



# **Assessment of Mission Support and Test Services, LLC Issues Management at the Nevada National Security Site**

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## Acronyms

AC	Adverse Condition
CAEV	Corrective Action Effectiveness Validation
CAP	Corrective Action Plan
CAS	Contractor Assurance System
CD	Company Directive
CONOPS	Conduct of Operations
DAF	Device Assembly Facility
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
FY	Fiscal Year
LANL	Los Alamos National Laboratory
MSTS	Mission Support and Test Services, LLC
NFO	Nevada Field Office
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NQA	Nuclear Quality Assurance
NvE	Nevada Enterprise
OFI	Opportunity for Improvement
PD	Program Description
PM	Preventive Maintenance
QAP	Quality Assurance Program
RAR	Radiological Awareness Report
RIB	Risks and Issues Board
SC	Significant Condition
SSC	Structure, System, and Component
TIM	Training Implementation Matrix
TO	Trend Only
TUF	Track Until Fixed
UPS	Uninterruptible Power Supply

# Assessment of Mission Support and Test Services, LLC Issues Management at the Nevada National Security Site July – September 2020

## Summary

### **Scope:**

This assessment evaluated the Mission Support and Test Services, LLC (MSTS) management, and National Nuclear Security Administration Nevada Field Office (NFO) oversight, of issues associated with radiological protection, nuclear maintenance, conduct of operations, and industrial hygiene at the Nevada National Security Site since January 1, 2018. The results of the Office of Enterprise Assessments (EA) report *Safeguards and Security Follow-up Assessment at the Nevada National Security Site*, July 31, 2020, were factored into this assessment to provide a more comprehensive assessment of issues management.

### **Significant Results for Key Areas of Interest:**

MSTS proactively uses its issues management tools (e.g., causal analyses) to resolve safety issues, while other processes and controls prevent significant consequences. Still, this assessment identified several opportunities to further improve MSTS's issues management performance and resiliency.

### Identification and Categorization

MSTS self-identifies approximately 1,000 issues per year, indicating a willingness to identify and correct issues. However, MSTS managers are not adequately identifying issues with maintenance in nuclear facilities or trends in issues. In June 2019, MSTS formed its Risks and Issues Board, which improved the categorization of issues and nearly doubled the number of apparent cause analyses performed. Still, the Risks and Issues Board categorizes some safety issues (e.g., those indicative of weaknesses in the cognizant system engineering program) below that required to invoke MSTS's more rigorous tools for preventing recurrence of these issues.

### Issue Resolution

MSTS adequately implements a graded, structured approach for issues management. However, differences in corrective action plans and their supporting causal analyses, and inadequate resolution of the extent of condition and cause(s) for several issues, have allowed some issues to recur.

### Timeliness and Closure

MSTS is actively closing issues and reducing the overall number of open issues, yet the average age of open issues has remained approximately twice the MSTS goal, and the resolution of many safety issues has been protracted. Evidence supporting closure of issues is adequate with a few exceptions.

### Field Office Oversight

NFO adequately oversees MSTS management of issues. NFO management identified concerns with MSTS's identification of trends and untimely resolution of NFO-identified issues; NFO's concerns align with and support the findings of this assessment.

### Best Practices and Findings

The assessment team identified one best practice: issues management specialists review documentation supporting closure of all issues and opportunities for improvement to ensure that action is taken or justification is provided for not taking action.

The assessment team identified two findings: one for inadequate trending of issues to identify systemic weaknesses and one for untimely (delayed) resolution of safety issues.

**Follow-up Actions:**

Based on indications of programmatic weaknesses observed during this assessment, future EA assessment(s) of nuclear maintenance management and cognizant system engineering performance will be coordinated with NFO.

## **Assessment of Mission Support and Test Services, LLC Issues Management at the Nevada National Security Site**

### **1.0 INTRODUCTION**

The U.S. Department of Energy (DOE) Office of Environment, Safety, and Health Assessments, within the independent Office of Enterprise Assessments (EA), assessed the effectiveness of Mission Support and Test Services, LLC (MSTS) in identifying and correcting issues impacting safety to prevent recurrence and assessed National Nuclear Security Administration (NNSA) Nevada Field Office (NFO) oversight of MSTS's management of these issues. This assessment was conducted remotely due to the pandemic from the coronavirus disease of 2019 (COVID-19), with the majority of interviews occurring July 13 – 23, 2020, and August 31 – September 10, 2020.

In fiscal year (FY) 2019, EA identified issues management as a targeted review area. This assessment is the fourth review examining corrective action processes. Results from these targeted reviews and from other EA assessments will be documented in a lessons-learned report that will contain EA's overall assessment on issues management across the DOE complex.

In accordance with the *Plan for the Assessment of Mission Support [and] Test Services, LLC Issues Management at the Nevada [National] Security Site, July - September 2020*, this assessment evaluated MSTS's management, and NFO's oversight, of issues associated with radiological protection, nuclear maintenance management, conduct of operations (CONOPS), and industrial hygiene since January 1, 2018. A separate EA team recently followed up on the resolution of safeguards and security issues identified in previous EA and NNSS reports. As planned, the results in the EA report *Safeguards and Security Follow-up Assessment at the Nevada National Security Site, July 31, 2020*, were used to provide a more comprehensive assessment of issues management by MSTS.

Because of the unique mission functions and inter-working relationships between various user entities (e.g., personnel of Triad, LLC from Los Alamos National Laboratory, or LANL, and personnel from other national laboratories), the Nevada National Security Site (NNSS) is often referred to as the Nevada Enterprise (NvE). Since December 1, 2017, MSTS is the management and operating contractor for NFO at NNSS and is responsible for managing the majority of NNSS facilities and for collaborating with user entities on issues as needed to ensure safety is maintained.

### **2.0 METHODOLOGY**

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which is implemented through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms "best practices, deficiencies, findings, and opportunities for improvement (OFIs)" as defined in DOE Order 227.1A.

The assessment team used Criteria 5 of Objective 1 and the criteria of Objective 3 of EA Criteria and Review Approach Document (CRAD) 30-01, Revision 1, *Contractor Assurance System (CAS)*, February 15, 2018, to assess the flowdown and implementation of issues management requirements from DOE directives and also invoked national consensus standards. The assessment team also used elements of the Office of Health, Safety and Security (HSS, the predecessor of EA) CRAD 45-21, *Feedback and Continuous Improvement Assessment Criteria and Approach – DOE Field Element*, Revision 1, to collect and analyze data on NFO oversight of issues management.

The assessment team examined key documents, such as procedures, quality assurance program descriptions, internal and external assessments, reports on issues and potential improvements, extent-of-condition reviews, causal analyses, corrective action plans (CAPs), effectiveness evaluations, and evidence of corrective action completion. The assessment team conducted a detailed review of 487 reports (reviewing all issues that MSTS identified relevant to nuclear maintenance, industrial hygiene, and CONOPS, and 102 out of 160 reports on radiological protection). Reports on issues and potential improvements reviewed included: (1) those MSTS identified as having a potential to significantly impact safety, (2) a sample of issues MSTS identified as having less significant impact to safety, and (3) conditions that MSTS screened (transferred) to other management systems for consideration/resolution (e.g., suggestions). These reviews enabled the assessment team to determine whether issues impacting nuclear safety and industrial hygiene are adequately identified and corrected to prevent recurrence.

The assessment team interviewed by teleconference MSTS personnel responsible for individual issues and for implementation of the MSTS issues management processes, as well as NFO managers and subject matter experts (SMEs) responsible for overseeing MSTS's issues management and the selected areas. In addition, assessment team members attended teleconferences that MSTS used before and during the COVID-19 pandemic to prioritize risks and issues, brief MSTS senior management on the resolution of adverse and significant conditions and overall issues management performance, and discuss issues with managers within the NvE.

The members of the assessment team, Quality Review Board, and management responsible for this assessment are listed in Appendix A. Weaknesses noted by the assessment team on individual issues are summarized in Appendix B. The assessment team did not follow up on previous EA findings during this assessment.

### **3.0 RESULTS**

In this section, results are grouped into the following functions for issues management: issue identification and categorization, issue resolution (including evaluations of the effectiveness of actions), timeliness of actions and closure of issues, and field office oversight of issues management.

#### **3.1 Issue Identification and Categorization**

The objective of this portion of the assessment was to examine whether issues and trends are identified and categorized to meet the requirements for issues management in the MSTS PD-0001.002, *Quality Assurance Program (QAP)*. For issues management, the MSTS QAP commits to DOE requirements; the International Organization for Standardization (ISO) 9001:2015, "Quality management systems – Requirements" consensus standard; and the American Society of Mechanical Engineers consensus standard Nuclear Quality Assurance (NQA)-1, *Quality Assurance Requirements for Nuclear Facility Applications*, Revision 2015, Parts I and II. These commitments are implemented per MSTS CD-1000.200, *Issue Resolution and Improvement System*, using a commercial off-the-shelf software (caWeb) to track issues and improvements.

