Assessment of Issues Management at the Savannah River Site SRNS Facilities

November 2020

Office of Enterprise Assessments
U.S. Department of Energy

Table of Contents

Acronyms

ARM	Area Radiation Monitor
CA	Corrective Action
CAP	Corrective Action Program
CAS	Contractor Assurance System
CR	Condition Report
DOE	U.S. Department of Energy
DOE-SR	U.S. Department of Energy – Savannah River Operations Office
EA	Office of Enterprise Assessments
EDWS	Electronic Document Workflow System
HEPA	High Efficiency Particulate Air
LCO	Limiting Condition for Operation
MFO	Management Field Observation
MRB	Management Review Board
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement
ORPS	Occurrence Reporting and Processing System
PCR	Procedure Change Request
PM	Preventive Maintenance
PMT	Post Maintenance Test
PuFF	Plutonium Fuel Form
QAMP	Quality Assurance Management Plan
SC	Significance Category
SCAQ	Significant Condition Adverse to Quality
SMART	Specific, Measurable, Achievable, Relevant, and Timely
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
SSC	Structure, System, and Component
STAR	Site Tracking and Reporting
STD	Surveillance Test Database
TSR	Technical Safety Requirement

Assessment of Issues Management
at the Savannah River Site SRNS Facilities
March – May 2020

Summary

Scope:
This assessment evaluated the issues management processes and their implementation by Savannah River Nuclear Solutions, LLC (SRNS), the management and operating contractor at the Savannah River Site. These nuclear facilities included F/H Laboratory, 235-F, H Canyon, K Area Complex, and L Area. The assessment team reviewed a sample of condition reports initiated between January 1, 2018, and February 28, 2020, and assigned to responsible managers in the listed facilities.

Significant Results for Key Areas of Interest:
Overall, the SRNS issues management process is well integrated with the rest of the SRNS contractor assurance system, with generally effective procedures, senior management involvement, willingness to identify issues, and organizational commitment to correcting problems. However, some issues are categorized at a lower level than appropriate, leading to ineffective resolutions and recurrence control.

Identification and Categorization
Personnel are actively using the issues management process to identify and resolve issues and trends to improve performance. Management Review Boards appropriately screen most issues. However, responsible managers did not categorize a number of significant issues as required. As a result, SRNS's more rigorous issues management tools were not used. This lack of appropriate identification and categorization allowed nuclear safety issues to recur three times in some cases. The corrective action program procedure also contains weaknesses in its guidance for categorizing issues.

Issue Resolution
The apparent cause analyses, when performed, were of adequate quality, although not many were performed. While corrective actions for most of the reviewed issues were adequate to resolve the identified problems, some did not meet the criteria in the corrective action procedure. Some of the assessed effectiveness reviews were inadequately narrow. Additionally, SRNS managers did not identify adequate actions to prevent recurrence for 34% of the issues reviewed.

Timeliness and Closure
In general, corrective actions are completed in a timely manner. Most of the reviewed issues were properly closed, although some did not document all actions taken to address an issue or otherwise did not include adequate closure documentation.

Best Practices and Findings
The assessment team identified two best practices, one for the SRNS independent team's review of at least half of the causal analyses each month for tracking and improving the analyses, and the other for the performance of quarterly assessments of 5% of issues closed each quarter.

The assessment team identified one finding as part of this assessment. SRNS managers responsible for nuclear safety issues do not always adequately implement the required graded approach to ensure that nuclear safety issues are rigorously analyzed and resolved to preclude recurrence.

Follow-up Actions:
No follow-up activities were identified.

Assessment of Issues Management
at the Savannah River Site SRNS Facilities

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of issues management at the Savannah River Site (SRS) of selected nuclear facilities managed by Savannah River Nuclear Solutions, LLC (SRNS), the management and operating contractor at SRS. The purpose of this assessment was to independently evaluate issues management processes and their implementation by SRNS. This assessment was conducted remotely due to the COVID-19 pandemic, with the majority of interviews occurring from May 11-27, 2020.

EA recently identified issues management as a targeted review area. This assessment is the third of a series of reviews examining corrective action processes. Results from these targeted reviews and from other EA assessments will be used in an EA lessons-learned report that will document EA's overall assessment on issues management across the DOE complex.

As described in the *Plan for the Issues Management Assessment at the Savannah River Site SRNS Facilities, March – May 2020*, this assessment evaluated issues management at selected nuclear facilities at SRS (i.e., F/H Laboratory, 235-F, H Canyon, K Area Complex, and L Basin). The issues management process for all of SRS is controlled by a single set of procedures that collectively form the corrective action program (CAP). Individual issues, when entered into the computerized Site Tracking and Reporting (STAR) tool, generate condition reports (CRs) that are then assigned to responsible managers for resolution. The scope of this review included CRs initiated between January 1, 2018, and February 28, 2020, to assess issues management at SRS before the reduced onsite staffing due to the COVID-19 pandemic potentially affected performance. Individual CRs were examined to determine the effectiveness of the SRNS issues management program in correcting problems and preventing recurrence.

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.

This assessment considered the requirements related to issues management in Attachment 1 to DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, which requires the contractor assurance system (CAS) to include a structured issues management system that captures program and performance deficiencies for timely reporting and correction using a graded approach. The assessment team also used the criteria for Objective 3 of EA Criteria and Review Approach Document 30-01, Revision 1, *Contractor Assurance System*.

The assessment team examined key documents, such as procedures, quality assurance program descriptions, internal and external assessments, CRs, extent-of-condition reviews, causal analyses, corrective action plans, effectiveness evaluations, and evidence of corrective action completion. The CRs for review were initiated between January 1, 2018, and February 28, 2020, and were assigned to responsible managers working in F Area, H Canyon, K Area, and L Area. The team conducted a detailed

review of 444 out of the 2,850 CRs (over 15%) for these facilities over this time frame to ensure all significant topics were addressed; the selected CRs included issues from all significance categories (SCs) and focused on issues coded for functional areas related to nuclear safety.

The assessment team also interviewed by teleconference key personnel responsible for contractor issues management process implementation, with a focus on issues associated with nuclear safety, and reviewed meeting minutes and products of Management Review Boards (MRBs). 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 in individual CRs are summarized in Appendix B.

EA has not conducted a recent assessment of SRS issues management, so there were no items for follow-up during this assessment.

3.0 RESULTS

Observations are grouped below into the following functions for issues management: issue identification and categorization, issue resolution (including evaluations of the effectiveness of actions), and timeliness of actions and closure of issues.

3.1 Issue Identification and Categorization

The objective of this portion of the assessment was to examine whether issues and trends are entered into STAR and categorized to meet the requirements for issues management in the SRNS Quality Assurance Management Plan (QAMP). The SRNS QAMP commits to DOE requirements for issues management and the American Society of Mechanical Engineers consensus standard Nuclear Quality Assurance (NQA)-1, *Quality Assurance Requirements for Nuclear Facility Applications*, Revision 2008 with the 2009 Addenda, Parts I and II. These commitments are implemented through SRNS Manual 22Q, Procedure CAP-1, *Corrective Action Program*.

3.1.1 Processes for Issue Identification and Categorization

CAP-1 provides adequate means for entering issues into STAR; entries may be made directly into STAR by those who use the system, by a qualified issue analyst, or by any personnel on site using the STAR "Short-Form" (available on the STAR Webpage accessible through the SRS Intranet). Facility and program assessments conducted by the SRNS internal Independent Evaluation Board and self-assessments actively identify trends and issues within individual facilities and across functional area programs. Assessment lines of inquiry are updated based on recent significant issues. SRNS managers, using the process outlined in Manual 22Q, Procedure PA-1, *Performance Analysis*, integrate input every quarter from multiple sources (including input from facility and functional area managers and the Independent Evaluation Board on ongoing issues) to identify cross-cutting and recurring issues for broader analysis and corrective action development per CAP-1.

CAP-1 defines qualitative criteria for categorizing issues based on G-QO-G-00002, *Savannah River Site (SRS) Management and Operations (M&O) Quality Assurance Graded Approach Plan*, to implement the issues management requirements per the commitments in the SRNS QAMP. Issues are categorized from high risk to low risk as SC 1 through SC 4, respectively, or for trending (SC T). For issues with greater risk, CAP-1 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). CAP-1 establishes that MRBs are responsible for overseeing the categorization of issues.

CAP-1 allows MRBs to categorize significant conditions adverse to quality (SCAQs) as either SC 1 or SC 2. For SC 2 issues, CAP-1 requires corrective actions "to correct the apparent causes and to prevent recurrence of the **specific** [emphasis added] issue. Actions are designed to remedy the issue and minimize the likelihood of repetition of the **same** [emphasis added] issue." This requirement does not adequately implement the NQA-1 requirements for SCAQs, because corrective actions that only address the specific/same issue, and not the broader scope or extent of cause, will not preclude recurrence as required by NQA-1. (See **Deficiency D-SRNS-1**.)

The process in CAP-1 for categorizing issues does not correctly invoke issues management requirements in DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, and in NQA-1 for analyzing the cause and scope of nuclear safety issues to prevent recurrence. Contrary to DOE Order 232.2A, which requires facility managers to identify the causes of issues, CAP-1, Attachment 8.1, *Criteria for Assigning Significance Categories,* incorrectly allows the MRBs to categorize reportable issues associated with equipment failures as SC 3. Causal analyses are not required for SC 3 issues. Additionally, footnote (4) of Attachment 8.4 of CAP-1 states that the root cause analysis can be waived for reportable events with concurrence of the DOE/National Nuclear Security Administration Facility Representative without requiring some other causal analysis (e.g., an apparent cause analysis). (See **Deficiency D-SRNS-2**.) SRNS frequently uses this allowance. From January 1, 2018, until February 28, 2020, 59 out of 64 instances in which structures, systems, and components (SSCs) at SRNS facilities were not able to perform their design function when required to be operable for nuclear safety (i.e., Occurrence Reporting and Processing System (ORPS) reporting criteria 4A(1)) were downgraded from SC 2 to SC 3. As a result, causes for these events were not determined, contrary to DOE Order 232.2A.

3.1.2 Issue Identification by Personnel and Categorization by Nuclear Safety Managers

SRNS personnel, both workers and managers, actively identify issues from multiple sources (e.g., self-assessments, performance metrics, and management observations). SRNS effectively communicates emerging issues across the site through immediate "Heads Up" notifications, a daily morning call between all facilities and senior management, weekly Issue Investigation summaries, a monthly metrics review in the Facility Managers Forum, and the quarterly Environmental Management Operations Review Board with senior management. Managers conduct targeted management field observations (MFOs) when they identify performance issues that would benefit from supervisory observations and in-field coaching. These observations are rolled up and analyzed to see whether there is a need to implement broader actions to improve performance. MRBs are comprised of representatives of diverse functional areas to help identify issues and potential trends across SRNS. The collective impact of the review boards provides senior management with an integrated view of site issues from a programmatic as well as facility-by-facility perspective. Additionally, the process of preparing for the review boards includes an introspective and critical review at multiple levels of management.

