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# *Significant Strengths and Weaknesses in and Recommendations for the Management of Safety Issues*

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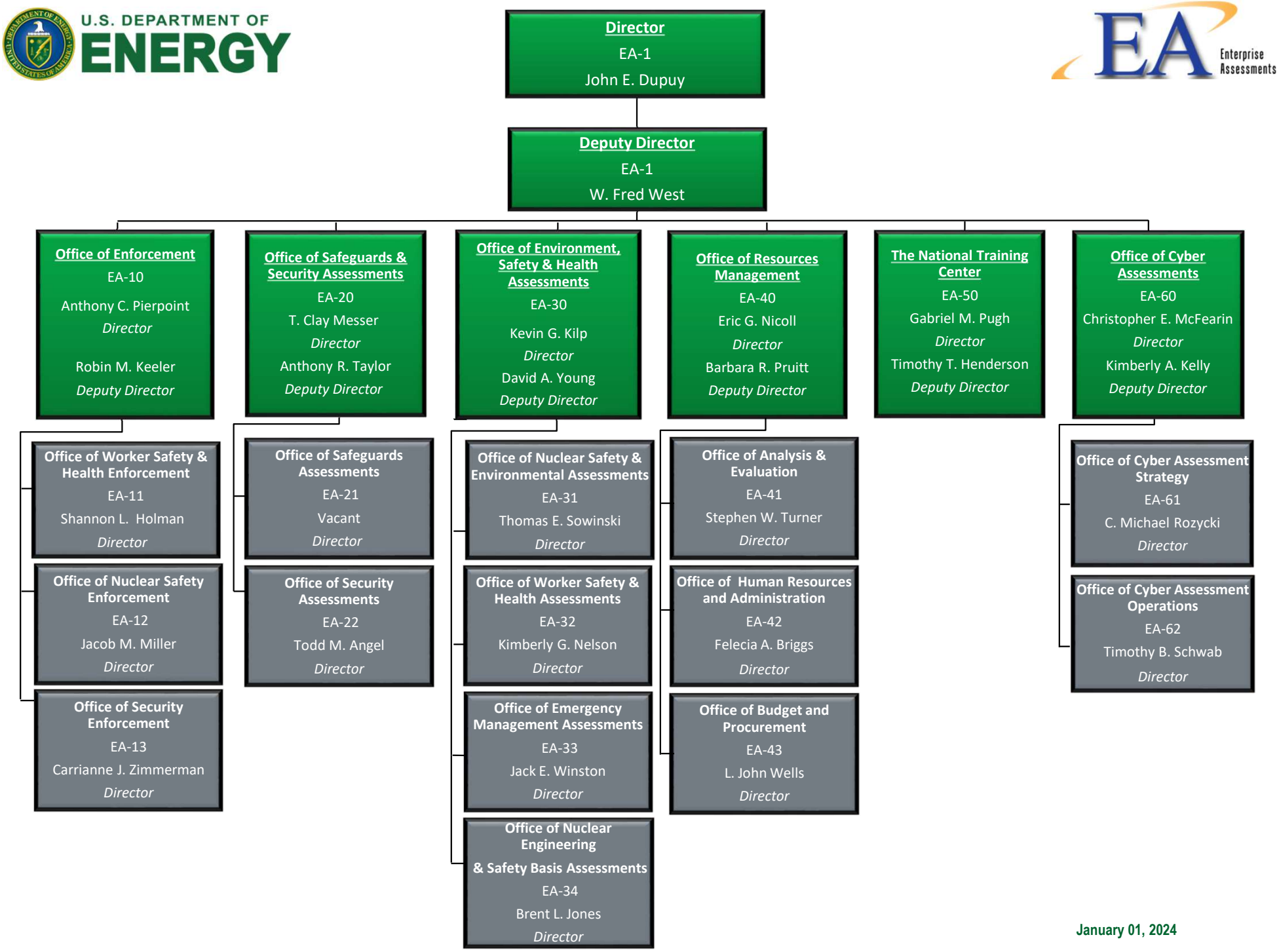
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# Summary

DOE contractors adequately managed approximately three of every four safety issues but less than two thirds of the hazardous energy control and conduct of operations issues reviewed.

Issues that were inadequately managed tended to be more complex or near misses to significant safety issues.