##### **3.1.1 Issue Identification**

Overall, MSTS self-identifies approximately 1,000 issues per year, indicating a willingness to identify and correct issues. However, MSTS managers are not adequately identifying issues with maintenance in nuclear facilities or trends in issues.

As required by NNSA/NFO Order 412.X1, *Real Estate Operations Permit*, assessment findings and significant weaknesses are adequately shared between MSTS and NNSS user entities across NvE via multiple forums, including daily operations calls and the bi-weekly Partnership Forum. MSTS facility managers are also kept informed of issues and their resolution by cognizant managers from user entities (e.g., MSTS facility managers are kept informed of issues and their resolution by LANL cognizant managers).

MSTS, through CD-1000.200, encourages employees at every level to raise issues and provides them adequate means for entering issues or improvements into caWeb by emailing a completed issue entry form to the help desk, calling the help desk, or contacting their Field Issue Management Coordinator. The MSTS performance measure of the ratio of issues it self-identified to the total number of issues remained above its 80% goal since January 1, 2018, indicating that MSTS is the predominant source of issues entered into caWeb and is typically entering and resolving issues before accidents or incidents occur. In January 2020, MSTS self-identified in management assessment MA-20-A321-001, *Issues and Corrective Action Maturity*, that “The major source of issues is from formal assessments or reviews vs. normal daily observations” and “most issues are reported by Senior Professionals or Manager I levels.” MSTS assigned caWeb item 32544 to its Manager, Issues Management/CAS to further promote the use of CD-1000.200 throughout all levels of MSTS. However, little or no progress was observed and no action has been documented. (See **OFI-MSTS-1**.)

Although, overall, MSTS proactively identifies issues for resolution per CD-1000.200, the assessment team identified the following exceptions.

MSTS is not adequately “developing, maintaining, and communicating performance measures to identify maintenance issues requiring corrective action and lessons learned” as required by DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*. Collectively, the issues discussed below are indicative of programmatic weaknesses in nuclear maintenance management. (See **Deficiency D-MSTS-1**.)

- Only five of the eleven MSTS measures (metrics) for maintenance had goals to identify issues in performance requiring correction. Four of these five metrics indicated adverse trends in maintenance, but no issues were entered into caWeb to correct these trends.
- The fifth metric with a performance goal inaccurately indicates that no preventive maintenance (PM) has been missed in the last 22 months. Yet, the MSTS Biweekly Maintenance Report dated July 21, 2020, listed 59 PMs that exceeded their nominal period for execution and the “grace period” for accomplishing these PMs, meeting the definition of “missed” PMs in MSTS directive CD-8128.003, *Preventive Maintenance/Predictive Maintenance (PdM)*. (See **Deficiency D-MSTS-2**.)
- No issues have been entered into caWeb based on maintenance performance measures since MSTS became the management and operating contractor.
- MSTS has not implemented performance measures to monitor the management of deferred PM (e.g., metrics monitoring completion of deferred PM within the authorized date). The following are two additional examples of maintenance issues requiring corrective action that could have been identified by a more thorough set of performance measures.
  - Form FRM-1173, *PM/PdM & CMMS [Computerized Maintenance Management System] Change Request Authorization*, was not completed by the Responsible Engineer, as required by CD-8128.003, for the 59 missed PMs discussed above. (See **Deficiency D-MSTS-2**.)

- Each completed FRM-1173 authorizes deferral of a PM to a particular date, which MSTS maintenance personnel enter into the computerized maintenance management system (Maximo). However, Maximo treats these PMs like PMs that haven't been deferred, allowing them to be performed within a grace period beyond the due date authorized on the respective FRM-1173. (See **Deficiency D-MSTS-2.**)

Contrary to the MSTS QAP and PD-0001.003, *Contractor Assurance System Description*, MSTS managers are not trending issues “through the evaluation of information entered into the issues management system,” as demonstrated by the following. (See **Finding F-MSTS-1.**)

- The MSTS Facilities, Infrastructure, Maintenance & Services directorate does not trend caWeb issues. Of the 68 maintenance issues identified by MSTS since January 1, 2018, 18 (26%) were related to PMs that were not performed or were not scheduled to be performed at the required periodicities. The MSTS Facilities, Infrastructure, Maintenance & Services directorate has not identified this trend in caWeb or taken any action to correct this trend.
- The MSTS Operations Assurance directorate does not review issues in caWeb for trends in CONOPS; rather, they are using reports issued by a few MSTS CONOPS specialists, or “coaches,” to identify trends. The assessment team identified numerous issues in Appendix B associated with operating procedures (see caWeb items 32562, 32407, 31998, 30528, 32950, 32686, 32449, 32728, 32032, 31944), training proficiency (see caWeb items 30697, 30801, 30845, 31663, 31795, 32038, 32937, 32945), and the management of timely orders (see caWeb items 30768, 31084, 31236, 31295, 32109, 32085, 33021), that have not been analyzed for trends to determine whether systemic weaknesses exist. Additionally, the MSTS Issues Management/CAS group did not adequately assign issues to the CONOPS functional area in caWeb, complicating efforts to identify trends; 38% of issues identified by the assessment team as CONOPS-related were omitted. (See **OFI-MSTS-2.**)
- The Radiological Protection group does not trend issues in caWeb as required; rather, they trend issues using their separate system for radiological awareness reports (RARs) with its own trend codes and capabilities. However, trending of RARs does not include approximately 65% of the issues assigned to the Radiological Protection group (i.e., issues solely entered into caWeb). (See **OFI-MSTS-2.**)
- None of the responsible or functional area managers interviewed trended issues categorized as “Trend Only” (TO), even though issues are specifically assigned this priority level in caWeb for trending.

The assessment team also identified weaknesses with MSTS’s identification of recurring issues (i.e., issues that recur following a causal analysis and implementation of corrective actions). Specifically:

- CD-1000.200 does not identify who is responsible for identifying recurring issues or additional evaluations or considerations for recurring issues.
- The chairman of the Risks and Issues Board (RIB) stated that RIB members are expected to identify recurring issues and assign the appropriate priority level or Issue Owner to prevent recurrence. However, a few of the RIB members interviewed did not know that they were expected to identify recurring issues.
- A field in caWeb for indicating a recurring issue was only used three times since January 1, 2018. The assessment team identified other recurring issues (see caWeb items 32945, 31733, and 31749 through 31758 in Appendix B).

- The MSTS *Recurring Issue Identification Job Aid* predominantly provides guidance on how to show that similar issues may not be indicative of recurrence, rather than encouraging responsible managers to look more for common causes among similar issues that are indicative of previously unresolved causes that warrant more rigorous analyses and actions to resolve. (See **OFI-MSTS-3**.)

### 3.1.2 Issue Categorization

Overall, MSTS is adequately implementing a graded approach for issues management and is proactively categorizing issues such that its more rigorous issues management tools (e.g., causal analyses) are used to resolve safety issues, while other processes and controls prevent significant consequences. As expected with this more proactive management of issues, issues at MSTS since January 1, 2018, were generally smaller in scope and significance than those reviewed by the EA assessment team at other sites to-date during the targeted assessment of issues management.

CD-1000.200 defines priority levels for categorizing issues to implement issues management requirements per the commitments and graded approach in the MSTS QAP. Issues are categorized as significant conditions (SCs), adverse conditions (ACs), track until fixed (TUF), and TO, and improvements are categorized as OFIs. For issues with greater risk, CD-1000.200 appropriately specifies more rigor for evaluating these issues and validating the effectiveness of corrective actions (e.g., causal analyses, extent-of-condition reviews, validations of corrective action completion, and effectiveness reviews). MSTS intended the SC and AC priority levels to align with significant conditions adverse to quality and conditions adverse to quality of NQA-1. However, for ACs, CD-1000.200 requires an apparent cause analysis, which exceeds the requirements of NQA-1 for conditions adverse to quality. These causal analyzes of ACs are key to proactively correcting safety issues, while other processes and controls prevent significant consequences (e.g., maintain other layers of defense, or defense in depth, to ensure resiliency in nuclear safety).

