

**Independent Oversight Targeted Review of the
Safety Significant Blast Door and Special Door Interlock
Systems and Review of Federal Assurance Capability
at the Nevada National Security Site**



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Acronyms

BDI	Blast Door Interlock
CCD	Core Company Directive
CD	Company Directive
CFR	Code of Federal Regulations
CM	Corrective Maintenance
CONOPS	Conduct of Operations
CRAD	Criteria, Review and Approach Document
CSE	Cognizant System Engineer
CY	Calendar Year
DAF	Device Assembly Facility
DOE	U.S. Department of Energy
DNFSB	Defense Nuclear Facilities Safety Board
DSA	Documented Safety Analysis
FP	Fire Protection
FR	DOE Facility Representative
FTE	Full-Time Equivalent
FY	Fiscal Year
HE	High Explosives
HSS	Office of Health, Safety and Security
ISMS	Integrated Safety Management System
IST	Issues Screening Team
LO/TO	Lockout/Tagout
NCERC	National Criticality Experiments Research Center
NFO	Nevada Field Office
NMMP	Nuclear Maintenance Management Program
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NOD	Nuclear Operations Directorate
NOM	Nuclear Operations Manager
NSTec	National Security Technologies, LLC
OC	Operations Controller
OFI	Opportunity for Improvement
OT	Operations Technician
PAG	Performance Assurance Group
PdM	Predictive Maintenance
PEP	Performance Evaluation Plan
PM	Preventive Maintenance
PMT	Post-Maintenance Test
QA	Quality Assurance
QARD	Quality Assurance Requirements Document
QG	Quality Grade
SDI	Special Door Interlock
SC	Safety Class
S/CI	Suspect/Counterfeit Items
SME	Subject Matter Expert
SMP	Safety Management Program
SR	Surveillance Requirement
SS	Safety Significant
SSC	Structures, Systems, and Components

SSO	Safety System Oversight
SSOR	Safety System Oversight Representative
TA	Tagging Authority
TSR	Technical Safety Requirement
UPS	Uninterruptible Power Supply
VSS	Vital Safety System
WP	Work Package
WPI	Work Package Instruction

Independent Oversight Targeted Review of the Safety Significant Blast Door and Special Door Interlock Systems and Review of Federal Assurance Capability at the Nevada National Security Site

1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security (HSS), conducted an independent review of the safety significant Blast Door Interlock (BDI) and Special Door Interlock (SDI) systems at the Nevada National Security Site (NNSS) Device Assembly Facility (DAF). The NNSS DAF is operated by National Security Technologies, LLC (NSTec) under contract to the National Nuclear Security Administration (NNSA) Nevada Field Office (NFO). In addition, Independent Oversight also reviewed the performance of DOE oversight, as appropriate, to provide input for our evaluation of the effectiveness of Federal assurance capability. This is an assigned task for HSS in accordance with Commitment #16 of the DOE Implementation Plan to Improve Oversight of Nuclear Operations, which DOE developed in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*. The Independent Oversight review was performed on site August 19-27, 2013.

2.0 SCOPE

The targeted review of management of safety systems evaluated the effectiveness of processes for operating, maintaining, and overseeing the performance of selected safety systems at the DAF by specifically reviewing the safety significant (SS) BDI and SDI systems. The review consisted of an evaluation of the procedures and processes used to demonstrate ongoing operability and reliability of the systems and specific evaluation of the implementation of those procedures and processes for a sample of components within those systems. The review focused on the implementation of the facility's safety basis as it relates to the selected safety systems; the review did not evaluate the adequacy of the documented safety analysis (DSA). The review also evaluated the effectiveness of the DOE safety system oversight for the selected systems and the effectiveness of the Federal assurance capability.

Selected objectives and criteria from the following sections of HSS Criteria, Review and Approach Document (CRAD) 45-11, Revision 3, *Safety Systems Inspection Criteria, Approach, and Lines of Inquiry*, was used to define the scope of this targeted review:

- IV. Maintenance
- V. Surveillance and Testing
- VI. Operations
- VII. Cognizant System Engineer and Safety System Oversight
- VIII. Safety System Feedback and Improvement.

This review included the following activities:

- Observation of contractor and/or field office personnel during facility walkthroughs, safety system walkdowns and maintenance work package workability walkdowns, surveillance tests, and contractor assessments or observations of maintenance on the safety system.
- Detailed review of documentation associated with completed surveillance tests, assessments of safety system performance, and maintenance history for the selected safety systems.

This review also evaluated the effectiveness of both the contractor and field office programs in managing and maintaining safety system performance.

The review team also utilized the following criteria from HSS CRAD 45-21, Revision 1, *Feedback and Continuous Improvement Inspection Criteria and Approach – DOE Field Element*, to collect and analyze data on Field Office oversight activities for evaluation of the effectiveness of the Federal assurance capability:

- DOE Field Element Line Management Oversight Inspection Criteria 1-6.
- DOE Field Element Facility Representative Program Inspection Criteria.

3.0 BACKGROUND

The DOE Independent Oversight program is implemented by HSS's Office of Enforcement and Oversight, an independent office within DOE that has no line management or policy-making responsibilities or authorities. The Independent Oversight program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements, and the effectiveness of DOE and contractor line management performance in safety and security and other critical functions as directed by the Secretary of Energy. The Independent Oversight program is described in and governed by DOE Order 227.1B, *Independent Oversight Program*, and a comprehensive set of internal protocols, operating practices, inspector's guides, and process guides. The program is implemented by two subordinate offices: the Office of Security and Cyber Evaluations and the Office of Safety and Emergency Management Evaluations.

The Office of Safety and Emergency Management Evaluations evaluates safety policies and programs throughout DOE, with a particular emphasis on evaluating worker and public protection from the nuclear hazards that exist at many DOE sites. This office accomplishes its mission through two primary mechanisms: (1) a network of staff site leads who are assigned to monitor the activities at DOE sites with nuclear facilities or activities and coordinate office appraisal activities at those sites; and (2) a program of targeted reviews that evaluate selected functional or topical areas at multiple sites across the DOE complex. Appraisal activities are selected, prioritized, and planned based on such factors as risk to workers and the public, facility operational status, and performance history.

“Safety Class or Safety Significant Structures, Systems and Components” was identified as an Independent Oversight targeted review area for 2013 in an HSS memorandum from the Chief Health, Safety and Security Officer to DOE senior line management dated November 6, 2012. The memo also stated that the areas would be further defined in associated Independent Oversight review plans. In addition, the HSS memo stated that the performance of DOE oversight would be evaluated during the targeted reviews to provide input to the overall evaluation of DOE Federal assurance capability.

Independent Oversight selected the SS BDI and SDI Systems at the DAF located at the NNSS in Nevada for review. The DAF is a hazard category 2 nuclear facility composed of a number of buildings within a common structure. Access to some of the buildings is through a set of blast or special doors. Each set of doors is interlocked to prevent both doors from opening at the same time. The DSA credits one of the doors and the interlock system for confinement and/or blast protection.

Although the review focused primarily on the BDI/SDI system, Independent Oversight considered additional systems during field observations as necessary to obtain a clearer perspective for evaluating implementation of some of the CRADs.

4.0 METHODOLOGY

Independent Oversight completed the targeted review through detailed document reviews and an on-site review of contractor safety system engineering, operations, maintenance and feedback and improvement activities; system material condition; and field office oversight of the selected safety class (SC) and/or SS systems.

The targeted review process was divided into several stages, including onsite and offsite planning, onsite data gathering activities, report writing, validation, and review. Planning included discussions with responsible site personnel, determination of the details of safety systems to be reviewed, scheduling of the review, collection of applicable site procedures and documents, and document reviews. After the onsite data collection period, a draft independent review report identifying overall perspectives, deficiencies, and opportunities for improvement (OFIs) was prepared and made available to line management for review and feedback. Finally, the results of the review were briefed to key managers, consistent with site needs.

When all of the selected DOE sites have been reviewed, Independent Oversight will prepare a report summarizing the conclusions of the assessment regarding the overall status of safety system management throughout the DOE complex, common issues, and lessons learned. Independent Oversight will also prepare a report summarizing the effectiveness of Federal assurance capability throughout the DOE complex in response to the DNFSB.

5.0 RESULTS

5.1 NSTec Maintenance

The overall objective of a sound nuclear maintenance program is to ensure that maintenance activities are properly planned, scheduled, and performed to ensure that safety systems can reliably perform their intended safety functions when required.

Nuclear Maintenance Management Plan and Program

Maintenance of SC and SS structures, systems and components (SSCs) is addressed in the DOE-approved NSTec nuclear maintenance management program (NMMP), *Nuclear Maintenance Management Program (PD-Zone4.001)*, as required by DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*. The NMMP was developed using DOE Guide 433.1-1A, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*, and was approved in a letter from the NFO dated January 19, 2012. The document describes how NSTec implements each of the order requirements and includes references in each section to the procedures that implement the particular requirement. Independent Oversight reviewed the document for compliance with DOE O 433.1B and determined that it adequately describes the program in sufficient detail, and ensures effective processes are in place for safety systems to maintain their integrity, operability and reliability.

DOE Order 433.1B recognizes maintenance as a safety management program (SMP) in accordance with 10 CFR 830.204. The DAF Technical Safety Requirements (TSR) Section 5.6.4 includes the maintenance program as one of the facility's SMPs. However, Chapter 17 of the DAF DSA, which identifies the SMPs for DAF, does not include maintenance as one of those programs. Chapter 10, Initial, In-service Testing and Maintenance, of the DAF DSA describes the maintenance program but does not specifically refer to the maintenance program as an SMP. (See **OFI NSTec-Maint-1.**)

The BDI/SDI system is included under the scope of the NNMP and the maintenance program is further supported by a series of process procedures as shown below. The framework of these process procedures acceptably defines a maintenance management program at the working level.