DOE-Savannah River Operations Office (SR) letter AMNMS-16-0008 identified concerns with four violations of technical safety requirements (TSRs). CAP-1 requires DOE concerns to be categorized as SC 1. SRNS's use of its most rigorous issues management tools, as required for SC 1 issues, resulted in the drastic reduction in the number of TSR violations from an average of 2.5 per quarter during fiscal years 2012 to 2014 to zero since March 2019. However, SRNS managers rarely categorize issues as SC 1 or SC 2 as required by CAP-1, whether those issues originate with DOE-SR or themselves. The SRNS Contractor Assurance Quarterly Performance Analysis Report for 3Q Fiscal Year 2019 stated "SRNS self-identified only one SC 2 issue during 3rd Quarter [sic]." As a result, SRNS senior management identified the execution of its corrective action process as a Top Cross-Cutting issue (2019-CTS-008275) to improve its self-identification of SC 2 issues and improve corrective action development. Despite this added focus, SRNS did not adequately establish the scope or significance of the weaknesses in categorizing issue significance in 2019-CTS-008275. From January 1, 2018, through February 28, 2020,

no issues related to nuclear safety were categorized as SC 1 and only 47 issues (1%) were SC 2. The assessment team found several types of issues that were inappropriately categorized at lower SCs than required. The most significant examples were:

- Contrary to CAP-1 and PA-1, responsible managers are not categorizing recurring nuclear safety issues as SC 1. The safety significant plutonium fuel form low differential pressure switch in F Area experienced four failures while it was required to perform its function credited in the safety basis. (See **Deficiency D-SRNS-3**.) The H Canyon safety class exhaust fans tripped three times over a 13-month period due to an electrical overload. (See **Deficiency D-SRNS-4**.) Over an 18-month period, six STAR items documented instances of combustible materials exceeding the procedure limits for H Canyon. Three of these STAR items stated that there had been multiple instances of previous inspection findings not being addressed. (See **Deficiency D-SRNS-5**.) Instead of categorizing these recurring issues as SC 1, each example provided was categorized as SC 3, with corrective actions narrowly targeted at specific examples, and no causal analysis was performed to determine why the issues recurred despite previous actions taken. These inappropriate categorizations allowed nuclear safety issues to recur.

- Responsible managers for nuclear safety issues are not appropriately categorizing SCAQs. Per NQA-1, SCAQs include conditions (issues) that "if uncorrected, could have a serious effect on safety or operability." These issues include potential systemic weaknesses in safety management programs or significant degradations in safety class or safety significant SSCs that provide layers of defense for nuclear safety. CAP-1 requires that SCAQs be categorized as SC 1 or SC 2 to implement the issues management requirements of NQA-1. Instead, each instance below, with the exception of the second L Area limit block event, was categorized or downgraded to SC 3 and the NQA-1 requirements (e.g., determining the cause) were not met. The H Canyon safety class circulated cooling control water diversion valve failed twice within approximately six months while it was required to perform its function credited in the safety basis. (See **Deficiency D-SRNS-6**.) The H Canyon B-receiver check valve failed twice within six months while it was required to perform its function credited in the safety basis. (See **Deficiency D-SRNS-7**.) In L Area, on two occasions, limit blocks were not installed as required for criticality safety on rails supporting movement of fissile materials. (See **Deficiency D-SRNS-8**.) If uncorrected, issues of this type can result in the loss of layers of defense and can have serious effects on nuclear safety.

SRNS managers are not categorizing most significant, higher-risk nuclear safety issues per the graded approach in CAP-1 for implementing requirements in Section 2.b(3)(b) of Attachment 1 of DOE Order 226.1B and NQA-1 to prevent recurrence. (See **Finding F-SRNS-1**.)

Although SRNS senior management identified the execution of the SRNS corrective action process as a Top Cross-Cutting issue, SRNS's subsequent actions have been inadequate based on the scope and significance to nuclear safety as discussed above. Additionally, the causal analysis and actions in Top Cross-Cutting issue 2019-CTS-008275 do not sufficiently address categorizing potential systemic weaknesses in nuclear safety management programs or significant degradations in safety class or safety significant SSCs. These nuclear safety management programs and SSCs provide layers of defense for nuclear safety. If uncorrected, the loss of layers of defense can have serious effects on nuclear safety. Functional area managers, functional area program managers, facility managers, and CAS experts at SRNS lack detailed criteria and/or examples in their issues management procedures to properly categorize issues. (See **OFI-SRNS-1**.)

Issue Identification and Categorization Conclusions

SRNS personnel, both workers and managers, actively identify issues from multiple sources, communicate issues across the site, and enter issues into STAR in accordance with CAP-1. Most issues are appropriately screened by the MRBs and assigned to a responsible manager for corrective action development. SRNS's use of its most rigorous issues management tools resulted in the drastic reduction in the number of TSR violations to zero since March 2019, following the identification of that issue as an SC 1. However, SRNS managers rarely categorize issues as SC 1 or SC 2, as required, to invoke the use of SRNS's more rigorous issues management tools; this inappropriate categorization allowed nuclear safety issues to recur three times in some cases. The process in CAP-1 for categorizing issues also does not correctly invoke issues management requirements in DOE Order 232.2A and NQA-1 for analyzing the cause and scope of nuclear safety issues to prevent recurrence.

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 scope, causes, and corrective actions for issues and for reviewing the effectiveness of actions taken to ensure that issues are resolved.

SRNS uses a metric to track the 12-month rolling average number of issues identified at each facility. From January 2018 to February 2020, the average number of all issues identified for the facilities assessed decreased from 408 to 329, and the average number of nuclear safety issues decreased from 247 to 180. This decline in issues may indicate that SRNS is actively resolving issues so that fewer are recurring, because there was no corresponding decrease in work. CAP-1 sets the minimum requirements for analyzing and resolving issues based on their assigned SC. SC 1 issues require root cause analyses, extent-of-condition reviews, and effectiveness reviews. SC 2 issues can use an apparent cause analysis instead of a root cause analysis, extent-of-condition reviews are optional, and effectiveness evaluations can be waived with MRB approval. CAP-1 includes additional requirements for SCAQs to implement NQA-1 issues management requirements.

3.2.1 Causal Analysis

On March 1, 2018, SRNS issued Manual 22Q, Procedure CA-1, *Causal Analysis*. The intent was to improve SRNS's causal analyses by providing detailed roles and responsibilities for causal analysts, causal analysis team members, responsible managers, and the MRB responsible for the issue. CA-1 requires that an independent team reviews at least half of all causal analyses each month and grades the causal analysis report. Causal analyses for this review are selected in coordination with the responsible managers and MRBs. This independent team scores the causal analyses for tracking and improving analyses. (**Best Practice**) Each of the 12 sections of the causal analysis report are graded against a bulleted list of criteria, with the most weight given to the cause analysis results and the corrective actions table. The independent team discusses causal analyses that score less than 70% with the responsible MRB chair for further disposition.

Although the formal processes of CA-1 are generally sound and the apparent cause analyses within the scope of this assessment were of adequate quality, these processes are rarely used at SRNS because only 1% of issues are categorized at a high enough category to require a causal analysis. Several responsible managers and issue analysts stated that they often categorized issues as SC 3 because the workers, engineers, managers, and other subject matter experts who participate in issue evaluations that are performed per Manual 2S, Procedure 5.2, *Issue Investigations*, adequately identify the causes of performance issues that need to be resolved. Procedure 5.2, however, states that an issue investigation

determines "probable causes" and does not adequately specify when causal analyses per CA-1 are required. (See **OFI-SRNS-2**.) Additionally, SRNS engineering managers stated that they often perform evaluations that determine the causes of engineering design issues and equipment failures for SC 3 issues using processes outside the issues management process. (See **OFI-SRNS-3**.)

Per CAP-1, events at the low reporting level of DOE Order 232.2A can be categorized as SC 2, for which only apparent cause analyses are performed. However, CA-1 states that an "apparent cause analysis (ACA) does not evaluate every apparent cause of the issue, but should identify at least one weak or ineffective barrier, or unrecognized error precursor related to the problem." This guidance is contrary to DOE Order 232.2A, which requires facility managers to identify the causes (plural) of issues. (See **Deficiency D-SRNS-9**.) STAR item 2019-CTS-04029 documented an ORPS-reportable event that occurred because a component that was required to perform a criticality safety function was removed from service for preventive maintenance (PM). A subsequent problem prevented the component from returning to service, and as a result, a safety-basis-required sump-level reading for ensuring criticality safety was missed. This issue was categorized as SC 2 and an apparent cause analysis was performed, but the initial decision to remove the needed component from service in order to perform the PM was not identified as a cause of the event, and consequently, there was no associated action to address the cause.

3.2.2 Corrective Actions to Prevent Recurrence

Attachment 8.5 of CAP-1 defines an action to "Prevent Recurrence" as an action "that eliminates an identified cause of the noncompliance and/or significantly reduces the likelihood or consequence of the noncompliance." Prevent Recurrence actions must have an independent closure verification. Of the issues reviewed during this EA assessment, 47 had Prevent Recurrence actions. Of these 47, in 16 cases (34%), responsible managers selected inadequate actions to prevent recurrence. Key examples are discussed below. (See **Deficiency D-SRNS-10**.)

In STAR items 2018-CTS-08864 and 2019-CTS-02450, SRNS chose disciplinary actions as the corrective action to prevent recurrence, when the identified, needed process improvements would have been more relevant. In another example, 2018-CTS-06758, the corrective action to prevent recurrence was to increase the log sheet frequency for recording lube oil level from four hours to two hours, even though the low level had been recorded every four hours with the diesel running for hundreds of hours. A more appropriate Prevent Recurrence action was to set minimum lube oil-level readings that direct action to add oil when a set level is reached.

In F Area, responsible managers for SC 3 issues frequently use the Prevent Recurrence label for corrective actions that do not reduce the likelihood or consequence(s) of the noncompliance, as required by CAP-1. For example, 2018-CTS-008686 reported an unplanned actuation of SS 254-13F Diesel Generator A, caused by an animal intrusion on a power pole exterior to the facility. The action to reset the breaker was marked as prevent recurrence, with no documented consideration of preventing animal intrusions in the future. STAR item 2020-CTS-001287 had five actions marked as prevent recurrence, and three of them were to "reinforce expectations…" which is not an action that will result in sustained change.

3.2.3 SC 3 Corrective Action Quality

SRNS Top Cross-Cutting Issue 2019-CTS-008275 was established in part because "In general actions developed for [SC] Level 3 issues are not adequate." Of the 444 issues reviewed, 392 (88%) had adequate corrective actions documented in STAR. For example, 2019-CTS-002021, *Lead Acid Battery Preventive Maintenance for F-Area Safety Significant Engine Start Batteries*, provided a positive example of incorporating lessons-learned for existing staff, as well as future employees. However, contrary to

CAP-1, which requires corrective actions to be specific, measurable, achievable, relevant, and timely (SMART), 52 (12%) of the reviewed issues had corrective action statements that did not meet these criteria. (See **Deficiency D-SRNS-11**.) Two examples are highlighted below, and more information can be found in Appendix B.