In June 2019, MSTS instructed the RIB to begin reviewing issues “to ensure issues are assigned a proper priority, receive the appropriate level of cause analysis, have a credible corrective action plan, and that the complete resolution can be effectively verified.” The RIB subsequently increased the rigor (priority level) assigned to the more significant issues (e.g., the number of issues categorized as AC nearly doubled from 0.9 per week to 1.6 per week). The RIB also appropriately screened non-issues (e.g., suggestions) to other tracking systems outside the scope of CD-1000.200 for consideration by appropriate managers. Still, the RIB categorized some issues with priority levels below that required by CD-1000.200. The extent of this condition (under categorization by the RIB) for the issues within the functional areas reviewed during this assessment is discussed below. (See **Deficiency D-MSTS-3**.)

- CaWeb item 32572 involves unauthorized changes to PM information in Maximo. The RIB categorized this issue as TUF despite the issue description stating “PM changes can significantly impact maintenance and inspections that are performed and/or the next scheduled PM or inspection.” The details regarding these unauthorized changes have not been determined, including the specific items that were changed, who made the changes, and why the unauthorized changes were made. In addition, as a TUF, actions to address the extent of condition and causes were not required and have not been performed. Unauthorized changes to PMs that can affect the health and reliability of systems important to safety warrant categorization as an AC per CD-1000.200 to bound and/or correct the extent and implications of the unauthorized changes, and to ensure the continued accuracy and integrity of Maximo.
- CaWeb items 31290, 32364, 33101, 33103, and 33104 document non-compliances with the requirements in DOE Order 433.1B (as MSTS committed to in its nuclear maintenance management program) and DOE Order 420.1C, *Facility Safety*, for monitoring and maintaining the health,

reliability, and configuration of structures, systems, and components (SSCs) credited in the safety bases for nuclear facilities. The RIB categorized these items as TUFs, and the only actions in caWeb involve completing missed health reports and assessments, and updating the system description documents (SDDs). However, these issues are indicative of weaknesses in the cognizant system engineering program that warrant categorization as AC(s) per CD-1000.200 due to the consequences on nuclear safety.

- CaWeb item 32292 documented a spread of thallium 201 contamination at the Remote Sensing Laboratory location at Joint Base Andrews. The RIB categorized this issue as an AC, because they considered the safety impact and contaminations to be minor. However, the MSTS critique of this event demonstrated that multiple barriers failed in work planning and execution, and in the response to the unexpected situation; these failures could have allowed more significant contamination and consequences to the health and safety of personnel. The MSTS apparent cause analysis performed did not adequately determine why the event occurred in order to develop corrective actions to restore these barriers and preclude recurrence. Per CD-1000.200, the issue should have been categorized as an SC based on the potential for significant consequences.
- CaWeb items 32937 and 32945 document issues with workers not being evaluated periodically for performance, as required in the DOE approved PLN-1016, *Nevada National Security Site (NNSS) Integrated Training Implementation Matrix (TIM) for DOE O 426.2*, and CCD-QA02.001, *Training Program Manual*. Although initially categorized as an AC, the RIB incorrectly re-categorized these non-compliances as a TUF or screened them out of the CD-1000.200 issues management process, without determining why the requirement was not being met or correcting the non-compliances. Per CD-1000.200, “noncompliance with requirements with minor consequences” such as these are categorized as ACs.
- Appendix B includes examples of other issues that require higher categorization per CD-1000.200, but the need for additional analysis or action is not evident considering the actions taken. (See caWeb items 32364, 32365, and 32769 in Appendix B.)

The following factors may contribute to the cases in which the RIB categorized issues below what is required by CD-1000.200.

- CD-1000.200 only provides subjective definitions and a few examples of issues at each priority level. The EA safeguards and security follow-up assessment also noted that the MSTS processes do not “include a consistent decision model for priority categorization of issues.” (See **OFI-MSTS-4**.)
- The CD-1000.200 definition for ACs only includes issues with “lesser consequences,” whereas the definition for SC includes issues with “potential or actual significant consequences.” Conditions adverse to quality, as defined by NQA-1, that did not result in actual consequences due to other processes and controls still in effect, would not meet the CD-1000.200 definition for ACs as intended by MSTS. (See **OFI-MSTS-5**.)
- While most members of the RIB are knowledgeable of the issues management system, a few lacked sufficient experience in the disciplines they represent and others did not attend RIB meetings adequately prepared for the items on the agenda.

### **Issue Identification and Categorization Conclusions**

Overall, MSTS is proactively identifying issues for resolution per CD-1000.200. However, performance measures are not adequately used to identify issues with the maintenance of nuclear facilities and SSCs,

and MSTs managers do not adequately use capabilities in caWeb to identify trends per the MSTs QAP and CAS. MSTs is proactively categorizing most issues such that its more rigorous issues management tools (e.g., causal analyses) are used to resolve safety issues, while other processes and controls continue to prevent significant consequences. Accordingly, issues at MSTs since January 1, 2018, were generally smaller in scope and significance than those the assessment team has reviewed at other sites to-date. The RIB improved the categorization and screening of issues; however, some safety issues (e.g., those indicative of weaknesses in the cognizant system engineering program) continue to be under categorized based on the requirements of CD-1000.200.

### 3.2 Issue Resolution

The objective of this portion of the assessment was to verify that the issues management system includes structured processes, using a graded approach based on risk, for identifying the causes, extent, and corrective actions for issues and for reviewing the effectiveness of actions taken to ensure that issues are resolved.

CD-1000.200 sets the minimum requirements for analyzing and resolving issues based on their assigned priority level (from the RIB categorization of the issue). SCs and ACs require causal analyses (including extent-of-condition reviews) and CAPs, as well as RIB concurrence with each causal analysis, CAP, and issue closure documentation. For SCs, root cause analyses and independent corrective action effectiveness validations (CAEVs) are required. For ACs, an apparent cause analysis can be used instead of a root cause analysis and CAEVs are not required, but the MSTs *Corrective Action Plan (CAP) Development Job Aid* recommends including actions to assess the effectiveness of corrective actions in CAPs for SCs and ACs. The *Corrective Action Plan (CAP) Development Job Aid* also provides adequate guidance for developing “SMARTER” (i.e., Specific, Measurable, Attainable, Relevant, Timely, Effective, and Reviewed) actions and implementing a hierarchy of actions (e.g., attempting to develop actions eliminating hazards before using personal protective equipment) for safety related issues. The RIB-assigned Issue Owners are required to document actions taken (or promised) for TUF and TO issues and for OFIs.

Per MSTs charter CHTR-SMRB.001, *Senior Management Review Board (SMRB)*, MSTs senior directors review causal analyses and CAPs for SC safety, environmental, security, and quality issues, and operational upsets. During the SMRB meeting and other forums observed by the assessment team, MSTs senior management demonstrated proactive engagement in the management (resolution) of significant issues.

However, the assessment team identified several inadequate causal analyses and CAPs that did not adequately address the causes or recommendations from the causal analyses. The RIB concurred with the causal analyses and the CAPs developed by the assigned Issue Owner for each issue. (See **Deficiency D-MSTS-4**.)

- The root cause analysis for caWeb item 31733 identified inadequate procedures and processes for ordinary lifts as a cause for safety incidents in April 2019, specifically recommending six improvements to CD-9000.001, *Rigging and Overhead Crane Operations*. However, five of the six recommended actions for this cause were not taken or dispositioned. Subsequently, the apparent cause analysis for the uncontrolled lower of the launch tube in the JASPER facility (caWeb item 33021) identified inadequate procedures and processes as a contributing cause.
- The stated apparent cause for caWeb item 32722 was that “CD-P450.005, Silica Protection Program did not adequately address the Occupational Exposure Limit, clearly establish the competent person, and specify exposure control methods.” These program inadequacies are not the apparent cause of

the issue, but only consequences of the actual but not determined apparent cause. While the actions taken corrected CD-P450.005, the underlying causes as to why the program was not initially compliant were not analyzed.

- CaWeb item 32292 documented a thallium 201 contamination event resulting from several failed barriers. There is an inconsistency in the number of causes listed in the apparent cause analysis (5 causes) and the CAP (8 causes). The actions taken required pre-job briefings to be documented and changed the procedure on purchasing radiological material to ensure that the correct containers were purchased; neither of these actions effectively addressed the identified cause of “signs to stop work and reanalyze the hazards were ignored/not acted upon.”
- CaWeb item 32924 documented the discovery of Troxler gauges that were not identified as having accountable sources. The MSTS causal analysis identified the cause for this issue as improper completion of the requisition form; this is a problem statement instead of a cause. Additionally, the only action was to send an email to the MSTS staff that complete the requisition forms. Addressing incorrect completion of a form through a one-time action, like an email, can allow significant issues to recur. A previous, similar issue was identified and referenced in the caWeb item, but both were incorrectly considered isolated instances because the mistakes occurred approximately two years apart.
- The EA safeguards and security follow-up assessment noted that 3 of 28 security issues contained actions that did not align with the causal analyses. The development of these causal analyses and corrective actions occurred before the RIB was established.

