimental Research (JASPER) Facility

The JASPER Facility enables researchers to acquire high-quality performance data associated with 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 focus of activity at JASPER this year has been on returning the facility to operations as a Hazard Category 3, non-reactor nuclear facility after the contamination resulting from Shot 86 in 2009. Construction work included replacement of the Secondary Confinement Chamber and associated piping and is essentially complete. Implementation of the Documented Safety

Analysis will proceed once the new Secondary Confinement Chamber acceptance testing is complete. Safety basis implementation is currently scheduled for completion in FY 2011.

JASPER Secondary Confinement Chamber

U1a Complex

The U1a Complex provides an underground experiment test bed for the conduct of subcritical experiments using high-explosive and special nuclear material. Although the U1a Complex is not categorized as a nuclear facility, certain subcritical experiments may be Hazard Category 2 and 3 nuclear activities. The day-to-day operations that take place at the U1a Complex involve mining and construction, drilling operations, excavation, utilities installation and modification, maintenance, heavy equipment operations, system operations and other underground operations to prepare for and support the fielding and execution of subcritical experiments.

U1a was used in FY 2010 to conduct the Barolo series of subcritical experiments. The Barolo Project is designed to examine the strength and damage properties of plutonium (Pu) to improve understanding of some performance differences that were seen in previous experiments. The information gleaned from Barolo is expected to provide an important component of the data suite needed to resolve the initial conditions for boost. The Barolo Project will be conducted as vessel experiments in the Armando drift at U1a. The Barolo Project is designed to study the effects of damage, spall, and re-compaction in shock regimes of interest in primary performance.

The Barolo Project consists of a series of three experiments. Prior to the experiments, the NNSA ORR was conducted in June 2010 and a confirmatory experiment was completed in July 2010. This confirmatory experiment did not use special nuclear material and validated U1a readiness, physics package design, and the U1a experimental set-up. The first subcritical experiment in the Barolo Project, Bacchus, was conducted in September 2010. The remaining two experiments will be completed by March 2011. The Barolo Project is being conducted in the U1a.05 drift in front of the Cygnus machines. Basic diagnostics include x-ray imaging, Photon Doppler Velocimetry, Velocity Interferometer System for Any Reflector, Shadowgraphy, and High Explosive pins.

The Large Bore Powder Gun (LBPG) Project is a series of 24 sub-critical experiments designed to investigate the properties of special nuclear materials (SNM) and enhance the understanding

of the Plutonium Equation of State (EOS). This series will occupy the U1a.102d zero room, originally designed for a LLNL-sponsored experiment, which is equipped with a containment barrier. The experiments will be conducted with a reusable large-bore powder gun firing into a confinement vessel with a fast closure valve designed to confine SNM and avoid contamination of the zero room. This plan envisions preserving the zero room and therefore leveraging the large investment by NNSA, NSO, LLNL, and LANL associated with its construction over several series of Dynamic Plutonium Experiments. A Project Execution Plan for this project has been developed and an enhanced U1a Safety Basis Strategy is underway.

There are two major project elements of the LBPG Project. The first is the establishment of a LBPG development alcove and the completion of engineering testing necessary to finalize the design of the LBPG. This element will include the design and construction of the Powder Gun development alcove at the U1a Complex.

The second major element is the development of the LBPG subcritical experiments test bed. This element focuses on the work associated with preparing the U1a 102d alcove to receive the subcritical experiments LBPG; install diagnostics, Timing and Firing equipment, process controls, barriers, and handling fixtures; fabrication of Target Containment Systems; development of the safety basis; safety management program implementation; operational readiness review; transfer to operations; and conducting the first experiment.

Cygnus radiographic imaging capability at the U1a Complex

F. Oak Ridge Office

The Oak Ridge Office (OR) is responsible for major Department of Energy (DOE) science, technology, and environmental management programs. OR is responsible for activities at Oak Ridge National Laboratory (ORNL), the East Tennessee Technology Park, and other areas of the Oak Ridge Reservation. Safety accomplishments and activities at Oak Ridge projects and facilities are provided in the following sections.

Uranium-233 Project

The U-233 Material Downblending and Disposition Project continued to experience design challenges during FY 2010. Issues regarding geological voids and consequences associated with thoron release scenarios have resulted in additional analyses and redesign of the proposed systems. In addition, design changes have resulted from DOE's direction regarding fire protection and ventilation systems performance criteria based on a Defense Nuclear Facility Safety Board (Board) Recommendations 2008-1 and 2004-2, respectively.

On May 14, 2010, DOE revised Option 1 of the Isotek Systems, LLC (Isotek) contract to focus Isotek's efforts on completing design and safely managing the 3019 Complex. As a result of this direction, Isotek has revised the project schedule to reflect a completion date for Option 1 of May 2011. In parallel with the design activities, DOE has commissioned a review of alternatives for dispositioning the U-233 inventory. Alternatives previously identified, as well as new developments in technology, are being reviewed to attempt to identify more cost-effective approaches. Phase 1 of the study, which will identify potential alternatives, is scheduled to be completed in January 2011. Alternatives which may provide a cost and/or schedule benefit will undergo a detailed analysis during Phase 2. Phase 2 is scheduled to be completed later in 2011.

Isotek continues to safely manage the 3019 Complex. During this period Isotek has accumulated over 1.5 million hours without a lost-time injury or reportable accident. DOE approved Isotek's Integrated Safety Management System Description (January 2010) and the Worker Safety and Health Program (May 2010). Isotek received approval of revision 4 of the Documented Safety Analysis on (March 2010), which restricts operations to surveillance and maintenance activities. Isotek is operating under an approved 10 CFR Radiation Protection Plan (July 2010) and revision 2 of the Safety Design Strategy (March 2010). DOE approved Isotek's Implementation Plan for the Board Recommendation 2008-1 (June 2010).

Transuranic Waste Processing Center

The Transuranic Waste Processing Center (TWPC) is managed by Wastren Advantage, Inc. (WAI) under Contract DE-EM0000323 with DOE. The TWPC's mission is to receive legacy and newly-generated transuranic (TRU) waste and high alpha radiation-emitting waste from ORNL and other sites as directed by DOE. Waste is characterized and processed inside protective containments (gloveboxes, box breakdown areas, hot cells) in the TWPC process building. Repackaged and characterized waste is sent for disposal at the Waste Isolation Pilot Plant (WIPP), Nuclear Test Site (NTS), or other waste repository, as appropriate for its classification. Currently three waste types – contact handled (CH) solids/debris, remote handled (RH) solids/debris, and CH soils wastes are being processed at the TWPC. In 2004, the TWPC completed processing of liquid supernate, which was disposed of at NTS as LLW. Future major scope tasks include processing of RH Sludge waste.

TWPC American Recovery and Reinvestment Act (ARRA) Activities

In FY 2010, TWPC CH and RH waste processing operations were funded totally by ARRA funds. Two shifts of CH and RH processing are staffed and operational. The Drum Venting System was successfully brought on line and is supporting CH waste processing. An additional on-site, non-destructive assay characterization unit (Isotopic Quantification 3rd Generation) was deployed and made operational, supporting CH waste processing.

TWPC Metrics and Safety Performance Highlights

No lost time or restricted work day injuries or illnesses were experienced at the TWPC during 2010, thus extending the TWPC's record to more than 2.5 million hours (2904 days) since the last restricted work day case and 2.6 million hours (3104 days) since the last lost time injury.

VPP/Safety Record Recognition

In July 2009, the TWPC under EnergX management was awarded "VPP Star" status in the DOE Voluntary Protection Program (VPP). The TWPC team immediately began efforts to retain VPP Star status, the highest level of VPP participation. This resulted in TWPC being awarded the VPP "Star of Excellence" designation in August 2010, after completing 2009 with superior performance.

In addition to the VPP recognition, the TWPC received its eighth consecutive National Safety Council Perfect Record award. The TWPC also received from the National Safety Council a Safety Leadership Award recognizing its lengthy safety record and an Occupational Excellence Award for an outstanding safety record relative to similar industries.

TRU Waste Operations (CH)

TWPC contractor WAI, in cooperation with the Central Characterization Project (CCP), DOE's TRU waste characterization and certification contractor, processed 234.0 cubic meters of CH waste toward the extended Tennessee Department of Environment and Conservation (TDEC) Site Treatment Plan (STP), which is 92% of the target. Thirty six (36) CH waste shipments were completed in FY 2010.

TRU Waste Operations (RH)

TWPC contractor WAI, in cooperation with the CCP, processed 51.7 cubic meters of RH waste toward the TDEC STP, which is 132% of the target. Fifty three (53) RH waste shipments were completed in FY 2010.

Environmental Management System

The TWPC Facility Environmental Management System received ISO 14001:2004 re-certification in May 2010. The re-certification was earned via an independent examination of TWPC programs to address environmental issues. The TWPC re-evaluation did not result in any

findings or observations. The TDEC annual hazardous waste Resource Conservation and Recovery Act audit was conducted with no findings or observations at the TWPC site.

Contractual/Administrative Changes

WAI completed a 35 day transition on January 17, 2010, assuming the prime contractor role for TWPC under DOE contract DE-EM0000323. The current contract for WAI runs through January 16, 2015. WAI is an 8A Certified small business and the TWPC contract was competed and awarded as a Small Business designated competitive procurement.

Sludge Technology and Readiness Build-out

Buildout for sludge processing operations continued as a DOE Capital Project in the Planning, Engineering, and Design phase towards readiness for CD-2/3A decision. Performance baseline planning and preliminary design is underway for mobilization of sludge from the current Melton Valley Storage Tanks (MVSTs) and the MVST Annex tanks and for sludge process systems build-out. Sludge hot operations are projected to begin mid-FY 2013. The sludge project design is implementing DOE STD 1189.

Drum Venting/Safety Basis

Drum Venting System was successfully started up in September 2010.

Tank W-1A

Tank W-1A at ORNL is an empty, abandoned tank surrounded by highly contaminated soils. These soils contribute to an ongoing release of radioactive contaminants to groundwater, which subsequently discharges to a down-gradient stream. The scope of work includes excavation; size reduction (as required); packaging and transport for disposal of approximately 355 cubic yards of contaminated soil, the tank shell, and 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.

During 2010, the cleanup approach was finalized and required documents completed for the tank and associated soils. The negative air weather enclosure and service annex were installed and preparations for readiness were initiated. The NTS approved the disposal profile and the Documented Safety Analysis was approved. Current schedules call for readiness review and excavation start in early second quarter FY 2011.

Hanford Waste Treatment and Immobilization Plant and Tank Farms, October 2010

G. Office of River Protection

The U.S. Department of Energy's (DOE) Office of River Protection (ORP) is responsible for retrieving and treating for disposal, the 53 million gallons of chemically complex radioactive waste 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), our mission is to remove the waste from the tanks, design and construct the Waste Treatment and Immobilization Plant (WTP) to vitrify the waste (turn it into a stable glass waste form) for long-term storage and ultimate disposal, and close the tank farms.

The WTP is at a "pivot point" in the project, shifting focus from design/construct to construct/commission. This "pivot" focuses work from constructing to operating the WTP. Three of the main facilities, including Low-Activity Waste Vitrification Facility, Analytical Laboratory, and the Balance of Facilities, are 80% constructed. These three facilities, along with the High-Level Waste Vitrification Facility, form a complex operation requiring a workforce and supporting infrastructures unlike that which has existed at Hanford for decades.

The DOE-ORP Site Office and the DOE-WTP Project Office emphasis on the integration of the WTP and the Tank Operations Contractor (TOC), WRPS, work scopes 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. It is imperative to successfully develop and implement this one-system approach in order to remove the hazards posed by Hanford's 53 million gallons of tank waste.

In 2010, DOE-ORP and DOE-WTP, along with contractor and independent expert staff, participated in the Board's public meeting, in Richland, WA. The public meeting focused on several technical areas of the WTP including:

- Changes in safety-related design criteria resulting from modification of the material-at-risk

- Changes in design strategy to address hydrogen in pipes and ancillary vessels (HPAV)
- Criticality safety concerns and other safety-related risks for the pulse jet mixing system
- Reclassification of safety-related systems, structures, and components
- Safety-related design aspects of new facilities or modifications of existing facilities needed to deliver high-level waste feed

ORP submitted to the Board written responses to their questions 30 days prior to the public meeting. The written responses were treated as part of the record and used by the Board to assist in framing the issues to be discussed during the meeting. There were four sessions during the public meeting including: Pretreatment Facility Mixing; Feed Preparation and Supplemental Treatment; Pretreatment Facility Safety and Operation; and, HPAV. Each session had panel members which were selected by the Board. The panelists consisted of members from the DOE, DOE-ORP contractors, and subject matter experts from laboratories, industry and academia.

Waste Treatment and Immobilization Plant Project

WTP Project Status of Construction

As of September 2010, the WTP was 57% complete. Through September 2010, approximately 204,000 cubic yards of concrete, 16,686 tons of structural steel, 1,360 tons of heating, ventilation, and air conditioning ducting, 204,480 linear feet of piping, and 280,830 linear feet of cable and wire had been installed. Engineering design was 82% complete.

Employees tie rebar on the fifth lift walls at the Pretreatment Facility.

Significant accomplishments include receiving DOE's Voluntary Protection Program (VPP) Star recognition, beginning installation of the fifth elevation of concrete walls at the Pretreatment Facility (PT) reaching the 98 foot elevation, receiving two Low Activity Waste Vitrification Facility melters assemblies, setting four massive shield doors at High-Level Waste Facility (HLW), completing mechanical systems design for the Analytical Laboratory, the first of the WTP's four major facilities to reach this point and marking a 9-year effort to design a series of complex systems and components, and resolution and closure of all technical issues from the External Flowsheet Review Team (a total of 31 issues were identified in their 2006 report).

Table 1. Displays the project design, procurement, and construction status of each of the five WTP facilities at the end of FY 2010.

Facilities	Total Facility	Design	Procurement	Construction
Low-Activity Waste	65%	92%	79%	64%
Analytical Lab	45%	82%	72%	68%
Balance of Facilities	46%	83%	44%	60%
High-Level Waste	49%	86%	59%	30%
Pretreatment	47%	82%	45%	34%

Table 1. Status of WTP Completion by Facility though End of Fiscal Year 2010.

WTP Project Occupational Safety Record

WTP is the government's largest construction project in the federal sector, and continues to exceed industry safety records. The WTP worked more than 6 million hours between the last case involving a day lost to accident or injury in 2009 and the single case experienced in 2010 for a cumulative rate through October 2010 of 0.04. The Calendar Year (CY) 2010 cumulative total recordable injury case rate through October is 0.70; a 25% improvement compared the CY 2009 rate of 0.93. The WTP Construction site was awarded DOE VPP status in July 2010, further recognizing or commitment to excellence in occupational safety.

WTP Project Voluntary Protection Program Site Assessment

DOE's Office of Worker Safety and Health Assistance completed an onsite DOE-VPP certification review of the WTP. The WTP received VPP STAR status in July 2010.

The WTP received VPP STAR status in July 2010.

Project Completion Status

As of September 30, 2010, the WTP project is 57% complete, with engineering 82% complete, procurement 59% complete, and construction 54% complete.