Unresolved, the significant and extensive identified weaknesses in the management of safety issues increase the likelihood of safety issues with more significant consequences.

However, many identified strengths and practices of DOE contractors and of other Federal agencies can be the basis for improving the management of safety issues and other issues.

# Weaknesses

The following significant and extensive weaknesses allowed, in many cases, compromises in hazard controls for worker safety and nuclear safety, as well as the "defense-in-depth" approach for nuclear safety, to develop and to persist unnecessarily for extended periods:

- Inadequate involvement in issue identification
- Infrequent identification and correction of the causes of issues
- Untimely issue resolution

Other weaknesses also impeded the resolution of safety issues:

- Misunderstandings of DOE requirements
- Contractor personnel identifying hundreds of noncompliances as optional opportunities for improvement, lessons learned, or suggestions
- Contractors typically documenting cause analyses months to more than a year after the issues were identified
- Contractors inadequately monitoring the age of open issues

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# Compromises in Safety

- A DOE contractor categorized the significance of a near miss to fatal injury from a falling object lower than required by the contractor's procedures to preclude recurrence, resulting in less rigorous and less effective tools being used. Subsequently, two additional near misses to fatalities from falling objects occurred in the next three months. The two additional near misses could have been precluded by performing the required and timely causal analysis and corrective actions.
- Six contractors had not determined the causes to prevent recurrence of 90 structures, systems, and components (SSCs) not being able to perform their function credited in the nuclear facility safety bases.
- Six contractors had not identified or resolved 25 adverse trends in nuclear safety management programs.
- In two cases, extensive noncompliances and broad performance issues with the contractors' nuclear qualification programs remained unresolved for years without the contractors determining whether work performed by potentially unqualified workers had impacted nuclear safety or determining and correcting the causes of the noncompliances and performance issues.

# Strengths

DOE contractors demonstrated many strengths and practices that can be the basis for improving the management of safety:

- Contractors self-identified approximately 80% or more of their issues. A few contractors demonstrated practices that significantly increased the identification of issues by working-level personnel and contractors' identification of adverse trends.
- A few contractors demonstrated that determining the causes of more issues leads to more effective corrective actions, preventing recurrence and reducing the significance of subsequent safety issues.
- Four contractors demonstrated best practices for monitoring and/or self-assessing the implementation of their issues management processes, resulting in improved performance.

# Other Practices Identified from Benchmarking

A few practices used by other Federal agencies that may significantly improve performance include:

- Other Federal agencies have a much lower threshold for entries into issues management systems, resulting in substantially more issues being identified, corrected and/or trended.
- Other Federal agencies perform significantly more causal analyses and typically complete them within a day to two months.
- Other Federal agencies set more aggressive goals for the completion of corrective actions (e.g., within six months of identifying the issue), and due date extensions are escalated to higher levels of management for approval.
- Naval Nuclear Propulsion Program executives periodically review the significance of identified issues and revise, as necessary, criteria for headquarters' review of specific issues or events to ensure that weaknesses are resolved before more significant events occur.

# Recommendations

EA identified recommendations to resolve the likely causes of the observed weaknesses. Many of these recommendations would also help to correct the causes of issues in other areas.

- DOE should ensure that its directives adequately "[e]stablish high level expectations" and "clearly and concisely specify the goals and requirements that must be met" for the timely identification and correction of issues, adverse trends, and their causes using a graded approach considering the risk of safety issues.
- DOE contractors should share practices that encourage and facilitate the earlier identification of issues by more working-level personnel and of adverse trends.

# Recommendations (continued)

EA identified recommendations to resolve the likely causes of the observed weaknesses. Many of these recommendations would also help to correct the causes of issues in other areas. (continued)

- Contractors, in consultation with their DOE line management, should establish performance objectives for achieving yearly improvements in their timely identification and correction of issues, adverse trends, and their causes, and for increasing their use of simple, informal causal analysis techniques and more rigorous issues management tools.
- Contractors and DOE field/site offices should assess the contractor's issues management, especially the contractor's management of conduct of operations and hazardous energy control issues, by periodically reviewing representative samples of issues to ensure that the required rigor is used to manage (resolve) issues and their causes in a timely manner.