CD-1000.200 and the *Extent of Condition Job Aid* do not require adequate action for issues within MSTS’s cognizance (responsibility) to correct the extent of condition and cause of SCs to preclude recurrence, as required by NQA-1. The *Extent of Condition Job Aid* states that issue owners should “develop and submit a Lessons Learned, which allows for notification outside of [the Responsible Manager’s (RM’s)] area of responsibility so other RMs can investigate and correct as needed,” rather than assigning an action in caWeb. CD-1000.200 only requires that Issue Owners “Address the results of the extent of condition,” rather than ensure that the extent of condition and/or causes are corrected. For caWeb item 33021, the Issue Owner accepted the results of an extent-of-condition review, but only two of four respondents answered the specific request to ensure that authorized lifts were categorized correctly. Comments provided in Appendix B for caWeb items 30628, 31744, 31900, and 31962 provide additional examples of inadequate extent-of-condition reviews. (See **Deficiency D-MSTS-5**.)

OP-1000.401, *Corrective Action Effectiveness Validation (CAEV)*, states, “The purpose of the CAEV process is to evaluate the implementation of corrective actions with a focus on the effectiveness of those actions; that is, collectively, the actions taken to correct the underlying causes of the identified problems have been effective...” However, the process does not establish criteria for evaluating the effectiveness of the corrective actions in addressing underlying causes, and focuses on validating completion of the actions. Of the nine SCs within the scope of this assessment, only two CAEVs were due and completed. Neither of these CAEVs evaluated the effectiveness of the actions to address the root causes (see caWeb items 31322 and 30548 in Appendix B). (See **OFI-MSTS-6**.)

Although the MSTS *Corrective Action Plan Development Job Aid* discusses including actions in the CAP to verify effectiveness, none of the ACs reviewed included effectiveness reviews. Per CD-1000.200, CAEVs are only required for SCs, and Section 4.4.2, *CAP Development*, does not discuss including actions to verify the effectiveness of actions. (See **OFI-MSTS-7**.)

## Issue Resolution Conclusions

Overall, MSTS is adequately implementing its graded, structured approach for issue resolution. MSTS management monitors and directs, as needed, the resolution of significant issues and the overall performance of its issues management program. However, differences between CAPs and their supporting causal analyses, as well as inadequate resolution of the extent of condition and cause(s) for several issues, have allowed some issues to recur. Additionally, CAEVs do not meet their stated purpose of ensuring that underlying causes of SCs have been corrected.

### 3.3 Timeliness and Closure

The objective of this portion of the assessment was to verify that planned corrective actions are completed in a timely manner and that closure is adequately documented.

Overall, MSTS is closing its more recently identified issues within MSTS's performance goals; however, the backlog of older issues continues to age and MSTS has not corrected some nuclear safety issues "as soon as practicable." MSTS manages approximately 1,000 issues per year and, since January 1, 2018, has met its goal of keeping the 12-month cumulative number of issues closed at a rate that is greater or equal to the 12-month cumulative number of issues opened. Since March 2020, the number of issues closed each month exceeded the number entered each month, reducing the number of open issues. MSTS typically meets its goal of the 12-month rolling average of issues closed within a year at 85% or greater. However, approximately 20% of MSTS's open issues are one to two years old, and approximately another 20% are over two years old. Since January 1, 2018, the MSTS reported three-month rolling average age of open issues was 394 – 580 days, which is significantly over the MSTS goal of 250 days; this three-month rolling average age has been increasing since November 2019.

NQA-1, Part 1, Requirement 16, states that "conditions adverse to quality shall be identified promptly and corrected as soon as practicable." Contrary to this requirement, MSTS has allowed issues to remain open for extended periods, with corrective actions delayed for years without justification. The assessment team identified the following factors that contribute to the untimely resolution of issues. (See **Finding F-MSTS-2**.)

- CD-1000.200 does not require conditions adverse to quality to be "corrected as soon as practicable" as required by NQA-1. (See **Deficiency D-MSTS-6**.)
- While MSTS establishes timely immediate and compensatory actions, the resolution of operational incidents is delayed by the sequential process/practice of issuing the critique reports per CD-0400.007, *Incident Scene and Evidence Preservation and Incident Critiques* before categorizing the issues and initiating the causal analyses and CAP development per CD-1000.200.
  - In 2020, critique reports were issued, on average, two weeks after the event or the discovery of the issue.
  - The RIB typically waits for the critique report to be entered into caWeb before categorizing the issue (i.e., assigning the priority level), and determining whether root cause or apparent cause analysis and a CAP are required.
  - Since January 1, 2018, over 60% of the issues critiqued were categorized as ACs (requiring an apparent cause analysis) and only approximately 3% were categorized as SCs.

- Most, if not all, of the personnel that would perform an apparent cause analysis already attend the critique, so waiting until the critique report is issued to formally start a causal analysis and corrective action development per CD-100.200 unnecessarily delays resolution of ACs and SCs subject to a critique. The results of an apparent cause analysis and corrective actions developed during or soon after a critique meeting could be incorporated into a subsequent root cause analysis and CAP, if an incident is subsequently categorized as an SC. (See **OFI-MSTS-8**.)
- The MSTS-reported metric monitoring the percentage of issues over the past 12 months that had the causal analysis and CAP completed within 45 days of categorization, has remained below the goal of 80%, varying between 38.9% and 70.4%. Of the 58 CAPs for the last 12 months (as reported at the end of August 2020) that exceeded the goal, 21 were over a month overdue. Only 47.6% of CAPs met the 45-day goal over the 12-month period reported at the end of August 2020.
- Section 4.3.2 of CD-1000.200 sets the default due date of 90 days for all TUFs (and OFIs), “which serves as a reminder to the Issue Owner that this issue is still active and requires a response,” rather than requiring issue resolution when practicable. Many of the TUFs reviewed indicated Issue Owners began working on these TUFs only after receiving the automatic reminder of this 90-day due date.
- Repeated extensions to corrective action due dates without justification have significantly delayed corrective actions, and resolution and closure of issues significant to safety.
  - CaWeb item 32216 identified a safety risk to personnel due to an inadequate ability to “characterize the extent and magnitude of the hazardous chemical release, determine safe evacuation routes, and habitability evaluation.” This issue is categorized as an AC, and yet, the action item to fund this ability has been extended twice, to over 13 months, without justification; the action item remains open.
  - Actions to revise and develop PM and inspection procedures for lightning protection for the Device Assembly Facility (DAF) and the NNSS Balance of Plant Facilities, respectively, have been extended 2 – 4 times, thereby delaying corrective actions for over 1 – 2 years without justification. (See caWeb items 31372 and 32624 in Appendix B).
  - Additional examples are caWeb items 31597, 31918, 33019, 33020, 33032, and 33034 in Appendix B.
  - The EA safeguards and security follow-up assessment noted 7 of 28 security issues “took a protracted span of time for completion” (e.g., 330 – 892 days to close TUFs and approximately 15 months to develop administrative processes for two other issues).
  - Actions are often extended without the Issue Owner acknowledging or concurring with the new due date (e.g., the Issue Owner receives a copy of the email changing the dates).
  - Actions with extended due dates are not reported to senior managers, and the metrics on the rolling average age and the number of issues closed within 90 days, 6 months, less than 1 year, and over 1 year that are reported to senior management, can mask delays with the resolution of open safety issues.

Issue Owners are required to obtain RIB concurrence with the documentation supporting closure of all SCs and ACs. The assessment team found adequate evidence supporting closure of SCs and ACs with one exception (see caWeb item 30467). The MSTS Manager, Issues Management/CAS, has each TUF and OFI reviewed by his staff to ensure that action is taken or that justification is provided for not taking action. (**Best Practice**) As a result, MSTS Issue Owners routinely respond to OFIs with appropriate

action or justification/explanation for not accepting the recommendation. Additionally, most TUFs were appropriately closed with straightforward actions or documented responses to the issues. However, some items are incorrectly screened out of the CD-1000.200 process, and some examples were identified of TUFs and OFIs with inadequate documentation (see caWeb items 30409, 30523, 30539, 30616, 31010, 32404, and 32833 in Appendix B for examples).

### **Timeliness and Closure Conclusions**

MSTS is closing more recently identified issues within MSTS's performance goals, reducing the overall number of open issues; however, the average age of open issues has remained approximately twice the MSTS goal due to the backlog of older issues. Some nuclear safety issues are also not resolved "as soon as practicable." The assessment team identified delays associated with initiating causal analyses and CAP development due to waiting for critique reports for issues. Additionally, repeated, unjustified extensions of corrective action due dates have delayed the resolution of safety issues. Except for a few issues, MSTS responsible managers provide adequate evidence supporting the closure of issues.