- Issue 2019-CTS-010546, documented two operators who failed examinations in May 2019. These failed examinations resulted in an email to operations management; however, the issue was not entered into STAR until October 2019. By this time, the operators had been re-examined and progressed in the training program. Training management determined that the action in the CR to conduct an academic board would no longer serve its purpose because the operators had already advanced. The only corrective action implemented was to hold a meeting "…to prevent recurrence." The outcome of the meeting was that "further guidance …will be rolled out." None of the actions associated with the original issue were specific, measurable, or timely.

- For Issue 2018-CTS-07595, Action 6 was generated to establish expectations for assessments of permanently installed criticality blocks. This action does not address the issue that multiple MFOs, not assessments, conducted by criticality safety personnel did not identify that one mechanical blocking device was not present at a prescribed location. Also, Action 10 stated "Develop strategy to resolve legacy Safety Basis Issues." This action is not sufficiently specific, and the scope is not well defined.

The assessment team also found that some responsible managers "cascade" action items (i.e., open new action items in order to close an existing one) contrary to their responsibilities in CAP-1 to validate and close the "issue report after all corrective actions and actions supporting completion of Opportunities for Improvement (OFIs) have been closed, verified, and reviews/approvals completed." (See **Deficiency D-SRNS-12**.) For example, in 2018-CTS-8037, Action 5 evaluated and declined the need for additional training based on the presumed completion of Actions 2 (to provide a briefing) and 3 (to perform a procedure evaluation/change). The Action 3 procedure evaluation was closed by cascading to a new Action 7 to track completion of the changes. Action 7 was later closed, stating that the changes were determined to be unnecessary. After cancelling Action 7, Actions 3 and 5 were not re-evaluated for impact. The only completed action was Action 2, to provide a briefing, which was not sufficient to address the issue. In another example, 2019-CTS-07538, an action to perform an extent-of-condition review identified needed changes to two documents. A new STAR item, 2019-CTS-08754, was created to track the changes instead of tracking and closing them within the existing item.

3.2.4 Effectiveness Reviews

CAP-1 provides detailed direction for how to conduct effectiveness reviews. Per CAP-1, effectiveness reviews and MRB approval of effectiveness review reports are required for SC 1 issues, and are recommended for SC 2 issues but can be waived with MRB approval. Since January 1, 2018, no issues have been categorized as SC 1 and only 47 (1%) have been categorized as SC 2; therefore, the formal processes of CAP-1 for reviewing the effectiveness of corrective actions and for MRB oversight of effectiveness reviews are infrequently performed. For many SC 3 issues, despite the lack of a graded approach in CAP-1, responsible managers include ad hoc actions to verify the effectiveness of corrective actions. For example, targeted MFOs are successfully used to verify corrective action effectiveness of many SC 3 issues associated with worker performance issues. (See **OFI-SRNS-4**.)

CAP-1 states "The effectiveness of corrective actions to prevent recurrence is determined by assessing for recurrence of the issue and similar issues recurrence," instead of assessing recurrence of the cause of the issue. This guidance has led to inadequate, narrow reviews that do not identify weaknesses in the corrective actions to address the cause(s) of the issue. (See **OFI-SRNS-5**.) For example, an effectiveness

review for an inadvertent transfer of material caused by an operator incorrectly operating a valve (2018-CTS-08864) had a very limited condition of "No record of inadvertent transfers in H Canyon" to assess the effectiveness. This review did not assess whether another issue that documented a failure to implement the inadvertent transfer protocol indicated that the cause of 2018-CTS-08864 was still present despite the actions taken.

In the case of a partially effective or ineffective review, CAP-1 requires that the corrective action to perform the review be closed with an acknowledgment of the lack of effectiveness, that any necessary new actions be added to the STAR item, and that another effectiveness review be scheduled to address any new corrective actions. However, H Canyon responsible managers and an issue analyst stated during interviews that they sometimes pause an effectiveness review if conditions suggest that it may be ineffective, without documenting that pause in STAR. The organization is then given time to address any shortcomings prior to resuming. This practice results in missed opportunities for the organization to learn from actions that were not effective at resolving an issue.

Although CAP-1 allows effectiveness reviews to be performed in stages, none of the eight completed effectiveness reviews assessed used these stages (i.e., none performed interim effectiveness reviews before all the actions were completed) to provide timely feedback on the effectiveness of the actions taken. Additionally, the team reviewed eight issues with partially completed corrective actions, and none had completed interim effectiveness reviews. In one example where an interim effectiveness review would have been beneficial, SRNS experienced multiple hazardous energy control events; these events were categorized as a Top Cross-Cutting issue in October 2018. The effectiveness review for this Top Cross-Cutting issue was scheduled for July 2020, 21 months after the issue was identified. Although additional events occurred in 2019, no interim effectiveness review was conducted of the implemented actions to determine whether additional actions were warranted to address the cause(s) of the Top Cross-Cutting issue and these new events.

Issue Resolution Conclusions

Overall, the apparent cause analyses in the scope of this assessment were of adequate quality, although CA-1 contains language that incorrectly states that only one weak or ineffective barrier needs to be identified during an apparent cause analysis. While corrective actions for most of the reviewed issues were adequate to resolve the identified problems, responsible managers are often selecting inadequate actions to prevent recurrence and, in some cases, are inappropriately "cascading" action items. Effectiveness reviews are rarely required, and some of the assessed effectiveness reviews were overly narrow.

3.3 Timeliness and Closure

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

CAP-1 adequately defines the requirements for corrective actions and for the objective evidence demonstrating the completion of actions. Specifically, CAP-1 requires issue evaluation (e.g., causal analysis) and corrective action development to be completed within "45 days from the date of discovery" with justification for any extension documented in STAR. CAP-1 also requires that corrective actions should be SMART. Per CAP-1, personnel who have been assigned actions must attach objective evidence of completion to the STAR record, include a reference demonstrating completion, or "provide clear description of the action taken." However, 12% of the reviewed STAR entries for issues had inadequate closure documentation associated with the corrective actions or had not fully captured all the actions taken to address an identified issue. (See **Deficiency D-SRNS-13**.) This lack of documentation

can hinder future efforts to learn from the record the specific actions that were taken. Two examples are highlighted below, and more information can be found in Appendix B.

- Issue 2018-CTS-011567 details actions taken to address holes in glovebox gloves. The STAR record does not completely capture the final long-term changes implemented to address the issue. Interviews revealed that the solution evolved over time without the benefit of a formal causal analysis. The written record does not reflect the full efforts taken for analysis or final problem resolution.

- Issue 2019-CTS-03794 resulted from a major loss of power to L Area and P Area due to fiber optic cable work being performed. Action 6 was initiated to review the communication protocol between SCE&G (a utility subcontractor) and SRS for critical SCE&G work that can affect facility operations. The closure statement includes "proposed" actions, but it does not provide a definitive conclusion as to what specific corrective action was taken or provide closure evidence of that action.

The SRNS CAS group performs quarterly assessments of the CAP-1 implementation by reviewing 5% of the facility and functional area program issues closed each quarter. Based on these assessments, Top Cross-Cutting issue 2019-CTS-008275 was initiated to improve the implementation of the CAP. DOE-SR independently assesses the results of the SRNS CAS assessments. (**Best Practice**)

This EA assessment focused on issues identified from January 1, 2018, until February 28, 2020. At the time of the assessment, only 15 issues related to the four facilities were still open from 2018. Only 31 were still open from prior to 2018, and none of those older open issues were SC 1 or SC 2, indicating that SRNS is addressing most issues in a timely fashion. However, the corrective actions for some issues were not timely. Two examples are highlighted below, and more information can be found in Appendix B.

- STAR item 2018-CTS-6759 documents the second overload trip of a canyon exhaust fan in less than two months. A corrective action to address what was determined to be the likely cause was to develop PM guidance to "wipe and adjust the potentiometer for the overloads." This guidance was not developed for 15 months, and no action was performed to ensure that the wipe and adjust was done.

- Due to a change in software, K Area Complex was unable to obtain accurate data to perform a quarterly documented safety analysis surveillance to ensure that chemical inventories were below required thresholds. A software improvement was completed, but it took almost nine months to address an issue that occurred every three months; therefore, this corrective action was untimely.

Timeliness and Closure Conclusions

In general, corrective actions were completed in a timely manner. However, 12% of the reviewed issues either did not capture all actions taken to address an issue, or did not have adequate closure documentation.

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 practices were identified as part of this assessment.

- SRNS requires an independent team to review at least half of the causal analyses each month. This independent team scores the causal analyses for tracking and improving analyses and correcting low-scoring analyses. Each of the 12 sections of the causal analysis report is graded against a bulleted list of criteria, with the most weight given to the causal analysis results and the corrective actions table.

- The SRNS CAS group performs quarterly assessments of the CAP-1 implementation by reviewing 5% of the facility and functional area program issues closed each quarter. DOE-SR additionally independently assesses the results of the SRNS CAS assessments.

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 corrective action plans 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.

Savannah River Nuclear Solutions, LLC

Finding F-SRNS-1: SRNS managers responsible for nuclear safety issues are not always adequately implementing the required graded approach to ensure that they apply adequate rigor to analyzing nuclear safety issues. (CAP-1, Section 2.b(3)(b) of Attachment 1 of DOE Order 226.1B, and Requirement 16 of NQA-1, as invoked by the SRNS QAMP)

6.0 DEFICIENCIES

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Thirteen 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.