- CCD-QA05.001, *NSTec Integrated Work Control Process* – This core company directive (CCD) establishes the requirements and controls necessary to implement the integrated safety management system (ISMS) and quality assurance (QA) requirements into a single integrated work control process for activity-level work.
- CCD-QA05.001-005, *Work Package Process* – This directive implements the NSTec work package (WP) process, which provides a structured and systematic process for planning and preparing activity-level WPs used to safely perform activity level work at NSTec-managed onsite and offsite facilities.
- CCD-QA05.001-001, *Requesting, Processing, and Executing Activity Level Work Requests on Site Operations Real Property* – This CCD describes the process for requesting, processing, and executing activity-level work requests on Site Operations real property.
- CCD-QA05.001-010, *Activity Level Work Document Writing Requirements* – This directive establishes the requirements for writing activity-level work documents.
- CCD-QA05.001-003, *Activity Level Hazard Analysis Process* – This document describes the process to identify potential hazards associated with activity-level work and assess the potential for worker injury. It also provides requirements for pre-job briefs and providing feedback.
- CD-Zone4.003, *Preventive Maintenance/Predictive Maintenance* – This company directive (CD) establishes the preventive maintenance/predictive maintenance (PM/PdM) program at nuclear facilities managed by NSTec.
- CD-Zone4.004, *Planning, Scheduling, and Coordinating Maintenance* – This CD defines the administrative process for planning, scheduling, and coordinating maintenance activities at nuclear facilities managed or supported by NSTec.

Corrective, Preventive and Predictive Maintenance

NSTec conducts corrective maintenance (CM) and PM/PdM at DAF using its work control process. Since no CM was performed on equipment important to safety during the onsite data collection period, the evaluation of CM was based on the review of ten completed CM WPs. These WPs were reviewed against the maintenance/work control requirements established by NSTec. The work documents generally contained sufficient detail in the work steps, and the appropriate post-maintenance test (PMT) requirements to re-establish operability for the SSCs involved in the tasks.

PMs are routinely performed on SC and SS equipment including the BDI/SDI system. BDI/SDI PMs include annual structural hardware functional tests of each interlocked door set. PMs are adequately scheduled and tracked through the computerized maintenance management system and are consistent with vendor recommendations. Equipment reliability is managed under the Cognizant System Engineering program. (See Section 5.4 of this report.)

NSTec has over 20 site-wide performance indicators in the area of maintenance that include for example maintenance backlog, WP cycle time, and average number of days to WP closure. The set of

maintenance metrics have been marginally effective in promoting continuous performance improvement in DAF maintenance and this was further validated during interviews with DAF management. For example, the Monthly Maintenance Backlog tracks the number of weeks of maintenance backlog for the site. The July 2013 PI report shows a backlog of 8.1 weeks with an adverse trend that has existed for several months. The analysis/action section of the Monthly Maintenance Backlog PI does not contain any analysis nor actions to address the adverse trend in backlogs (dating back to October 2012) shown on the July 2013 monthly indicator. Overall, DAF has established two goals related to the Monthly Maintenance Backlog; one at a six weeks threshold and a lower goal bar at four weeks. When asked about the two different goals for the metric, DAF management stated that the upper bar was an upper limit and the lower goal of four weeks was a value used to justify current workforce levels. During 2013, the overall maintenance focus has been to accomplish as much maintenance as possible with the workforce resources available. As a result and confirmed by DAF management the backlog metrics were of little value to drive continuous improvement in maintenance performance at DAF. (See **OFI NSTec-Maint-2.**)

Periodic Inspections

CD-P280.006, *Formal Workplace Inspection Program*, establishes an acceptable process for Facility Managers to inspect their work locations for potential safety hazards, test or inspect safety equipment, and check housekeeping conditions. Special attention is given to inspection of legacy issues relative to aging facility equipment and utilities. Specific safety items are designated for either weekly or monthly inspections. General facility inspections are conducted weekly, monthly, quarterly, or semi-annually depending on the facility type. A checklist is provided as guidance for conducting inspections. For the nuclear facilities, OP-NENG.004, *System Engineer Program*, establishes that the CSEs are responsible for periodic reviews of their assigned systems (active SC and SS SSC) for operability, reliability, material condition, and performance in comparison to established criteria. Management also periodically reviews the condition of nuclear facilities through feedback from Condition Assessment Surveys, which are controlled through the implementation of CD-Zone4.001, *Facility Condition and Inspection Process*. A sample of inspection and review reports was reviewed by Independent Oversight and found to be useful in prioritizing maintenance activities.

Maintenance Configuration Control and Conduct of Maintenance

Maintenance activities for SC/SS SSCs, including work control, post-maintenance testing, material procurement and handling and control and calibration of test equipment are formally and adequately controlled through NSTec procedure CD-ENGR.002, *Configuration Management for Facilities and Infrastructure and implemented through the NSTec Integrated Work Control Process*. As maintenance is planned and scheduled, WPs are prepared in accordance with CCD-QA05.001-005 implementing the NSTec work control process, which follows the five core functions and the seven guiding principles of the ISMS. Prior to issuing a WP, the package undergoes a thorough review by one or more subject matter experts and a quality reviewer to ensure that the work activity will not change the system configuration and operability of the system can be restored following completion of the maintenance and PMT. Except as noted below, the WPs reviewed by Independent Oversight properly implemented this process.

The NSTec DAF maintenance organization routinely conducts a plan-of-the-day meeting at the end of each workday (Monday through Thursday) on the status of work items completed and work to be performed for the next day. On Tuesday of each week, a plan-of-the-week meeting is conducted to review operations, in-service inspections/surveillances, and maintenance activities planned for the next work week. However, the development of the plans is not based on resource-loaded scheduling, and there are significant changes in planned activities from day to day during the work week. In discussions with the DAF Maintenance Manager, Independent Oversight learned that the DAF Maintenance Department does not try to execute work using a resource-loaded schedule and that the eight-week rolling

maintenance schedule is only a guide, rather than a process to ensure that scheduled work is performed as scheduled. (See **OFI NSTec-Maint-3.**)

Four PMs were observed by Independent Oversight during the targeted review. The first was a quarterly fire protection (FP) PM. Independent Oversight observed the pre-job brief and the conduct of the monthly FP PM (WO 3001235267, WPI 062 R9) on a DSA-credited portion of the FP system. The pre-job brief was thorough and detailed, and it included a read-through of every work precaution/limitation, prerequisite, and work step. In addition, the briefing covered hazards/controls and personal protective equipment requirements for the PM. The task leader (Lead FP Technician) conducted the brief and solicited input from those in attendance to make sure that those involved in the activity were clear on all aspects of the job to be performed. The need for three-way communication was also discussed at the pre-job brief based on questions raised by the Independent Oversight reviewer. In addition, Independent Oversight questioned a comment made by the Lead FP Technician during the pre-job brief that the PM work document contained a note saying that the procedure steps could be followed in any order, although it is intended that the steps are followed step by step. When asked about the purpose of the note, the lead FP technician stated that the note was there for performance of the PM in one particular building within DAF. The lead technician agreed that this note could cause confusion during performance of the PM.

The DAF Principal Deputy Manager attended the pre-job brief for the FP PM to perform a scheduled monthly management observation (topic: independent verification). The manager stated during the pre-job brief that he only needed to observe the independent verification steps of the PM that would occur as part of returning the system to normal at the end of the PM. Independent Oversight interviewed the manager about the management observation program (scope and management involvement) and whether the program required constructive feedback of his observations to the workers observed. It was determined that the program did not require feedback but that this manager usually provided it as a matter of practice. The observation program only focused on chapters of the Conduct of Operations (CONOPS) manual and applied only to operations. Only one management review is required of the selected monthly CONOPS topic and that responsibility was rotated among the DAF Manager and his direct reports. (See **OFI NSTec-F&I-1.**)

Some of the maintenance supervisors conduct observation of work execution in the plant using a form entitled *Site Operations Supervision Inspection Guide*. However, the guide is not part of any company directive or procedure, there are no requirements to conduct management observations of maintenance work activities, and the information listed on the informal form is not reviewed, tracked, or trended as an input to improve maintenance performance. (See **OFI NSTec-F&I-1.**)

During the observation of the FP quarterly PM, the work steps in the PM were clear and followed correctly by the sprinkler fitters performing it. An Operations Technician (OT) also assisted with radio communications during the PM performance. Three-way communications were used during the performance of the PM during radio communications between the fitters and with the OT, since PM actions steps were performed both inside and outside the facility. Good communications technique was observed during most of the PM performance. However, at times the repeat-backs were incomplete due to radio interference or incomplete verbal communication. The person giving the information did not consistently request retransmission of the full-repeat back. Some of the PM work steps were long, complex, and difficult to repeat back. The OT assisting with communications in the field was not familiar with the specific FP PM steps and, following completion of one of the PM sections, stated that an information copy of the procedure would be helpful to improve the communications during remote reader-worker steps. (See **OFI NSTec-Maint-4.**)

Because Independent Oversight was unable to observe the post-job feedback meeting for the quarterly FP PM, a follow-up interview was conducted with the Lead FP Technician who conducted the post-job

briefing. The Lead FP Technician confirmed that the following issues observed by Independent Oversight during the PM were not discussed during the post-job meeting:

- The need for an informational copy of the PM at the outside location of the pressure isolation valve
- Adjustments needed on the extremely loose FP electrical supervision switch
- Difficulty in radio communications
- PM instruction note that steps of the procedure can be performed in any order

Although the *Pre-Task and Post Task Hazard Review* form (NSTec Form 0185) for the quarterly FP PM listed “none” under “Job Improvements” and “Lessons Learned,” each of these items above should have been discussed in the post-job brief and documented on Form-0185, and actions to address them should have been assigned. This omission is an example of ineffective post-job feedback. (See **OFI NSTec-Maint-5.**)

Another PM observed was the monthly diesel generator PM. The pre-job brief was thorough and covered the hazards and controls for the PM, which were mostly involving the electrical hazards and the lockout/tagout (LO/TO) prescribed by the WP. Although review of industrial hazards and controls is not directly related to this maintenance review, it is included to ensure the resultant OFI is addressed. The LO/TO process at the NNSS is conducted by the Maintenance organization. The process has training requirements for those working under a LO/TO and for the Tagging Authority (TA) that issues the LO/TO permit. The training for LO/TO consists of a course (Course 1E000444), which requires a written exam with at least an 80% score. In addition to the LO/TO course, a practical evaluation (#1E00P444) is performed where a mock energized system is locked out and tagged out to demonstrate the worker’s knowledge and ability to de-energize a system and re-energize the system. NSTec’s approach uses a TA to ensure safety for both systems LO/TO and personal LO/TO. The process requires the TA to verify system boundaries and the adequacy of the LO/TO permit. TAs are appointed by management and do not require system/facility-specific training for qualification as a TA other than the course and practical described above. TAs are placed on a list of all NSTec TAs and are not designated based on facility. Nothing in the NSTec LO/TO process ensures that designated TAs have the knowledge, skills, and abilities to verify system boundaries and hence the adequacy of the LO/TO permit. (See **OFI NSTec-Maint-6.**)

A third observed PM activity was the annual special doors preventive maintenance (WPI-028) for 400-134 and 712-104 interlocked doors. This PM satisfies TSR Section 5.6.4 and helps to ensure the reliability of the BDI/SDI system. Although the doors are opened frequently during the course of a year, very few failures of the BDI/SDI system have occurred. Based on a review of the Occurrence Reporting and Processing System, no BDI/SDI failures have been reported. This provides evidence of the system’s reliability and the condition with which the system is maintained. In addition to the PM work package instruction WPI-028, two accompanying procedures were also included in the PM WPs to cover the removal and reinstallation of the backs of each interlocked door (Building 400 Special Door-Back Removal and Re-installation, WPI-070; and Building 712 Special Door-Back Removal and Re-installation, WPI -071). The WPs were intended to be worked with WPI-028 as the controlling procedure and WPIs 070 and 071 to be subordinate to WPI-028.