### **3.4 Field Office Oversight of Issues Management**

The objective of this portion of the assessment was to verify that NFO adequately oversees implementation of the MSTS issues management system and the management of issues associated with maintenance, industrial hygiene, CONOPS, and radiological protection. The EA safeguards and security follow-up assessment included an evaluation of NFO's oversight of issues managed by SOC, LLC (SOC) and MSTS.

NFO adequately oversees the MSTS implementation of CD-1000.200 and conducts sufficient operational awareness activities to oversee the management of issues. During these activities, NFO identifies issues for MSTS resolution as appropriate.

- On August 19, 2020, NFO issued a management concern (IM-110) to MSTS identifying that "The MSTS Contractor Assurance System (CAS) has not ensured that multiple systemic trends/concerns identified by NFO via FY19 Interim Feedback Reports (IFRs) and the FY19 Performance Evaluation Report (PER) have been resolved in a timely and effective manner." Although the scope of the trends/concerns identified by NFO are focused on MSTS management of onsite projects, NFO identified that "MSTS trending and analysis is not always resulting in self-identification of adverse trends in performance" and that 40% of the NFO-identified trends/concerns in IFRs and PERs have not been resolved in a timely manner. These NFO-identified issues are in alignment and support findings F-MSTS-1 and F-MSTS-2 identified by the assessment team.
- NFO SDD 226.X, *NFO Oversight System Description Document*, establishes the Subject Matter Expert Forum as a means to inform management, integrate Federal perspectives, and adjust oversight plans. During the forum, NFO SMEs present their ongoing assessment of MSTS performance, risks, and issues quarterly, effectively highlighting significant issues, analyzing performance and trends, and supporting the NFO annual PER of MSTS.
- NFO uses caWeb for its issues management and obtains administrative support from the MSTS Issues Management/CAS group for NFO issues management and data collection, supporting NFO oversight of MSTS's issues management.

This assessment is in alignment with the EA safeguards and security follow-up assessment, which concluded that NFO, MSTS, and SOC "have made notable progress in addressing many of the issues" and "have enhanced the integration of NvE issues management activities, processes, and communications

for resolving issues and improving systems. [NFO] provides oversight of MSTS and SOC issues management through continual communication and operational awareness activities.”

### **Field Office Oversight of Issues Management Conclusions**

NFO adequately oversees the MSTS implementation of CD-1000.200 and conducts sufficient operational awareness activities to oversee the management of issues associated with maintenance, industrial hygiene, CONOPS, and radiological protection. When appropriate, NFO identifies issues for MSTS resolution.

## **4.0 BEST PRACTICES**

Best practices are safety-related practices, techniques, processes, or program attributes observed during an assessment that may merit consideration for implementation by other DOE and contractor organizations. The following best practice was identified as part of this assessment.

- The MSTS Manager, Issues Management/CAS, has each TUF and OFI reviewed by his staff to ensure that action is taken, or justification is provided for not taking action.

## **5.0 FINDINGS**

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement CAPs for findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, to manage the corrective actions and track them to completion.

### **Mission Support and Test Services, LLC**

**Finding F-MSTS-1:** MSTS managers are not trending issues “through the evaluation of information entered into the issues management system.” (PD-0001.002, Section 16.3.2, and PD-0001.003, Section 4.5.7)

**Finding F-MSTS-2:** MSTS has allowed issues to remain open for extended periods, with corrective actions delayed for years without justification, contrary to NQA-1, which states that “conditions adverse to quality shall be identified promptly and corrected as soon as practicable.” (Requirement 16 of NQA-1, as invoked by the MSTS QAP)

## **6.0 DEFICIENCIES**

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Six deficiencies that do not meet the criteria for findings are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

## **Mission Support and Test Services, LLC**

- Deficiency D-MSTS-1:** MSTS is not adequately “developing, maintaining, and communicating performance measures to identify maintenance issues requiring corrective action and lessons learned.” (DOE Order 433.1B, Attachment 2, Section 2.o)
- Deficiency D-MSTS-2:** MSTS is not consistently following its requirements for identifying missed PMs and authorizing deferral of PM. (CD-8128.003, Section 4.2, 4.2[5]B, and 4.5)
- Deficiency D-MSTS-3:** The RIB does not consistently categorize safety issues with the priority levels required by CD-1000.200. (CD-1000.200, Section 5.1 and 5.18)
- Deficiency D-MSTS-4:** MSTS Issue Owners did not always develop actions to “Address causes identified in the cause analysis” for safety issues. Additionally, the RIB did not ensure that the CAPs for these issues “provide reasonable assurance that the issue will be appropriately resolved.” (CD-1000.200, Section 4.4.2 and 4.4.3)
- Deficiency D-MSTS-5:** MSTS inadequately implements NQA-1 for significant conditions adverse to quality by not requiring the Issue Owner for SCs to verify completion of corrective actions for the implications (extent) of the condition and its cause(s) to preclude recurrence. (Requirement 16 of NQA-1, as invoked by the MSTS QAP)
- Deficiency D-MSTS-6:** MSTS CD-1000.200 does not require conditions adverse to quality (i.e., SCs and ACs related to nuclear safety) to be “corrected as soon as practicable.” (Requirement 16 of NQA-1, as invoked by the MSTS QAP)

## **7.0 OPPORTUNITIES FOR IMPROVEMENT**

The assessment team identified eight OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in assessment reports, they may also address other conditions observed during the assessment process. These OFIs are offered only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

## **Mission Support and Test Services, LLC**

- OFI-MSTS-1:** Consider revising caWeb item 32544 to require that supervisors and managers convey to their workers the performance expectation to identify issues and improvements, and subsequently respond to feedback from their workers.
- OFI-MSTS-2:** Consider ensuring that the Issues Management/CAS group work with functional area leads and NFO to develop capabilities in caWeb for functional area leads and line managers to trend issues.

- OFI-MSTS-3:** Consider revising CD-1000.200 to require that responsible managers and the RIB identify recurring issues and the reasons why previous actions were not effective in order to ensure that the new CAP is appropriate and that unnecessary/ineffective actions are discontinued.
- OFI-MSTS-4:** Consider including more detailed criteria and/or examples in CD-1000.200 to aid in issue categorization (priority level selection) based guiding principles, good examples from RIB meetings, and input from functional area leads.
- OFI-MSTS-5:** Consider revising the definition in CD-1000.200 for ACs to include issues with potential consequences (e.g., conditions with indications of systemic weaknesses in safety management programs, where other layers of defense may continue to provide safety and prevent actual consequences).
- OFI-MSTS-6:** Consider clarifying Section 4.3[4] of OP-1000.401 to ensure that CAEVs confirm that the underlying causes of SCs are corrected.
- OFI-MSTS-7:** Consider revising Section 4.4.2 of CD-1000.200 to implement a graded approach for effectiveness reviews that leads to their performance or at least consideration for ACs. A simplified approach for an effectiveness review of a lower-risk issue may include having the functional area leads or responsible line management specifically review the effectiveness of actions to correct the apparent cause(s) and prevent recurrence as part of a management assessment.
- OFI-MSTS-8:** Consider integrating the critique processes per CD-0400.007 and the issues management processes per CD-1000.200 (e.g., by starting an apparent cause analysis during or soon after the critique meeting of CD-0400.007 for most incidents/abnormal conditions) to accelerate the development of corrective actions.

## **8.0 ITEMS FOR FOLLOW-UP**

EA will coordinate with NFO on future EA assessment(s) of nuclear maintenance management and cognizant system engineering performance based on indications of programmatic weaknesses observed during this assessment.