WTP Technical Issues

The status and progress for various technical issues at WTP are as follows:

- WTP Structural Issues. Summary Structural Reports (SSR) are being finalized for the PT and High Level Waste (HLW) Facility to summarize the calculation methodologies for the structural design based on the revised ground motion criteria. The original SSRs were updated to incorporate the modified design methodology and were updated with the

Board staff review comments incorporated in 2008. As a follow up with further Board staff reviews, DOE-ORP formally submitted Revisions 1 and 2 of the Pretreatment (PT) and HLW facilities SSRs to Board on April 09, 2009, and September 30, 2009, respectively. DOE-ORP was anticipating concurrence to the updates from Board staff in anticipation of closure of the issues. Subsequent to concurrence, the Board raised a concern related to the concrete and steel composite behavior/performance of the WTP Facility Structures. In response to the Board's concern, DOE-ORP, along with the DOE-ORP Peer Review Team, worked with BNI to develop a streamline (hybrid) modeling technique and evaluation approach that reduced the potential cost impact and schedule impacts to the project while providing verification of adequate analysis of WTP Facility Structures. On March 26, 2010, this approach was finalized following a face-to-face discussion with Board staff to reach an agreement prior to preceding with reevaluation through analysis of the quarter representative finite element models of WTP. Based on the Board recommendation, DOE-ORP has been providing quarterly updates on the DOE-ORP Peer Review Team input. The final versions of these SSRs will be issued during 2012/2013 at the completion of WTP structural design, while incorporating required interim updates recommended by Board staff.

- External Flowsheet Review Team (EFRT) Issue Resolution Activities. During the External Flowsheet review, completed in March 2006, plant waste processing issues and concerns were evaluated. The EFRT identified 31 issues of which 19 were considered major (an issue that would likely prevent satisfaction of contractual treatment rates). As of August 20, 2010, all of the EFRT issues were resolved and closed.

  The final issue was closed on August 20, 2010 and addressed inadequate pulse jet mixing system design. The issue related to mixing system designs that result in insufficient mixing and/or extended mixing times. These issues include a design basis that discounts the effects of large particles and of rapidly settling Newtonian slurries. Closure of the mixing issue resulted in design changes to vessels that handle high solids content. These changes included adding more power, redistributing power, revising vessel feed limits, adding heel removal capability, and adding inspection capability.

  Follow-on activities to further reduce risk include completion of testing to underpin a model used to assess accumulation for the non-Newtonian vessel configurations, and large scale testing. The large scale testing will provide additional data on: scaling for both non-Newtonian and Newtonian vessels; prototypic level and density instrument function; mixing performance with complex simulants (may be addressed through smaller scale testing if appropriate); and, integrated operation of mixing, sampling, control, and transfer systems. On December 17, 2010, the Board issued Recommendation 2010-2, Pulse Jet Mixing at the Waste Treatment and Immobilization Plant, providing its recommendations on the appropriate scope of the testing program needed to show that the pulse jet mixing and transfer systems will perform reliably and effectively."

- Material at Risk (MAR) and HPAV. As the preliminary design proceeded in the years leading up to 2008, ORP became concerned with the complexity of the design in the PT and HLW. ORP chartered two task teams (MAR and HPAV) early in 2009 to assess such concerns and to determine whether action was appropriate to identify alternate design approaches that would simplify the facility for construction and operation, while maintaining necessary conservatism and adequate assurance of safety.

    - MAR - In January 2009, ORP commissioned a group of experts to assess whether the contract MAR was causing the functional safety classification of systems to be inconsistent with the level of risk posed by the WTP. The group of experts issued a report entitled *Evaluation of Important Uncertainties and Resulting WTP Design Conservatisms* (HNF-40122) documenting five recommendations aimed at "balancing the risk between the Tank Farm and WTP for achieving acceptable waste feed, primarily based on operational and economic considerations without compromising safety." The MAR expert team recommendations led to the development of a revised Unit Liter Dose calculation based on improved understanding of the character of the waste, adoption of the widely accepted MELCOR Accident Consequence Code Systems, Version 2, a DOE toolbox code for consequence analysis, and more realistic modeling of hydrogen generation.

    - HPAV - ORP chartered a team of experts to review whether unwarranted conservatism in the evaluation and design requirements for hydrogen accommodation was driving operational complexity to the detriment of operational reliability and safety. The team published a report (*WTP – Control of Hazards Associated with Hydrogen Accumulation in Piping and Ancillary Vessels, Alternative Evaluation and Design Approaches* (CCN 201897), dated February 26, 2009) containing five recommendations for evaluating HPAV. Implementing two of the five recommendations (i.e., reevaluate selected assumptions and methods of accident analysis, and reduce the levels of conservatism in methodology and acceptance criteria) has resulted in revised accident analysis assumptions and methods, more realistic bounding HPAV assumptions based on testing, analysis of piping fragmentation, improved piping calculations, and improved understanding of gas retention characteristics in Newtonian vessels. The classification changes support fewer redundant systems, fewer active hydrogen controls for piping systems, and reducing the redundancy required based solely on fragmentation concerns, thereby reducing the total number of required safety components. Additional confirmatory testing was conducted by BNI, DOE-ORP, and the California Institute of Technology over the last year to support implementation of these recommendations.

      On February 15, 2010, DOE-ORP conditionally approved the HPAV analysis and design criteria. The analysis and design criteria include a quantitative risk analysis (QRA) process as a design tool and input to structural code calculations. The analysis and design criteria were reviewed by DOE-Environmental Management subject matter experts, as well. To provide added assurance that the proposed HPAV analysis and design approach is justifiable, an HPAV

Independent Review Team (IRT) composed of 12 industry experts was established. The IRT was to answer three primary questions:

1. Will implementation of HPAV criteria and methods provide reasonable assurance that an HPAV event will not prevent Systems, Structures and Components (SSC) from performing their intended safety function?
2. Will implementation of the HPAV criteria and methods provide reasonable assurance that an HPAV event will not significantly affect the WTP mission duration (i.e., cause a failure for which the Pretreatment Facility cannot recover by routine parts replacements)?
3. What flammable species might exist at WTP and does the use of hydrogen and nitrous-oxide mixtures adequately bound the possible combustion effects for all such flammable species?

The HPAV IRT kick-off meeting was held in Richland the week of April 12, 2010, and held its final team meeting on June 22-23, 2010, to support issue of the final report. The IRT briefed the Board on its findings on July 8, 2010, and issued the final report on July 12, 2010. The team identified 35 findings that must be completed prior to their concurrence of the overall approach. The IRT concluded that the design approach for HPAV piping and components are acceptable provided BNI resolves the findings. The IRT also concluded that they could provide an affirmative response to the three primary questions of the IRT Charter when the IRT's findings are resolved and further stated that there is *"high confidence that*:"

- *The QRA approach is acceptable for defining loads to be used in design, and there is a low probability of exceeding either their frequency or their magnitude.*

- *The best estimate pipe stresses and strains, computed from the defined loads in the manner proposed by BNI, are not likely to be significantly exceeded.*

- *The combination of QRA load definitions, best estimate piping system response calculations and conservative acceptance criteria developed pursuant to the piping Code B31.3 provides a reasonable balance of probabilistic and deterministic elements appropriate for design of HPAV piping and components.*

- *The net result of this approach to design will be a low probability of pipe failure if hydrogen explosions occur."*

An HPAV Implementation and Closure Plan (ICP) was initially issued on August 12, 2010 and most recently on December 10, 2010. The goal is to complete all major actions by February 2011 with all actions documented in summary response sheets. The ICP will be updated monthly until completion of all actions

is accomplished. A summary of the plan was discussed with the Board at a second review by the IRT leads on August 24, 2010.

Fire Protection of WTP Confinement Ventilation

The WTP authorization basis invokes DOE-STD-1066, *Fire Protection Design Criteria*, which includes requirements in Section 14 for fire protection features within nuclear facility ventilation systems to protect high-efficiency particulate air (HEPA) filters from damage during a facility fire. The radial flow HEPA filter configuration used in the WTP ventilation systems does not support explicit compliance with DOE-STD-1066-99. The WTP design is based instead on facility-specific fire hazard analyses and the Integrated Safety Management process.

BNI developed and submitted to ORP an alternative design option that provides comparable safety and mission protection as allowed by DOE-STD-1066, and in accordance with DOE Order 420.1B. The alternate approach does not provide all of the fire protection features prescribed in Section 14 of DOE-STD-1066, but does provide multiple levels of fire protection features that adequately protect final HEPA filters from fires.

The alternate approach was identified by ORP as a gap in implementation of Board Recommendation 2004-2, Active Confinement Ventilation Systems. DOE-EM accepted the gap analysis in July 2009. ORP directed BNI to implement the alternate approach in the authorization basis documents and the design. BNI continues to implement the agreed to design requirements and ORP continues to monitor implementation.

Authorization Basis Changes (Design and Standards Change Approvals)

The Safety Requirements Document (SRD) was prepared when the WTP was envisioned to be a privatized facility and provides the nuclear, process, and radiological safety requirements for the WTP. Five significant changes to the SRD were approved in fiscal year 2010. These included:

1. Clarification of seismic testing requirements for SC-III SSCs allowing the use of industry standard AC 156, *Acceptance Criteria for Seismic Qualification Testing of Nonstructural Components and Systems*.
2. Revising the HPAV design criteria for the Pretreatment (PT) facility affecting closed systems (e.g., piping systems and components) for the hot cell and C3 area bulges by permitting plastic through-wall average strain to be 1.5 times higher or limited to less than 2.5% for HPAV events resulting in hydrogen detonations.
3. Additional detail for seismic interaction requirements (two over one protection).
4. Clarification of the definition of black cells and hard-to-reach areas outside of black cells for leak testing and weld inspection requirements.

5. Incorporation of ANSI/ISA 67.04.01-2006, *Setpoints for Nuclear Safety-Related Instrumentation*, as an implementing standard for proving the appropriate methodology to determine setpoints for safety class or safety significant instruments.

DOE reviewed and approved 4 changes to the Preliminary Documented Safety Analysis (PDSA) in fiscal year 2010, as well as approving 6 authorization basis amendment requests to the SRD. Additionally, DOE approved 4 Justification for Continued Design, Procurement, and Installation. There were 104 changes to the PDSA in fiscal year 2010 that required only contractor approval. The numbers of DOE-approved changes is much less than previous fiscal years as the design of the facilities have matured, where significant changes are not expected.

Structural and Equipment Qualification Peer Review Team (PRT) Activities

Based on Board recommendation DOE-ORP has been providing quarterly updates on the DOE-ORP PRT activities. The primary activities for 2010 were performed by the Structural PRT and included:

- Review and comment on analysis methods for addressing concerns with composite behavior in WTP Facility Structures,
- Pretreatment Facility Control Building Soil Structure Interaction analysis,
- Systems for Analysis of Soil-Structure Interaction model approaches on HLW seismic response, and
- Review of specific analyses and drawings released since the last Structural PRT meeting.

The Equipment Qualification PRT also met to review the Plant Wash Vessel (PWD-VSL-00044) re-analysis. DOE-ORP is planning on increased involvement of the Equipment Qualification Peer Review Team given the maturing design of WTP equipment.

A number of issues previously identified by both teams were closed during the November 2010 review, in which Board staff observed.

Assessments of WTP Contractor Activities

For several years, ORP has been working with BNI to develop a complete set of performance metrics that track the effectiveness of BNI's program. ORP and BNI have applied considerable resources to the development of metrics that truly measure BNI's performance in meeting quality assurance (QA) requirements. ORP has been showing the design of these metrics to other DOE and DOE contractor organizations and encouraging adoption. These organizations are becoming increasingly receptive. ORP is using the output of these metrics as an input for determining fee.

These metrics showed improved effectiveness and performance in nearly all areas of the BNI QA program throughout FY 2010 as follows:

Criteria	**September 2009 Results**	**September 2010 Results**
Program	Meets Standards	Substantially Exceeds Standards

Training and Qualification	Meets Standards	Substantially Exceeds Standards
Quality Improvement	Exceeds Standards	Exceeds Standards
Documents and Records	Exceeds Standards	Substantially Exceeds Standards
Work Processes	Meets Standards	Exceeds Standards
Design	Meets Standards	Exceeds Standards
Procurement	Below Standards	Exceeds Standards
Inspection and Acceptance Testing	Exceeds Standards	Substantially Exceeds Standards
Independent Assessment	Exceeds Standards	Exceeds Standards
Management Assessment	Below Standards	Substantially Exceeds Standards
Overall	Meets Standards	Substantially Exceeds Standards

These results are correlated with commonly used colors as follows:

Substantially Exceeds Standards:	Blue
Exceeds Standards:	Green
Meets Standards:	Yellow
Below Standards:	Red

BNI arrived at these conclusions using objective measures, and ORP agrees with the results.

Significant quality issues include:

- Broad Based Review (BBR) – As part of the corrective actions and extent of condition determination for the "black cell" piping spool issue, BNI assembled a team of engineers to review five specific component engineering and procurement activities and five program activities that have cross-cutting engineering and procurement impacts. The scope of the BBR was to examine upper-tier requirements and verify they were cascaded down to lower-level procurement documents and construction drawings. The review examined seven systems and four component classes in vertical and horizontal slices respectively. The final BBR report was issued on December 31, 2008. To date a majority of the issues have been closed through the Contractor Corrective Action Program. A review by DOE/ORP noted approximately 95% of the issues have been closed. The review was formally transmitted to BNI and reinforced that BNI should continue to focus on closing the issues in a thorough and timely manner.

- WTP Quality Assurance – ORP vendor oversight activities transitioned from the ORP WTP project organization to the ORP Quality Assurance Team (QAT) at the beginning of Calendar Year (CY) 2010. Qualified Nuclear Quality Assurance (NQA)-1 auditors have performed independent NQA-1 audits of two WTP vendors and observed BNI vendor qualification and triennial NQA-1 audits of three additional vendors. The ORP Integrated Assessment Schedule for CY 2011 includes QAT oversight of an additional five BNI NQA-1 vendor audits. The focus of the audit and oversight activities is to

validate the implementation and effectiveness of the WTP corrective actions taken to correct the Vendor Commercial Grade Dedication deficiencies identified by ORP in 2009 as part of the overall vendor qualification process to ensure procured items and services meet contractual QA requirements. The results indicate that most vendors have made improvements in their dedication processes for commercial grade items and services. For those vendors that have not implemented effective corrective actions, BNI has required vendors to conduct causal analyses, extent of condition reviews, and implement corrective actions through supplier corrective action reports that, in some cases, have included stop work/stop shipment restrictions. For WTP equipment already delivered to the WTP, BNI has undertaken a substantial effort to evaluate all plant equipment received from vendors to ensure adequate commercial grade dedication activities were performed. For equipment of suspect quality, BNI's process for resolving nonconformances was used to disposition the items and equipment according to WTP quality assurance program requirements. The ORP QAT is overseeing the corrective action process at both vendors and the WTP project to validate the effectiveness of commercial grade dedication issue resolution using an approved Corrective Action Closure and Validation Plan.