- WPI-028 requires that all applicable steps be performed sequentially. However, the millwrights removed the door-back per WPI-070 before taking door alignment measurements in step 5.1.2 of

WPI-028. WPI-028 did not specify removal of the door-back until step 5.2.1. Removal of the door-back at that time violated WPI-028.

- Following performance of the major door PM steps (5.2.2-5.2.6), step 5.2.7 performs miscellaneous door checks. Some of the checks are performed by millwrights, and others are performed by pipefitters and wiremen. The checks made by wiremen have to be performed inside the electrical disconnect box, which contains limit switches and other items that have to be continuity checked. Before conducting these checks, the millwrights removed the tags and locks affixed to the outside of the disconnect box so that the box could be opened. This lock/tag removal was not a step in the procedure and was an unauthorized action.
- Step 5.2.7[8] of WPI-028 applies another single-source LO/TO inside the disconnect box to protect the wireman performing the succeeding steps in the procedure. After the wireman checks are complete, step 5.2.7[13] removes the “LO/TO for Wireman activities.” At this point, the millwrights re-applied their locks and tags to the outside of the disconnect box. However, this action was also not a step in the procedure and was not authorized by the procedure.
- Section 7.0, Post Maintenance Testing, of WPI-028 refers to a procedure step that does not exist: “Section 6.0[2] A thru H.” The actual section is Section 6.1[1]. The millwrights used the information in the correct section to go back to WPI-070 to re-install the door-back, perform the PMT, and return the system to service. In addition, Section 8.0, Return to Service, in WPI-028 has the same incorrect reference to “Section 6.0[2] A thru H.” This procedure has been used for many annual PMs since the effective date of these procedures (9/26/2011) and has never been identified as deficient.
- When the PM on the second door of the interlocked pair (Special Door 712-102) was performed later in the day, WPI-028 step 5.1.2 was performed in the correct sequence. However, the same LO/TO unauthorized steps were performed. The job foreman did not stop and contact his supervisor to have the procedure changed.

The observation of the annual special doors PM activity resulted in a Finding based on the above examples of not following the required procedures. (See **Finding-NSTec-Maint-1.**) In addition, many other NSTec WPIs contain large numbers of steps, some of which direct the worker to a different procedure and then back again. In a procedure with many steps, which usually must be followed in a step-by step fashion, there is an increased risk of missing a procedure step. A formal method for procedure placekeeping could reduce the likelihood of human error. (See **OFI NSTec-Maint-7.**)

Independent Oversight also observed a DAF external equipment door annual PM, which was performed correctly as specified in the work document. The pre-job brief was thorough and properly prepared the millwrights to perform the work. However, the post-job brief only provided feedback that all went well with the work. Of the four PM activities observed by Independent Oversight, only one contained worker feedback, and none of the ten completed CM packages reviewed by Independent Oversight contained worker feedback. Although it is not expected that every job will have items worth noting on the post-task section of the Pre-Task and Post-Task Hazard Review form, the examples observed by Independent Oversight and the sampled completed CM packages suggest that worker feedback is not being captured under the current process. (See **OFI NSTec-Maint-5.**)

Procurement and Suspect/Counterfeit Items

SC and SS SSCs for maintenance are procured through NSTec CCD-QA07.001, *Procurement Process*. SC components of the blast and equipment doors are procured at Quality Grade (QG)-1. SS components are procured at QG-2 or better. Other SS/SC components for the BDI/SDI systems are procured using commercial grade dedication, which is referred to as QG-3. The process for commercial grade dedication includes the identification of critical characteristics of the SSCs and the appropriate methods for verifying those characteristics during the procurement process. The QG-1 and QG-2 items are procured from a qualified vendor approved by NSTec and NSTec receives periodic evaluations of the supplier's quality process. Of the four SC/SS parts Independent Oversight observed in storage in the Warehouse Facility, three were QG-3 and one was a QG-1 procurement. The procurement documents and receipt inspections were complete and in accordance with the NSTec procurement procedure.

CCD-QAS2.001, Suspect/Counterfeit Items Program, describes NSTec methods, responsibilities, and controls for prevention, detection, and disposition of suspect/counterfeit items (S/CIs) as required by NSTec Requirements Document (RD)-3200.001, *Quality Assurance Requirements Document (QARD)*. The NSTec S/CI program also requires all employees who assess, use, inspect, maintain, design, or install items subject to the QARD to receive S/CI awareness training (NSTec Course No. 1N00A146). A sample of maintenance staff training records were reviewed by Independent Oversight and no issues were found. A review of the Occurrence Reporting and Processing System database was performed against the S/CI reporting criteria, and only one S/CI occurrence associated with SC/SS SSCs had occurred in the last three years. This occurrence (NA-NVSO-NST-NTS-2011-0014) involved legacy suspect bolts on the SC side of the FP water supply to DAF. The bolts were discovered by the S/CI Coordinator and were properly dispositioned.

In summary, the NSTec maintenance program at the DAF is effective in maintaining the BDI/SDI system in a condition that ensures the system will be available to perform intended safety functions. However, management attention is needed to correct the problems in procedure use and adherence (i.e., not following procedures as written). Management attention is also needed to reinforce effective three-way communications and also to improve post-job feedback, the qualification process for TAs, and maintenance performance indicators.

5.2 NSTec Surveillance and Testing

This area reviewed the surveillance and testing program and activities to evaluate whether they are properly performed in accordance with the TSR surveillance and specific administrative controls.

TSR Requirements in Surveillance Procedures

TSR Section 3/4.2, *Special Door Interlocks*, requires testing of the Special Door interlock system that verifies the system prevents multiple doors in series from being open at the same time and confirms the latch pins are engaged for the closed doors. This test is required on start-up (daily) when High Explosives (HE) is being handled and annually in buildings where HE has not been handled. Independent Oversight verified the surveillances and tests adequately demonstrate as required by TSR Section 3/4.2 that the door interlock systems are capable of accomplishing their safety functions, which are generally defined for the BDI/SDIs as preventing the opening of a second paired door with one already open, and continue to meet their applicable system requirements and performance criteria. During abnormal conditions such as loss of electrical power or pneumatic pressure to the interlock's operating mechanism, the door latch bolts remain in the "as found set position," which normally has the door in a fully closed position and the latch pins fully seated. Since electrical power or air pressure is not required to maintain door configuration in

an abnormal event, both the UPS system and compressed air system are not designated safety-significant support systems for the special door interlocks.

System Parameters Confirmed by Surveillance Procedures

DAF Surveillance and test procedures, as required by TSR Section 3/4.2, confirm that key BDI/SDI operating parameters (i.e., to prevent both doors from opening at the same time and to ensure engagement of closed door latch pins) and its major components remain within TSR and operating limits. Independent Oversight determined that the combination of daily interlock functional checks when handling HE and annual functional tests in areas where HE has not been handled ensures that the BDI/SDI system will meet the DSA and TSR requirements. This is further demonstrated by the high reliability of the system as discussed in Section 5.1 of this report.

Surveillance and Testing Performance

The surveillance and testing procedures for the BDI/SDI were closely reviewed and were found to contain the necessary safety basis testing specifications and acceptance criteria for these components. The surveillance tests are performed by DAF Operations Technicians (OT), and functional tests are performed during PMs by maintenance staff and by OTs following completion of annual door PMs and door CM activities. Independent Oversight reviewed selected records of completed surveillances and verified satisfactory compliance with TSR requirements.

NSTec has adequately defined its surveillance and testing process in OP-DAF.SP00, *Control and Execution of Device Assembly Facility Activity Level Work Documents Involving Surveillance Requirements*. This procedure controls the preparation, scheduling, and performance of DAF TSR surveillance and tests. Surveillances and tests are adequately scheduled and tracked using the facility-wide computerized maintenance management system. OP-DAF.MN05, *Building Safety System Status*, defines and implements the process for tracking SR/ISIs and operability status. OP-DAF.MN05 requires that SR/ISI status be maintained by the Nuclear Operations Manager (NOM). The procedure further requires the tracking of the status of SC/SS systems as they are taken out of service and returned to operable status. Trending of SR performance and deficiencies is performed by the Cognizant System Engineer assigned to the system. Independent Oversight reviewed the status of SRs and all TSR requirements were up to date as of August 2013. This procedure also requires that SRs be scheduled 3 months in advance and the schedule is reviewed monthly, weekly and daily by facility and operations management to ensure that SRs are properly and timely executed. No issues with missed surveillances have been reported within the last three years.

Independent Oversight observed the performance of a functional test after completion of a PM activity in Building 712 on doors 134 and 104 (see also Section 5.1 of this report). The functional test was performed according to the procedure (SPI-013) and was successfully completed. The acceptance criteria of making sure that only one interlocked door opens at a time and the closed door remains latched was successfully met in accordance with the TSR. To further review the knowledge of the OTs involved in this test, Independent Oversight questioned when operability of the interlock was reestablished. After discussing the issue with the OTs, who were unsure of the answer, Independent Oversight also asked one of the Nuclear Operations Managers (NOMs). The NOM's initial response was that the test performed by the OTs restored operability, but after further consideration, the NOM concluded that operability was restored after the maintenance PMT for the annual door PM. (See **OFI NSTec-Surv&Test-1.**)

Instrumentation, Measurement and Test Equipment

There is no instrumentation associated with the BDI/SDI system that requires calibration and no measurement and test equipment is used for associated TSR surveillances and tests. Therefore, this aspect of the inspection criteria was not measured during this targeted review.

In general, surveillance and testing activities for the selected BDI/SDI system were properly performed in accordance with TSR SRs. Surveillance and testing of the system demonstrates that the system is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria. However, improvement is needed in clarifying the process for re-establishing operability of the BDI/SDI system following maintenance activities.