## **Appendix A Supplemental Information**

### **Dates of Assessment**

Remote Assessment: July – September 2020

### **Office of Enterprise Assessments (EA) Management**

Nathan H. Martin, Director, Office of Enterprise Assessments  
John E. Dupuy, Deputy Director, Office of Enterprise Assessments  
Kevin G. Kilp, Acting Director, Office of Environment, Safety and Health Assessments  
Kevin M. Witt, Director, Office of Nuclear Safety and Environmental Assessments  
Charles C. Kreager, Director, Office of Worker Safety and Health Assessments  
Terrance J. Jackson, Acting Director, Office of Emergency Management Assessments  
Kevin G. Kilp, Acting Director, Office of Nuclear Engineering and Safety Basis Assessments

### **Quality Review Board**

John E. Dupuy  
Kevin L. Dressman  
Thomas “Clay” Messer  
Michael A. Kilpatrick – Advisor to the QRB

### **EA Site Lead for Nevada National Security Site**

Sarah C. R. Gately

### **EA Assessors**

Joseph E. Probst – Lead  
Charles C. Kreager  
Sarah C. R. Gately  
Thomas M. Wirgau  
Glenn W. Morris  
Eric R. Swanson

**Appendix B**  
**Weaknesses Noted in Individual Reports**

<b>Maintenance</b>	
caWeb Item	Comment*
30616	(TUF) This item reported a failure of a diesel-driven fire pump. The corrective action consisted of pursuit of an exemption to preclude the need for the fire pump versus repairing/replacing the pump. All actions were closed on or before 12/4/2019. However, the caWeb item was not closed until 5/20/2020. Although no additional actions were added to the item, the closure documentation included a procurement request for a replacement pump. The actions listed in caWeb do not match the final action taken to address the issue.
30628	(AC) This item reported a failed uninterruptible power supply (UPS). The apparent cause analysis and corrective action plan (CAP) were thorough with the exception of the discussion on the extent of condition. The extent-of-condition review stated that the condition could exist for any UPS. However, no actions were included in the CAP to ensure that the same condition was not present in other site UPS systems.
32572	(TUF) This item involved unauthorized changes to preventive maintenance (PM) in the maintenance management system (Maximo). The issue was categorized as TUF despite the issue description acknowledging that PM changes can significantly impact maintenance and inspections performed. The details regarding these unauthorized changes have not been determined, including the specific items that were changed, who made the changes, and why the unauthorized changes were made. Unauthorized changes to PM can potentially affect the health and reliability of systems important to safety, and meet the definition of an AC.
30639	(TUF) This item reported a missed three-year Device Assembly Facility (DAF) Fire Tank PM/inspection. The action taken to close the issue involved performing the inspection on 3/19/2019, about one year after the original due date. Although the inspection identified critical deficiencies with the tank, these deficiencies were not listed in the caWeb item and there was no reference to a follow-on issue identified in the item. A review of caWeb did not identify any issue to address the deficiencies contained in the independent inspection report.
31372	(TUF) This item reported that lightning protection system requirements were incorrect at DAF. The recommended action was to correct the inspection and PM frequency requirements. The issue was identified on 12/8/2018; three extensions were given to the issue without justification; and the current due date is 1/27/2021, more than three years after the issue was identified.
31498	(TUF) This item reported that PMs were not being performed for emergency lighting in NNSS balance of plant facilities. Monthly PMs scheduled for 11/2018 and 12/2018, and an annual PM scheduled for 10/2018, were not performed. Actions to close the issue involved initiating work orders for the missed PMs but did not address actions to ensure that the PMs would be performed in the future.
31900	(AC) This item reported the inappropriate de-energizing of a UPS at U1a that caused multiple problems, including loss of security and fire barrier alarms and computer network condition indications. The apparent cause analysis and CAP were adequate. However, the extent-of-condition review stated that similar issues with the lockout/tagout of equipment could occur in

	other locations, but actions were not added to this item to prevent similar issues in other locations.
31962	(AC) This item reported an unexpected trip of a UPS breaker due to an engineering problem. The apparent cause analysis states that the extent of condition would be evaluated by Design Engineering per Critique-31962, dated 7/9/2019. However, the CAP did not include an extent-of-condition review, and none was documented.
32002	(TUF) This item reported no documentation for quarterly testing and maintenance of safeguards and security systems required by DOE Order 473.3A, <i>Protection Program Operations</i> . The only action was to schedule performance of the PM. However, no action was taken to ensure that testing and maintenance are performed quarterly.
32624	(TUF) This item reported that PMs were not performed on the lightning protection system for the “balance of the plant” (i.e., facilities not credited in a nuclear safety basis). The issue date is 1/30/2020, and the due date to perform the PMs has been extended three times, without any justification, to 2/21/2021.
31918	(TUF) This item reported that the room temperature of the battery room for UPS batteries is not being monitored. The associated surveillance cannot be passed without ongoing room temperature monitoring. The date identified was 6/18/2019, but resolution has been extended to 3/31/2021 without justification.
31597	(TUF) This item reported that trend analysis is not performed on the DAF lightning protection system, contrary to DOE-STD-1212-2012, <i>Explosives Safety</i> , Chapter 10, Section 3.5a and 3.5b. The item was entered into caWeb on 3/5/2019. On 9/19/2019, the due date was extended from 9/18/2019 to 3/4/2020. On 3/4/2020, the due date was extended again to 9/30/2020. Both extensions were made without justification.
31290, 32364, 33101, 33103, 33104	<p>(TUF) These items reported several non-compliances in the execution of the MSTs cognizant system engineer (CSE) program. Specifically, seven vital safety system (VSS) assessments (including two for safety class systems) and two system health reports were approximately one to two years overdue, and nine system description documents (SDDs) were not being adequately maintained. MSTs procedures OP-SENG.001, <i>Cognizant System Engineer Program</i>, and OP-ENGR.009, <i>Engineering Design Process</i>, require these periodic VSS assessments and system health reports, and up-to-date SDDs, to meet the requirements of DOE Order 420.1C, <i>Facility Safety</i>, Chapter V, <i>Cognizant System Engineer</i>, and DOE Order 433.1B, <i>Maintenance Management Program for DOE Nuclear Facilities</i>, for monitoring and maintaining the health, reliability, and configuration of structures, systems, and components (SSCs) credited in the safety bases for nuclear facilities.</p> <p>Most of these non-compliances were for SSCs in the DAF, but no causal analysis, extent of condition/cause, or actions to prevent recurrence were developed because all of the items were categorized as TUFs. The action for these issues only involves completing the delinquent assessments and system health reports, and updating the specific SDDs, despite their impact to nuclear safety. These items meet the definition of an AC (i.e., an issue with lesser consequences to the project or mission, health, and safety of personnel and/or environment or quality), but were categorized as TUFs contrary to CD-1000.200.</p>

<b>Conduct of Operations</b>	
caWeb Item	Comment*
30500	<p>(SO) The Conduct of Operations (CONOPS) Applicability Matrix for Nuclear Facilities does not reflect the contractor change. This issue was screened out of the CD-1000.200 process without recording the reason or what system it was screened to. This issue was identified by NFO as related to CONOPS but coded for trending by MSTs as QAP: Performance/Implementation, which complicates the trending of issues between NFO and MSTs.</p>
30548	<p>(SC) On 1/19/2018, NFO denied the MSTs Radiological Response Data Portal Authority to Operate accreditation, thereby delaying authorization and use of the system through 3/8/2018. Additionally, the MSTs root cause analysis of its issues leading to NFO denying MSTs the accreditation was not completed until a year later.</p> <p>The corrective action effectiveness validation (CAEV) did not address what the root cause analysis identified as a “critical point” that “a Project Execution Plan focused on planning, resources and schedule necessary for supporting Continuous Monitoring efforts and attaining the next accreditation will be critical to program sustainability.” A calendar was provided instead of a resource-loaded project plan that was recommended by the root cause analysis, and the CAEV did not review the effectiveness of this calendar.</p>
31322	<p>(SC) A positive unreviewed safety question (USQ) was not acted upon by the previous contractor and work was performed that spanned the 12/1/2017 turnover to MSTs. One root cause (RC03) was inadequate tracking of the issue. The recommendation to address this root cause was to conduct training on roles and responsibilities. The actual action taken was to conduct a needs analysis for revision of training for e-USQ implementation, which was completed but did not address the issue of tracking. No action was taken to reinforce the use of an issue tracking system (e.g., caWeb). The CAEV recorded that all actions were deemed effective, but some of the record was not adequate. For most of the actions, the CAEV report only confirmed that the actions were implemented, not that the root causes were addressed. A strategy for determining effectiveness of the overall plan was not apparent, such as interviewing trainees for learning per OP-1000.401, <i>Corrective Action Effectiveness Validation (CAEV)</i>.</p>
31733	<p>(AC) Work control for hoisting and rigging as a common cause was analyzed by a root cause analysis. The root cause analysis identified inadequate procedures and processes for ordinary lifts as a cause for safety incidents in 4/2019; however, 5 of 6 recommended actions to improve CD-9000.001, <i>Rigging and Overhead Crane Operations</i>, for this cause were neither taken nor dispositioned. Subsequently, the apparent causal analysis for the uncontrolled lower of the launch tube in the JASPER facility (caWeb item 33021) identified inadequate procedures and processes as a contributing cause.</p> <p>The extent-of-condition review conducted as part of the root cause analysis found 6 additional hoisting and rigging issues, which informed the 18 recommended actions.</p> <p>Action number 27009 was to “Formalize proficiency requirements for hoisting and rigging workers and crane operators.” No change was made in the procedure submitted as closure evidence (CD-9000.004) to accomplish this, but a change included detailed instructions for crane operation during a critical lift.</p>