- Pretreatment Vessel Ventilation System - In 2010 ORP initiated several assessments of BNI engineering design. One of these reviews was the review of the PT vessel ventilation system. The board staff conducted a review in February 2010. BNI is studying upgrading the system from passive to active safety function, implementing agreed-upon changes from the MAR accident analysis regarding solids entrainment, accommodating mixing and cesium ion exchange system changes, and addressing DOE findings. Several alternatives to meet these requirements are being studied utilizing a best value methodology. The Board staff will be briefed in January 2011 on the alternatives analysis and path forward.

Tank Farms Project

Hanford's tank farms contain 53 million gallons of radioactive and chemical waste that resulted from more than three decades of plutonium production. The waste is stored in 177 large underground tanks. ORP and its TOC, WRPS, are removing and transferring this waste from the older 149 single-shell tanks to the newer 28 double-shell tanks to reduce the environmental risk posed by the older tanks.

Integrated Safety Management System

In August 2009, ORP performed a combined Phase I & II ISMS review using an independent review team. The review team concluded that ISMS functions and principles have been effectively described in WRPSs' and ORP's management systems and effectively implemented. An ISMS Annual Review was conducted in August 2010. The review focused on the six functional areas: Corrective Action Management, Work Planning and Control, Radiological Protection, Environmental Protection, Emergency Preparedness, and Commercial Grade Dedication. The review found that WRPS has established an adequate ISMS.

Occupational Safety

The Tank Operations Project worker accident/injury performance continues to be excellent. In 2010, the TOC had a Total Recordable Case Rate of 0.8 with a Days Away Restricted or Transferred (DART) case rate of 0.4.

Table 2. Washington River Protection Solutions LLC (WRPS).

Organization(s): 4707104 Year: 2010								
Fiscal Year	**Fiscal Quarter**	**Hours**	**TRC**	**TRC Rate**	**DART Case**	**DART Case Rate**	**DART**	**DART Rate**
2010	1	795,183	5	1.3	3	0.8	355	89.3
2010	2	888,351	4	0.9	3	0.7	404	91.0
2010	3	941,352	4	0.8	2	0.4	145	30.8
2010	4	1,012,187	1	0.2	0	0.0	0	0.0
Total for 2010		**3,637,073**	**14**	**0.8**	**8**	**0.4**	**904**	**49.7**
Total For Query		**3,637,073**	**14**	**0.8**	**8**	**0.4**	**904**	**49.7**

Table 3. Advanced Technologies and Laboratories International, Inc. (ATL).

Organization(s): 4702004 Year: 2010								
Fiscal Year	**Fiscal Quarter**	**Hours**	**TRC**	**TRC Rate**	**DART Case**	**DART Case Rate**	**DART**	**DART Rate**
2010	1	33,325	0	0.0	0	0.0	0	0.0
2010	2	39,197	0	0.0	0	0.0	0	0.0
2010	3	43,586	1	4.6	0	0.0	0	0.0
2010	4	43,100	0	0.0	0	0.0	0	0.0
Total for 2010		**159,208**	**1**	**1.3**	**0**	**0.0**	**0**	**0.0**
Total For Query		**159,208**	**1**	**1.3**	**0**	**0.0**	**0**	**0.0**

American Recovery and Reinvestment Act

In 2009 ORP received an additional $326M through American Recovery and Reinvestment Act (ARRA) funding to support tank farm upgrades. ORP directed WRPS to accelerate work under the TOC and to ensure that organization and management systems were put in place to support completion of all original ARRA-funded projects by the end of FY 2011. The primary objectives of the ARRA for ORP were: (1) to create jobs to execute the ARRA work scope; (2) to

accelerate life cycle extension upgrades to tank farm infrastructure and waste feed delivery systems required to support the delivery of tank waste to the WTP for treatment; (3) to improve reliability and availability of waste feed delivery systems, which reduce surveillance and maintenance costs over the life cycle of the TOC Project; and (4), through D&D activities, further reduce tank farm surveillance and maintenance costs and eliminate potential sources of contamination.

In the last fiscal year, WRPS completed 62 sub-projects and a total of 1605 Key Performance Parameters using ARRA funds, spending $175M. Overall performance has been within budget and WRPS is on schedule for completing the original ARRA scope by the end of FY 2011. Seventeen "high risk" work packages were completed without a single recordable or lost work day. WRPS has hired over 250 direct employees and invested $4.4M in their training using ARRA funding. Some of the most notable accomplishments are: replacement of the AN-107 and AW-104 corrosion probes; removal of obsolete equipment from several Single Shell Tank Farms; raw water system and process condensate leak detection upgrades at the 242-A Evaporator; isolation and removal of three Clean Out Boxes at AW farm; and installation of an interim barrier at TY-Farm.

Tank Farms workers remove Clean Out Boxes (COB) at the AW farm.

Department of Energy (DOE) Voluntary Protection Program (VPP) Tank Farm Contractor

WRPS solutions retained VPP STAR Status in the Waste Feed Operations and the Analytical Technical Services. In 2010, WRPS combined all of its operations into one VPP Application to seek STAR Status for the entire organization. WRPS conducted self-assessments in December 2009 and delivered the VPP Application to ORP in January 2010, followed by a HQ-DOE Office of Health, Safety and Security VPP review. The Review was completed in November 2010 and VPP Merit Status was achieved for the entire WRPS organization.

Environmental Impact Statement (EIS)

In February 2003 a Notice of Intent for the *Retrieval, Treatment and Disposal of Tank Waste and Closure of Single-Shell Tanks Environmental Impact Statement (EIS)* was issued. At the same time, the *Hanford Solid Waste EIS* was in preparation. Washington State Department of Ecology entered into litigation with DOE regarding the *Hanford Solid Waste EIS.* A decision was made to combine the scope of the *Hanford Solid Waste EIS* with the scope of the *Retrieval, Treatment and Disposal of Tank Waste and Closure of Single-Shell Tanks EIS* and the scope of the *Fast Flux Test Facility EIS* as a result of a court settlement agreement related to errors in the *Hanford Solid Waste EIS*. This new EIS, the *Tank Closure and Waste Management EIS* analyzes new

approaches to completing the groundwater analysis and enhancing the scope of the document to include a more quantitative cumulative impact analysis. The draft *Tank Closure and Waste Management EIS* was released for public comment on October 30, 2009. The 185-day public comment period was completed May 3, 2010. The EIS is required to support future tank waste treatment, storage, and disposal; disposition of waste generated at Hanford; waste to be potentially shipped to Hanford from other DOE sites; and the final disposition of the Fast Flux Test Facility.

Double-Shell Tank** (DST) **Integrity Accomplishments for FY 2010

The Hanford Tank Integrity Program focuses on controls and inspections for the 28 Hanford Double-Shell Tanks (DSTs) that were constructed from 1967-1986. The DSTs consist of a primary and secondary carbon steel tank within an outer reinforced concrete structure. These tanks have a nominal capacity of approximately one million gallons each. Because some of these tanks are beyond their original design life, and will be needed to support tank waste through the life of the WTP, additional testing, inspection, and monitoring is performed to assess and monitor the condition of these tanks as required by DOE Order 435.1, *Waste Management*. Specific accomplishments include:

Tank Farms workers install a corrosion probe in tank AN-107.

- Installation of corrosion probes into tanks AN-107 and AW-104. The probes monitor the corrosion potential of the waste to ensure that the potential is not in the range that would cause corrosion of the liner. The potentials of concern have been determined by laboratory testing that has been guided by an Expert Panel Oversight Committee. The probes also contain metal coupons of the same material as the tank that can be extracted after extended exposure to the waste and examined in the laboratory.
- The DST Integrity Program completed the Ultrasonic Testing examination of five tanks in FY10. The program is scheduled to examine three to four tanks using UT per year to allow for the examination of all DSTs every eight to ten years. The UT examinations are a key element the DST leak integrity program.
- Completed primary and annulus video inspection of nine tanks in FY 2010.
- Performed development testing of a new device that will examine the DSTs for signs of steel liner distress. The device uses an electromagnetic acoustic transducer mounted on a machine that crawls on the exterior of the primary tank wall. This tool will allow more surface area to be scanned than is currently practical using UT technology. The device is planned to be tested in a DST in FY 2011.
- An Expert Panel Oversight Committee guided research in three areas of chemistry optimization of the waste stored in the double shell tanks:

- Minimum value inhibitor testing for the prevention of stress corrosion cracking (SCC).
- Parametric testing of nitrite, pH, and nitrate impact on SCC.
- Testing to further understand liquid air interface (LAI) and vapor space corrosion.

Single-Shell Tank Integrity Assessment Accomplishment for FY 2010

149 single-shell tanks (SST) were constructed at the Hanford Site from 1943-1964 to hold radioactive waste created by the production and separation of plutonium and other radionuclides. The SSTs are underground, reinforced-concrete structures (i.e., a concrete tank with a concrete dome) with a carbon steel liner covering the concrete base and walls. Of the 149 SSTs, 133 are large-capacity tanks with nominal capacities ranging from 530,000 to 1,000,000 gallons each and 16 are smaller tanks with a 55,000 gallon capacity each. Specific accomplishments include:

- At the request of ORP, WRPS established a Single-Shell Tank Integrity Panel. The panel consists of nine nationally-recognized members from industry and academia in the areas of structural integrity, non-destructive evaluations, corrosion, nuclear waste chemistry, soils and vadose zone, and material properties. The panel was chartered to evaluate SST conditions and provide recommendations for the best technical approach to maintain SST structural integrity and leak integrity. The panel has provided two reports with recommendations that will provide the foundation for a robust Single-Shell Tank Integrity Program. ORP and WRPS are working with the Washington State Department of Ecology to develop plans to implement these recommendations.
- A modern finite-element structural analysis of record which began in FY 2009 for the SSTs continued in FY 2010. This analysis of record was one of the recommendations provided by the expert panel and is expected to be completed in FY 2011.
- Twelve Single-Shell tanks were visually examined using video cameras that are lowered into the tank. These visual inspections look for signs of concrete degradation of the tank as well as signs of steel liner distress. The 12 tanks examined did not indicate any significant signs of distress.

A work plan was developed in FY 2010 to obtain a concrete sample from one of the SSTs. This work will evaluate the material properties of the concrete and determine what impact historic high waste temperatures in the tanks has had on the concrete.12

[1] In July 2010 allocation of the shared services, in total facility percent complete, was removed out of the various facilities to show the true individual facility percent complete.
[2] The calculation of radiological consequences per liter of waste (the Unit Liter Dose) facilitates accident evaluation for different possible vessel sizes or fill levels.

Pantex Site Office

In FY 2010, Pantex successfully exceeded commitments to fully support the directive schedule and Defense Program (DP) "Getting the Job Done" goals. These goals were achieved in the face of a significant flood event. At the same time, Pantex continued to upgrade safety systems to enhance the safety of nuclear explosive operations.

Additionally, with the authorization of the B53 and W84 weapon programs, Pantex achieved a significant safety milestone in that all weapon program operations meet Seamless Safety for the 21st Century (SS-21) criteria, thus completing a multi-year effort to infuse enhanced safety techniques into weapon operations.

Pantex accomplished the National Nuclear Security Administration (NNSA) weapons production mission while achieving a level of safety that ranks among the top "safety leaders" in the NNSA complex over the last five years. The lowest ever Total Recordable Case rate of 0.40 and Lost Time Case rate of 0.06 were achieved. Pantex obtained Voluntary Protection Program (VPP) Star status in FY 2010.

In conjunction with the NNSA Pantex Site Office (PXSO), B&W Pantex continued to deploy the Pantex High Reliability Organization (HRO) framework plant-wide to minimize the potential for a high consequence, systems accident. This experience was shared with other NNSA sites, federal agencies and commercial entities. B&W Pantex further demonstrated its commitment to the success of the Pantex Plant by investing in a comprehensive and ongoing plan to actively engage employees across the organization through employee outreach, recognition, empowerment, training and support, and professional growth and career advancement.

B&W Pantex continued to enhance nuclear safety performance through effective and continuous improvement of its Contractor Assurance System (CAS). A B&W Technical Services Group Corporate team independently evaluated the B&W Pantex CAS as compliant with requirements. Further, Pantex was responsive to issues identified by the FY 2009 Office of Security Enforcement Program Review. During a follow-up visit in FY 2010, the team identified Pantex's use of an Assessment Review Team and Corrective Action Review Team as noteworthy practices.

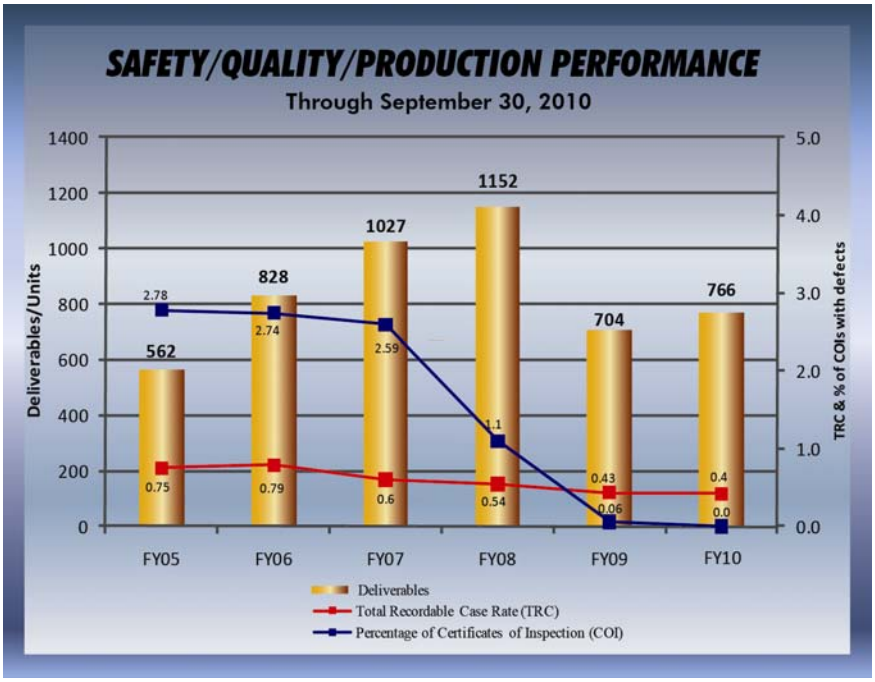
Pantex continued to excel in environmental stewardship by fostering a system of environmental management recognized by the NNSA Pollution Prevention Best-in-Class Award and the Department of Energy (DOE) Environmental Sustainability Award (EStar) for exemplary environmental sustainability. FY 2010 marked the 16th consecutive year with no violations or findings from the annual Texas Commission on Environmental Quality waste inspection and the

plant received recertification approval of Gold Leadership-level participation in the Clean Texas Program.

Looking ahead to 2011, Pantex will continue to uphold a high standard of excellence in safety, security, and quality to provide the foundation for sustained nuclear weapons production and improved capabilities to support NNSA's long-term plan for a viable and efficient Nuclear Security Enterprise (NSE). Pantex will continue to work with partners within the NSE to focus on planning scenarios and projects that support footprint reduction as well as positioning the site to meet future staging and surveillance requirements.