Savannah River Nuclear Solutions, LLC

Deficiency D-SRNS-1: SRNS inadequately implements NQA-1 in CAP-1 by allowing causal analyses and corrective actions for SCAQs to be limited to preventing recurrence of the specific or same issue, rather than precluding recurrence by addressing the broader scope or extent of cause. (Requirement 16 of NQA-1, as invoked by the SRNS QAMP)

Deficiency D-SRNS-2: SRNS allows facility managers to categorize reportable equipment failures as low risk, a category for which causal analysis is not required and also allows a requirement for root cause analysis to be waived without requiring other causal analysis. (DOE Order 232.2A, Attachment 1, Section 4.b)

Deficiency D-SRNS-3: SRNS has not categorized recurring failures of the safety significant plutonium fuel form low differential pressure switch as SC 1. (CAP-1, Attachment 8.1)

Deficiency D-SRNS-4: SRNS has not categorized recurring trips of the H Canyon safety class exhaust fans as SC 1. (CAP-1, Attachment 8.1)

Deficiency D-SRNS-5: SRNS has not categorized recurring issues with combustible material exceeding procedure limits for H Canyon as SC 1. (CAP-1, Attachment 8.1)

Deficiency D-SRNS-6: SRNS has not categorized the SCAQ associated with the two failures of the H Canyon safety class circulated cooling control water diversion valve as SC 1 or SC 2. (CAP-1, Attachment 8.1)

Deficiency D-SRNS-7: SRNS has not categorized the SCAQ associated with the two failures of the H Canyon B-receiver check valve as SC 1 or SC 2. (CAP-1, Attachment 8.1)

Deficiency D-SRNS-8: SRNS has not categorized the SCAQ associated with the first instance of limit blocks not being installed as required for criticality safety in L Area as SC 1 or SC 2. (CAP-1, Attachment 8.1)

Deficiency D-SRNS-9: SRNS procedure CA-1 allows apparent cause analyses of reportable events that do not always fully identify all the causes. (DOE Order 232.2A, Attachment 1, Section 4.b)

Deficiency D-SRNS-10: SRNS responsible managers for nuclear safety issues are not identifying adequate actions to "Prevent Recurrence" for 34% of the issues reviewed that contained actions to prevent recurrence. (CAP-1, Attachment 8.5)

Deficiency D-SRNS-11: SRNS responsible managers for nuclear safety issues are not consistently identifying SMART actions. (CAP-1, Attachment 8.15)

Deficiency D-SRNS-12: Some SRNS responsible managers "cascade" action items (i.e., opening new action items in order to close an existing one), instead of validating and closing the issue report after all corrective actions have been closed, verified, and reviews/approvals completed. (CAP-1, Section 4.9)

Deficiency D-SRNS-13: SRNS responsible managers for nuclear safety issues are not ensuring "that closure statements fully address all aspects of the corrective actions … and the closure documentation adequately addressed the corrective actions". (CAP-1, Section 5.8)

7.0 OPPORTUNITIES FOR IMPROVEMENT

The assessment team identified five 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.

Savannah River Nuclear Solutions, LLC

OFI-SRNS-1: Consider including more detailed criteria and/or examples to CAP-1 to aid in SC selection based on the issue management requirements in DOE directives and NQA-1, and to emphasize continuous improvement and learning organization principles.

OFI-SRNS-2: Consider improving the integration of the corrective action program of CAP-1 and the issue investigation process of Procedure 5.2 by allowing the causal analyses of CA-1 to be performed as part of the issue evaluations of Procedure 5.2.

OFI-SRNS-3: Consider including rigorous engineering evaluations (e.g., failure modes and effects analysis), performed by qualified personnel, in the graded approach for causal analyses in CA-1, as used by Bechtel National, Incorporated, at the Hanford Site Waste Treatment and Immobilization Plant.

OFI-SRNS-4: Consider implementing a graded approach for effectiveness reviews to efficiently increase the number of reviews performed for lower-risk issues, as used by Bechtel National, Incorporated, at the Hanford Site Waste Treatment and Immobilization Plant.

OFI-SRNS-5: Consider requiring effectiveness reviews for higher-risk issues to determine whether the actions have resolved the cause(s) of the issue, in addition to determining whether the issue has recurred.

Appendix A
Supplemental Information

Dates of Assessment

Remote Assessment: March – May 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
Aleem E. Boatright, Acting Director, Office of Nuclear Safety and Environmental Assessments
Charles C. Kreager, Director, Office of Worker Safety and Health Assessments
Anthony D. Parsons, Acting Director, Office of Emergency Management Assessments

Quality Review Board
John E. Dupuy
Richard L. Donovan
Robert J. Hailstone
Ruel D. Hicks (observer)
Michael A. Kilpatrick – Advisor to the QRB

EA Site Lead for the Savannah River Operations Office

Kevin M. Witt

EA Assessors

Sarah C. Rich – Lead
Frank A. Inzirillo
Joseph E. Probst
Tom E. Tankersley
Kevin L. Tempel

Appendix B
Weaknesses Noted in Individual Condition Reports

F Area	
Condition Report	Comment
2018-CTS-000201	This Site Tracking and Reporting (STAR) item reported a periodic assessment of F Canyon Complex 294-F/294-1F sand filters and the 291-F stack. The corrective actions (CAs) for this issue address the originally identified assessment gaps, but do not address the organizational behavior gap(s) of why the previously required CAs were not addressed in the corrective action program (CAP)/issues management system.
2018-CTS-001195	This STAR item reported a field review of high efficiency particulate air (HEPA)-filtered equipment and systems (HEPA Vacuums, Mac-21s, Copus Blowers). Contrary to the direction in corrective action 2 for a procedure change, the response simply states that no procedure change is required. No basis or rationale is provided for disregarding the original action.
2018-CTS-001358	This STAR item reported a field review of HEPA-filtered equipment and systems (HEPA Vacuums, Mac-21s, Copus Blowers). CA2 addresses a HEPA custodian knowledge gap by assigning a procedure to read. However, there is no reference to any training/qualification review for programmatic adequacy.
2018-CTS-001941	This STAR item reported a field and administrative review of facility routines. CA3 indicates that "guidance" was provided but does not indicate the form or whether the guidance was incorporated into any process or formal guidance.
2018-CTS-003207	This STAR item reported a review of calculations. The only action taken was to perform an "interactive briefing." While this may be the appropriate action, the CA and final closure were not timely. The STAR item was initiated on April 4, 2018; the briefing was conducted on June 19, 2018; and the STAR item was not closed until October 25, 2018.
2018-CTS-004928	This STAR item reported a potential inadequacy in the safety analysis (PISA) PI-2018-0007 - *Identification of Catalytic Generation of Hydrogen in Organic Bearing Solutions*. The action closure states that no actions were taken because "…the USQ [unreviewed safety question] for this PISA was negative." No analysis, basis, or objective evidence is included in the closure.
2018-CTS-005576	This STAR item reported that the 254-13F A train 125-volt ammeter failed calibration. This item was ORPS reportable, and although it was initiated as significance category (SC) 2 it was downgraded to SC 3. CA5 notes "prevent recurrence" but is limited to re-calibrating the ammeter. The Prevent Recurrence aspect of the action is not adequately specified.
2018-CTS-005672	This STAR item reported a plutonium fuel form (PuFF) low differential pressure switch failure. The item was originally SC 2 but was downgraded to SC 3. An additional CA is included in 2018-CTS-012276, which was linked to a third STAR item (2018-CTS-12624). This switch failure was the first of four incidents with the equipment in question. Replacing the pressure switch was credited as an action to prevent recurrence. However, subsequent equipment performance did not support switch replacement as a basis for preventing recurrence.
2018-CTS-005793	This STAR item reported an E5 exhaust fan 1 failure during a ventilation instrument loop test. The causal analysis found that there were too many attempts to restart the fan without sufficient cooldown time between starts. Of seven CAs in the record, only two actually address the issue: revise two procedures to add the cooldown time between starts, and monitor the starter operation (including

	thermography) during the next start. The action plan did not consider operator knowledge or skill gaps and any associated training gaps. Additionally, no specific actions were implemented to investigate any potential fan motor damage due to the multiple (unsuccessful) start attempts.
2018-CTS-006234	This STAR item reported issues encountered during air handling unit #2 contactor repairs. The closure describes the work management center "system," but provides no reference to any process, procedure, checklist, etc. The closure description does not provide sufficient detail to fully understand how the performance gap was addressed.
2018-CTS-006668	This STAR item reported the loss of communications to a fire panel. The CA directs, "Communicate lessons learned…to FedNet…" The associated closure statement notes that lessons learned were communicated to the FedNet Manager, but the notes do not describe what that manager did with the information. The closure rests on an open-ended handoff.
2018-CTS-007844	This STAR item reported maintenance procedure issues at the F Area facilities. CA3 is to "Provide expectations to F-Area Planners…", which was closed with a briefing. This briefing would only be appropriate for an interim action pending a more permanent process/procedure change. Additionally, the three-month delay before providing the briefing does not reflect a sense of urgency.
2018-CTS-008686	This STAR item reported an unplanned actuation of safety significant 254-13F diesel generator A. Removing a bird carcass and resetting the breaker are provided as actions to preclude recurrence. However, there is no documented consideration of modifying equipment to preclude a similar event (e.g., animal intrusion) in the future.
2018-CTS-008780	This STAR item reported an observation from a task readiness/pre-job brief. The CA calls for "training," but the closure refers to a "briefing." The closure does not provide sufficient detail as to what constitutes training (i.e., formal classroom training or a pre-shift brief).
2018-CTS-011129	This STAR item reported a 235-F shoe contamination. CA2 states, "Develop a survey protocol…" The closure lists a number of changes in the daily routine but does not explain how these changes are incorporated via a process (e.g., checklist, procedure, schedule) for sustainability.
2018-CTS-011544	This STAR item reported an indeterminate operability of the 254-13F standby diesel generator A. The final closure notes that the noncompliance report dispositioned to "USE AS IS" and no CA was taken. The ground fault was attributed to environmental conditions. The effectiveness review was deleted when the item was downgraded from SC 2 to SC 3. There is no documented evidence of considerations for insulating the equipment from environmental transients (with any associated cost/benefit considerations).
2018-CTS-011567	This STAR item reported problems with Piercan gloves. The STAR record does not specify what long-term changes were incorporated and how those decisions were reached. The efforts to address the glove issue evolved over several months. No formal causal analysis was performed. The organization relied on an evolving intuitive approach rather than using the array of causal analysis tools available. Both the documentation in the record and the approach used to address the issue reflect reticence to adhere to the formal CAP processes.
2018-CTS-012276	This STAR item reported practices for installed process instrumentation change points. This item is an additional CA required by the closure review of an earlier item (STAR-18-5672). CA2 closure states, "Determined another STAR CA needed, resulting in initiating 2018-12624." As a result, this item constitutes "cascaded" actions across three separate documents.
2019-CTS-000273	This STAR item reported a quarterly facility review of unreviewed safety question program implementation for work packages. CA2 states, "Evaluate the process to consider any action…" This action is not specific or measurable.