	<p>An extent-of-condition review for caWeb item 31744 anticipated that this CAP would address hoist and crane inspections, but action 27003 only addressed mobile cranes.</p> <p>While closure has not yet been reviewed by the Risks and Issues Board (RIB), no effectiveness review is planned.</p>
31737	<p>(OFI) This item documents opportunity for improvement (OFI) CONOPS.2-3, which recommends consideration be given to ensure that all MSTs operations are providing feedback to MSTs management, allowing for tracking and trending of CONOPS issues. The closure basis is “The MSTs CONOPS organization is working to establish metrics that capture facility trends and positives for reporting to MSTs Sr. Management.” This issue was closed on 8/15/2019, but inadequate trending of CONOPS issues persist.</p>
31738	<p>(OFI) This item documents an OFI from NFO to increase the number of CONOPS coaches. The issue was closed, but MSTs continues to have problems maintaining its desired number of CONOPS coaches.</p>
31744	<p>(AC) The hoisting and rigging subject matter expert (SME) noted that two of the four annual certification tags on the Dry Alluvium Geology site electric hoists indicated that the hoists were past their inspection dates. The extent-of-condition discussion in the apparent cause analysis acknowledges site wide applicability and dependence on facility managers to request inspections, but no action was taken to address this hoist type.</p>
31735, 31749 through 31758	<p>(TUF) These items document that FRM-2400, <i>Conduct of Operations (CONOPS) Matrix/CONOPS Outline Periodic Review</i>, has not been completed as required for numerous facilities. Corrective actions were extended, many by 7-10 months, and no system corrective actions were immediately taken by the cited facilities. Future efforts for the FRM-2400 were addressed during the updates of CONOPS applicability matrices for the facilities cited. In caWeb item 31735, MSTs agreed with an OFI suggested by NFO, but closed this item without taking action. The justification for closing caWeb item 31735 is that software changes for this OFI would be a future consideration; however, no method was provided to track/prompt these changes in the future.</p>
31800	<p>(AC) Damage was found on some consumable parts within the JASPER Gun Secondary Containment Chamber and the gas breach area. The actions taken were inconsistent with facts recorded in the critique report, causal analysis, and CAP (e.g., for training of supervisors). No action or disposition was recorded for apparent cause AC-2 regarding modifying the petal valve retainer.</p>
32216	<p>(AC) This item identified safety risk to personnel due to an inadequate ability to “characterize the extent and magnitude of the hazardous chemical release, determine safe evacuation routes, and habitability evaluation” during emergencies. Action to fund this capability has been extended twice, without justification, to over 13 months after the issue was discovered; the item remains open.</p>
32683	<p>(SO) The alarm response procedure needed modification/changes to improve the response of personnel. The RIB screened this issue out because the corrected procedure ARP-DAF-002, <i>DAF Building 343 Alarm Response</i>, was attached when the issue was entered into caWeb. This issue is an example of an inadequate procedure and, per CD-1000.200, should have been categorized as TO or entered as a TUF and closed. As an emergency management finding from an after-action report (AAR), corrective action planning is required to include an</p>

	<p>apparent cause analysis and CAP per PD-EMSS.001, <i>Emergency Management, Safeguards and Security Assurance Program</i>. Entry of the issue into caWeb was not timely, with the AAR issued 1/23/2020 and the issue not entered until 2/12/2020.</p>
32722	<p>(AC) The apparent cause determined for this item was that “CD-P450.005, Silica Protection Program did not adequately address the Occupational Exposure Limit, clearly establish the competent person, and specify exposure control methods.” The action taken was to revise the procedure, but this action does not address why the procedure was not compliant.</p>
32937	<p>(TUF) This item documents that workers are not being evaluated periodically for performance as stated in the DOE-approved Training Implementation Matrix (TIM) and Training Manual. Because this issue was initially categorized as AC, an apparent cause analysis was completed; however, the analysis restated the problem as the cause and did not determine why the requirement was not being met. No compensatory actions have been implemented, and planned corrective actions do not resolve the non-compliances.</p>
32945	<p>(SO) This item documents DAF sprinkler fitter fire suppression system and alarm technicians not being evaluated periodically for performance as MSTs committed to in the DOE-approved TIM and Training Manual. This issue was downgraded from AC to SO based on the MSTs SME interpretation that this periodic proficiency evaluation is not required. By screening this issue out, MSTs did not address the problem of personnel performing tasks with which they are not familiar (see also caWeb 31733), or implement the commitment in the TIM.</p>
33019, 33020, 33032, 33034	<p>(TUF) DAF, Radioactive Waste Management Complex, and U1a formal workplace inspections are conducted under local instructions to meet CD-0280.006, <i>Formal Workplace Inspection Program</i> (FWIP). The reports are entered periodically into caWeb with new deficiencies, deficiencies still open from previous FWIP inspections, and corrected/transferred items are then cancelled and replaced with the next FWIP inspection. Most issues are housekeeping-related and readily corrected. However, some of the issues carried forward have been open for extended periods and were not minor issues, such as electrical safety, life safety (National Fire Protection Association 70, <i>National Electrical Code</i>) issues, and fire door issues (some of the latter remain unresolved since 2010 per caWeb 18206). RIB reviews of FWIPs did not consider individual issues, while routinely categorizing them as TUF items.</p> <p>After discussion with the assessment team, the Issues Management Manager initiated caWeb item 33078 to improve the tracking of FWIP deficiencies through full resolution.</p>
33021	<p>(AC) This item relates to the JASPER shop crane incident (gun tube drop). The apparent cause analysis was thorough, including an evaluation of human performance error precursors. A corrective action effectiveness matrix for prior issues and actions was performed and found that corrective action 27006 of caWeb item 31733 to revise CD-9000.001, <i>Rigging and Overhead Crane Operations</i>, incorporated only five of six recommended changes following the camera drop incident in U1a.</p> <p>Timely resolution of this issue has been impacted by the following: the priority level assignment of the issue was delayed about two weeks waiting for the critique report to be finalized, the causal analysis was completed on 8/11/2020 (four weeks after the incident), and the CAP was due on 9/18/2020. However, the facility returned to operation on 8/4/2020 after completing several pre-job briefing items and cancelling the compensatory measures (timely orders). The Defense Nuclear Facilities Safety Board Resident Inspector discovered three</p>

	<p>weeks later that timely order TO-JAS-2020-003 Action 5 was not performed before cancellation, so a new action was added to caWeb.</p> <p>This item included a task to perform an extent-of-condition review on all routine procedures and work packages that contain non-critical lifts and re-evaluate against the critical lift criteria, but only half of the respondents answered the specific request to ensure that authorized lifts were categorized correctly.</p>
31793, 32140	<p>(TUF) This issue identified that Lockout/Tagout Authorized Employee and Tagging Authority training does not include material on how lockouts can hinder facility operations. The corrective action specified that a training needs analysis be performed, which concluded that training revisions were needed. However, the training was not revised, and the issues were closed.</p>
32557, 32564, 32565,	<p>(TUF) The Down Draft Table management self-assessment reported several pre-start findings related to procedures. Despite the significance of pre-start findings, these findings were input to caWeb as TUFs, and no action was taken to review the extent of condition or determine why several procedures were not adequate. After corrective actions for these pre-start findings were completed, the contractor readiness assessment identified two additional procedure issues (caWeb items 32730 and 33056), which were graded as AC and included an apparent cause analysis and CAP to address the extent of condition.</p>
31792, 31793, 31794, 31795	<p>(OFI/TUF) An independent assessment of the electrical lockout/tagout (LO/TO) program identified four deficiencies (non-compliances). Three were tracked as OFI and one as TUF. Two OFIs were closed and provided as suggestions for future procedure changes, one OFI was closed as being inaccurate, and the TUF was noted in caWeb item 31793 above. Contrary to CD-1000.200, the RIB categorized these non-compliances with safety requirements as OFIs.</p>