Operational Excellence

Pantex demonstrated outstanding leadership within the plant, as well as the NSE, by providing the direction, coordination, and communication required to successfully deliver on NNSA goals, while retaining its recognized status as one of the safest companies in the United States. Pantex continues to strive for operational excellence by proactively identifying and resolving issues to improve execution in mission performance, as Pantex emerges as an HRO.



In FY 2010, B&W Pantex and PXSO have continued to foster the concept of "One Team, One Plant, and One Customer." This alignment is a natural outgrowth of the cooperative partnership between B&W Pantex and PXSO over the past several years in effectively managing through challenging technical issues to successfully meet the plant's mission. The shared value between B&W Pantex and PXSO leadership is sustaining operational excellence at Pantex.

Safety Performance

Pantex continued to strive to enhance operational safety performance and maintain its position as a "best-in-class" safety leader within the NSE. Employees demonstrated their strong safety culture by embracing opportunities to lead various employee-driven and/or -owned safety

programs designed to increase operational safety performance. Those programs included: Pantexan Actions Toward Reducing Injuries Offers True Safety (PATRIOTS), Ramp Safety, Hand Safety, Electrical Lockout/Tagout Review, and the Personnel Protection Equipment Review. Specifically notable were:

- VPP Steering Committee: The application was approved and Pantex achieved STAR status in FY 2010.

- Safety Observations Achieve Results (SOAR): The SOAR committee blends Behavior Based Safety, Integrated Safety Management (ISM) and Human Performance Improvement for use by the protective force. The SOAR group is comprised of front-line supervisors, representatives from each department in the Security Division, and a team of champions from senior management. SOAR observations require that the observer have a conversation with the person(s) being observed and that no names of the persons being observed be documented. The SOAR committee meets monthly and specifically extracts the trending information based on the observations performed for the protective forces.

- B&W President's Safety Council (PSC): This is a forum for Division Managers, selected line-level managers, leadership of both the Metals Trade Council and Pantex Guards Union, and members of PATRIOTS and the VPP Steering Committee. PSC assembles to discuss current safety and security trends, events, lessons learned, and special focus topics.

Nuclear Safety Improvements

Pantex began a significant effort to improve fire protection for weapon program operations with the start of the capital project to upgrade the distribution piping of the High Pressure Fire Loop. Additionally, combustible loading evaluations for three weapon programs were updated. An electronic system to trace technical safety requirements to the facility or the weapon program, or both, was completed and tested. Lightning committee work was completed in regard to indirect effects analysis. In addition, testing to address bond-wire inductance issues was conducted in several facilities. The following specific improvements to nuclear explosive operating facilities were completed:

- Seven new ASME NUM 1 Type 1B seismically-qualified hoists were installed and approved for weapon program operations. Seismic outliers were resolved for seven nuclear explosive operating bays and the design packages were completed to perform the modifications in the remaining bays. Seismically-qualified emergency lights were installed in two nuclear explosive operating cells, and the design of seismically qualified emergency lights was completed for all nuclear explosive operating bays.

- As a follow-on to the evaluation conducted in FY09 and in addition to continuing with the implementation/execution of the trainer maintenance program, Pantex upgraded two weapon program trainers during FY2010, one was for Joint Fuel Assembly use.

In regard to management of the Pantex safety basis, new information (NI) and potential inadequacies in the safety analysis (PISAs) were resolved in a timely manner with the average closure of NI (not dependent on weapon response information requests) completed in less than five days and PISAs in under a month. As of the end of the FY2010, there were no outstanding

issues in the NI database and only one open PISA, which is dependent on weapon response information. An upgraded PISA process was implemented based on changes to the Unresolved Safety Question Process Guide (i.e., DOE G 424.1-1) which has substantially improved the efficiency of resolving a PISA declaration. Pantex completed the 10 year updated analysis for wind natural phenomenon events and incorporated the revised information into the Site wide Safety Analysis Report. Pantex also developed an extensive site specific Flood Hazard Analysis at about the time that the actual flood event occurred in July. The results of the analysis correlated well with the actual event.

Weapons Operations

B&W Pantex exceeded planned weapon deliverables by aggressively overcoming schedule obstacles including technical issues, availability of critical components, and facility flooding due to excessive rain. Pantex delivered 112% of planned W76-l LEP deliverables, 114% of surveillance deliverables, and 126% of the scheduled dismantlement work. B&W Pantex successfully met or exceeded product delivery commitments to fully-support the FY2010 directives schedule and DP's "Getting the Job Done" goals. This included the authorization of W84 and B53 weapon program operations. In regard to the B53, Pantex successfully managed tooling and process changes needed to enhance safety throughout the entire year. All activities related to readiness reviews, Nuclear Explosive Safety Study (NESS) approval, and contractor and NNSA readiness assessments were completed to support the planned authorization date. Additionally, all W62 dismantlement, including trainer dismantlement, was completed in FY2010, one year ahead of the planning date.

Significantly, Pantex now has authorization to perform work on all nuclear explosives in the active stockpile. Notable initiatives that began in FY2010 to improve accomplishing the DSW mission in support of DP "Getting the Job Done" include developing upgraded SS-21 tooling and a more modern process for the B83 program. This upgrade effort will significantly improve safety and efficiency by, among other things, virtually eliminating the use of personnel bonds to provide protection for electrostatic discharge hazards.

Pantex completed several other specific activities in direct support of stockpile surveillance work these included: the B61 TYPE 6D JTA FPU (incorporation of SS-21 tooling reduced process time by 25%); W76-1 JTA FPU; W78 JTA5 build; and authorization to build the W87 JTA 1-3. Pantex completed 100% alteration kit deliverables to the Department of Defense and 100% of surveillance deliverables.

Secretary Chu Visits Pantex and Observes the Dismantlement of the Last W62 Warhead

Special Nuclear Material (SNM) Operations

Pantex successfully implemented facility reconfiguration for pit staging to address future pit storage capacity concerns in a timely and cost-effective manner. As a result, NNSA is now afforded the time necessary to efficiently implement the pit disassembly and conversion project and successfully avoid over $90M in previously projected expenditures (validated during fourth quarter FY2010).

Pantex completed laser gas sampling for the W78 Pit Surveillance backlog significantly ahead of schedule. Additional pits from current design and implementation cycles were also completed, exceeding quantity targets defined in the Baseline Work Execution Plan. Pantex also completed mechanical upgrades to the Laser Gas Sampling System for the B61 Program and performed surveillance operations for several pits. Also, Pantex developed redundant capabilities by qualifying an additional Weigh and Leak Test Station in support of the W76-1 Program and expanded the Special Nuclear Materials Component Requalification Facility capabilities by modifying the Micro Focus X-ray System to allow evaluation of two additional pit types. Qualification was achieved for High Resolution X-ray Computed Tomography.

In other pit surveillance activities, Pantex accomplished NM container surveillance objectives for the following shipping containers: AL-R8/SI 2040, AL-R8, MH2800 container Sealed Insert (SI) packaging, AL-R8/SI 2030 and AT-400A. Pit storage sample surveillances were completed in FY 2010. Pantex also completed the following container-related activities: identified and qualified softwood Celotex as a replacement for cane Celotex in AL-R8 2030 SI containers to assure no impact to packaging operations; installed and completed startup activities for the 2040 SI bell jar; qualified two coordinate measuring machines to meet capacity demands and provide enhanced reliability in support of pit requalification and pit surveillance programs; completed re-

packaging of all backlogged CSAs currently authorized for packaging and re-packaged 160% of CSAs from the FY09 baseline; packaged and shipped 136% of the baseline FL units to the national laboratories for further testing; packaged and shipped 111% of the baseline tritium reservoirs, including implementation and utilization of the T568 tester; and, procured, installed, and completed testing of a universal bell jar capable of conducting leak checks of all pit storage and shipping containers with containment vessels.

Flood and Recovery

In July 2010, the severe thunderstorms produced unusually heavy rain in areas of the Texas Panhandle including the Pantex Plant. Parts of the plant experienced rainfall amounts of up more than 10 inches. The most affected areas included Zone 12 South, where the nuclear explosive and nuclear material operations facilities are located. The localized heavy rain caused significant flooding, including substantial equipment and facility damage. A number of plant personnel onsite on the evening of the event responded to sandbag and, to the extent possible, divert water from sensitive facilities and equipment and to prevent more extensive damage. Afterwards, a damage survey determined 60 nuclear explosive, nuclear material, and explosive operating and staging facilities and 22 access ramps were subjected to varying levels of flood water up to about a foot.

The following specific actions were taken to systematically evaluate the condition of facilities, infrastructure, equipment, weapons, and weapons-related material, prior to resuming work:

- A total of six multi-disciplinary teams systematically assessed and addressed facility, infrastructure, systems, structures, and component condition, weapons and weapons-related material, and the safety basis.

- Design agencies were consulted on weapon and weapon-related material condition.

- Cost estimates were prepared to replace equipment, including multi-million dollar test equipment ruined in the event.

- Facilities and equipment were brought back on line as evaluations were completed and any issues, including any safety basis issues, were addressed and resolved to assure safe operations.

Rainwater Flooding in Ramps at Pantex Plant

Performance Assurance/HRO

During the FY2010, Pantex continued to execute the CAS/Line Oversight (LO) process. All quarterly CAS Performance Reports were completed and briefed to PXSO. As of the 3rd quarter the contractor declared worker safety and health, ISM, the VPP (through award of Star Status), and the environmental management system as effective. Additionally, the Site Office provided a separate evaluation of performance through routine management assessment reports. The Energy Facilities Contractor Group (EFCOG) CAS conducted a review of various DOE/NNSA quarterly CAS reports and found that B&W's report provided not only metrics, but analysis of information and the identification of "top issues' impacting Pantex. The EFCOG CAS working group found that Pantex was the only site to have communicated "top issues" to the local Site Office.

As an additional way to evaluate and trend issues, all items in the issues management system were screened against the ISM Guiding Principles and causal factors. The data was binned, trended, and provided to PXSO. Extensive data analysis was performed on a quarterly basis. Pantex continued to execute its commitment to regularly evaluate compliance with the Orders covered in DOE O 410.1 and completed 18 Prime Contract List B assessments. Pantex exceeded the CAS scheduled assessment commitment for FY2010. Two Safety Management Programs (SMP) from the DSA were assessed. The first focused on the Nuclear Safety Program (SMP: Chapter 17). The second focused on Technical Training Program (SMP: Chapter 12). Pantex has also completed all planning for FY2011 CAS and Line Oversight activities and has begun execution. The contractor coordinated LO/CAS integration and shadow activities with

PXSO in September 2010 and developed the FY2011 CAS assessment schedule to support final approval by the end of FY2010.

Pantex continued to implement HRO concepts and practices within the Pantex Plant and to introduce the program to NNSA and outside entities. Most significantly, Pantex implemented a "barrier analysis" process as part of its defined "break the chain" framework for ensuring and improving system reliability. The barrier analysis process was successfully completed for two systems in the business and material handling/shipping functional areas that resulted in the identification of improved process flow, as well as identifying the important barriers to the reliability of those systems. In addition, Pantex partnered with Texas Tech University to develop a safety-culture survey that was piloted in the Applied Technology Division (now the Explosives Technology Division). Pantex and Texas Tech will continue to analyze the results and refine this process in FY2011. Pantex provided HRO seminars to the plant population and completed training all first level supervisors and managers. Several outside organizations participated in these seminars, including the Norwegian oil exploration and production company, Statoil. As a result of these seminars, Pantex was invited to discuss HRO principles and practical application with Statoil's exploration division at a meeting in Houston, Texas.

Specific HRO-related activities include:

- Trained all section managers and first line supervisors in the practical application of HRO.

- Shared HRO expertise with outside community to include the National Transportation Safety Board, Brookhaven National Laboratory, American Public Transportation Association, Welstar Healthcare, BSA Hospital, Statoil of Norway, and Y-12.

- Initiated HRO collaborative academic efforts with UC Berkley Hass School of Business, Texas A&M University and Texas Tech University.

- Conducted first joint Causal Factors analysis with B&W Pantex, Sandia National Laboratories, and NNSA/PXSO.

- Developed and piloted a comprehensive safety-culture survey of the Applied Technology Division at Pantex with Texas Tech University.

- Continued collaborations to implement HRO concepts among Y-12 employees and the Y-12 Site Office.

I. Richland Operations Office

The DOE Richland Operations Office (RL) is reaching closer to 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 towards cleanup of the site.

During FY 2010, RL continued extensive oversight of its contractors. This included a significant oversight effort focused on American Recovery and Reinvestment Act (ARRA) work. RL completed 100% of planned oversight activities as scheduled in the integrated evaluation plan. In February 2010, RL completed an Integrated Safety Management System (ISMS) Phase II Verification of the Plateau Remediation Contract. The ISMS review team found that the contractor had documented and implemented an adequate ISMS System Description. Systems identified within the CH2MHill Plateau Remediation Company ISMS description were effectively implemented with one significant exception and some concerns related to existing processes that are critical to ISMS. The one significant exception is related to overall implementation of ISMA implementation at the Waste Retrieval Project. RL recently completed its self-assessment of the effectiveness of its Quality Assurance (QA) Program implementation assisted by Office of Environmental Management (EM) staff from EM-23. Some recommendations and areas for improvement have been identified, but overall the RL QA implementation was considered satisfactory. In the April 2010 timeframe, RL identified a Conditional Payment of Fee due to performance failures that reflect a lack of focus on environmental, safety and health, and failure to comply with approved ISMS.

The Defense Nuclear Facility Safety Board (Board) completed a review of work planning and control for the Plateau Remediation Contract. The Board observed a hazards analysis process that provides insufficient focus on task-specific hazards and their associated controls, and incomplete integration of hazards and associated controls into work instructions. A plan to address the Board concerns is in process. The Board also reviewed work planning and control for Washington Closure Hanford, and is in the process of developing its response to this review.

The DOE Office of Health, Safety and Security (HSS) inspection of the Hanford beryllium program was conducted February 2010 thru June 2010 in response to concerns raised by current and former workers. A Corrective Action Plan (CAP) was developed to address all findings and opportunities for improvement. The CAP was approved by EM with the concurrence by HSS. An Independent Beryllium Oversight Team was also established to provide support and enhance communications with affected workers, and to perform independent oversight of contractor implementation of the CAP corrective actions.

RL 2010 Activity Highlights

Plutonium (Pu)-238 Disposition

The Hanford Site has completed the campaign of shipments of Pu-238 materials to the Savannah River Site (SRS) for reprocessing. This campaign involved interfacing with the Idaho National Laboratory (INL) for the use of their Radioisotope Thermoelectric Generator (RTG) shipping containers, specifically designed to carry materials like the Pu-238 being shipped from Hanford to SRS in this campaign. The RTGs were approved for shipment of these materials in October 2009. SRS completed modifications to the nuclear safety basis for authorization to receive and process the materials that helped the project maintain schedule for completion by the end of the

FY2010 . It was thanks to the coordination of the INL, SRS, and Office of Secure Transportation that Hanford can celebrate the completion of this monumental effort.