5.3 NSTec Operations

This area reviewed NSTec operations to determine if these activities are conducted in a manner that ensures the BDI/SDI systems are available to perform their intended functions when required.

Accurate Operations Procedures

Independent Oversight reviewed the set of operating procedures covering the BDI/SDI system and found these procedures are technically accurate to achieve required system performance for normal operating conditions. These procedures include OP-DAF.SP00, *Control and Execution of Device Assembly Facility Activity Level Work Documents Involving Surveillance Requirements*, OP-DAF.MN05, *Building Safety System Status*, which defines the process and specifies the requirements for defining and maintaining the status of DAF SC/SS SSCs, and the procedure set covering CONOPS implementation. There are no abnormal or emergency operating conditions that apply to the system and therefore no abnormal/emergency operations response actions required for the system.

Operations Personnel Training

At DAF, nuclear operations are conducted under the direction of NOMs who report to the DAF Operations Deputy Manager. Operations Supervisors, who report to the NOMs, direct the daily activities of the DAF operators (the OTs), who perform shift checks of various cells within the DAF as part of beginning daily operational activities. The OTs also perform certain TSR surveillance activities according to a surveillance schedule. Each morning, the NOM holds an operations meeting to ensure proper coordination and alignment of activities scheduled for performance. The NOM is responsible for all activities conducted in the facility to ensure that the facility is maintained in a safe and DSA/TSR compliant configuration.

Operations Controllers (OCs), who also report to the NOMs, authorize individual work activities and access to areas within the DAF. The OCs work within an operations control area where access is controlled in accordance with CONOPS requirements. Operations logkeeping is performed by the OCs using an on-line software program that has controls to ensure accurate operator log entries and also allows for searches of information fields within the log's database.

Training/qualification for OTs and operator supervisors is implemented under the NNSS Integrated Training Implementation Matrix that implements DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, and Program Development Plan DAFQ023, *DAF Operations Technician Qualification Program*. OTs and their supervisors receive general and facility-specific training. General topics include industrial safety, instrumentation and control, basic physics and chemistry, radiological control, and procedure use and adherence. Facility-

specific training includes safety systems, the DSA, and TSRs. Continuing training for NSTec technicians includes job-specific tasks, such as system alignments, emergency lighting, and fire watch responsibilities; requalification for technicians is not required. They are also trained on proper BDI/SDI system response. The only failure mode related to the BDI/SDI system is the failure of the system to prevent opening of an interlocked door with one door already open. In this case the BDI/SDI system for the associated interlocked door set is declared inoperable and the associated LCO is entered. The TSR-directed action in this case is to cease all operations in the affected building, place the building in a safe and stable condition and confirm one special door is closed with latch pins engaged. Within 4 hours of declaring the SDI system inoperable, access control to the affected building is to be established. There are no other failure modes or required actions involved in credible accident scenarios in which the system is required to function. This is covered in the TSR training for operations staff. Independent Oversight reviewed a sample of OT qualification cards and found no issues.

During the observation of daily operations activities, Independent Oversight questioned seven OTs about their knowledge of the BDI/SDI system requirements. The OTs were very knowledgeable of most operational aspects of the systems including proper system response, failure modes, and safety basis requirements of the system. However, none of them remembered under what condition the TSR requires performance of a test on startup of the SDI system. TSR SR 4.2.1.1 requires this testing when active operations involving HE will be performed during the workday. (See **OFI NSTec-OPS-1**.)

Independent Oversight also observed OTs performing daily fire protection riser checks (DAF TSR SR 4.4.1 and 4.8.1). One of the OTs explained that the riser check in Building 712 was performed to satisfy the daily check requirements TSR SR 4.4.1 and 4.8.1. In the SR procedure, identical riser checks are listed with TSR SR 4.4.1 and 4.8.1 as a basis for the surveillance. OTs were asked why two requirements were in the procedure, and neither OT knew that the two different requirements applied to different buildings; SR 4.4.1 applies to all DAF buildings except for Building 343, and SR 4.8.1 is specific to Building 343. (See **OFI NSTec-OPS-1**.)

Operational Configuration Control

During facility walkdowns with DAF engineers and operations staff, selected portions of the BDI/SDI system were reviewed by Independent Oversight for adherence to proper configuration as identified on plant drawings and procedures. No discrepancies were identified by Independent Oversight and all of the BDI/SDI system SSCs were properly aligned and controlled in accordance with the DAF Conduct of Operations implementing procedure OP-DAF.FA16, *DAF Control of Equipment and System Status*.

Conduct of Operations

Independent Oversight observed daily DAF facility checks (SOP-DAF.FA028). Page 10 of Data Sheet A has checks of the uninterruptible power supplies (UPS). The OTs explained that the DAF UPS had alarm indications for a “failed fan,” which they checked on the data sheet as “acceptable” and noted as a having “known conditions.” The daily data checks were reviewed by the operations supervisor and the NOM. Discussions with the OTs performing the checks indicated that these alarm indications had existed for more than three years and that the engineers were aware of the issue but had taken no action to correct the failed fan indications because the UPSs are not SC/SS SSCs. (See **OFI NSTec-OPS-2**.) No other issues were identified by Independent Oversight associated with operator rounds and facility status and configuration and therefore in general are acceptable.

A further review was performed of the CONOPS matrix covering the DAF by Independent Oversight. The CONOPS matrix was submitted in accordance with DOE Order 422.1, *Conduct of Operations*, for DAF and was approved by NFO in a letter dated May 9, 2012. The CONOPS manual for the site (CD-

NOPS.005, *Implementation of Conduct of Operations in NSTec Facilities*) addresses the implementation of CONOPS and refers to individual facility matrices for specific facility-level requirements.

The DAF CONOPS matrix covering specific requirement 2.m, *Control of Interrelated Process*, refers to implementing documents that are not related to the subject of the requirement. Specific requirement 2.m of DOE Order 422.1, *Conduct of Operations*, was the only requirement that substantively changed from the previous order (DOE Order 5480.19). Specific requirement 2.m under DOE Order 422.1 addresses the control of interrelated processes, including definition of responsibilities, training/qualification, and communication. The intent of this requirement is to establish responsibilities for both nuclear facility operators and the personnel who operate/control interrelated processes to ensure that impacts to the nuclear facility are minimized. Achieving compliance with this requirement requires defining interrelated processes for each nuclear facility, personnel responsibilities and knowledge, and lines of communication between nuclear operators and interrelated process personnel. These lines of communication are intended to flow between groups within the organization so that not only do nuclear facility operations personnel communicate concerns about the performance of interrelated processes to those who operate/control those processes, but also that those who operate interrelated processes communicate any process problems to the affected nuclear facilities in a timely manner so that actions can be taken to prevent adverse effects on facility safety.

NSTec has not identified interrelated processes for DAF and thus has not identified specific responsibilities for DAF operating staff or the NSTec staff who operate/control interrelated processes. NSTec has not assessed training/qualifications needs for these personnel groups to ensure that they understand the interrelated processes and how nuclear and interrelated process operations affect each other. Finally, effective lines of communications have not been established to ensure that activities are properly coordinated and that process system upset conditions are communicated to affected organizations in a timely manner. The DAF implementation of specific requirement 2.m is not in compliance with DOE Order 422.1. (See **Finding-NSTec-Ops-1.**)

In summary, operations are conducted in a manner that ensures the availability of safety systems to perform the intended safety functions when required. Procedures are technically accurate and complete, and operator training is sufficient to meet DOE Order 426.2. OTs and their supervisors are current in their training, and OTs exhibit an acceptable level of competence in their knowledge of the facility and associated safety systems. Adequate systems are in place to maintain safety system equipment and system status. Operation of the BDI/SDI system is rigorous and meets the assumptions of the safety basis for safe operation. However, management attention is needed to ensure that operator knowledge of TSR requirements is maintained, that equipment deficiencies are corrected in a timely manner, and that interrelated processes are improved.

5.4 NSTec Cognizant System Engineer Program

NSTec has established an effective cognizant system engineer (CSE) program as defined in DOE Order 420.1B, *Facility Safety*, to ensure the continued operational readiness of vital safety systems (VSSs) to meet their safety functional requirements and performance criteria. NSTec procedure OP-NENG.004, *System Engineer Program*, adequately establishes roles and responsibilities and describes the CSE program and its implementing processes and procedures.

CSEs are trained and qualified in accordance with the NSTec Training Implementation Matrix and CCD-QA02.001, *Training Program Manual*, which defines the site's qualification process elements as required by DOE Order 426.2, *Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities*. Specific training requirements are defined in ENG0001, *System Engineer Fundamentals*, which is the program development plan for CSEs. Revision 2 of this plan in 2006 added a comprehensive

examination as part of the CSE qualification process, and Revision 7 of this plan in 2011 added facility-specific and system-specific qualification criteria, which are noteworthy. New CSEs are expected to complete the qualification program within 180 days. Full qualification includes formal training requirements, document reviews, and on-the-job training/mentoring with another qualified CSE. There is no interim qualification and no periodic requalification, but continuing training includes both fixed and flexible continuing training requirements. Independent Oversight reviewed the qualification cards and training records for the primary and backup CSEs for the BDI/SDI systems to verify compliance with requirements. CSEs meet the requirements and are technically competent, but a recent NSTec management assessment completed in April 2013, MA-13-EN22-003, *System/Cognizant System Engineering Training and Qualification Program Evaluation*, noted a concern that CSE training does not go into practical implementation and that more practical task training is needed; this concern is discussed later in this section. Overall, NSTec has defined adequate CSE qualification and training requirements and is assigning appropriately qualified CSEs to each VSS.