2019-CTS-000334	This STAR item reported issues noted in the annual fire protection building assessment for Building 235-F. CAs 2, 3, and 4 (post an email, remind workers to avoid blocking emergency vehicle access, remove a fire barrier sign, respectively) each took four months to complete. These actions were not timely.
2019-CTS-002546	This STAR item reported an F Area transuranic waste database issue. CA3 is closed to a promise ("…is to be deleted…") with no final action established.
2019-CTS-004084	This STAR item reported an expired decay correction for 235-F beta-gamma stack sources. CA5 directs that information be included in the annual training for the radiation protection (RP) department. The closure statement only says, "RP Training department has been contacted." There is no confirmation that the information has been added to the training schedule.
2019-CTS-005471	This STAR item reported the 2019 F/H Laboratory and F Canyon Complex program manager facility assessment. CA2 directs that a tickler be created to check training, which is an action to create an action. The real issue (validating delinquent training) does not have a due date. The STAR-CTS report does not include a CA to address the "why" aspect of how the employees' training became delinquent.
2019-CTS-007639	This STAR item reported a low vacuum alarm due to the E1 fan being shut off. CA7 states, "Evaluate the procedure…to define improvements…" The associated closure statement notes that Engineering recommends a revision to the procedure. There is no CA to implement the change, leaving this as an "orphan" recommendation.
2019-CTS-008425	This STAR item reported the event response and recovery for loss of instrument air at the F/H Laboratory. CA3 is closed to a promise, that the procedure will be revised. The closure statement used the term "will be" twice without noting an actual change to the procedure.
2019-CTS-010546	This STAR item reported an evaluation of academic review board execution. Operations management was notified (via email) of two operators failing fundamentals examinations on May 7, 2019. The STAR item originated on October 1, 2019, to document the failures and lack of a required academic board. The STAR item was not evaluated until October 21, 2019, by which time both operators had been retested and passed the examinations in question. The STAR evaluation stated that the "Academic Board would no longer serve its purpose" because the operators had already passed the examinations. The record also notes that training managers had a meeting to prevent recurrence, but no details were provided on the details of the actions taken, only that further guidance would be rolled out. None of these actions were timely. No details were provided, and no objective evidence accompanied the record. Finally, the item is closed to a promise of "further guidance."
2019-CTS-10922	This STAR item reported results from the 2019 Independent Evaluation Board F Area Operations integrated safety management evaluation. CAs 3 and 4 are flagged to prevent recurrence. Neither of these actions contain elements that are substantive enough (e.g., emphasize management expectations) to be expected to prevent recurrence.
2019-CTS-012611	This STAR item reported an issue with a PuFF low differential pressure switch. The action taken was to replace the switch. This item was the third issue with the switch within 18 months, and the second time the switch was replaced. Despite this history, replacing the switch was credited as an action to prevent recurrence. This STAR item was initially screened as an SC 2 with an apparent cause, but was then downgraded to SC 3 with no apparent cause. The issue occurred again four months later.
2020-CTS-000919	This STAR item reported a waste bag-out bag tear during waste removal. The record notes that new replacement bags were built, but no sustaining improvement action is recorded. Additionally, CA3

	directs that lessons learned be developed and presented. Supplying the lessons-learned information to the training department for inclusion in a formal initial or continuing program is not mentioned.
2020-CTS-001287	This STAR item reported a hut removal and installation without the necessary technical work document(s). In the STAR item, five actions are flagged to prevent recurrence. Three of the five are to "reinforce expectations…" to different groups. Only one CA noted as preventing recurrence involves a process change. Additionally, CA15 lists actions to be completed prior to release of a timeout. This action had been extended and lacked any documentation that the actions were completed prior to lifting the timeout.
2020-CTS-001995	This STAR item reported issues from the annual fire protection building assessment for Building 772-F. Two actions (both for inappropriate storage of combustible materials) were overdue. While the organizational focus and onsite staffing was impacted by COVID-19 protective measures, extending these actions should have been included in interim planning.
2020-CTS-002140	This STAR item reported an issue with a PuFF low differential pressure switch. Initially classified as SC 2, this STAR item was downgraded to SC 3. This item was the fourth occurrence of this issue in less than 24 months. The originally directed apparent cause was changed to an issue evaluation upon downgrading the issue to SC 3. The scheduled effectiveness review was cancelled at the same time. The only (non-process) CA taken was to change the calibration frequency from three months to one month. In the past 24 months, four failures have occurred with the following CAs: June 14, 2018, replaced the switch; May 28, 2019, adjusted the switch and changed the calibration frequency from 12 months to 3 months; November 25, 2019, replaced the switch; March 2, 2020, changed the calibration frequency from 3 months to 1 month. The same actions have been repeated without correcting the issue, and the causal analysis has been deleted.

H Canyon	
Condition Report	Comment
2018-CTS-00288	This condition identified an error in the design specifications for flex hoses used as product transfer jumpers. The condition was closed to a nonconformance report with no additional CAs identified.
2018-CTS-00621	This condition identified the improper storage of combustible materials. The CAs to correct the improper storage and to issue a shift order that addressed the standards that allowed the condition took three months to implement.
2018-CTS-01152	This condition identified an error in the design specifications for flex hoses used as rigid transfer jumpers. CAs to correct the design and testing requirements took six months to implement. No actions were identified to remove existing jumpers from service.
2018-CTS-01442	This condition identified a failure to meet combustible and hazardous waste storage requirements. The closure statement recommended further evaluation by Industrial Hygiene to address toxic health hazard maximum allowable quantities that exceed National Fire Protection Association Standard 400 levels. The STAR item was closed with no action to address this recommendation. Also, the action to develop training material slides stated "will be included in training in August," with no action to track.
2018-CTS-01459	This condition identified a failure to implement timely CAs associated with a needed procedure revision. The extent of condition took seven months to implement.
2018-CTS-01532	This condition was written to address errors in completing component operability checks. The CA response identified that some procedure-listed components did not exist in the field. There was no

	action to address this gap between the procedure and the field condition. The CTS item was closed without any further actions.
2018-CTS-02401	This condition was written to address the failure of a safety class component. The component failed its scheduled preventive maintenance (PM). A 4A(1) degradation of a safety significant system should be classified SC 2 and receive a causal analysis. The CA was to replace the component. No assessment was performed to increase the frequency of the PM with criteria to replace the component prior to its failure.
2018-CTS-02639	This condition was written to address a lockout/tagout valve mis-positioning error that resulted in 625 gallons of caustic draining from a tank. This condition was designated SC 3. Given the amount of caustic spilled and the fact that it spilled onto a sidewalk, this condition should have been designated SC 2.
2018-CTS-3704	This condition was written to address expired charcoal in use in radioiodine detectors. No extent of condition was performed to identify other affected detectors.
2018-CTS-04189	This condition was written to identify an incorrectly applied lockout/tagout. As a result of this issue, workers on a scaffold were sprayed with cold condensate; however, the issue was categorized as SC 3 instead of SC 2 and no causal analysis was performed.
2018-CTS-04700	This condition was written to address the trip of the safety class canyon exhaust fan #4. No cause was identified, and the trip was attributed to a contaminant on the overload potentiometer. No extent of condition was performed, and no PM item was identified to periodically clean the potentiometer. A work order for a one-time cleaning of the potentiometer took seven months to write, and the action was closed with the statement "will be scheduled to work at a later date."
2018-CTS-06670	This condition identified an error in the design specifications for components associated with air purge jumpers. CAs took over a year to implement, including briefing of engineers and required reading for other affected organizations. Also, the required reading action was to issue rather than to document completion.
2018-CTS-06758	This condition was written to identify the performance degradation of a diesel generator to perform a safety class function. The CA to increase a monitoring frequency from four to two hours missed the fact that the decrease in lube oil level had occurred over several hundred hours of operation. Also, the causal analysis identified a fuel filter reduced flow with no actions to address.
2018-CTS-06759	This condition was written to address the trip of the safety class canyon exhaust fan #1. No cause was identified, and the trip was attributed to a contaminant on the overload potentiometer. The performance of a PM item for the other three fans was closed to revised work orders. There was no action to track scheduling or completion.
2018-CTS-07974	This condition was written to address work performed on a safety class canyon exhaust fan #1 under a general service work package. The response to CAs that specifically called for an evaluation of the removal oil used and the deburring of the fan shaft did not address the issues. The removal oil used was closed to a vendor recommendation without a follow-up CA, and the deburring of the fan shaft was closed to a determination that the clutch was safety class, with no mention of the maintenance technique used to debur the fan shaft.
2018-CTS-08378	This condition was written to address the functional test failure of the safety class B air receiver check valve. The cause was determined to be contamination in the system. A 4A(1) degradation of a safety significant system should be classified SC 2 and receive a causal analysis. Engineering determined that the material in the check valve consisted of "rust particulates and a filler material

	consistent with pipe dope (thread sealer)." No action was identified to address contaminants in the system. In addition, it took seven months to implement compensatory actions.
2018-CTS-08864	This condition was written to address a valve mis-positioning error that resulted in the unintended transfer of 3,850 pounds of aluminum nitrate to the wrong tank. A common cause analysis was performed instead of an apparent cause analysis. The common cause analysis included STAR items 2018-CTS-02639, 2018-CTS-08864, and 2018-CTS-09168. A separate STAR item, as required by Manual 22Q, Procedure CA-1, Section 5.4, was not written to document the common cause. In addition, there was no action in 2018-CTS-08864 directing a common cause, and the three CAs identified in the common cause were not entered under any STAR item. An effectiveness review was performed for the event identified in the STAR item but not for the common cause. Procedure CA-1 requires an effectiveness review for any SC 2 common cause. The effectiveness review that was performed used a very narrow criteria to determine effectiveness, specifically the criteria was "no records of inadvertent transfer in H Canyon." This effectiveness review did not identify STAR item 2018-CTS-11016, which was written within the review window, as an indication of a lack of effective actions. That STAR item noted that deficiencies were identified in the implementation and execution of the inadvertent transfer protocol.
2018-CTS-09168	This condition was written to address a mis-valving event where water for acid stripping of an evaporator was sent to the wrong tank. Although categorized as SC 2, no causal analysis was performed. Credit was taken for the common cause performed under 2018-CTS-08864, but this approach was not identified in any CA response. It took over five months to review the procedure and implement "immediate" procedure changes. An effectiveness review was performed only for the event identified in the STAR item but not for the common cause. The effectiveness criteria looked only at Occurrence Reporting and Processing System (ORPS) reportable events for similarity. Additionally, the effectiveness review did not identify STAR item 2018-CTS-11016, which was written within the review window, as an indication of a lack of effective actions. That STAR item noted that deficiencies were identified in the implementation and execution of the inadvertent transfer protocol.
2018-CTS-11016	This condition was written to address a failure to implement the inadvertent transfer protocol. The CA1 closure statement stated that the H Canyon Management Review Board developed CAs and made action assignments, but there was no documentation of these actions or mention of how they were to be tracked.
2018-CTS-12189	This condition was written to address poor command and control for controlling personnel, who required monitoring in accordance with radiological control procedures when exiting the radiological buffer area boundary. It took over six months to issue a memorandum reinforcing management expectations for emergency response.
2018-CTS-12335	This condition was written to address a failure to enter the applicable safety basis control (evaluation of the safety of the situation operating requirement 2) in response to out-of-specification readings on two safety significant vessel air purge rotameters. Two of the five Prevent Recurrence actions, which involved developing training materials, lacked specifics as to what the training would contain. An action to conduct scenario-based training did not identify what types of scenarios. The closure just stated that scenario-based training was scheduled. The training to reinforce knowledge of safety basis requirements also lacked specifics, even though the causal analysis was specific as to knowledge issues that required reinforcement. The closure only stated that safety basis training was scheduled.
2018-CTS-13175	This condition was written to address the adequacy of procedures associated with transient combustibles. Two CAs involved the issuance of a procedure change request (PCR). However, these actions do not affect procedure quality. They are requests for which there is no control over their implementation once the CA item is closed.