Demolition of Five Access Control Buildings at the Plutonium Finishing Plant (PFP)

The profile of the Plutonium Finishing Plant (PFP) Complex is greatly altered with demolition of five access control facilities: the Patrol Central Alarm Monitoring Facility; the Vehicle Search Portal-Tent; the PFP Badgehouse; the Vehicle Inspection Shelter; and, the PFP Operations Control Facility. In addition, the perimeter fence and vehicle barrier have been removed. Due to ARRA funding, the preparation for the facilities demolition work was completed more than one year and seven months in advance of the baseline schedule.

Nuclear Materials Stabilization & Disposition

Critical decontamination and decommissioning work is being accelerated to prepare the PFP for demolition three years ahead of the Tri-Party Agreement milestone of September 2016.

Waste Disposal Record Set at Hanford's Disposal Facility

The Waste Operations/Disposal Project set a record by disposing of 1,589,668 tons of contaminated soil and debris in the Environmental Restoration Disposal Facility (ERDF) during FY 2010. This was an increase of approximately 730,000 tons from FY 2009. The disposal forecast for FY 2011 is to dispose of 2,000,000 tons in ERDF.

U Plant Ancillary Facilities

Demolition of the 224-U structure is complete. Rubble and waste disposition is ongoing. Complete disposition, including surveying and grading the area, is close to completion.

Explosive Demolition of 300 Area Buildings

Explosives were used to demolish the Fast Flux Test Facility office and High-Bay Testing Facility and Plutonium Recycle Test Reactor exhaust stack. The demolished structures were located in the 300 Area of the Hanford Site adjacent to the Columbia River and North Richland.

Shipments to the Advance Mixed Waste Treatment Project (AMWTP)

The Richland Operations Office will resume shipments of Transuranic waste to the Idaho National Laboratory – AMWTP. Approximately 1,000 55-gallon drums individually over-packed into 85-gallon drums are being shipped to the AMWTP for super-compaction and processing for disposal at the Waste Isolation Pilot Plant.

Welling Drilling Achieved

The ARRA Operations Activity Key Performance Parameter has been achieved. 258 wells have been installed to date. The metric was for 243 wells.

Building 327 Hot Cell Removal

The disposal of the 10 above-grade hot cells removed from the 327 Post Irradiation Test Facility was completed. The hot cells were transported to the ERDF for final grouting and disposal. The remaining hot cell is below grade and will be removed with the remainder of the building structure. Prior to deactivation, Building 327 was a hazard category two nuclear facility.

Start of 100-F Area Remediation

Contractors started remediation of the 24 100-F Area waste sites on September 16, 2010. The work being performed is planned to be completed by April 2011. Remediation of these 100-F Area waste sites is being accelerated by ARRA funding.

J. Sandia Site Office

The Department of Energy (DOE)/National Nuclear Security Administration (DOE/NNSA) Sandia Site Office (DOE/NNSA/SSO) is the management office providing oversight of the Sandia National Laboratories (SNL). Sandia Corporation (Sandia), a wholly-owned subsidiary of Lockheed Martin Corporation, manages and operates SNL for the DOE/NNSA. Sandia designs all non-nuclear components for the nation's nuclear weapons, performs a wide variety of energy research and development projects, and works on assignments that respond to national security threats. The following sections summarize the status of nuclear facilities, and significant interface activities with the Defense Nuclear Facilities Safety Board (Board) and staff during FY2010.

Sandia Nuclear Facility Status

Annular Core Research Reactor

Operational. The Annular Core Research Reactor supported a testing schedule for 2010 that included work for the ***Atomic Weapons Establishment*** (AWE), Defense Programs, and radiation effects science testing. 84 Steady State and 234 Pulse Operations were safely conducted for a wide range of experiments.

Sandia Pulsed Reactor Facility/Critical Experiments (SPRF/CX)

Operational. The facility continued operations with the 7% fuel core using a variety of configurations of fuel rods and water voids. The facility is in the process of using CX to assist in NNSA's criticality operator training program.

Gamma Irradiation Facility

Operational. The Gamma Irradiation Facility performed testing in 2010 for a variety of Defense Programs customers most notably in the area of nano-technology.

Manzano Nuclear Facilities

Operational. The facility supported the preparation of Transuranic (TRU) Waste for shipment offsite.

Auxiliary Hot Cell Facility

Operational. After completion of the contractor and federal Operational Readiness Reviews (ORR), DOE/NNSA/SSO authorized startup operations at the facility. The facility's mission is to prepare Remote Handled legacy waste, including TRU and other waste forms for shipment offsite. Work on the first package began in October 2010 (see Figure below). The facility is projected to operate for five years.

First Drum Being Loaded into the Auxiliary Hot Cell Facility

Onsite Transportation of Hazard Category 3 Radioactive Materials:

Operational. The Federal ORR was performed December of 2009. Operations began in February 2010 and the first shipments took place later that month.

Significant Interface Activities with the Board and Staff

The Board visited DOE/NNSA/SSO and SNL on November 30, 2010. This visit included agenda items on the W76-1 issue and the Z Machine.

W76-1

On January 25, 2010, the Board sent a letter to the Administrator of the NNSA observing unacceptable processing of information concerning an emergent issue at SNL regarding components used in the W76 Mod 1 program. The lack of timely review and communication of

new information from SNL personnel to those qualified to assess its safety impacts resulted in operations being performed by the Pantex contractor without a complete understanding of the hazards involved.

The SSO, the Pantex Site Office, and B&W Pantex performed a joint review using the Pantex Causal Factors Analysis process to conduct a complete review of the event. The decision to conduct this review was made well before and independent of the Board letter.

The Board requested a briefing 30 days after completion of the causal factors analysis (CFA) on the CFA findings and any actions taken to prevent recurrence of such an event. The Board was briefed on May 12, 2010 by the site offices and contractors. During the Board's visit of November 30, 2010 to the SSO and SNL, they were briefed on the status of SNL's corrective actions. The Board and its staff continue to monitor the CFA corrective actions.

Hazard Categorization at the Z Machine

The Board staff had been provided briefings on the Plutonium Isentropic Compression Experiments (Pu-ICE) that had been performed at the Z Machine. In their March 2010, visit the staff voiced concerns regarding the hazard categorization of these experiments. On May 21, 2010 a letter was sent from the Board to NNSA regarding hazard categorization at the Z Machine. The letter also requested a briefing to the Board on the topic. A briefing was provided to the Board in July 2010. Sandia provided the results of analysis, simulation, and testing that supported the appropriateness of treating the Z Machine vacuum as an initial condition and demonstrated that this work was properly hazard-categorized as radiological. The first plutonium shot at the refurbished Z Machine was completed safely and successfully in November 2010. At a November 2010 visit, the Board was briefed on the significant safety upgrades that SNL made to the facility, specifically in support of this work. Sandia, on its own initiative, began an ambitious initiative to significantly improve the safety, reliability, and operability of Z Machine through an extensive program of analysis, testing, and equipment upgrade. The work done at Z Machine is a product of the concept of engineered safety being developed at Sandia.

Visits by Board Staff

DOE/NNSA/SSO and Sandia hosted Board staff members in March, August, September, and December 2010. The topics of interest for the visits included the status of the Auxiliary Hot Cell Facility, hazard categorization at the Z-Machine, Nuclear Weapon Safety, and SNL support to Pantex. Dr. Thomas Spatz, the cognizant engineer for the DOE/NNSA/SSA and SNL, participates via video teleconference in the weekly DOE/NNSA/SSO Operations Meetings. This has proved very beneficial by allowing both DOE/NNSA/SSO and Dr. Spatz to fully-understand the status of areas of interest to the Board.

Document Requests

DOE/NNSA/SSO and Sandia responded to sixteen unclassified document requests and four classified document requests from the Board concerning SNL nuclear facilities and support of Pantex.

K. Savannah River Operations Office

The Savannah River Site (SRS) performs activities for the DOE Office of Environmental Management (EM) and the National Nuclear Security Administration (NNSA). Activities performed by the site contractors – Savannah River Nuclear Solutions, LLC (SRNS) and Savannah River Remediation, LLC (SRR), and Parsons Infrastructure and Technology Group, Inc. (Parsons) – in support of EM are overseen by the DOE Savannah River Operations Office (DOE-SR) and include nuclear materials stewardship and environmental stewardship. Major activities and accomplishments in 2010 for the EM specific facilities/projects at SRS are summarized below.

Safety

SRS continues to implement many initiatives to improve performance in ensuring public health and safety. The following are key highlights:

- In FY2010, SRS (including DOE-SR, all contractors and subcontractors) achieved a total recordable case rate of 0.78 and a Days Away, Restricted, or Transferred rate of 0.40 versus the DOE average of 1.20 and 0.52, respectively.

- SRS Construction forces continued a world record for hours worked without a Days Away injury. They are now in excess of 24.5 million hours, exceeding 12 years in June 2010.

- During the Annual National Voluntary Protection Program (VPP) Participants Association (VPPPA) conference, held in August 2010, SRNS received their 3rd consecutive Star of Excellence Award, and their 1st Legacy of Stars award. SRR received their 9th consecutive Star of Excellence Award, and their 3rd Legacy of Stars award. These are both very significant awards and were achieved in large part due to the energy, enthusiasm, commitment, and professionalism of the SRNS/SRR VPP Core Team.

- SRS led the DOE complex with the organization and development of the DOE 2010 ISM Champions Workshop – Pathways to New Missions, which was held in Augusta, GA, in September 2010.

- SRS served as one of two DOE pilot sites for the deployment of the Enterprise Integrated Safety Management System's Exposure Assessment module (EISM-EA). EISM-EA provides for the collection and effective management of industrial hygiene data and will allow for the accurate retrieval of workplace exposure information in response to future requirements.

Although many aspects of worker health and safety continue to improve, SRS did sustain one significant accident while performing transuranic (TRU) waste remediation work. A technician received a puncture wound near the base of the index finger while placing an

indicating device (a wire survey flag) into a quart sized waste can. The technician bent the survey flag into a "U" shape and the uncovered end of the flag punctured his personal protective equipment, resulting in internal contamination with transuranic elements. An initial range (low and high) projection was estimated to be between 5 and 50 rem committed effective does to the whole body and between 166 and 1657 rem committed equivalent dose to the bone surface from this intake. DOE-SR initiated a Type B Accident Investigation Board to investigate the accident. The Accident Investigation Board concluded the root cause of the accident was a less than adequate graded approach used for high hazard TRU waste remediation work not coinciding with the disciplined warranted for high hazard work. A Corrective Action Plan was developed, approved and is currently being implemented."

American Recovery and Reinvestment Act (ARRA)

SRS recognizes that the successful execution of the ARRA project requires a systematic approach to safety. Under ARRA, SRS is safely accelerating cleanup activities and reducing the SRS footprint, risk, and future costs, while generating meaningful jobs for hundreds of workers. To properly and safely execute this work within the defined timeframe, the ARRA Project required a rapidly expanded workforce. This expanded workforce is comprised primarily of subcontracted/staff augmentation staff. To ensure that these new workers, as well as current workers, are kept safe and that the safety basis of existing operations are not adversely impacted, SRS employs a rigorous Integrated Safety Management System (ISMS). Implementation of this system ensures consistent understanding and execution of SRS Safety & Health policies, programs, and procedures by: integrating safety and health activities into ARRA project planning, identifying and managing ARRA risk, communicating with customers and stakeholders to facilitate transparency and trust, and advocating appropriate ARRA implementation and emerging safety and health policies.

Although SRS has a well-established Environmental, Safety, Health, and Quality Assurance program, this program has been expanded to support the increased work scope of the ARRA project. Actions continue to be implemented to ensure the safety of ARRA workers.

- The oversight of field operations continues to be managed through management field presence and conduct of operations support, such as: a mentor program for new hires, daily hot wash/end of week housekeeping, and Subcontract Technical Representatives oversight. Additionally, ARRA maintained independent oversight of its operations by staffing a dedicated ARRA Facility Evaluation Board comprised of technical experts that observe and assist in operational reviews and assessments.
- The ARRA project has successfully accumulated 4,612,823 hours through FY 2010. Although the safety performance remains a challenge and the highest priority of management, safety rates continue to improve and SRS rates remain consistently lower than the DOE national averages.

Area Completion Project

The Area Completion Project (ACP) includes work scope for soils, groundwater, and surface water remediation. and the deactivation and decommissioning of inactive, excess SRS facilities to support the SRS Area Completion Strategy. This work scope is conducted by ACP contractor employees. Through FY10, 373 of the 515 waste units have been completed under the oversight

and approval of the South Carolina Department of Health and Environmental Control (SCDHEC) and the Environmental Protection Agency – Region 4 (EPA). Additionally, through FY10, 258 of 985 Gold Metric facilities have been dispositioned.

In FY 2010, ACP completed M Area and is currently working to complete D, P, and R Areas. ACP worked closely with the EPA and SCDHEC, the public, and the SRS Citizens Advisory Board, to obtain an in situ end state decision for SRS reactors, which will provide short- and long-term protection for human health and the environment. Additionally, ACP continued to operate active, enhanced, and passive subsurface contaminant remediation systems.

Solid Waste

In FY10, SRS maintained its accelerated TRU waste program, dispositioning 661 cubic meters of legacy TRU waste and successfully completing 81 shipments to Waste Isolation Pilot Plant. SRS resumed the operations of TRU waste remediation and repackaging processes at the H-canyon facility and F-canyon facility. SRS started the soil cover removal and culvert retrieval from the last earthen covered pad (TRU Pad 1) of retrievable disposed waste and completed retrieval of 73 culverts. Also, during FY10 SRS shipped 5409 Depleted Uranium Oxide drums to Energy Solutions in Utah for disposal and 506 drums shipped to Oak Ridge as blend down material.

Savannah River National Laboratory (SRNL)

Savannah River National Laboratory (SRNL) is a DOE multi-program applied science laboratory. The mission of SRNL is to provide technology-based solutions for the Nation's challenges of cleaning up the environmental legacy from the weapons program, and meeting key national and energy security objectives. To support these missions, SRNL provides applied technology through multi-disciplinary programs of scientific research and applied engineering in a safe and secure environment. Some of SRNL's most significant accomplishments during the last year include the following:

- SRNL retained its position as the safest national laboratory for sixth consecutive year and achieved over 7 million man-hours without a Lost Workday Case in FY10.
- Completed construction of the FBI Forensic Laboratory to perform traditional forensics on radiologically contaminated evidence. The project was conducted safely, ahead of schedule and under budget; the ribbon cutting was held on June 6, 2010.
- Developed process flow-sheets for disposition of legacy nuclear materials enabling inventory reductions at other DOE sites and universities; accelerating salt waste processing at SRS and Hanford; Defense Waste Processing Facility disposition of excess Np-237 and Pu-239 for significant cost-avoidance and potentially increasing future Canyon Pu processing rates.
- Completed Mobile Plutonium Facility for deployment to proliferate nations to safely prepare nuclear materials for shipment.

- Completed second year for Center of Excellence for Hydrogen Storage and created reversible route to generate high-capacity H_2 storage material (aluminum hydride) for applications spanning energy technology and synthetic chemistry.
- Completed SRS Composite Analysis for radiological waste, which is being used by DOE-HQ as a model for the Complex.
- Advanced Technology Demonstration Characterization Team received the Department of Homeland Security's Domestic Nuclear Detection Office Award for characterization support of new radiation detectors.
- Eight patents issued/allowed, four licenses, six Cooperative Research and Development Agreements modified/extended, 48 invention disclosures, 114 nondisclosure agreements, and 110 publication agreements.