OP-NENG.004, *System Engineer Program*, provides adequate program guidance for system engineering responsibilities and complies (almost to the point of verbatim repetition) with the CSE requirements defined in DOE Order 420.1B; i.e., CSE program coverage for VSSs, configuration management, and CSE support for operations and maintenance. Two key supporting documents for the CSE program are OP-NENG.045, *System Health Monitoring*, and OP-NENG.046, *Vital Safety System Assessments*. CSEs are expected to evaluate their systems on a monthly basis and use Form FRM-2463, *System Health Monitoring*, to record the specified data and information obtained from their evaluation. The monthly evaluation of system operability, system performance, system maintainability and system configuration provides input to the metric database and serves as baseline information for input to the system health reports. CSEs are also expected to perform a VSS assessment annually for SSCs designated as SC and triennially for SSCs designated as SS, using the criteria delineated on Form FRM-2459, *Vital Safety System Assessment Criteria*. The VSS assessments are scheduled on the annual Joint Assessment Schedule and include a review of the areas covered in the monthly reports, as well as safety basis documentation and evaluation for system aging and obsolescence. Independent Oversight's review of several recent system health reports and VSS assessment reports noted that these reports satisfy the minimum expectations of DOE Order 420.1B but are not sufficiently detailed and comprehensive to provide meaningful, challenging, and leading performance indicators for system health. (See **OFI NSTec-CSE-1.**)

One aspect of the CSE program that contributes to the observed weaknesses in reports is that it does not provide clear management expectations for the conduct and documentation of routine CSE activities (e.g., system walkdowns, system health monitoring, and VSS assessments), so the program may be inconsistently implemented. (See **OFI NSTec-CSE-2.**) NSTec recognizes that CSE training needs improvement regarding practical implementation of the CSE program requirements and plans to develop training for OP-NENG.045 and OP-NENG.046. Independent Oversight concurs with this approach which will help the Nuclear Operations Directorate (NOD) implement more useful and consistent system performance metrics to increase senior management's understanding of the risks being accepted by any degraded system attributes/conditions. Another contributing weakness is that management assessments lack rigor in self-identifying issues, as discussed further in Section 5.5 of this report. Specifically, the NSTec management assessment of the CSE program completed in April 2013 identified only one finding related to vendor manual training and two OFIs, while a subsequent NFO assessment of the CSE program in August 2013 identified four findings, with three of them related to CSE training and assignments, and ten OFIs. NSTec recognizes that the CSE program is maturing and NOD recently reorganized the CSEs under a new Safety System Engineering Division in May 2013 to achieve better focus, but there is still room for management to be more proactive in improving the CSE program. (See **OFI NSTec-CSE-1.**)

In summary, the CSE program is well-established and is undergoing improvements that are expected to

have a positive effect on system performance and reliability. The system engineers who were interviewed are appropriately experienced and qualified. The procedures for system health monitoring and VSS assessments address the key system engineering program elements, but some additional practical training is needed. Most important are the CSE's daily and routine activities to provide technical support for operations and maintenance and to continually assess the operability, reliability, and material condition of assigned VSSs. Independent Oversight reviewed these activities and concluded that the CSE program is effective in ensuring that safety systems can reliably perform as intended. However, management attention is needed to clarify CSE roles and responsibilities and to improve the rigor and formality of the system health monitoring process.

5.5 NSTec Safety System Feedback and Improvement

A critical aspect of ensuring VSS functionality, operability, and reliability is a feedback and improvement process incorporating: monitoring and trend analysis for system operability; analysis of incidents and off-normal conditions; and, lessons learned. Independent Oversight evaluated the establishment and implementation of feedback and improvement programs and processes that affect nuclear SS systems at the NNSS. Independent Oversight reviewed development, implementation, and evaluation of corrective actions and dissemination and review of program and process documents; interviewed responsible managers and staff; and evaluated samples of process outputs, such as assessment reports, issues management documentation, trend and performance indicator reports, incident and event analysis reports, and lessons-learned publications.

NSTec has established feedback and improvement programs and implementing documents supporting the management of NNSS safety systems. Feedback and improvement processes are described in the QA and ISMS program descriptions. NSTec has issued numerous process descriptions (designated as CCDs), implementing procedures (designated as CDs), and job aids/guides for performing assessment activities, issues management, event reporting and analysis, safety basis development and revision, lessons-learned screening and use, and development of performance indicators. In addition, various guidance and links to outside information sources are available on the program owner's home page on the NSTec intranet.

Assessment Program

NSTec has established an assessment program that includes management and independent assessments, narrower-scope reviews called surveillances, management observations, and various safety-related inspections. Annual assessment schedules are developed and maintained using a formal risk-based selection process. NSTec is partnering with NNSA/NFO in integrating assessment schedules that include NFO shadowing of NSTec assessments. The integrated assessment schedules for 2012 and 2013 reflect a variety of management assessments, including nuclear safety-related reviews by the various responsible organizations. However, most of the independent assessments scheduled and performed were mandatory assessments required by DOE or other regulatory directives. Assessment schedules are reviewed and approved by the NFO. Before performing management assessments, responsible managers, assessment team leaders, and all team members are required to complete a computer-based briefing on the necessary steps in conducting management assessments. Independent Oversight reviewed the assessment briefing materials and considered the content to be appropriate basic material describing expectations and introducing assessment techniques. The NSTec QA Department has also conducted several "brown bag" lunch sessions (voluntary attendance) to present additional information on assessment techniques.

Independent Oversight reviewed the reports for 12 management, 4 independent, and 3 parent organization (NSTec) assessments conducted in fiscal years (FYs) 2011, 2012, and 2013 that affect NNSS safety systems and processes. Formal CRADs are developed for management and independent assessments. Standard performance objectives and criteria for assessment of SMPs have been established in a formal

NSTec company plan. Assessment reports are documented in standardized formats, typically with attached checklists of criteria and compliance results. Responsible managers review and approve management assessments and ensure that issues are entered into the appropriate issues management processing system.

The independent assessments reviewed by Independent Oversight were comprehensive, substantive, value-added evaluations. Parent organization assessment reports showed good independent process and performance evaluations, with many identified OFIs. Some of the management assessments were comprehensive and identified issues and OFIs, but many of them focused too much on compliance rather than on performance and observation of field activities. Some of the reports did not provide sufficient detail to support the conclusion that criteria had been satisfactorily met. Although VSS assessments are not considered to be management assessments, Independent Oversight identified similar weaknesses in VSS assessments.

The NSTec QA Department also provides oversight, mentoring, and feedback for management assessments as described in a desk instruction. Completed management assessment plans and reports are reviewed against 13 criteria covering the various elements of the assessment process. Each criterion is given a point value based on its importance; the reports are scored and documented in an Excel spreadsheet, and an e-mail of the completed evaluation template is sent to the responsible manager and lead assessor. Independent Oversight reviewed the criteria and completed evaluations for eight management assessment reports. The criteria and valuations were deemed appropriate, but the grading appeared to be less than rigorous and did not adequately address the weaknesses noted above with respect to the approach or the inadequate support of conclusions.

In addition to management and independent assessments, NSTec has established a formal workplace surveillance process for less structured assessment activities. As part of a procedures adherence and improvement initiative, NSTec conducts activity-based management observations of CONOPS elements for radiological, HE, and hazard category 2 and 3 nuclear facilities. Initially, this process was detailed in a company directive, but in early 2013 the procedure was canceled and replaced by a guidance document (GDE-NOPS.008), and observations were conducted and documented in accordance with the requirements of the company directive on surveillance. Management observation surveillances are scheduled and included on the integrated assessment schedule. In accordance with the guide, management observations are to be performed monthly at the high hazard nuclear facilities and quarterly at other facilities. The guide specifies the paragraphs in the CONOPS matrix to be evaluated during each month of the year.

Independent Oversight reviewed GDE-NOPS.008 and 29 CONOPS surveillances conducted between March and June 2013 and identified a number of weaknesses in process and performance. The guide could be improved by better describing the value and purposes of management field observations, including the benefit/intent to encourage management presence in the field to gain first-hand knowledge of conditions, activities, and possible issues and to emphasize interactions between managers and field personnel and solicitation of feedback from workers to managers. Managers approach the CONOPS elements specified for a particular month in the guide as a requirement, even when that approach is inappropriate or not applicable. For example, a number of reports documented an observation for abnormal events even though no events had occurred that month, so the report had no content. The guide specifies a relatively low expectation that managers need to document only one field observation per quarter in nuclear operations facilities. The guide also implies that if at-risk behaviors are observed and corrected on the spot they need not be documented in the issues management system, and it states that if the at-risk behavior cannot be resolved (undefined), a Priority Level 4 issue is to be entered into the tracking system. The issues management process provides for screening and assigning priority levels and arbitrary designations without details of the issue. Many of the reports reviewed were word-for-word,

cut-and-paste copies. Based on Independent Oversight's experience in watching work activities, the rigor and formality of the process for management observation activities at NNSS may be questionable, since it has documented a low number of document or performance problems. In the 29 reports reviewed, only one at-risk behavior was identified, and one minor issue was documented in the tracking system. One report noted that the WP could not be worked because required radiation surveys were not specified in the package. The report did not identify this as an issue and did not identify at what point in the observation this error was identified, by whom, or any resulting corrective actions.

Independent Oversight observed a manager performing a management observation at DAF for the month of August 2013 (see Section 5.1 of this report). The manager performing the observation stated that he was there to observe only the specific topic of the month (independent verification) and was not observing any other aspect of the FP maintenance activity. The manager further stated that the management observation program did not require feedback to those being observed. Management should observe and reinforce many behaviors and requirements during direct observation of work activities, so the practice observed by Independent Oversight represents a missed opportunity to reinforce management expectations for employee performance. In addition, the frequency of these observations is inadequate to identify trends and programmatic issues. Although some maintenance supervisors occasionally conduct informal observation of work activities, there are no other management observations of work performed in the field. The management observation program lacks the breadth and frequency to be effective in reinforcing management expectations.

Although NSTec has established and implemented a generally adequate self-assessment program and a variety of assessments are performed and provide input for improved processes and performance, a few weaknesses were noted in the planning, performance, documentation, and evaluation of assessment activities that need management attention. (See **OFI NSTec-F&I-1.**)

Issues Management

NSTec has established a set of procedures and guides that detail the processes, requirements and guidance for documenting, categorizing, evaluating (i.e., causal analysis, determining extent of condition, and evaluating corrective action effectiveness) and correcting deficiencies and OFIs using a graded approach. Independent Oversight reviewed procedures and guidance documents, attended meetings, reviewed a sample of issues management documents for issues identified in the assessments, and interviewed managers and staff responsible for administration and implementation of the program. Many process and performance issues identified either during assessment activities or through incidents and events or proactive initiatives, are formally documented, evaluated, and resolved by NSTec. An issue tracking system called caWeb is used for documenting issues (categorized as deviations from requirements, findings, or OFIs), documenting activities for managing the issues, and tracking actions to closure. Findings are categorized into one of four priority levels using a probability/consequence matrix. A chartered Issues Screening Team (IST) meets daily when issues have been identified for entry into caWeb to ensure that issues and requirements are clearly stated, assigned the proper priority level, and assigned to the proper organization for resolution. The IST membership includes issues management staff, the regulatory enforcement representative, QA, NNSA/NFO, and Directorate staff as needed. Independent Oversight attended an IST meeting and determined that the reviews of issues were thorough and appropriate and added value. A panel of senior managers called the Executive Safety Review Board also meets as needed for high-significance issues to evaluate the adequacy of causal analyses and ensure that appropriate corrective and preventive actions are established.