2019-CTS-01061	This condition was written to document errors in the content of a procedure. Action 4 to revise procedures was closed to a PCR. The CA to perform an extent of condition was not implemented for eight months. The extent of condition identified 46 procedures needing a PCR. The action was closed with no additional actions to address the extent of condition.
2019-CTS-01076	This condition was written to address an incorrectly installed software temporary modification in a computer. There was no action to address the error, adequacy of the installation procedure, or actions to implement controls when installing software temporary modifications. The issue was "corrected on the spot" and the shift technical engineer installed the correct software temporary modification.
2019-CTS-01954	This condition was written to address operators not performing work instructions as written. As a result, a required post maintenance test (PMT) was not performed. The CA was to provide a shift order three months later to remind personnel to perform PMTs as required by work instructions, which was untimely given the frequency at which PMTs are performed. There were no other actions.
2019-CTS-02287	This condition was written to address an improperly applied lockout/tagout. The actions do not address the fact that the lockout/tagout installation error was identified by workers ready to go to work (i.e., the last line of defense). Actions for a shift order and increased management field observations (MFOs) with checklists were assigned a due date three months out. Because there were no other actions to immediately address the issue, this action is untimely.
2019-CTS-02450	This condition was written to address the exit of a limiting condition for operation (LCO) for a diesel when the diesel was not aligned to provide power. A compensatory action to issue a shift order to communicate the protocol for exiting LCOs took over two months to implement. The only Prevent Recurrence action for this issue was disciplinary action.
2019-CTS-02557	This condition was written to address the fact that instruments found not to meet reliability targets were not evaluated by Engineering to address calibration frequency or instrument replacement in accordance with procedure requirements. Actions were closed without meeting recommendations, such as submitting procedure changes, changing procedures or requests to shorten calibration frequencies, or shortening calibration frequencies.
2019-CTS-03525	This condition was written to address an instance in which the shift operations manager provided incorrect direction to operate equipment. A valve was repositioned versus having an administrative lock removed. The cause was attributed to a mental lapse. This event was one of a number of equipment mis-operations over the past year. The only CA was to reposition the valve, with no action to address the trend for equipment mis-operations.
2019-CTS-04029	This condition was written to address a missed sump-level reading that was required to implement a criticality safety double contingency analysis action. The reading was being taken visually from a crane, as an alternate to an out-of-service indicator. In between readings, the crane was taken out of service for a PM. When a problem prevented the crane from being placed back in service, the next reading was missed. No CA was initiated to address the decision to take the crane out of service.
2019-CTS-04030	This condition was written to address an incorrect sequencing of valving for a lockout/tagout to isolate and drain a steam system. It took five months to issue a lessons learned to all involved in the lockout/tagout.
2019-CTS-04259	This condition was written to address a condition where workers performing a maintenance activity removed incorrect control jumpers/wires, resulting in the unexpected loss of power to damper controls. Actions did not address all identified causes. The adequacy of work instructions and the misinterpretation of instructions were not addressed. Also, it took three months to communicate lessons learned.

2019-CTS-05603	This condition was written to address work on electrical conductors with degraded insulation, using work instructions intended for conductors with intact insulation. It took three months to distribute the briefing/training material. There were no actions to follow-up or ensure that training was conducted.
2019-CTS-03866 2019-CTS-06274	This condition was written to address the adequacy of a procedure to initiate fissile material tracking. A similar issue in item 2018-CTS-03866 stated that an action was to be added to 2019-CTS-06274. However, an action was not added as stated in 2019-CTS-03866.
2019-CTS-06865	This condition was written to address fire protection inspection issues, especially those that have been previously identified (mainly combustible material storage). An action to implement a database for open items does not address tracking and trending, or establish any metrics with thresholds for escalated action. Combustible material storage has been an ongoing issue at H Canyon. Causes identified included not setting and maintaining standards and expectations. It took seven months to complete the briefing to reinforce standards. There were no actions, such as targeted MFOs or increased inspections, in the interim.
2019-CTS-07294 (See: 2018-CTS-04700 2018-CTS-06759)	This condition was written to address the trip of safety class canyon exhaust fan #4. Power was also lost to fan lights and alarms. Although the cause was not known, it was assumed that the adjustable fan overload trip setting needed to be set to the high end of its range. No references were included to the trips of fan #4 and fan #1, during the previous year, or to the effectiveness of actions associated with those trips. In addition, no extent of condition was included for other fans dealing with adjustments of overload settings. There was also no action to address the loss of power to fan lights and alarms, which would not ordinarily be caused by an overload trip.
2019-CTS-07435	This condition was written to address inadequate vessel 11.1 air purge for hydrogen dilution. During rounds, it was discovered that two or three safety significant rotameters were reading less than required values. A 4A(1) degradation of a safety significant system should be classified SC 2 and receive a causal analysis. No actions were identified to address the cause of low flow other than purge of lines. A similar event occurred in November 2018 with vessel 10.2 (2018-CTS-12335).
2019-CTS-07665	This condition was written to address an incorrect application of a lockout/tagout. A maintenance first line manager identified a breaker to be locked in the closed position, as opposed to the required open position. Training was not completed until eight months later, with no compensatory actions in place. An action to address the use of breaker clips resulted in a response with no specific direction or procedure guidance, but with a list of approved clips. No reference was made to the hazardous energy Top Cross-Cutting site issue identified in October 2018 and the effectiveness of CAs (2018-CTS-11240).
2019-CTS-07702	This condition was written to address operators not performing work instructions as written. As a result of this issue, a required PMT was not performed. The only CA was to issue a shift order to remind personnel to perform PMTs as required by work instructions. The same condition occurred five months earlier (2019-CTS-01954) with the same CA. The shift order from that occurrence was issued six weeks before this event.
2019-CTS-08093 2019-CTS-08131 2019-CTS-13086	This condition was written to address the improper storage of combustible materials. In addition, excessive combustible materials cited in previous inspections were not corrected prior to the next inspection. Storage of combustible materials and failure to correct previous deficiencies have been repeat issues. However, there was no action to address repeat occurrences. The only CA was to add an entry in shift orders reminding personnel to correct inspection deficiencies. There was also no reference to the previous occurrence (2019-CTS-06865) and the adequacy of those CAs.
2019-CTS-08279	This condition was written to address one of two required redundant communications lines in the H Canyon control room that was out of service for several months. The CTS item also addressed a failure to make a log entry on a separate issue. The CAs addressed the log entry issue, but contained

	no actions to address the out-of-service communication line or the significant period of time that it was out of service.
2019-CTS-08288	This condition was written to address single-point lockout/tagout database inaccuracies when compared with field conditions. The cause highlighted not maintaining and auditing the database. A CA to issue required reading to shift operations managers and first line managers took four months to distribute. There was no action to ensure that required reading was completed. No reference was made to the hazardous energy Top Cross-Cutting site issue identified in October 2018 and the effectiveness of CAs (2018-CTS-11240).
2019-CTS-11074	This condition was written to address a safety class circulated cooling water diversion valve failure. A 4A(1) degradation of a safety significant system should be classified SC 2 and receive a causal analysis; this issue was classified as SC 3 with no causal analysis.
2019-CTS-11270/ 11272	These conditions were written to address lockout/tagout disagreements between the electronic database and the field. There were no actions to perform an extent of condition by increasing the sample size of the audit. In addition, there were no compensatory actions to address the adequacy of protection for ongoing work. No reference was made to the hazardous energy Top Cross-Cutting site issue identified in October 2018 and the effectiveness of CAs (2018-CTS-11240).
2019-CTS-13810	This condition was written to address work that was performed in conjunction with a lockout/tagout order that did not include documentation showing that the workers had signed on to the tagout. An action for lessons learned was "submitted to the site" with no direction as to who should receive it or by when. No reference was made to the hazardous energy Top Cross-Cutting site issue identified in October 2018 and the effectiveness of CAs (2018-CTS-11240).

K Area	
Condition Report	Comment
2018-CTS-00590	This condition was written to address the automatic actuation of a safety significant standby exhaust fan in K Area. The fan automatically actuated as designed due to conditions in the ventilation system, not due to a failure of the fan or its actuation system, yet it was downgraded from SC 2 to SC 3. Lacking a more thorough and rigorous analysis of the cause of this reportable event, the only CA was to place a caution tag on the door and write a shift order to encourage people to close the door slowly to avoid actuating the safety significant standby exhaust fan.
2019-CTS-06225	Several materials were found to be stored improperly. One action was to brief personnel on the issues found, with a deliverable to attach the slides from the briefing. Although an attendance roster was attached, the slides were not.
2019-CTS-06233	Due to a change in software, K Area Complex was unable to obtain accurate data to perform a quarterly documented safety analysis surveillance to ensure that chemical inventories were below required thresholds. A software improvement was completed, but it took almost nine months to address an issue that occurred every three months; therefore, this resolution was untimely.
2019-CTS-07180	Two findings from an assessment were not entered into STAR so that actions could be assigned and taken. The CA to put the two findings into STAR took four months to complete, further delaying action.
2019-CTS-08317	Several issues with operating logs were written in this STAR item. One issue, that one operator position was not routinely logging changes in equipment status, did not have an action created to address it.

2019-CTS-08352	The 2019 K Area program manager facility assessment identified that not all currently assigned facility personnel in K Area Complex were receiving nuclear criticality safety training as required, for the third year in a row. Although action was taken to address the reason why this issue was not corrected after the first instance, that action was not documented in STAR.
2019-CTS-11528	A lockout/tagout was installed on the incorrect circuit breaker. An action to address the cause, by ensuring the consistent use of nomenclature, was scheduled to be completed more than six months later.
2019-CTS-12176	During maintenance inside a glovebox, the glass cracked after being accidentally struck with an object. The cracked glass was not able to perform its design function when required to be operable for nuclear safety, so the issue was reportable under ORPS criterion 4A(1). Although initially screened as an SC 2 issue, this item was downgraded to SC 3. All actions taken corrected the broken glass, but none addressed the cause.