<b>Industrial Hygiene</b>	
caWeb Item	Comment*
32769	<p>(TUF) This item documents a finding from an external assessment that “There is no formal process for identifying new sources of beryllium being brought onto site by outside entities.” This issue is a non-conformance to CD-0450.014, <i>Chronic Beryllium Disease Prevention Program</i>, which requires MSTS “Identify locations where [beryllium] is being or was used in past NNSA/NFO operations (legacy sites) and where employee exposures could potentially still occur.” This non-conformance was categorized as TUF, but should have been categorized as an AC considering its implications to worker safety.</p>
32833	<p>(SO) This item reported several gaps identified in the implementation of the silica protection program requirements. Contrary to CD-1000.200, the reason for screening out the issue was not documented in caWeb.</p>
31855	<p>(OFI) This item reported that the Safety Data Sheet shared electronic folder and book version used by the A-1 Machine Shop was not annually updated as required per CD-P450.003, <i>Hazard Communication Program</i>. Contrary to CD-1000.200, this issue is categorized as OFI despite a non-compliance with company requirements.</p>

31669	(TUF) This item reported that no monitoring capability for oxygen exists in the refuge stations of U1a and U12p. Contrary to CD-1000.200, this issue is categorized as TUF despite its potential impact on worker safety. The issue was resolved by providing oxygen monitoring capabilities within refuge stations.
31601	(TUF) This item reported that a small cylinder of oxygen/gas mixture was stored in the same rack as other flammable gases. Contrary to CD-1000.200, this issue is categorized as TUF despite its potential impact on worker safety. The issue was resolved by moving the cylinder to another rack and installing additional storage.
30604	(TUF) This item reported that a laborer was not wearing a half-face respirator, as directed in the Toxic Hazard Work Permit, during excavation activities. Contrary to CD-1000.200, this issue is categorized as TUF despite its potential impact on worker safety. The issue was resolved by providing a pre-job brief to clarify requirements.
30539	(SO) This item reported that facility managers are not maintaining records regarding the presence, location, and quantity of asbestos materials. Contrary to CD-1000.200, the reason for screening out this issue was not documented in caWeb.
30467	(AC) This item reported that Industrial Hygiene was not appropriately engaged in hazard identification, the time-out process was not appropriately engaged and followed, and work resumed that resulted in inappropriate abatement of asbestos-containing material. Contrary to CD-1000.200, actions (24997 and 24998) were closed without documentation or verification of completion.
30409	(OFI) This item reported that a number of areas were identified in U1a Complex surface and underground areas where additional hearing protection signage and postings may be needed in order to comply with requirements in CD-P450.003, <i>Hearing Conservation Program</i> . Contrary to CD-1000.200, this issue is categorized as OFI despite a potential non-compliance with company requirements. Finally, the item is closed to a promise of completing noise surveys and updating signage to reflect the requirements in CD-P450.003.

<b>Radiological Protection</b>	
caWeb Item	Comment*
32040	(AC) This item reported that an expired check source was used for operability checks. A radiological awareness report (RAR) was written within a day of the issue's occurrence, but the issue was not entered into caWeb until two weeks later.
31569	(AC) This item reported that contamination from both radiation and beryllium leaked during/after the Ediza subcritical experiment (SCE) into the zero room confinement. The causal analysis was adequate, but there were disconnects between the causes and the actions in the CAP. The caWeb item also included a copy of the Ediza SCE Project Team Retrospective, which listed dozens of actions that are not in caWeb or the CAP. These Retrospective actions were developed separately from the corrective action process and were to perform various evaluations, not "SMARTER" (i.e., Specific, Measurable, Attainable, Relevant, Timely, Effective, and Reviewed) actions as discussed in the <i>Corrective Action Plan (CAP) Development Job Aid</i> .

32035	(AC) This item reported that a silicone respirator was issued to someone who was only fit tested on a rubber one, because the user was from LANL, which uses different respirators. The apparent cause analysis was well done and good supporting information was attached. The first version of the CAP included only a couple actions and did not address all causes from the apparent cause analysis; however, the CAP was subsequently revised to include more actions and address all causes.
32292	(AC) This item reported an incident where an improperly packaged source leaked; the individuals using it knew it was leaking but still used it; and as a result, contamination spread to equipment and people, resulting in one person having an uptake well below the threshold for concern. The apparent cause analysis identified five causes, although only some were connected to the Why analysis. The CAP included eight causes, some of which were different from the apparent cause analysis. The CAP identified four corrective actions, but one of the corrective actions was missing closure documentation. Based on the causes identified by the apparent cause analysis, it would have been appropriate to re-categorize this issue as an SC and apply the level of effort needed to identify a likely underlying cause that led to the five to eight apparent causes identified.
30767	(TUF) This item reported that the contracted bio-analytical services laboratory failed three categories of testing during regular performance testing. The issue stated that its performance would be monitored until the next session, but no detail was given on what kind of performance monitoring would be involved.
32924	(TUF) This item reported that Troxler gauges with accountable sources were not identified as having accountable sources because someone filled out the requisition form incorrectly. The MSTS causal analysis identified the cause for this issue as improper completion of the requisition form which is a problem statement instead of a cause. The only action taken, other than performing the required leak-check on the gauges, was to send an email to the staff responsible for completing the forms, which is a temporary solution only. A previous, similar issue was identified and referenced in the caWeb item, but both were incorrectly considered isolated instances because the mistakes were approximately two years apart.
32364, 32365	<p>(TUF) These items are NFO-identified findings from the same assessment. CaWeb item 32364 identified that the DAF Radiography Safety SDD was missing information. CaWeb item 32365 identified that the &gt;10 megaelectron-volt (MeV) linear accelerator is using a safety standard meant for accelerators below 10 MeV energies. These issues were categorized as TUFs, appropriate for issues with little or no consequences to overall objectives, rather than ACs, which are for non-compliances with requirements with minor consequences to the facility. Because the issues were categorized as TUFs, there was no evaluation into why these errors were made and why the errors were not identified by MSTS during multiple internal reviews performed to ensure quality. At the time of this EA assessment, both issues remain open.</p> <p>The EA safeguards and security follow-up assessment noted other issues identified by external sources (e.g., EA and NFO) that were inappropriately categorized as TUFs, increasing the likelihood that causes will not be adequately identified or addressed.</p>
31056	(TUF) This item reported missing signs around a radiologically controlled area. The RAR was written the day the missing signs were discovered, but the issue was not entered into caWeb until a week later.
31229	(TUF) This item reported fallen signs around a contaminated area. A survey was conducted the day the fallen signs were discovered, but the RAR was not written and the issue was not entered

	into caWeb until a week later.
31272	(TUF) This item reported that four thermoluminescent dosimeters showed dose readings up to four times greater than the associated electronic dosimeter readings, and noted that these inconsistent readings were an ongoing issue. In general, fast-reading electronic dosimeters should show a higher reading than the thermoluminescent dosimeters, which act as the dosimeters of legal record to prevent unexpected over exposure. Because this issue was noted as an ongoing issue, it should have been elevated to an AC because of the potential for unexpected over exposure.
30999	(TO) This item reported unexpected tritium contamination. Although actions were taken to address the issue the following day and an RAR was written a few days later, the issue was not entered into caWeb until two weeks later.
30523	(OFI) This item was associated with an assessment and identified that clarifications were needed to the Radiological Control Manual. The issue was closed out with a statement that the manual was revised, but a copy was not attached to the caWeb item.
31010	(OFI) This item was associated with an assessment and identified that clarifications were needed to the radiological protection program. The issue was closed out with a statement that the affected document was revised, but a copy was not attached to the caWeb item.
32014	(OFI) This item was written in response to a Management Concern identified by NFO that the proper expertise from the Radiological Control Organization is not engaged in the planning of the radiological work being conducted. The actions to address this issue were tracked outside of caWeb, and not all actions were complete when the caWeb item was closed. However, NFO reports that they have seen improvement in response to this Management Concern.
32404	(OFI) This item reports an airborne tritium alarm on a handheld instrument while tritium was being discharged via stack. While an RAR was written a couple days after the issue occurred, the critique was not held until a week later. Although the critique report lists several actions, they were not entered as actions into caWeb, so there was no closure evidence associated with their completion.
32789	(AC) This item reported an issue where an elephant trunk being used to remove contamination disconnected, resulting in airborne tritium. The identified corrective actions are adequate to address the issue, but the apparent cause analysis is superficial and lacks detail.

\* The assessment team conducted a detailed review of 487 reports (reviewing all issues that MSTs identified relevant to nuclear maintenance, industrial hygiene, and CONOPS, and 102 out of 160 reports on radiological protection). Weaknesses noted by the assessment team on individual issues are summarized in this appendix. Comments on CONOPS issues for caWeb items MSTs coded for other functional areas (e.g., fire protection) are included in the table with other CONOPS issues. The MSTs-assigned priority level for each caWeb item is in parentheses and precedes the comment(s). The priority levels are significant condition (SC), adverse condition (AC), track until fixed (TUF), trend only (TO), screened out (SO), and opportunity for improvement (OFI).