Transuranic Waste Operations (TRU)

In October 2009, SRS resumed operations of the TRU drum remediation facility in the Warm Crane area of 221-F Canyon and began modifications of the F-Canyon truck well to support a second TRU waste operation in F Area. This work is being funded by the ARRA through calendar year 2012. The TRU F-Canyon truck well operation is scheduled to start in the second quarter of FY 2011.

F Area

FB-Line and 235-F remained in a shutdown and de-inventoried state. A portion of F-Canyon continued to be used for TRU waste remediation capability. Further deactivation of F-Canyon systems not required for TRU waste remediation continued in FY 2010. Additionally, banding and palletizing of depleted uranium oxide in preparation for shipment was completed in FY2010. Plans are also being developed to reduce risk at the 235-F facility, including development of a

new Basis for Interim Operation. Stack height reduction for an abandoned stack adjacent to the 235-F facility was completed in FY2010. The F/H Lab remains in operation supporting customers across SRS. The laboratory received or renewed many certifications during the year.

H Area

In FY2010, H-Canyon had the lowest Conduct of Operations event rate in the last 6 years. The rate shows a 15% improvement from FY2007 to FY2008, and reflects an additional 27% improvement from FY2008 to FY2009. Other key accomplishments included:

- H Canyon completed dissolution of the 5.6 MT un-irradiated highly enriched uranium (included in the latest modification of the Interagency Agreement with the Tennessee Valley Authority [TVA]).
- Completed shipment of 24 trailers of Low Enriched Uranium to TVA.
- Received 12 drums of Hanford Pu-238 (Low Assay Plutonium) eight months ahead of schedule; 7 drums were processed through HB-Line. Shipment of the 12 drums involved coordination between the Savannah River Site, Idaho National Laboratory, Hanford and the Office of Secure Transportation.
- Dispositioned 76 kgs of plutonium in HB-Line.

Nuclear Materials Disposition Plans and Studies

- Completed the UNF Alternatives Analysis Study in January 2010, two months ahead of schedule.
- Completed five Integrated Facility Aging Management assessments.
  - Outside Facilities Steam and Condensate System
  - General Purpose Evaporator
  - H-Canyon Steam and Condensate System
  - K-Area Complex Buildings and Structures
  - Spent Fuel Project Buildings and Structures

Infrastructure Upgrades completions

- Built HB-Line Spare Dissolver
- Completed blanking the Old HB-Line Duct in 292-H
- Completed backfilling the 299-H Duct to H Area Sandfilter
- Replaced numerous Canyon Cell Cover Pier Supports

Waste Handling

- H Canyon was challenged to transfer less than 300K gallons of liquid waste to the Tank 39 during FY 2010. Approximately 35K gallons of liquid waste was transferred to the Tank Farm.

Nuclear Materials Management

K-Area

The K-Area Complex continued to effectively execute mission elements as SRS's only Category I facility. It has been more than 13 ½ years since the last lost workday case and over 10 years since the last personal contamination in the K-Area Complex. Key accomplishments for 2010 included:

- Completed all 3013 Surveillance activities ahead of schedule (34 non-destructive and 18 destructive examinations). Program results continue to provide valuable supporting data on the long-term storage of material in DOE-STD-3013 containers.
- Successfully supported the annual Russian inspection of K, L, P and C-Areas for the Plutonium Production Reactor Agreement.
- Installed the California Shuffler project on schedule (and under budget) enabling compliance with Material Control & Accountability requirements.

L-Area

UNF continued to be received and stored in the L-Area Basin awaiting disposition. The L-Area Complex safely performed work with no lost workdays in FY2010, extending their record to over 18 years without a lost workday case. Other risk reduction activities included:

- Received 594 fuel assemblies and two cores from foreign and domestic research reactors.
- Accelerated unplanned receipt of the Chilean fuel.
- Completed the refurbishment of two 70-ton casks, which will be used for future onsite transfers of UNF from L-Area to H-Area for disposition.

Liquid Waste Operations

The liquid waste disposition program made significant progress in FY2010 in safely treating and dispositioning high-level wastes and reducing risk.

Saltstone

- Processed approximately 1 million gallons of salt waste from Tank 50 over the past 12 months.
- Successfully processed Low Isopar salt waste from Modular Caustic Solvent Site Extraction Unit (MCU) under an Interim Documented Safety Analysis (DSA) for Low Organic Material.
- Modifications were completed at Saltstone for the Full Organic Material from Actinide Removal Process ARP/MCU.
- Two new disposal cells are under construction with site preparations completed to begin constructing an additional four cells.

Defense Waste Processing Facility (DWPF)

- Produced 192 canisters of vitrified High Level Waste glass during FY2010.
- Produced a fiscal year monthly maximum of 23 canisters in December 2009 and March 2010.
- Transitioned to Sludge Batch 6 (High Al sludge) in June 2010 and increased waste loading to 36%.
- Maintained waste loading to protect a repository maximum concentration limit of 897 gms fissile / cubic meter glass.
- Installed 4 melter bubblers in Melter 2 in September 2010 to increase melt rate capability.

H-Tank Farm Operations

- A total of 3.21 million gallons of space were recovered in FY10 through operation of three evaporator systems thereby allowing H-Canyon to meet its objectives, tank closure activities to remain on schedule, DWPF to maintain canister production, and sludge batch preparations to proceed as scheduled.
- Continued to demonstrate the viability of the ARP/MCU process in H-Tank Farm and DWPF since beginning radiological operations in April 2008. A total of 1.17 million gallons of salt solution have been processed to date since initiating radiological operations in April2008. Decontamination factors of the salt solution have averaged 200, which is much better than the design basis of 12.
- Continued process optimization with subsequent salt batches based upon experience and lessons learned from salt batch processing. Increasing overall attainment as modifications and changes are incorporated. Implementing Performance Improvement Plan to reduce batch preparation and qualification cycle time.
- Continued to share operating experience and Lessons Learned with the Salt Waste Processing Facility (SWPF).

F-Tank Farm

- F-Tank Farm made significant progress toward completion of Federal Facilities Agreement (FFA) milestones for waste removal and tank closure.
- Completed bulk waste removal from Tanks 8 and 12, and meeting two FFA milestones. Obtained SCDHEC and EPA approval to store aluminum rich supernate in Tank 8 following completion of bulk waste removal.
- Completed waste removal and cleaning activities in Tanks 5 and 6. Prepared “cessation of cleaning” case for obtaining DOE, SCDHEC and EPA concurrence to cease waste removal and enter into the sample and analysis phase.
- Activities are underway toward isolating Tanks 18 and 19 mechanical, electrical and ventilation systems. Characterization of residual waste in Tanks 18 and 19 was completed to support development of a first draft Closure Module for these two tanks. Review and comment by DOE, SCDHEC, and EPA on the Closure Module will occur next year.
- Revision 1 of the F Tank Farm Performance Assessment was published in April 2010 incorporating comments received from SCDHEC, EPA, Nuclear Regulatory Commission (NRC) and the public.

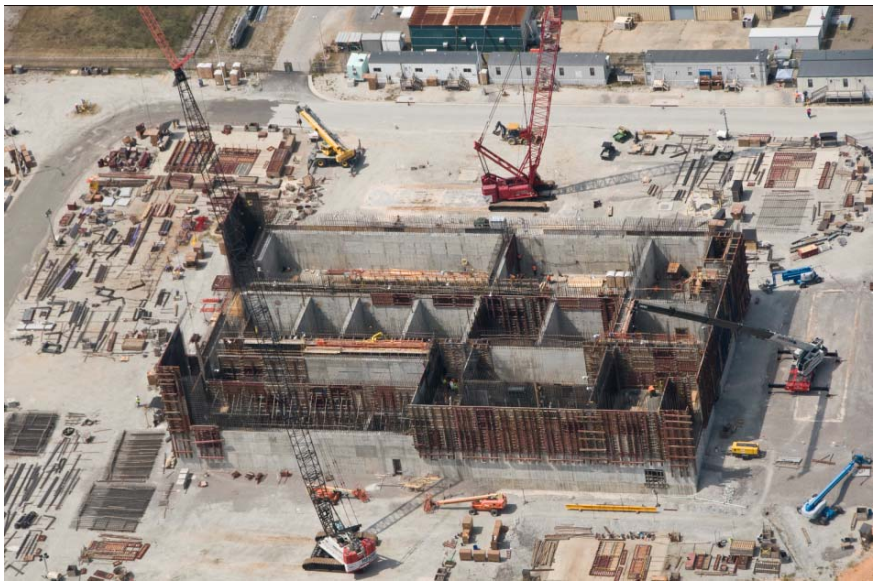
- Resolved issues with SCDHEC on the F Tank Farm General Closure Plan facilitating SCDHEC publication for public review.
- DOE requested NRC consultation on the Draft Basis for Section 3116 Determination for Closure of F Tank Farm and published the document for public and other stakeholder review and comment.

Salt Waste Processing Facility (SWPF)

The SWPF is managed by Parsons Infrastructure and Technology Group, Inc., under a separate contract with DOE. SWPF's most significant accomplishments during 2010 include the following:

- During 2010, construction effort accelerated significantly by working 2 shifts to complete the walls and first deck at the 116 foot level of the Central Process Area (CPA) by mid-July.
- Sixty-one of 72 concrete placements were completed which constituted 91% of the concrete required to achieve the walls to 139 foot milestone (as of 24 November). The deck at the 139 foot level was begun with 2 of 9 large concrete placements scheduled to be achieved by 31 December.
- Foundation work began and underground utilities were installed for the Cold Chemical Area, the Alpha Finishing Facility, and the North Facility Support Area buildings.
- Process pipe fabrication effort has shifted from the on-site fabrication shop to pipe support and process pipe installation in two of the CPA dark cells.
- Significant sub-contract work has begun to install the ventilation system and special wall coatings.
- Quality and schedule issues with the large ASME Tank Vendor caused Parsons to move fabrication to a new vendor. As a result, Parsons re-sequenced construction activities to mitigate schedule delays.
- With the above exception, the NQA-1 Vendors have provided needed equipment in time to support the construction schedule. Specifically, the three critical path drain tanks were procured and placed in the drain tank cell (November 2010) and the CSSX Contactor skids are within one month of shipping (December 2010).

Parsons engineering has identified a list open items resulting from reviews with the Board staff on safety basis, tank mixing, fire protection, commercial grade dedication, instrumentation and control, and control of flammable gases. During 2010, the majority of the actions were completed and information provided to the Board Staff. The remaining actions are planned for completion over the next several months.



L. Savannah River Site Office

The Savannah River Site Office (SRSO), in coordination with DOE-SR, oversees tritium programs-related National Nuclear Security Administration (NNSA) activities at the Savannah River Site (SRS). These activities include nuclear weapons stockpile stewardship and operation of the tritium facilities. NNSA activities at SRS are performed by the site contractor, Savannah River Nuclear Solutions (SRNS), which also supports activities that are overseen by the DOE Savannah River Operations Office (DOE-SR). In addition to the site-wide accomplishments, the following are the activities and safety-related accomplishments in 2010 associated with the NNSA Tritium Programs:

- Extraction of tritium gas from Tritium Producing Burnable Absorber Rods (TPBARs) continued in the Tritium Extraction Facility (TEF); the extraction of the Cycle 9A TPBARs was completed as scheduled.

- "Responsive Operations," a cost-effective workforce mobility practice, was successfully continued. During periods when extraction and processing of gas is not occurring in TEF, many of the TEF operators are assigned support functions in other tritium facilities. These operators have been trained and qualified in these additional support functions.

- Defense Nuclear Facilities Safety Board (Board) staff members received tours and detailed briefings regarding the tritium facilities during the week of August 23, 2010. The intent of the briefings was to provide detailed information regarding the Documented Safety Analysis (DSA). Topics addressed included the history of the DSA, facility processes and the material-at-risk, the Consolidated Hazard Analysis Process, Accident Analysis, credited controls, the dispersion model, and Specific Administrative Controls (SAC).

- The five Board members visited SRS October 20-21, 2010, for briefings and tours. Topics addressed included Nuclear Materials Disposition and Storage, Emergency Response, and protection of non-Safety Class and non-Safety Significant controls. SRSO provided tours of the tritium facilities and provided its perspective on the contractor's nuclear safety posture.

- The FY 2010 annual update to the tritium facilities' DSA was approved by SRSO on September 23, 2010. Major changes to the DSA include: incorporation of a new SAC to allow the receipt of tritium units (Non-Robust Containers) from design agencies; incorporation of outstanding comments from the safety basis comment database; revision of Limiting Conditions of Operations (LCO) set points for the Environmental Chamber Temperature Interlock and Oxygen Monitors, based on uncertainty calculations; clarification of LCO operability for the TEF Tritium Air Monitors; provision of general description updates throughout the documents; and, incorporation of outstanding safety basis change requests.

- The SRS tritium facilities continued supporting the Stockpile Stewardship Program by successfully completing function testing of several gas transfer systems in accordance with design agency direction, and providing the resulting data via formal reports to the design agencies for their analyses.

- The Tritium Facilities continued providing excellent support of on-time delivery for gas transfer systems to the Department of Defense.

- The Chief of Defense Nuclear Safety's review of the tritium facilities was completed in November 2010. There were two findings identified during the review; one was associated with NA-10, and the other associated with SRSO oversight of the Radiological Waste program. In addition to these findings, several opportunities for improvement were provided. SRSO is formally addressing each of the identified issues associated with this review.

- SRNS Tritium Programs continued a series of coaching tours and operational pauses to enhance the Conduct of Operations posture of the tritium facilities. During the coaching tours, teams of senior Tritium Programs managers monitor plant operations and maintenance activities, discuss expectations with plant personnel, and provide mentoring support to the plant personnel. Operational pauses allow the Tritium Programs management team the opportunity to discuss facility, site-wide, and complex-wide issues with operations, maintenance, and support personnel assigned to the facilities.

M. Y-12 Site Office

During FY 2010, the Y-12 Site Office and the site contractor B&W continued work to improve the overall safety and operation of the Y-12 site by focusing on: a) implementation of the site strategic plan, b) close oversight and line management attention to ensure safe operation of

several aging nuclear weapon production facilities; and, c) continued improvement of nuclear safety programs and conduct of operations.

Implementation of the Site Strategic Plan—Transforming the Site through Projects

Highly Enriched Uranium Materials Facility Project

In January 2010, National Nuclear Security Administration (NNSA) Administrator Thomas P. D'Agostino authorized the startup of the Highly Enriched Uranium Materials Facility (HEUMF). At a cost of $549M, the largest construction project at Y-12 in 40 years achieved readiness to start up an impressive 10 weeks ahead of schedule and under budget. The startup of this state-of-the-art storage facility marks a major milestone in NNSA's efforts to create a modern nuclear security enterprise. "Bringing HEUMF online is a prime example of the progress NNSA is making in transforming a Cold War nuclear weapons complex into a 21st century nuclear security enterprise," said Administrator D'Agostino. "I commend Y-12 for their efforts in bringing to fruition the construction and operation of a new nuclear material storage facility." On March 22, 2010, HEUMF was dedicated at a ceremony with U.S. Department of Energy (DOE) Secretary Steven Chu as the keynote speaker.