Independent Oversight reviewed a sample of issues and associated documentation, including causal analyses and corrective action effectiveness reviews for high priority issues. Independent Oversight identified significant problems in the causal analyses and extent-of-condition reviews. Subsequent

discussions with NNSA/NFO and NSTec management indicated that significant concerns about the implementation of the issues management program, especially the causal analyses, have been the subject of correspondence and discussion between NFO and the contractor for several months. Near the end of this Independent Oversight review, NSTec issued its FY 2013 Annual Analysis Report, providing its staff analysis of assurance processes for key mission and functional areas. This annual report, in earlier years a deliverable of the contract Performance Evaluation Plan (PEP) and this year a Technical Direction by NFO, identified that the issues management function appears to require significant management attention because of deficiencies in causal analysis and recurrence controls identified by NFO and an HSS Office of Security Enforcement investigation report, and confirmed by preliminary results of an extensive NSTec root cause analysis of these concerns. On August 15, 2013, the president of NSTec issued a report on the health of the organization that identified the issues management process as a focus area for system improvement for FY 2014. Because the problems in this area have been defined and aggressive actions are under way to comprehensively address them, this Independent Oversight does not enumerate additional examples of these problems.

Beginning in 2012, NSTec instituted a formal program to improve performance through structured process and problem team evaluations lead by trained facilitators. Although the objective of many of the improvement targets is efficiency or cost savings, some have a direct impact on safety. For example, CONOPS is the subject of an ongoing process improvement project. A number of improvement actions have been identified, and are being addressed, in the areas of defining and consistently applying requirements and a graded approach across the various facilities and projects at the NNSC; improving timely integration and accountability of functional and support organizations; and improving communication of senior management expectations to all organizations.

Although NSTec's issues management processes are effectively addressing many issues and OFIs, significant problems are hindering the program's effectiveness. NNSA/NFO and NSTec have identified these issues, and further analysis and resolution are under way. (See **OFI NSTec-F&I-2**.)

Event Reporting and Analysis

With one exception, NSTec has established well defined processes for identifying, investigating, and reporting reportable events and periodically analyzing performance trends for incidents or events as required by DOE directives. The company directive adequately specify the responsibilities and action steps for immediate response to incidents, including emergency actions, scene preservation, determining the need for work stoppage, categorization, investigation (including the conduct of critiques), reporting to DOE, and periodic trend analysis of events. A "job aid" provides a checklist for the conduct of a "management review," the NSTec designation for a fact finding or critique, and a template is provided to document the details of the management review. However, the event reporting procedure does not specify requirements or guidance on when a management review is required and the requirements for the conduct and documentation of a management review, and does not reference the published job aid or template.

To evaluate these processes and their implementation, Independent Oversight reviewed process documents and a sample of seven calendar year (CY) 2012 and CY 2013 NSTec events and associated management review reports (when performed) and interviewed the subject matter experts (SMEs) responsible for event reporting. The event reports reviewed by Independent Oversight generally provided adequate information on the event details, the resulting analysis, and corrective actions as required by DOE directives and site processes. For a number of the events, the management review template was completed, but the title was changed either to "root cause analysis report" or "apparent cause analysis report," and the report referred to the cause analyses following a management review; however, none of these reports documented all the elements specified in the job aid or attached supporting documentation,

such as personnel statements or a detailed chronology. Causal analysis is not an activity identified as a part of the management review process, as reflected in the job aid. The one properly titled management review report in the sample of event reports reviewed (NA-NVSO-NST-NLV-2013-001) was well documented, with a detailed chronological timeline, discussion of the event and conditions, and attachments including the attendance list and related supporting documents (e-mails, a radiological work permit, radiological awareness reports, and an inspection report). (See **OFI NSTec-F&I-3**.)

Performance Indicators

A CCD, job aid, and information on NSTec intranet websites adequately detail the requirements, processes, and management expectations for responsible mission and functional managers to analyze data sets and document metrics for monitoring performance and providing senior management and NFO with performance information. Company-level measures and analysis are compiled and presented in an NSTec monthly “dashboard.” An intranet-based tool supports development and presentation of consistently formatted dashboard metric data and analysis, providing multiple views of metric information including a data summary, data, analysis, impact, corrective actions, and description of the metric and established goals. Negative trends or performance issues are to be addressed using the site issues management process. Independent Oversight reviewed the company directive and a sampling of dashboard performance metrics.

Although many metrics are being generated by site organizations and higher level metrics are being presented to management in the company dashboard, the metrics could be strengthened to provide more meaningful and challenging leading performance indicators. In addition, some dashboard metric information was incomplete or insufficiently detailed to provide the most effective information to managers. For example, the measure of composite management assessment feedback scores has a goal of 90 percent, but scores for at least a year have all been above 95 percent, except for one month with one very low-scoring assessment. A similar measure, goal, and performance exist for causal analysis feedback performance. The measure for CONOPS management assessments and facility observation performance is simply the number scheduled vs. the number performed, but for eight quarters the performance has been 100 percent every quarter. For some of the metrics, no action levels are specified, and when actions are specified they have no due dates or the means or measures for completion (e.g., “the senior management team should reinforce the following expectations throughout NSTec”). Some lack established goals or action levels, some lack analyses of the data, and some do not identify actions or justification for no action. (See **OFI NSTec-F&I-4**.)

Lessons Learned

NSTec has established and implemented a robust, structured operating experience/lessons-learned program that identifies, evaluates, and provides for appropriate application of lessons learned generated from external operating experience and internal activities, conditions, and events. Approximately 50 lessons learned were generated internally in the past year. The program requirements and expectations are defined in an NSTec CCD. The program includes a content-rich and user-friendly intranet site with search functions by words, work function, hazard, ISMS element, and priority. A designated company program coordinator, who maintains formal operating experience documentation, oversees screening activities and evaluations, monitors application actions, and evaluates and publishes performance metrics. The program coordinator also provides mentoring and support for plant personnel and division lessons-learned coordinators in lessons-learned identification and development. The division lessons-learned coordinators are required to subscribe to receive appropriate DOE operating experience reports for topics and functional areas applicable to their organization.

There are over 30 designated division level coordinators or alternates who are directed to subscribe to receive operating experience reports for applicable topics/functional areas from the DOE Headquarters operating experience program. The program coordinator maintains a spreadsheet of screened DOE lessons learned, and division coordinators are required to provide feedback to the program coordinator on the means used to communicate applicable lessons (e.g., required reading, safety or pre-job meetings, or other distribution) and any specific benefits (e.g., incorporation into a WP or procedure). The program coordinator compiles and trends this data as a program performance measure.

The program coordinator routinely interfaces with division coordinators regarding applicability of operating experience information and the lessons-learned process and conducts quarterly counterpart meetings with the coordinators. NFO has directed NSTec to provide screening of external and internal lessons-learned services to NFO and distribute applicable lessons to cognizant NFO Assistant Managers. The coordinator also meets routinely with the designated NFO operating experience program staff member.

The planning and tabletop/walkdown checklist for WP reviews includes a field for identifying whether lessons learned or WP feedback was incorporated into the WP. In addition, the company directive for activity-level work document development includes identifying lessons learned that are part of the basis documents for technical work instructions. The coordinator maintains a spreadsheet of the externally generated lessons that are screened, the evaluation results, and feedback on actions taken from division/department coordinators. The coordinator summarizes and trends feedback and use data. A management assessment of the program, performed in 2012, identified several findings and OFIs. The program coordinator is in the process of implementing a formal lessons-learned awareness initiative to improve the program, workforce awareness, and the quality of lessons learned being generated. The initiative includes three phases: the conduct of an awareness survey (addressing availability, applicability and implementation, distribution methods, and overall effectiveness), establishment of a monthly recognition system for identifying high-quality and value-added lessons, and upgrade of the lessons-learned database.

Activity-Level Feedback and Improvement

NSTec has defined the requirements, expectations, and processes for planning and executing WPs or procedures that include requirements for workers and job supervisors or foremen to identify and identify issues in WPs and for the responsible managers to identify actions needed from the document owner. WP review criteria in the directive include determining whether action is required, based on craft feedback. The directive requires craft supervisors to conduct post-job reviews with craft workers to discuss the work performance and to document worker feedback on a post-job hazard review form that contains a set of six appropriate debriefing questions and fields for documenting positive and negative comments and identifying any lessons learned. However, the post job review forms related to safety system maintenance work that Independent Oversight reviewed documented few comments from crafts (see also Section 5.1 and **OFI NSTec-Maint-5**).

In summary, NSTec has established and implemented the elements of an effective assurance system supporting safety systems at NNS. However, significant weaknesses in issues management need to be addressed, and OFIs were identified in the planning, performance, and implementation of assessments; the process and requirements for management reviews; the performance metrics program; and, activity level feedback and improvement.

5.6 NFO Safety System Oversight Program

NFO has established and implemented an effective safety system oversight (SSO) program as defined in DOE Order 426.1, *Federal Technical Capability*, for qualifying staff to apply expertise in their oversight of assigned safety systems to ensure that the systems will perform as required by the safety basis and to monitor performance of the contractor's CSE program. NSO Order 426.XB, *Safety System Oversight Program*, adequately identifies the roles and responsibilities for SSO personnel and associated management and also establishes the program requirements related to the oversight of VSSs. NFO Order 226.X, *Line Oversight (LO) Program*, also assigns responsibilities for SSO personnel to monitor assigned facilities and systems and provide input to line management.

SSO personnel are trained and qualified in accordance with NSO Order 426.1A, *Technical Qualification Program Plan*, and the *Safety System Oversight Representative (SSOR) Qualification Standard*. New SSORs are expected to complete the qualification program within 18 months and re-qualify every five years. The SSOR qualification card was revised in 2012 to consolidate multiple safety systems into one qualification standard, with facility-specific and system-specific criteria for VSSs. Independent Oversight reviewed the qualification cards and training records for the primary and backup SSORs for the BDI/SDI systems to verify compliance with requirements. SSORs meet the requirements and are technically competent. Overall, NFO has adequately defined SSO qualification and training requirements and has assigned appropriately qualified and experienced SSORs to each VSS.