L Area	
Condition Report	Comment
2018-CTS-00810	A monthly hazardous energy control (lockout/tagout) assessment identified the need to evaluate a discrepancy between the site operations standardized tools (SOST) database and Procedure 8Q-32, *Hazardous Energy Control*, which resulted in a suggested procedure change. This action was closed by only referencing (cascading to) a previously identified open item 2017-CTS-00848.
2018-CTS-01100	This issue involves a walkdown of HEPA-filtered equipment used in radiologically contaminated areas. The action 2 closure statement was inadequate and was closed with future actions scheduled but incomplete. The action 3 description to "update inventory" lacks specific detail. The action 4 description to "update user log" lacks specific detail, and the closure statement lacks documentation.
2018-CTS-01102	HEPA-filtered equipment used out-of-date filters that were not tagged out of service. The CA ensured that the affected equipment was tagged out. However, this action was an immediate compensatory action. There was no action that would remain open to ensure that the equipment is brought back into compliance and returned to service. Furthermore, there was no action to address the programmatic deficiency that allowed the filters to become out of date without detection.
2018-CTS-01377	Contrary to Savannah River Site nuclear criticality safety manual SCD-3, several design changes were approved and/or field implemented in 2017 that had not received criticality safety review/concurrence. Further review of these design changes indicated that all but one did not potentially impact criticality safety. The one that did was sent to Criticality Safety for review, and concurrence has been received (corrected on the spot). A potential criticality safety deficiency should have been categorized higher than SC 3. Also, no actions were assigned to determine the cause or CAs to address the programmatic deficiency.
2018-CTS-02889	The review of Shift X4's preparation of turnover checklists identified that the off-going facility operator did not initial/sign in the spaces provided to indicate completion. Action 2 was to discuss turnover expectations with Shift X4, as well as discuss a recent ORPS-reportable event (elsewhere on site) involving failure to enter an LCO where poor turnover process rigor led to an error. The briefing was not provided to the other shift workers, who also could have benefitted from those topics.
2018-CTS-03237	Operations personnel identified a cask handling procedure error that prevented execution as written. The procedure review process for a previous revision did not identify unintended changes.

	Action 2 initiated a shift order to suspend the use of cask and fuel handling procedures until an extent of condition is completed and the procedure is released by facility management. The closure statement identified a new issue 2018-CTS-003527 for additional actions, instead of addressing them within this current issue. Action 5 evaluated configuration management of graphics inside procedures, resulting in a draft procedure revision. The action was closed to the draft revision, instead of waiting until the revision was completed and issued. Action 9 was to issue a lessons learned "to applicable L Area personnel," which is not specific enough to determine all intended personnel.
2018-CTS-04194	Fifty-eight new surveillances were created and issued into the technical safety requirement Surveillance Test Database (STD) without the correct review, approval, and documentation per procedural requirements. Action 2 was to develop and present a briefing to engineers on how to request proper access level to the STD, and that the surveillance test change request form is the proper means to request modifications to the STD. This briefing material should also be added to Engineering training/qualification for new engineers joining the organization in the future.
2018-CTS-04195	A system engineer obtained access to the STD without proper authorization. Access to the STD is controlled in accordance with site engineering manual procedures. Action 2 developed and presented a briefing to engineers on how to request the proper access level to the STD. This issue is similar to 2018-CTS-04194. A briefing was performed, and this briefing material should be added to Engineering training/qualification for new engineers joining the organization in the future.
2018-CTS-04722	An alert alarm was received on an area radiation monitor (ARM), which is a fission product gas detection system used to detect criticality incidents and alert personnel to evacuate to minimize exposure. The low or alert alarm is set to alarm on a minimal rise in radiation levels above background. Multiple actions involved troubleshooting, inspections, and evaluations by Engineering, electrical and instrumentation mechanics, Operations, and the radiation monitoring equipment shop. Because no problems were identified with the unit, Engineering recommended that the unit be made available for return to service. This troubleshooting/evaluation of a safety class/safety significant component was performed outside of a controlled/documented work package. Subsequent work involving the swapping of ARMs was performed under a work order. If the entire effort had been performed under a work order, then all activities would have been controlled and documented in one place.
2018-CTS-06177	An MFO review of an engineering calculation identified that an input was not clearly identifiable at the point of use within the calculation. The discrepancy was corrected when dispositioning comments. Multiple issues related to deficiencies in engineering calculations were "corrected on the spot," with no evidence of trending for common cause or more significant CAs.
2018-CTS-07170	Design change documents were not properly tracked to verify that revisions are incorporated into the impacted technical baseline documents. The action description is just the default boilerplate statement and was not updated to include the specific action(s) for this issue.
2018-CTS-07283	A required mechanical blocking device at the end of a monorail was not installed. The only CA for a missing criticality control blocking device was a "corrected on the spot" activity to install it. This issue was incorrectly categorized as SC 3 instead of an SC 2 issue, with no causal analysis performed

	to determine why it was missing or how to prevent recurrence.
2018-CTS-07595	A walkdown of the emergency basin storage of NRU/NRX fuel baskets showed that one mechanical blocking device (criticality block) was not installed. There was no link or reference to related issue 2018-CTS-07283, which implies that it was an independent event. Two previous assessments missed that the permanent criticality block was not installed. A missing criticality safety control should warrant a higher SC than SC 3. Action 2 closure wording conflicts with the issue statement, introducing confusion as to whether a criticality block was actually missing. The issue does not specify whether or when the missing criticality block was installed. Action 6 was to determine expectations for assessments of permanently installed criticality blocks. Multiple MFOs (not assessments) conducted by criticality safety personnel, related to the functional performance of mechanical blocking devices, did not identify that one mechanical blocking device was not present at a prescribed location. A new formal assessment was created to conduct a field walkdown of all mechanical blocking devices as prescribed per procedure. There is extensive discussion and actions related to "as found" field assessments versus actions to address positive procedural control (or lack thereof) over installation and removal of criticality blocks in real time. Action 8 involved a briefing "for personnel," addressing proper notifications during discovery of an event. Because the action did not clearly specify the recipients of the briefing, the closure document cannot accurately confirm that the entire intended audience was briefed. Action 10 stated "Develop strategy to resolve legacy Safety Basis Issues." This action is not sufficiently specific, and the scope is not well defined.
2018-CTS-08037	During handling, a fuel cask contacted the three-ton auxiliary hoist chain bucket. Supervision for the critical lift became complacent and was not attentive at the end of the lift. Action 5 evaluated and declined the need for additional training based on the presumed completion of actions 2 (briefing) and 3 (procedure evaluation/change). The action 3 procedure evaluation was closed by daisy-chaining to a new action 7 to track completion of the changes. Action 7 was later closed stating that the changes were not necessary. When that decision changed, actions 3 and 5 were not re-evaluated for impact. The cascading of action 3 to action 7 for completion contributed to the currently indeterminate state of this issue's evaluation and closure.
2018-CTS-09870	A necessary step in a fuel processing procedure was incorrectly marked "NA" (not applicable). This issue was caused by a transcription error while customizing the procedure. Action 3 shared lessons learned with shift operations managers and first line managers. However, the action statement did not include the operators.
2018-CTS-11931	This issue resulted from a finding by a U.S. Department of Energy – Savannah River Operations Office assessment of the Savannah River Nuclear Solutions, LLC (SRNS) response to the discovery of a missing criticality safety block. There was no link or reference to related issues 2018-CTS-07283 and 2018-CTS-07595. The finding stated that the issue investigation did not identify any actions to prevent a repeat of that occurrence. This issue was subsequently downgraded from SC 2 to SC 3 (with DOE concurrence), which precluded the requirement for actions to prevent recurrence or an effectiveness review. The SRNS Independent Evaluation Board performed a focused evaluation that also recognized the severity of the event, the repetitive instances, and the lack of a rigorous and well-documented corrective action plan.
2018-CTS-12454	This issue involved an error in recording the proper measurement and test equipment calibration due date in a procedure. Action 1 stated "Describe the Action Taken to Correct or Mitigate the Issue," which was the default

	boilerplate at issue initiation and was not updated with the specific action for this issue. The action was identified in the closure statement. The closure evidence was not attached because the corrected, completed procedure could no longer be located in the records management system.
2018-CTS-13368	The issue involved an incorrect response to a Kanne (tritium air monitor) alarm in L Area on backshift. Action 5 to "brief personnel on the importance of proper communications" was not specific as to the intended briefing audience or topic. Action 7 to revise a procedure was closed by only incorporating the required changes into another open issue, 2018-CTS-001869, which already existed for unrelated changes to the same procedure. This action should have remained open until the procedure change was completed.
2019-CTS-00474	The issue involved the delayed and inadequate response to a sump high-level indication. The issue investigation report states that there was a "latent organizational weakness" because a similar sump-level indicator in K Area "was found de-energized a few months ago and there was no communication to L-Area." There were no CAs related to this identified issue. Action 5 was initiated to evaluate whether a simple radiological screening analysis of the sump water sample was adequate, instead of the currently required full suite of laboratory analyses prior to release of sump contents. The closure statement indicated agreement with the change, but no action item was initiated to track or document the necessary procedure change to implement the process change. Action 7 stated "Develop and issue lessons learned from this issue," which is not specific as to lessons-learned content or intended audience. Action 8 evaluated and implemented the installation of an electronic rounds review software capability on designated managers' computers, but did not include any action(s) to address the expectations to ensure that the software is properly used.
2019-CTS-00503	Two electrical and instrumentation mechanics were not up-to-date on required Resource Conservation and Recovery Act training. Action 3 was for maintenance management to work with training personnel to ensure that the qualification standard is up-to-date and that it addresses the scheduling of required training to correct/eliminate this problem. The closure statement addressed the specific training deficiency of the two identified mechanics but did not address the action description to address the broader qualification standard deficiency.
2019-CTS-01837	A change to a work package specifying the travel path for the relocation of bucket storage racks (of poly material) was not routed for approval through Nuclear Criticality Safety Engineering. The work planner was unfamiliar with criticality steps in a work package. Action 3 involved a directive to Construction Engineering to provide notification of any changes to work packages. A directive is not sufficient to ensure that this notification is performed, instead of an appropriate procedure where this requirement could/should be specified. Action 5 evaluated the extent of condition for any other documents that required changes to criticality steps. The extent-of-condition review looked back less than two months, which is not extensive enough to perform an adequate evaluation.
2019-CTS-02336	Thirteen spent fuel project work packages were identified as not being in the electronic document workflow system (EDWS) and are considered to be lost. These packages were safety significant/safety class and must be processed as record documents. The lost work packages were recreated as the quality assurance record. The closure statement indicated that once all approvals are obtained, these recreated work packages "will be" processed to