Highly Enriched Uranium Material Facility

A number of initiatives and milestones were reached this year to complete the HEUMF project:

- The project completed a Corporate Operational Readiness Review (ORR) and NNSS ORR. The NNSA ORR team lead indicated that, of all the facility reviews he had completed, HEUMF was the best prepared to undergo review. The project team attributes several factors to the successful completion of readiness. One of them was a team-developed readiness certification assurance process never before used at Y-12 that added rigor and structure to the readiness process.

- The CD-4 package was submitted to the NNSA Energy Systems Acquisition Advisory Board (ESAAB) and approved by NNSA on March 12, 2010.

- The HEUMF transition commenced moving materials from the old warehouse on January 25, 2010, two months ahead of the readiness baseline schedule. Y-12 completed the de-inventory of Building 9720-5 on April 7, 2010, 17 days ahead of the 90-day goal. This accelerated plan provided a cost avoidance of $26M in safeguards and security costs and dramatically improved the safety of storage of the nation's stockpile of highly enriched uranium.

Progress on preliminary design efforts for Uranium Processing Facility (UPF) which will replace Y-12's current aging Enriched Uranium Production Facilities.

The project completed preliminary design and progressed well into final design with the overall design being 48% complete at year end. The design deliverables for the initial CD-2/3 package for Long Lead Procurement and Site Preparation are complete, including over 200 drawings, 37 construction specifications, 20 equipment specifications, design analysis calculations, system design descriptions, and other documents.

UPF Conceptual Design

The UPF project held a review with the NNSA Headquarters on December 17 to present the status of the project, plans for completion, issues, challenges, and funding.

The Facility Design Packages 1 (Architectural, Structural, and Fire Protection Preliminary Design), 2 (Utilities and Plant Design), 3 (Civil-Site Preparation), and 4 (final package, including wetland remediation and structural calculations) were issued for external reviews October through January, 2011 to support the CD-2/3 package. Also, approximately 350 Chemical

Processing piping and instrumentation diagrams were issued for use by facilities for their utility system design.

The project completed the design and submitted the complete CD-2/3 package for Site Preparation and Long Lead Procurement to YSO September 1, 2010, ahead of schedule. In addition to the design deliverables, the package included 26 required and 73 other documents, including a comprehensive cost estimate and a resource-loaded integrated schedule. The TPC range estimate was submitted ahead of schedule in July 2010 to YSO.

Other UPF project highlights follow:

- On June 3, the project celebrated working 1 million work-hours (accomplished in April, 2010) since the last recordable injury and the completion of preliminary design. The project has continued to maintain its safety record through the year, and is now at 1.3 million work hours.

- On October 20, 2009, the project team received the Defense Programs Award of Excellence from Brigadier General Harencak for the reconfiguration of the UPF facility that resulted in improved safety, security, and operations and reduced capital costs.

- The Construction Management and Execution Strategy for the UPF Project was issued in January 2010, and all construction procedures (approximately 30) required for CD-2/3 were issued by the end of March.

- Constructability reviews of the design were ongoing, resulting in significant cost reductions for the project. Construction, Engineering, and Security collaborated on a method for safely and efficiently constructing the exterior walls.

- The project held its second Suppliers Outreach in March, 2010, at which approximately 400 company representatives attended. The conceptual design subcontract award for the Advanced Integrated Machining System was issued during October, 2010 and the conceptual design was accepted.

- Results of the Defense Nuclear Facilities Safety Board (Board) visit indicated that UPF has a robust Quality Assurance (QA) Program, and UPF addressed actions through procedures and plans to prevent the re-occurrence of any negative lessons learned from HEUMF.

- The project supported reviews by the Office of Cost Analysis (OCA), the U.S. Army Corps of Engineers, NNSA-NA-54 (annual Integrated Product Realization (IPR)), Government Accounting Office audits, and the Scott Samuelson (NNSA/NA-10) review of the TPC range estimate.

The NNSA/NA-10 review team indicated the team and processes were in place for the initial CD-2/3 Site Preparation and Long Lead Procurement; and, although the TPC range was not complete at that time, the techniques, processes, and assumptions gave the reviewers confidence that the estimate would have a reasonable basis.

Site Infrastructure Safety Improvements

The dedication of the steam plant in June, 2010 celebrated an important step in modernizing Y-12's utilities infrastructure. The new steam plant replaces a coal-fired boiler steam plant with a new centralized steam plant using natural gas-fired, packaged boiler systems. Completion of the Steam Plant Life Extension (SPLE) project is expected to eliminate about $27M of deferred maintenance costs associated with the steam plant and steam distribution system at Y-12. The SPLE project was completed on schedule and under budget.

The Potable Water System Upgrades (PWSU) project is complete. The CD-4 package was approved by YSO with receipt of CD-4 Project Completion in October 2010. Completion of the PWSU project is expected to eliminate about $25M in deferred maintenance costs associated with the water distribution system at Y-12. The figure below shows the new Chestnut Ridge tanks in the background.

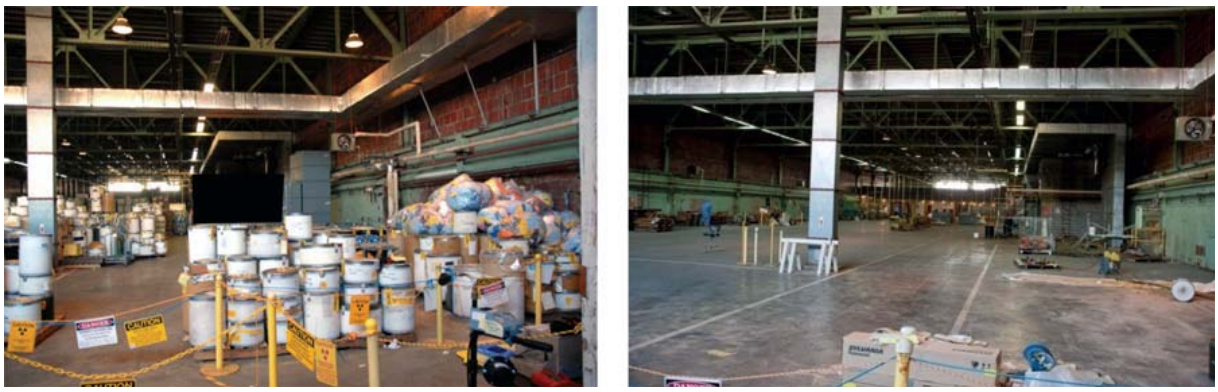
New Y-12 steam plant with Chestnut Ridge water tanks in the background

American Recovery and Reinvestment Act (ARRA)

The seven ARRA projects continued in 2010 at the same aggressive pace they started in FY 2009: 30 of 30 project milestones were completed on or ahead of schedule. ARRA projects created 1,202 jobs, and 77% of approximately $67.9M of subcontracted work was awarded to local small businesses. The Alpha 5 facility complex was downgraded to a level below that of a Hazard Category 3 nuclear facility. This reclassification significantly reduced the cost of operations within the facility, improved project efficiency, and reduced the hazards to personnel. The skyline at Y-12 was forever changed with demolition of a significant portion of the Biology Complex. Buildings 9220, 9224, and 9769 (figure below) were demolished well ahead of schedule, and Building 9211 is scheduled for demolition.

Removal of Legacy Material and Disposition in Preparation for Deactivation of Nuclear Facility Alpha 5

As of the end of September, 2010, the project was nearly 60% complete as compared to a plan of 55% complete. All legacy materials had been removed from the second and fourth floors in advance of critical project milestone dates (figure below). Materials removal continues ahead of schedule on the first and third floors.



Fourth floor of Alpha 5, before and after legacy material removal

Beta 4 Legacy Material Disposition

The Beta 4 Legacy Material Disposition project was 90% complete at the end of September as compared to a plan of 85% complete. All work was completed without a single first aid,

recordable, or lost-time injury since work was initiated on May 7, 2009. The figure below shows before and after photographs of Beta 4 legacy material removal.

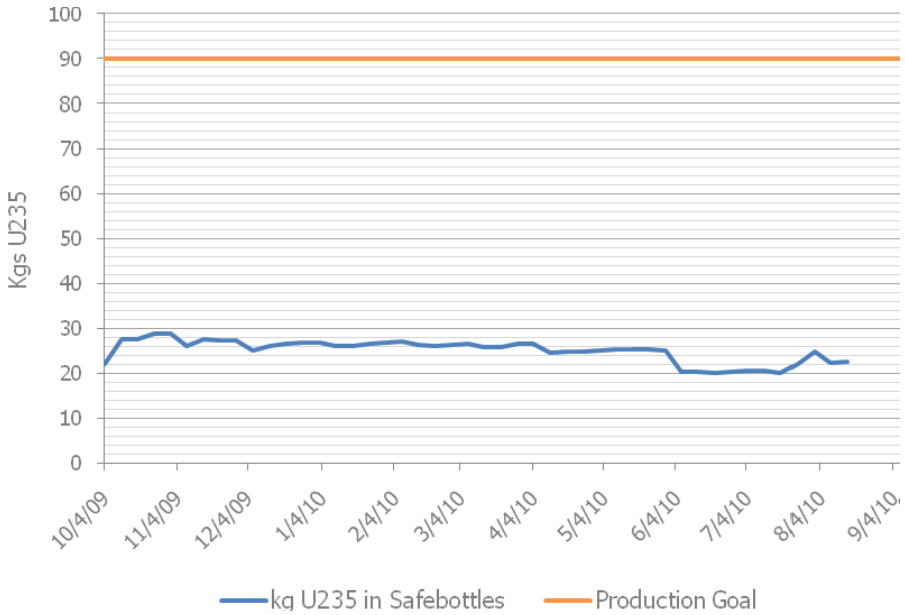
Beta 4 before and after legacy material removal

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

In September 2010 Board sent a report to Congress noting its concerns with the continuing reliance on aging facilities in the weapons complex to carry out hazardous production missions. An example of this persistent problem noted by the Board included the 9212 Complex, which performs enriched uranium processing at Y-12 National Security Complex. NNSA's long-term plan to meet its enriched uranium processing requirements is to replace the 50+ year old 9212 Complex with a new UPF, which is in preliminary design. In the interim, a regimen of increased vigilance and close observation that regularly assesses the physical condition of 9212 to support safe operations, has been established by YSO and B&W, and is being performed by the 9212 Continued Safe Operability Oversight Team (CSOOT).

The CSOOT has been tasked to periodically review technical and performance data identified in its charter, make periodic updates to senior management, and provide an annual written report and brief to NNSA and the Board on their evaluations and recommendations regarding the adequacy of 9212 to support continued reliable and safe operations. The report summarizes the evaluations of performance indicator data, analysis of production and operational issues and concerns, assessment results, and other pertinent information dealing with 9212's continued capability to support safe operations. The CSOOT's most recent annual evaluation of 9212 performance indicators, facility system and process condition assessments, and operations and safety data for the period March 2009 to February 2010 identified no safety issue that would currently provide reason for limiting 9212 operations.

Significant improvement in 9212 production system availability continued in FY2009 with 9212 meeting all production milestones. Reductions in the aqueous/organic solution U inventory in safe bottles have been maintained resulting in a reduced off-site consequence of associated fire scenarios. All wet chemistry systems operated at a full production pace in FY 2010. This allowed the safe bottle inventory to remain low and consistently steady (Figure below).



Safe Bottle Inventory

9212 completed multiple denitrators, Oxide Conversion Facility, and reduction runs in FY 2010. A focus was to adjust operating parameters to produce the highest quality and on-spec assay metal buttons as possible. Efforts were focused on this process, repetitively producing high-quality metal buttons.

Through effective use of the 9212 Operations Plan, B&W Line management continued actions to address long standing cleanliness, material issues, and numerous minor deficiencies. Another 9212 clean-up initiative was conducted during this period in which all production work was curtailed to focus on clean-up activities. Coordinated efforts over multiple organizations removed 11 tons of waste from the facility. 9212 Operations Management also completed several improvement efforts including: replacement of 5 electrical panels; completion of some ventilation system upgrades; fire suppression system #8 sprinkler head replacement; replacement and upgrade of emergency/exit lights; and, improvements to the exterior structure of a portion of the complex.

As a result of a NNSA initiated 9212 Facility Risk Review in 2006 a prioritized project, a 9212 Nuclear Facility Risk Reduction Project was created that clearly focuses on the following; enriched material reduction and infrastructure utility systems, structures and components; planned replacement of critical electrical control centers, switchboards and panels; addressing 2000-2 vital safety ventilation system degradations along with preliminary 2004-2 assessment recommendations; and, identifying waste paths for material with a backlog that could impact production and Material Recycle and Recovery Program (MRR) reduction. The Nuclear Fuel Risk Reduction (NFRR) project received authorization for CD-1 in October 2009 and funds for preliminary design in January 2010. In the ESAAB approval letter, the Acquisition Executive requested that the Nuclear Facility Risk Reduction (NFRR) project team develop the baseline cost and schedule for the complete project. YSO concurred with the Acquisition Executive

request and provided direction on January 14, 2010, to prepare a CD-2/3A package by October 2010. The evaluation is complete, and the baseline change proposal to change the execution to a CD-2/3A strategy was approved. The revised baseline schedule required submittal of the CD-2/3A package to YSO on September 30, 2010 which was met.

As part of the CSOOT oversight responsibility, the first of several planned critical infrastructure/process system inspections was conducted on the steam and steam condensate systems. Acceleration of steam condensate review was directly influenced by the condensate system failure in 9204-2E in FY2008. The 9212 independent inspection found that with the exception of a few locations, the steam and condensate piping is adequate for continued safe operation. Existing plant lesson learned, event notifications, and evaluations were examined and shown to provide effective notifications for potential equipment or system aging degradation failures. In addition, training was conducted within the facility to caution operators of the potential for unanticipated failures due to aged equipment, such as the steam condensate failure.

An electrical cable aging evaluation plan was implemented for 9212. The plan provides for systematic evaluation of existing cables using corrective and preventive maintenance activities for opportunities to examine insulation aging, and incorporates key elements of January 2010 Nuclear Regulatory Commission (NRC) issued new NUREG, Essential Elements of Electrical Cable Monitoring.

Continued Improvement of Nuclear Safety Programs and Conduct of Operations

Engineering and Nuclear Safety

A Nuclear Criticality Safety (NCS) Strategic Vision and Improvement Plan was completed, and execution was initiated. The plan defines the strategic direction and objectives to reach the vision of being recognized as Best in the Complex Criticality Safety Program. New revisions of the criticality safety evaluations (CSEs) for HEUMF were issued and approved. This was a significant milestone for the HEUMF project since all comments, both internal and external, were resolved in these revisions, except for a few comments from YSO, which were tabled, setting the stage for the readiness assessments leading up to authorization to operate the facility. A follow-up set of revisions was prepared and issued while the facility was in initial load out to add use of a new transfer drum for moving cans in from the metal production area of Building 9212. This provides a full set of NCS limits and controls for safe fissile operations and storage within the building. The experience and skills gained in preparing CSEs fully meeting the requirements of DOE STD 3007-2007 for HEUMF were utilized in upgrading four major process CSEs in Building 9212.