NFO updated its SSO staffing analysis in December 2012 in accordance with DOE-STD-1151 and determined that it needs an average of 3.7 fulltime equivalents (FTEs). Independent Oversight agrees with this staffing needs analysis. There are currently four qualified SSORs, and the SSO program manager performs double-duty as an SSOR with assigned safety systems. Independent Oversight discussed the assignment workload with the program manager and determined that current assignments are challenging in the near term but manageable. The NFO criticality safety engineer is currently cross-qualifying as an SSOR for the National Criticality Experiments Research Center (NCERC), so the NCERC SSOR will be able to take on other systems in FY 2014 and free up the SSO lead to better focus on program management. However, an SSO program self-assessment completed in August 2012 recommended that NFO should establish a long-term plan for replacing or providing backup SSO qualification and coverage, since some retirements are possible in the short term. Independent Oversight concurs that the path forward should sustain a healthy SSO program if the current staffing remains stable and NFO management stays proactive in this area.

Per NSO Order 426.XB, SSORs routinely maintain operational awareness of assigned safety system performance and the contractor's CSE program activities. SSORs perform quarterly walkdowns of their assigned safety systems and document these in weekly reports and in the caWeb issues management system. SSORs also perform at least one formal safety system assessment for SC systems every three years and for SS or important-to-safety systems every five years. Independent Oversight reviewed several recent quarterly walkdown reports and safety system assessment reports and found that the SSORs are adequately using the established assessment criteria and guidelines to review the major activities for the BDI/SDI system: safety basis documentation; material condition; and configuration management, maintenance, and surveillance testing. Additionally, SSORs assess the contractor's CSE program every three years. Independent Oversight reviewed the recently completed assessment report AMSS-RPT-2013-012, *Assessment for National Security Technologies Cognizant System Engineer Program*, to verify that SSORs used the CRAD derived from applicable directives to conduct the scheduled comprehensive program review during July 2013. This CSE program assessment identified four findings and ten OFIs; Independent Oversight concurs with the identified issues and notes that the assessment was sufficiently comprehensive. Overall, the SSORs are adequately performing routine and periodic oversight of their assigned systems and the contractor's CSE program.

5.7 NFO Oversight/Feedback and Improvement

In addition to the focused review of the NFO SSO program, Independent Oversight performed a broader evaluation of the establishment and implementation of NFO programs and processes for conducting oversight of NSTec management and operation of nuclear safety systems and NFO internal feedback and improvement systems and performance. Independent Oversight reviewed program and process documents, interviewed responsible managers and staff, and evaluated samples of process outputs (e.g., assessment schedules; assessment, surveillance, and operational awareness reports; issues management data; and contract performance-based incentive criteria and evaluations).

Management Oversight

The NNSA/NFO contractor oversight program is detailed in site policy NFO P 226.X, *NNSA/NFO Line Oversight System Description Document*, and site order NFO Order 226.X, *Line Oversight Program*. These documents provide appropriate description of the requirements and processes for conducting assessment and operational awareness activities, safety document review, management of issues, and performance evaluation to contract requirements. Guidance document NFO 226.003, *Assessment Implementation Plan Development*, describes the process for selecting and scheduling the annual assessment plan for the various functional areas using a risk-ranking system that identifies a basic, inherent risk for the area, adjusted in consideration of contractor assurance system performance, contractor oversight results vs. Federal oversight, and a program performance rating. The resulting assessed risk scores and color designations (red, yellow, green, and blue, ranging from “elevated risk” to minimal risk) are used to determine the frequency and type of oversight activities (i.e., transactional assessment at the activity level or systems assessment) by evaluating processes and contractor information such as assurance system metrics and program documents.

Independent Oversight reviewed the NFO FY 2013 NNSS assessment implementation plan, the resulting assessment schedule, and a sample of reports for NFO assessments of NSTec, shadowing of NSTec assessments, NFO self-assessments, surveillances, and weekly reports of FR activities. The risk analysis performed to develop the assessment plan is complex, includes a number of very subjective factors that can significantly alter the assessed risk score and ranking, and the planning approach, as implemented, may result in assessment schedules that do not reflect current performance status. For example, the NSO assessed risk number for the functional area of NSTec performance assurance indicated extremely low risk, and NSO gave it a color rating of “blue,” indicating minimal risk and infrequent, systems-based oversight. However, at about the time the analysis was issued and continuing until the time of this review, NSO identified significant concerns about NSTec’s performance in the area of issues management, with findings and rejections of root causal analyses. Functional area analyses must be completed each year by June 30 to meet an NNSA Headquarters deliverable. Although NSO completed and submitted the analysis before June 30, the final analysis report for FY 2013 and the schedule of assessments to be performed, based on that analysis, was not approved until January 2013, over six months later and over three months into the fiscal year. (See **OFI NFO-1**.)

The assessment activities documented in the reports reviewed by Independent Oversight were generally thorough and adequately documented, and they provided value in evaluating and improving contractor safety processes and safety system performance. NSO personnel performing shadow assessments of the contractor’s assessments complete a grading sheet to enable collective analysis and trending of the quality and effectiveness of the contractor’s assessment activities. The shadowed assessments are graded on criteria for the performance of the team leader and team members and on the assessment plan, the overall conduct of the assessment, the exit briefing and final report, and the timeliness of performance.

Facility Representative Program

NFO has established an effective Facility Representative (FR) program as defined in DOE-STD-1063-2011, *Facility Representatives*, for qualifying staff to monitor the safety performance and the day-to-day operational status of their assigned facilities. NFO procedure FRG-1, *Facility Representative Procedure*, is the current implementing document for the FR program.

FRs are trained and qualified in accordance with NFO Order 426.1A. As required by STD-1063, the NFO FR qualification includes the DOE-STD-1151 FR functional area qualification standard and additional site/facility-specific competencies. Candidates must successfully pass a facility walkthrough, a written examination, and an oral board for full qualification, with requalification required every five years. Provisions also allow for interim FR qualification leading to full qualification. The FR group lead manages the continuing training program in accordance with the technical qualification program plan. Independent Oversight reviewed the qualification cards and training records for several FRs and the facility-specific qualification standard for the DAF and Critical Experiments Facility (now renamed NCERC) and determined that the FRs are well-trained and qualified.

NFO recently updated the FR staffing analysis in May 2013 in accordance with DOE-STD-1151 and determined that it needs an average of 6.48 FTE. Independent Oversight agrees with this staffing analysis. There are currently seven qualified FRs, including the FR group lead who supervises the FRs. FRs are adequately assigned to cover the six hazard category 2 or 3 nuclear facilities and 19 other non-categorized facilities and activities at NNSS, with other facilities/activities covered on a case-by-case basis for reportable events and other significant/abnormal events. FRs are also assigned as backups to other FRs, and the backup FRs have generally been previously assigned to the facility. Independent Oversight reviewed the FR staffing analysis and assignments list and, based on interviews with several FRs, determined that the staffing analysis and current FR coverage is adequate for all of the facilities on site, although several FRs are eligible to retire in the near future. ASM-AMSO-10.2.2012-469532-Report, *Tri-Annual Facility Representative Program Self-assessment*, completed in December 2012, did not specifically address this potential weakness but did note that several individuals are interested in becoming FRs. In addition, the NFO staff includes several former FRs who could be reassigned if necessary, and STD-1063 allows FRs to be assigned to multiple hazard category 2 or 3 nuclear facilities if necessary, so there is sufficient staffing to sustain the FR program.

Per FRG-1, the primary duty of FRs at NNSS is to monitor day-to-day operations and performance of the facilities under their cognizance to ensure that the facilities are operated safely in compliance with the DSA and in conformance with TSR requirements. FRs are expected to spend at least 65 percent of their time in their assigned facilities observing operations and assessing operating conditions. FRs are expected to document their activities in an informal narrative journal, which they then enter into a formal weekly report that is integrated into a weekly summary report and provided to senior management, with highlights and significant events/issues for the FR activities for that week. Independent Oversight observed the FR daily routine at the Joint Actinide Shock Physics Experimental Research facility, reviewed his journal and record of caWeb reported issues, and determined that FR tracking of identified issues to closure is adequate. It is noteworthy that FRs are now entering OFIs, in addition to findings, into caWeb and that NSTec is actively resolving these minor issues and discrepancies, as well as more significant problems. Independent Oversight also reviewed several weekly summary reports, attended a quarterly FR briefing to line management, and attended a monthly CONOPS performance metrics briefing by NSTec to the FR group lead. Based on these observations and on discussions with several FRs, Independent Oversight determined that FRs provide effective oversight of their facilities, adequately communicate their results to line management and receive adequate functional support from line management for their activities. An adequate performance assessment and feedback program is in place to assess the effective implementation of the FR program.

Issues Management

NFO-identified issues, both self-assessment issues and those for which the contractor is responsible, are managed by NSTec in their issues tracking/management tool caWeb and monitored by NFO staff. The NFO issues management process and requirements are defined in the oversight program order NFO Order 226.X and guidance document NFO 226.005, *NFO Issues Management*. While the use of the contractor's issue tracking tool promotes efficiency and transparency, the process described in the site order and guide insufficiently describes the necessary elements of an effective issues management program, especially for NFO self-assessment issues. Neither the site order nor the guide adequately addresses the methods or requirements for conducting causal analysis (e.g., content, methodology, training, or report format). Extent of condition is not discussed. The guidance document contains requirement statements that distinguish between contractor issues management procedural requirements and NFO requirements for managing issues of different priority levels. In addition, NFO has issued guidance document NFO 226.001, *Quarterly Trend Evaluation and Reporting*, for the Performance Assurance Group (PAG) to analyze and trend contractor performance data, but there is no specific requirement in NFO site orders for the PAG to perform this analysis. NFO Order 226.X contains generalized statements that the Executive Council is to periodically analyze feedback information and Assistant Managers are to analyze feedback in their functional areas. (See **OFI NFO-2**.)