	document control and into EDWS for storage. The action should not have been closed until it was complete. The closure statement also indicated that the site was moving to an electronic work package system, and the issue "will be" resolved. "As these documents have already been (re)created, there is no need for an Action Plan at this time." However, no interim compensatory actions were identified to prevent recurrence prior to implementation of the electronic system, and there were repeat occurrences of lost work packages during that time (2019-CTS-006462).
2019-CTS-03563	Fuel stored on row R was not properly isolated due to adjacent row Q not having temporary criticality blocks on the north and south ends per SOP-DHS-095-L. The cause of this issue was that the fuel handling procedure provided less than adequate guidance on where to install the mechanical blocks. Additionally, the requirement for having criticality blocks installed for adjacent rows was not adequately discussed during the pre-job briefing. The cause of this issue was inadequate preparation for an infrequently used evolution in conjunction with a new configuration. (Improper criticality block utilization is a repeat issue from 2018.) Action 5 was initiated to identify actions to prevent recurrence. It was closed "because not required for SC2 issues." However, action 12 also required actions to prevent recurrence as part of a noncompliance tracking system (NTS) commitment. Actions 8, 9, and 11 were identified in action 12 closure as the CAs to prevent recurrence. The closure statements for actions 5 and 12 are in conflict. Furthermore, there was no intent to identify any actions to prevent recurrence for this important repeat issue, until driven to do so by an external NTS requirement. Action 6 determined the need for a status board for criticality blocks. The closure statement did not indicate completion of the action and should have remained open until the status board was installed. Action 8 was to revise two procedures for "improvement and consistency," which was not specific. The closure statement provided extensive detail that should have been provided in the initial action description. Action 9 implemented the two procedure changes, which included a thorough briefing and written examination. Due to the significance of the issue, this training material should also be incorporated into the new operator, first line manager, and shift operations manager training and qualification programs. Action 10 specified to either revise fueling procedures with similar criticality steps or place procedures on hold. Some procedures were revised, some were deactivated, and some were placed on administrative hold. Placing procedures on hold is not a relevant or timely CA for this deficiency.
2019-CTS-03597	A truck driver backed a cask trailer into the transfer bay and the bumper of the trailer contacted and wedged on the top of a nearby piece of equipment. A spotter used hand signals to communicate with the truck driver, who misinterpreted the signal to stop due to a glare and light transition from outside to inside the building. Action 1 was to evaluate whether training is necessary for spotters for proper hand signals. The closure statement offered a discussion on various training topics and suggestions, but did not provide a definitive conclusion. Action 2 was to evaluate the use of additional spotters or redundant communication. The closure statement referenced the current STAR issue number as documenting the evaluation, but the topics of additional spotters and alternate means of communication are not addressed within this action closure, or elsewhere within this issue. Action 5 was to evaluate the use of additional lighting inside the transfer bay. The closure statement did not provide a definitive conclusion. Action 7 was to complete a "spotting" roles and responsibility extent-of-condition review and incorporate needed actions for Transportation, Construction, and Operations. The closure statement does not provide a definitive conclusion. If training is necessary, then specifying who needs the

	training, what training is needed, and an action/closure that accomplishes this training, should be included.
2019-CTS-03794	This issue resulted from a major loss of power to L Area and P Area due to fiber optic cable work being performed. The event was ORPS reportable due to "A facility operational event which resulted in an adverse effect on safety." The issue was subsequently downgraded from SC 2 to SC 3. Per Manual 22Q, Procedure CAP-1, SC 3 is intended for issues with "minor impact on safe/secure facility operations" and "Corrected on The Spot (COTS) findings." However, this event was more significant. Action 6 was initiated to review the communication protocol between SCE&G (a utility subcontractor) and Savannah River Site for critical SCE&G work that can affect facility operations. The closure statement includes proposed actions but does not provide a definitive conclusion as to what specific CA was taken or provide closure evidence of that action. Action 7 requested an evaluation of bringing an emergency generator online. However, the brief evaluation documented in the closure statement was not a thorough/formal engineering evaluation.
2019-CTS-03921	An MFO identified that legacy basin coupon material was improperly installed on the monorail near the deposit and exit canal/vertical tube storage (VTS) - row 12. Procedures prohibit material being stored from the monorail in VTS. This type of event had previously occurred, as documented in 2019-CTS-02888, and so a CA more significant than "Corrected on the Spot during MFO" would be appropriate to prevent further recurrence.
2019-CTS-05444	Contrary to the requirements specified in Standard 15060 and Manual 1Q, Procedure 10.1, American Society of Mechanical Engineers B31.3 examinations were performed by a non-qualified mechanic. The mechanic had completed the required training and had the appropriate task qualifications, but the AQM B31.3 Qualification Card was not complete prior to performance of the examinations. A process should be in place (pre-job brief procedure/checklist, etc.) to ensure that personnel are properly trained and qualified prior to each task assignment. The pre-job check for qualifications was not effective in this case, and there was no action(s) to address that.
2019-CTS-06462	Two spent fuel project work packages were identified as not being in EDWS and are considered to be lost. These packages were safety significant/safety class and must be processed as record documents. This is a repeat issue (ref. 2019-CTS-02336) with nearly verbatim problem description, actions, and closure statements. Effective CAs or interim compensatory measures for the previous event could have prevented this recurrence.
2019-CTS-07400	An assessment identified numerous documentation deficiencies within the Shift Manager's operating logbook. Identified causes included a lack of awareness of the requirements for all activities to be logged. The action 2 statement simply said "Attach training documentation and rosters." The action description lacked specificity, and the closure statement, while identifying the type of training provided, did not identify the recipients. Numerous additional actions involved personnel briefings on changes to procedures and management expectations. The action descriptions and closure statements were not specific as to the target audience.
2019-CTS-07401	An assessment revealed that 38% of applicable STAR record events were found to be related to operations communications and turnover. These repeat conditions do not meet management expectations of performance. Action 4 concerned procedure revisions that were not being successfully communicated to shift

	personnel prior to implementation. The PCR form provides a systematic means to evaluate and specify necessary training/briefing for affected personnel prior to procedure change issuance. This process is not being used effectively.
2019-CTS-07538	An assessment determined that two mechanics who performed asbestos work were not qualified as asbestos workers and did not meet training requirements. Action 3 was to conduct an extent-of-condition review of training and qualification documents, but did not specify the scope of documents to be reviewed. A new STAR item, 2019-CTS-008754, was created to track identified changes to two documents, instead of tracking and closing them within this existing item. Furthermore, there was not an action item assigned to track completion of all identified incomplete asbestos worker qualifications (specifically those lacking a medical surveillance). Action 5 was assigned to "review recent issues to determine if there was a common cause." The action description was not specific as to what types or categories of recent issues were to be reviewed. The closure statement said "…this has been communicated several times…", which does not indicate a successful outcome. A more appropriate and effective action is necessary.
2019-CTS-10143	The issue involved inadequate management of the change process for a fuel handling procedure with criticality safety key attribute steps. A revision resulting in an increase in scope raised a concern that the current steps might not be fully compliant with requirements. Action 4 evaluated the L Area procedure change process to make it robust. The closure statement identified two new actions, but these actions were not added as new actions within this issue to ensure that they were effectively managed. Sub-Action 1: When a PCR is initiated that proposes changes to wording in a criticality step or a safety basis step, the step will be evaluated upfront to determine whether there is a potential noncompliance in the current version of the procedure. This evaluation will be facilitated by bringing the PCR to the procedure improvement meeting, where it can be reviewed with the proper team (e.g., Criticality, Engineering, and Operations). This evaluation process is an informal practice with no long-term certainty. It would be more appropriate to incorporate this evaluation or an equivalent action into a more formal procedure or process. Sub-Action 2: Procedure revision reviews that go beyond Draft C will be reviewed by the procedure owner or designee for scope creep. This action is not relevant because scope creep can occur at any point in the process.
2019-CTS-10629	Contrary to the requirements of Manual 1B, Procedure 3.32, four essential documents (drawings) could not be located in the L Area control room. The primary concern of a missing essential drawing is the inability to support the response to an abnormal/accident event. Document Control management indicated that similar situations have been identified at other locations on site. (Ref. Assessments 2017-SA-001816, 2017-SA-003903, 2019-SA-002072, 2019-SA-003566, and 2019-SA-003580). A good recommendation was included in the problem description section for additional action to address the sitewide problem, such as discussion and consideration by the Facility Managers Forum and possibly even addressing the issue as a separate opportunity for improvement in STAR rather than in this finding. However, there was no documented action taken to further pursue that effort.
2019-CTS-10853	A DOE assessment finding identified that an issue review did not address all key issues associated with the event, necessary documentation was not available at the issue review, and some key personnel were not present. Action 3 was to perform an effectiveness review in accordance with 22Q, CAP-1. However, no effectiveness review was performed because the issue categorization was downgraded from SC 2 to SC 3, and no effectiveness review is required for SC 3. The DOE statement "no action has been

	taken as a result of past feedback" indicates that an effectiveness review may have been beneficial in this case.
2019-CTS-11439	There were deficiencies with an L Area pop-up barricade requisition/purchase order approval process. A followup with Procurement Management for the delivery status of the barricade led to the discovery that the submittal package, review, and approvals were not sent to the vendor. Action 2 was for senior management to evaluate and identify improvements needed to track correspondence from the supplier to ensure that it is acted on in a timely manner. The actions or practices described in the closure statement did not identify any programmatic requirements documents to ensure that these activities are actually implemented on a routine basis. Action 3 was to communicate lessons learned when creating procurement requests to identify significant contract performance milestones on the requests. The closure statement indicated that the issue was communicated to Procurement Supply staff, and backups had been assigned among the staff. The backup capability allows any Procurement Supply buyer to access each other buyer's purchase orders. It is not clear that the closure statement adequately addressed the action description (no closure documentation mentioned), instead the closure statement discussed an action unrelated to the action description.
2019-CTS-11552	The Radiation Generating Device (RGD) Custodian did not print and provide an RGD operator listing to Radiation Protection personnel during the inspection and survey as required per procedure. The RGD Custodian was not aware of the need for a personnel listing. The action description was not updated from the default boilerplate statement to provide the specific actions associated with this issue.
2019-CTS-12202	This issue involved the incomplete implementation of a design change package (DCP) to isolate the domestic water booster pump. Components were mistakenly removed from the isolated (abandoned) portion of the piping system without a design change to appropriately reflect the new configuration. Personnel assumed that because the equipment was abandoned in place, it was okay to remove if necessary, without stopping to address design documents. The Action 3 closure statement provided a long discussion referencing existing procedural requirements that are intended to prevent this type of event. No actions were identified to ensure that those existing requirements are implemented. Action 4 evaluated the maintenance work package, including specific instructions when a DCP is involved. The closure statement identified that the Work Control group "has agreed to" put all the specific DCP implementation items in the maintenance instructions. However, a documented requirement is a more effective CA than "an agreement."
2019-CTS-12852	Two "Caution Radioactive Material" tags were discovered that were not updated during the last routine survey of the area. The action description section did not contain the action to be taken. Rather, it contained part of the closure statement.
2019-CTS-12933	A review of the Facility Packaging and Transportation Requirements Safety Analysis Requirements document discovered an incorrect reference number annotated on the top of each page. The action description section did not contain the action to be taken, and the closure statement lacked detail and evidence.
2019-CTS-12934	Section 4.2.1 of procedure SOP-DHS-160-L contains the identification of the tools and equipment to be used during the process. One of the torque wrenches documented as being used was changed during the work process and was not corrected in Section 4.2.1.

	The action description section did not contain the action to be taken, and the closure statement lacked detail and evidence.
2019-CTS-13053	During the most recent revision to an operating procedure, some sign-off designators were changed in a manner that does not fully satisfy the governing Nuclear Criticality Safety Evaluation requirement with regards to independent individuals performing and verifying steps. The error was not identified during the review and approval. Action 5 placed a procedure on administrative hold pending revision. The action to place the procedure on hold is an interim compensatory action but does not correct the identified deficiency. An action is necessary to complete the procedure revision/correction.