Extent of condition reviews of active CSEs for fissile processes in 9720-5, 9204-2/2E, 9215, and 9212 were performed in response to Board concerns relative to NCS evaluations performed at Y-12. They were primarily intended to confirm the adequacy of the existing control set for continued safe operation. Approximately 140 CSEs were reviewed. With the exception of a single process that was placed on hold while additional analysis was performed, the review confirmed the adequacy of the existing control sets for continued safe operation.

Benchmarking trips to Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL) were conducted to review NCS Program activities at those sites to be considered during efforts to improve the NCS Program at Y-12. Additional benchmarking visits to other sites are planned and should provide operational constructs that will help guide the Y-12 improvement initiatives.

The Y-12 Nuclear Criticality Safety Committee was restructured to strengthen the presence of senior management on the committee, and the charter was revised to clarify the committee role. The scope of the committee's annual review was altered to be more relevant to broader management and technical concerns of the site.

A roadmap was developed describing the UPF critical decision process relationship with DOE O 413.3A and DOE-STD-1189 requirements. The roadmap ensures that the requirements are fully addressed or that alternative strategies are clear and coordinated with NNSA.

Engineering led the development and implementation of a Quality Assurance Standards for Nuclear Facilities (NQA-1) compliant, commercial grade dedication process. Training and procedure development were completed. A transition plan to move from the old Configuration Control Equipment Data Sheet process was defined and executed.

An expert unreviewed safety question determination (USQD) process was developed and piloted at Y-12 over the previous 2 years and implemented by Facility Safety. It was judged to be rule-compliant by NNSA Headquarters and approved by YSO through the USQD procedure, Y74-809. It has gained wide attention around the DOE complex as a method for potentially significant cost savings. The quality of USQD documents was Outstanding (Figure below).

USQD Quality Metric

Industrial Hygiene implemented a number of process improvements: an automated beryllium fluorescence sampling and analysis method increased turnaround time and throughput for beryllium sample analysis; the beryllium qualification checker and automated beryllium work

plan sign-in system provided a means to verify personnel qualifications for beryllium training and medical approval; and, the medical surveillance enrollment system which eliminated unnecessary enrollment/participation in various medical surveillance programs.

Radiation Protection

Dose results for CY 2009 indicated that no one exceeded the Y-12 Administrative Control Level of 1.0 rem. In addition, the collective total dose was 61.67 person-rem, a 14% decrease from the CY 2008 dose of 72.06 person-rem.

Nuclear Facilities Quality Assurance

The Nuclear Facilities Quality Assurance (NFQA) organization was officially formed in October 2009 with personnel from existing quality groups. The management team was selected from among the most experienced operations, engineering, and quality groups at Y-12. This team evaluated organization goals, the assigned scope of work, facilities to be supported, and initial staffing to arrive at a fully functional staffing level of 56, including subcontractors.

Under NFQA management, the Suspect/Counterfeit Items (S/CI) Program increased emphasis on the identification and control of S/CI. This increased emphasis is in the form of an improved S/CI procedure Y60-138, *Suspect and Counterfeit Item Control Program Operations*, improved training (initial and requalification), conduct of S/CI coordinator workshops, and web-based information. Due to several recent fraud cases that impacted federal contracts, the emphasis toward S/CI increased to include regular inquiries from the Board. The increased emphasis resulted in additional man-hours required to research and respond to inquiries, including vendor data searches, requests for vendor sub-tier supplier information, and visual inspections or testing of items on-hand.

NQA-1 Implementation Plan and Schedule

An integrated plan for implementation of NQA-1-2008 requirements was developed and submitted to YSO on February 11, 2010, via a briefing to the Y-12 Site Manager. This plan includes over 1,000 activities leading to the full implementation of NQA-1-2008 at the site. Activities for NFQA staffing, gap analysis, revision of the Quality Program Division (QPD), evaluation and revision of site-, division-, and department-level procedures to flow down QPD requirements are included. In addition, activities for training of personnel, evaluation of implementation in nuclear facilities, Procurement/Procurement Quality Improvement Plan (P/PQIP), and material handling and storage improvement are included.

Review of all site-level procedures with QPD flow-down requirements (79 total) were completed by the end of July 2010. In addition, 90 division- or department-level procedures with QPD flow-down requirements were reviewed by the end of September 2010. Of the 169 total procedures reviewed, 20 required intent changes to incorporate QPD flow-down requirements.

Activities for the P/PQIP are included in the integrated schedule and continue to progress in a timely manner. NFQA completed evaluation of 102 material storage areas in 23 facilities across the site. This evaluation included determination of appropriate storage area designation (Level

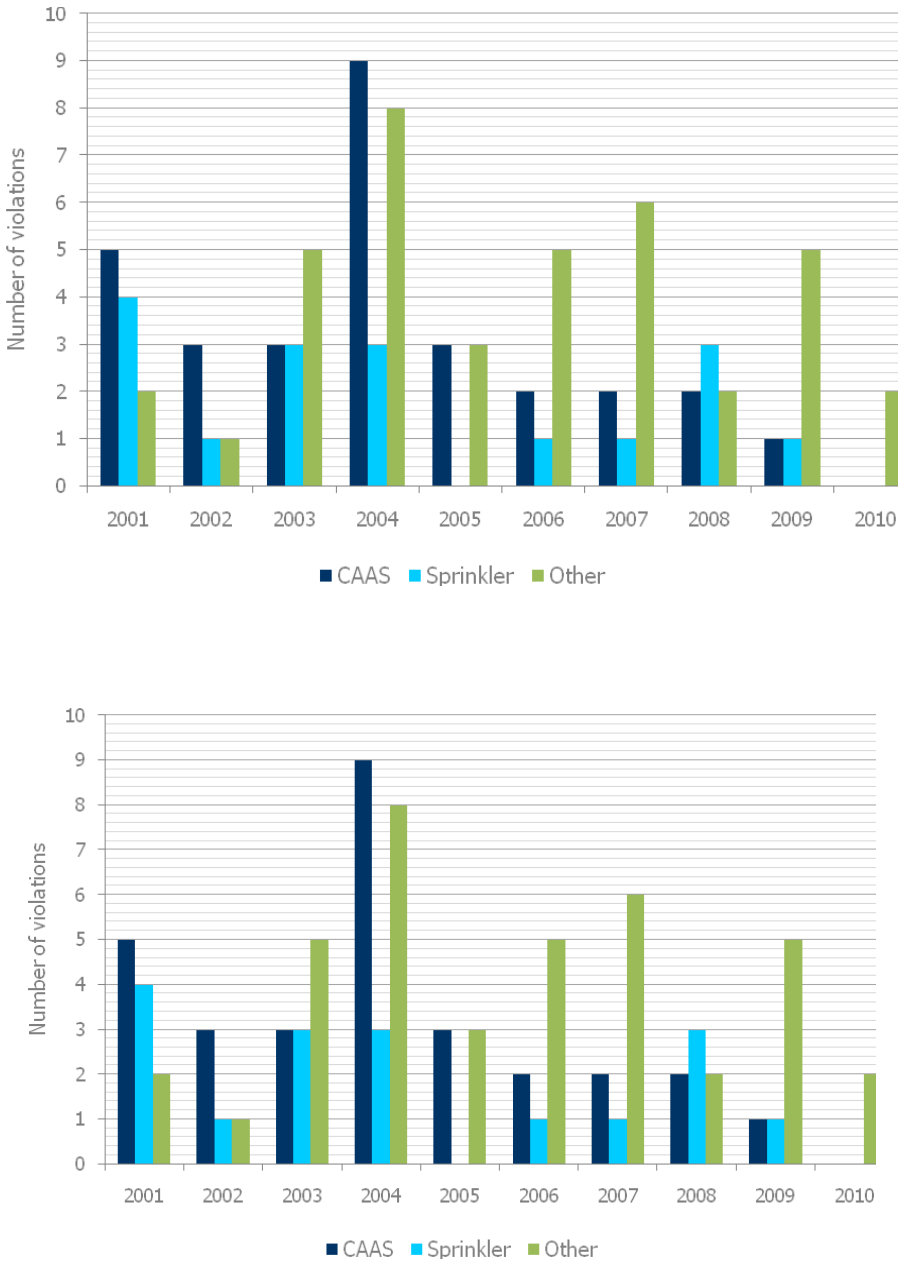
A–D) for each area, as well as recommended improvements to postings, access controls, and/or environmental control. Physical inventories of Grade 1 and 2 materials are in progress to help determine current storage needs.

Initial activities to strengthen the procurement process through identification of "quality levels" were completed in September 2009 through revision of Y60-602 and Y60-701. The addition of quality levels in these procedures implemented the graded approach to quality for procured items and improved the overall quality of procurement activities. Additional efforts are underway to expand the graded approach to quality for all aspects of Y-12 activities through issuance of Y60-200, *Graded Approach to Quality*. This procedure provides the framework for a process to identify quality levels and determine necessary controls to ensure the quality of items and services, provided by and for Y-12. Development of this procedure included review of similar processes/documents from the Waste Treatment Plant (WTP), LANL, LLNL, Bechtel-Jacobs, and the Price-Anderson Amendments Act subcommittee on graded approach, as well as evaluation by a team of representatives from NFQA, FI&S, Construction, Procurement, and Engineering.

Conduct of Operations (ConOps)

ConOps continued to reflect steady improvement. The full implementation and use of the event severity tool and the frequency data created effective diagnostic tools to proactively respond to trends. Considerable effort and focus went into making the critique process more robust. Through cooperative benchmarking and capturing best practices, a new Critique Evaluation Process was fully implemented. Behind the authority of a standing order and implementation of a thorough Critique Evaluation Checklist that was formalized in the forms management system, oversight and process detail were institutionalized. A suite of new metrics and trending charts allows for visibility to provide analysis from many angles. The Operational Performance Improvement department provided training on the new critique process in their focus area sessions. This training was opened up to all individuals at the site who are involved with the critique process. Additionally, software to allow capture and trending of critique evaluation data was developed. Data from the initial evaluations were entered, and the methodology is proving to be useful in improving how the critiques are conducted. Feedback and metrics indicate that the new process is having a positive impact on the overall quality of the critiques as root cause analysis is capturing better corrective actions.

As shown in the Technical Safety Requirements (TSR) violations chart (figure below), major improvements were observed in the overall management of the facilities and in the number of TSR violations. The continual decline in TSR violations represents improved adherence to compliance, consistency in implementation, and interpretation of the requirements defined in the safety basis documents for the nuclear facilities. Major improvements were observed in control of the Criticality Accident Alarm System (CAAS), as demonstrated by zero CAAS-related TSR violations in 2010. The management of fire sprinkler systems improved significantly, resulting in no TSR Violations associated with these systems.



TSR Violations

Operations Production Performance

The W76 Program completed approximately 10% additional units within existing funding levels by significantly reducing attrition rates, among other improvements.

The Packaging Program completed approximately $900K of additional container and other deliverables within existing funding levels, supporting accelerated Pantex dismantlement goals. This was accomplished by applying efficiencies generated throughout the Packaging Program.

The high-priority B61 Life Extension Program (LEP) 6.2/6.2A study scope (nondestructive evaluations) was executed within existing funding levels, and a high-priority project to procure and install additional oven capacity was initiated. These efforts were enabled by efficiencies generated throughout the Stockpile Systems Program.

The Dismantlement Program completed 11% additional dismantlements and 43% additional disposition work within existing funding levels.

The Production Support Program provided timely maintenance of key processes and enabled on-time completion of production deliverables in critical replacement items.

Under the Process Engineering and Design for Improved Component Testing (PREDICT) project, the Stockpile Readiness Program delivered depleted uranium parts to LANL for testing and accelerated production of additional parts to be delivered in early FY 2011.

Nearly 2,500 ft of excess items from various weapons and surveillance programs were shipped offsite, creating needed in-process storage for ongoing DSW programs. This effort, involving nearly 2,100 items, supported Y-12 safety goals to minimize personnel exposure.

The HEUMF Transition Program commenced the movement of materials from the old warehouse to the new facility on January 25, 2010. The accelerated load out was completed on April 7, 2010, 17 days ahead of the 90-day schedule goal. The HEUMF transition consistently stayed ahead of the planned schedule. The program completed 7% of the move by the end of January 2010, 49% of the move by the end of February 2010, 90% of the move by the end of March 2010, and was complete on day 73, which saved additional safeguards and security overtime cost. The MAA was downgraded within several weeks after the de-inventory completion. Throughout the transition, Operations worked in parallel with de-inventory, and the acceleration was executed with no concerns or issues. The result was a safe, secure transfer, completed ahead of schedule.

Continuous Improvement

Process improvement and ConOps are integral elements of day-to-day work in the Production Division, and the identification and elimination of wasteful activities are focus points for all Production team members. Expanding the use of lean tools, the division complemented the foundational techniques of 7S, brainstorming, and Six Sigma with the addition of Value Stream Mapping (VSM) and Rapid Improvement Exercises. Continuous improvement in ConOps resulted from the follow-up actions assigned during the critique process.

A VSM exercise was applied to the dismantlement process that had been scrutinized using conventional practices, and did not appear to have much room for improvement. The VSM approach yielded additional significant throughput reductions. As a result of improvements, there will be an 18% reduction in process time with an overall reduction in lead time of 67%. The VSM future state is significant as increasing numbers and complexity of dismantlements become a requirement.

Readiness Assurance Program

The Production Division succeeded in providing a high level of preparation prior to the formal declaration of readiness. Readiness reviews were extremely successful on even the largest of program activities. B&W Y-12 completed one substantial ORR for HEUMF and six Readiness Assessments. Authorization to operate HEUMF was received from NNSA on January 22, 2010, along with the approved Authorization Agreement. There were no issues noted that would indicate problems or missed opportunities with the approach to operational readiness performance. The startup of HEUMF was recognized by the NNSA ORR team leader as a very well managed and executed process, where the lessons learned from that process need to be shared around the DOE Complex. The NNSA credited the HEUMF effort as having the best preparations ever reviewed in the Nuclear Security Enterprise.

Over 20 startups or restarts were completed using the Standard Operations Checklist. This checklist provided an efficient and cost-effective means for ensuring low-risk startups and restarts are well prepared for operation.

B&W Y-12 continued its leadership role in NNSA by sponsoring the 2010 Readiness Workshop, August 17 and 18, 2010. This year's workshop was the tenth sponsored by B&W Y-12 and set an attendance record with over 150 representatives from many DOE sites, DOE contractors, Headquarters, and the Board.

In addition, there was a continuing effort to work closely with YSO and DOE Headquarters for implementation of a major revision to DOE 425.1 Order, *Startups and Restarts*. Y-12 plans to be one of the first to implement this order in the DOE Complex. B&W Y-12 is also supporting an NNSA Headquarters initiative to streamline the readiness process with a focus at improving several areas with regard to attaining operational readiness.

The 6-year trend of operational readiness preparation reflects constant improvement and maintenance of the high level of performance. 100% of the reviews conducted and evaluated in FY 2010 were evaluated as Acceptable or Excellent. The last four years reflect ratings of Acceptable or Excellent for reviews conducted at Y-12.