NFO employs a contract award fee process with a variety of performance-based incentives to prioritize and monitor contractor performance to ensure or improve nuclear safety. Independent Oversight reviewed the FY 2012 and FY 2013 PEPs for NSTec, the associated FY 2012 performance evaluation/award fee determination report, and the mid-year FY 2013 performance evaluation report. NNSA significantly revised the approach to contractor performance evaluations for FY 2013 and now uses what they characterize as a Strategic PEP. For 2012, there were 31 measures in five general performance areas, each measure defining specific actions and targets. At least 12 of these measures directly involved nuclear safety related performance improvement. Under the Strategic PEP approach, the plan was a much less detailed set of generic NNSA performance objectives, (nuclear weapons mission; broader national security mission; science, technology and engineering mission; security infrastructure, environmental stewardship and institutional management; and contractor leadership) with at risk fee breakdown of 30, 27, 3, 30, and 10 percent respectively. The FY 2013 PEP performance objective for security, infrastructure, environmental stewardship, and institutional management included a general objective to effectively and efficiently manage the operations of the site. The objective also identified several contributing factors with respect to nuclear safety performance, including delivery of an efficient and effective QA system and environment, safety, and health management processes. There were two safety related site-specific "outcomes" for this objective: 1) demonstrating effective implementation of NSTec functional areas into operations activities and maintenance, and 2) demonstrating effective use of a comprehensive, transparent, and integrated contractor assurance system. The contractor leadership objective cited, as contributing factors, creating a work environment that achieves compliant and effective safety performance and leading a culture of critical self-assessment. No specific measures, targets, or deliverables were identified for this objective. The lack of specificity in the new PEP objectives provides for less direct communication of expectations to individual contractors, specifies no commonly understood measures of performance. (See **OFI NFO-3**.)

In summary, NFO has implemented generally effective programs and processes for conducting daily and collective oversight of NSTec management and operation of nuclear safety systems and related activities. FRs and SMEs provide effective assessments and continuous routine operational awareness and surveillance feedback of nuclear safety to the contractor and DOE management. However, new NFO site orders lack sufficient detail in defining the requirements and processes for conducting consistent and effective oversight activities, and the requirements and process steps are inappropriately presented in guidance rather than requirements documents. Opportunities for improvement exist in the assessment

plan and the management of NFO-owned process and performance issues. NFO has also established and implements an annual performance evaluation process, with award fee incentives evaluated against general performance objectives and elements related to nuclear safety performance. However, the lack of specific criteria measures in the new NNSA PEP may result in less defined and understood expectations.

6.0 CONCLUSIONS

Overall, NSTec has established programs and processes necessary for management of safety systems at the DAF and implementation for the BDI/SDI system was adequate. The NSTec programs and procedures reviewed are generally adequate, and the DAF activities observed by Independent Oversight were properly planned and scheduled. Surveillance test activities observed were consistent with the approved safety basis documents and the CSE program was generally effective in ensuring continued operational readiness of identified system(s) to meet safety function requirements and performance criteria. NSTec has also established and implemented the elements of an appropriate quality assurance system supporting the management of safety systems at NNSA. These elements are generally effectively implemented and they are identifying and correcting process and performance deficiencies and identifying and implementing opportunities for improvement.

Management attention is needed in a few areas of implementation of the programs and processes used to ensure the continued readiness of safety systems at DAF. For example, procedure adherence and control of interrelated processes need attention. Processes used to conduct work safely and correctively could be improved to ensure that possible improvements in the manner with which work is conducted are effectively captured for incorporation during the next SC/SS work activity. Management observation of work at the activity level is inadequate and ineffective in reinforcing safe worker behavior and management expectations for the performance of work. In addition, the execution of event analysis related to the identification of causal factors and extent of condition should be improved to reduce the likelihood of recurrence.

NFO has implemented generally effective programs and processes for conducting daily and collective oversight of NSTec management and operation of nuclear safety systems and related activities. FRs and SSORs provide effective assessments and continuous routine operational awareness and surveillance feedback to the contractor and DOE management in nuclear safety and other areas. However, many requirements and process steps are placed in guidance documents rather than in site-level orders that detail process requirements. Opportunities for improvement exist in the development of the integrated assessment program, management of self-assessment (NFO-owned) issues, and provision of better site-specific performance objectives and criteria for award fee incentives related to nuclear safety performance.

7.0 FINDINGS

Findings represent identified deviations from the regulatory or procedural requirements. The site office and contractor management must address findings formally with an appropriately graded analysis of the causes and extent of condition, followed by development and implementation of a corrective action plan, effectiveness evaluation, and closure.

Finding NSTec-Maint-1: Contrary to DOE Order 422.1, *Conduct of Operations*, Section 2.p, *Technical Procedures*, WPI-028 (revision dated 9/26/2011) has been performed multiple times with incorrect information that prevented the procedure from being performed as written. As a result, workers, while attempting to compensate for the inadequacies in the procedure, have performed

unauthorized steps and have not followed the procedure in a step-by-step manner contrary to NSTec procedure use and adherence requirements contained in NSTec CCD-QA05.001-006, *Technical Procedure Process and Use*.

Finding NSTec OPS-1: The NFO-approved DAF CONOPS Matrix does not specifically address the required elements for specific requirement 2.m, *Control of Interrelated Processes*, and therefore do not fully comply with DOE Order 422.1, *Conduct of Operations*.

8.0 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight review identified the following OFIs. These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management organizations and accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities.

NSTec

OFI NSTec-Maint-1: NSTec should revise Chapter 17 of the DAF DSA to identify maintenance as an SMP at the next annual update to be in full compliance with DOE Order 433.1 and to ensure that all required reviews and activities assigned to SMPs are consistently applied.

OFI NSTec-Maint-2: NSTec should review its performance measures used for maintenance that are not effective in promoting continuous improvement in maintenance performance and re-evaluate them against the guidance provided in DOE Guide 433.1-1A, Admin Chg 1, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*.

OFI NSTec-Maint-3: NSTec should revise its process for conducting work at the DAF to require a resource-loaded schedule with specific requirements to ensure that work can be performed according to established schedules.

OFI NSTec-Maint-4: NSTec should reinforce effective three-way communication to ensure that communications from the giver are clear, full repeat-backs are provided by workers, and confirmation of proper repeat-back is verbally affirmed by the giver.

OFI NSTec-Maint-5: NSTec should encourage more post-task feedback to ensure it captures potential job improvements and other learning opportunities during performance of maintenance.

OFI NSTec-Maint-6: NSTec should review its qualification process for TAs to ensure that it includes system/facility-specific training so that the personnel assigned as TAs have the knowledge, skills, and abilities to verify the adequacy of boundaries for LO/TO.

OFI NSTec-Maint-7: DAF management should adopt formalized use of procedure placekeeping for operations and maintenance activities to reduce the likelihood of human error during procedure performance.

OFI NSTec-Surv&Test-1: NSTec should review WPI-028, *Technical Procedures*, to clarify whether the PMT reestablishes operability of the door interlocks or whether SPI-013/018 reestablishes operability.

OFI NSTec-Ops-1: NSTec should improve its continuing training on facility safety basis performance requirements to ensure that the DAF OTs' understand the TSR SRs for the BDI/SDI and the FP systems.

OFI NSTec-Ops-2: NSTec should address and resolve longstanding UPS equipment deficiencies.

OFI NSTec-CSE-1: NSTec should ensure that safety system assessments and management self-assessments are sufficiently detailed and comprehensive.

OFI NSTec-CSE-2: NSTec should provide clear management expectations for the CSE program for the conduct and documentation of routine CSE activities, to ensure consistent implementation of the program.

OFI NSTec-F&I-1: NSTec should strengthen the planning, performance, and review of its management and independent assessments. Specific actions to consider include:

- Increase the number of elective independent assessments. Consider employing SMEs from line organizations or other groups within the Environment, Safety, Health and Quality organization to supplement independent assessment efforts under the guidance and direction of qualified team leaders.
- Review and simplify the Performance Adjusted Risk Prioritization risk matrix for assessment program by clarifying the criteria and tailoring them to specific NNSC programs and facilities.
- Review and adjust the management quality review criteria and the thresholds for grading management assessments to better communicate expectations for performance improvement. Focus attention on improving assessments by increasing emphasis on performance and evaluating field activities rather than compliance, and ensuring that reports provide sufficient information supporting conclusions.
- Develop and require classroom training for management assessment team leaders and require periodic refresher training for all assessment performers.
- Review and revise the approach to conducting the management observation program to extend it beyond conduct of operations and the NOD. Convert the guide into a company directive and expand the description of the purposes and benefits of management field observations. Increase the expected frequency of field observations, and plan and conduct observations based on actual field conditions (i.e., what work is being performed, known areas of concern, or when events or incidents have occurred), rather than scheduling observations based on a particular functional topic or conduct of operations element.

OFI NSTec-F&I-2: NSTec should ensure that the ongoing review to evaluate and address its issues management processes and performance concerns includes all aspects of the program and is not limited to the causal analysis process as implied in the FY 2013 Annual Analysis Report and the FY 2014 President's Focus Area description .

OFI NSTec-F&I-3: NSTec should strengthen its management review (event critique/fact finding) process. Specific actions to consider include:

- Develop a company directive identifying the requirements and process for conducting management reviews, or include the requirements and process in the event reporting company directive. If a separate directive is developed, reference that document in the event reporting company directive. Clarify when a management review is required, and encourage a low threshold for conducting management reviews to provide more attention to precursor incidents. Clarify the distinction and relationship between a management review and a causal analysis.
- Convert the template used variously as a management review document or causal analysis record into a specific NSTec form.

OFI NSTec-F&I-4: NSTec should strengthen its performance indicator program implementation.

Specific actions to consider include:

- Review existing performance measures to identify more challenging, meaningful, and leading indicators. Ensure that metric presentations include defined and monitored action levels; definitive analysis sections that describe the status, trends, and significance of the data; and corrective action sections that clearly describe needed actions (including monitoring) and responsible parties, with due dates and deliverables.

NFO

OFI NFO-1: NFO should strengthen its integrated assessment plan development process. Specific actions to consider include:

- Review the assessment implementation plan process to determine whether it can be simplified and to ensure that the data and performance input to the analysis is current or that it is adjusted prior to approval to account for recent performance changes or issues.

OFI NFO-2: NFO should strengthen its issues management program. Specific actions to consider include:

- Incorporate requirements and processes for NFO conduct of cause and extent-of-condition analyses for NFO-owned issues into site level orders.
- Ensure that requirements are included in the site orders, not in guidance documents.
- Clarify the specific requirements for the conduct and use of performance trend analysis into NFO site-level orders, and remove requirements from the guidance document NFO 226.001.

OFI NFO- 3: NFO should strengthen its contractor annual performance evaluation measures.

Specific actions to consider include:

- Include additional and more definitive site-specific performance objective elements with defined criteria, measures, goals, and deliverables in the PEP.
- Provide the contractor with amplification of the generic performance objectives to provide more specific expectations for meeting the objectives, as well as providing a common basis for contractor and NFO evaluation of performance to meet those objectives.

Appendix A Supplemental Information

Dates of Review

Scoping Visit: August 6-7, 2013

Onsite Review: August 19-27, 2013

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Glenn S. Podonsky, Chief Health, Safety and Security Officer

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John S. Boulden III, Director, Office of Enforcement and Oversight

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