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# Scope

- From fiscal year 2019 - 2023, EA assessed the DOE requirements for issues management and the corresponding processes and practices used by DOE contractors to manage (correct) safety issues, including nuclear safety issues.
- Accordingly, EA assessed the management of safety issues by contractors of the DOE Offices of Environmental Management (EM), Science (SC), and Nuclear Energy (NE), and the National Nuclear Security Administration (NNSA).
- EA also met with representatives of the Naval Nuclear Propulsion Program (NNPP), the Nuclear Regulatory Commission (NRC), and the National Aeronautics and Space Administration (NASA) to discuss their processes and practices for resolving issues and maintaining safety.

# Methodology

- EA assessed the management of safety issues by nine contractors responsible for managing high hazard nuclear facilities to obtain a representative sample of how safety issues, including nuclear safety issues, are resolved.
- EA team members assessed the management of a representative sample of issues within their areas of expertise. In total, EA reviewed 3,898 issues.
- The contractor-specific assessments also included reviews of:
  - The incorporation of issues management requirements into contractor procedures from DOE directives and consensus standards as specified in contractors' quality assurance program descriptions.
  - Procedures and meetings used to manage (categorize issues and review causal analyses, corrective actions, and closure documentation) issues.
  - Field office and contractor assessments and metrics of the contractors' issues management.

# Methodology (continued)

- EA also met with representatives of the Naval Nuclear Propulsion Program (NNPP), the Nuclear Regulatory Commission (NRC), and the National Aeronautics and Space Administration (NASA) to discuss their processes and practices for resolving issues and maintaining protections (safety) for workers, the public, and the environment. Representatives of the Nuclear Energy Institute (NEI), the Institute of Nuclear Power Operations (INPO), and Entergy Corporation also elected to participate in this meeting.
- Based on an analysis of the contractor-specific assessment reports and the discussion with the representatives of other Federal agencies, EA identified overall strengths and weaknesses, best practices, and recommendations to improve the management of safety issues throughout the Department.

# Flowdown of Issues Management Requirements and Expectations

DOE invokes directives via contracts, and the DOE program offices or field/site offices approve contractors' quality assurance program describing how DOE requirements are flowed down into contractor procedures.

**Strengths**

- All assessed DOE contracts invoked applicable directives for issues management.
- Eight contractors used appropriate consensus standards for issues management (e.g., the American Society of Mechanical Engineers consensus standard Nuclear Quality Assurance (NQA)-1-2008, *Quality Assurance Requirements for Nuclear Facility Applications*, with the NQA-1a-2009 addenda, or subsequent revisions for nuclear safety issues).

# Flowdown of Issues Management Requirements and Expectations

## Weaknesses

- Although DOE Policy 450.4A, *Integrated Safety Management Policy*, provides an expectation on the "involvement of workers in all aspects of work performance," a requirement for employee involvement in issue identification has not been established in DOE directives.
- DOE's "ultimate safety goal is zero accidents, work-related injuries and illnesses, regulatory violations, and reportable environmental releases." However, DOE policies do not provide expectations or direction for ensuring safety by resolving issues and their causes before weaknesses accumulate and increase the likelihood of more significant consequences.

# Flowdown of Issues Management Requirements and Expectations

**Weaknesses (continued)**

- The requirements of DOE Order 414.1D, *Quality Assurance*, to "[i]dentify the causes of problems, and include prevention of recurrence as a part of corrective action planning" are commonly misunderstood and inconsistently flowed down.
- Similarly, the requirements and responsibilities in DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, for issues resulting in reportable occurrences, are commonly misunderstood (e.g., the responsibility that facility managers "[d]etermine causes and generic implications … for reportable occurrences.")
- EA also identified the weaknesses in the flowdown of requirements from the contractor-developed, DOE-approved quality assurance programs to the contractors' implementing procedures (e.g., inadequate descriptions of how requirements will be met and inconsistencies).

# Flowdown of Issues Management Requirements and Expectations

**Different Approaches and Practices Identified During the Benchmarking**

- The NNPP and the NRC allow some issues (e.g., conditions adverse to quality that are not significant) to be corrected and/or trended without determining the causes or actions to preclude recurrence.
- Personnel at nuclear power plants and utilities develop corrective actions per NQA-1 to preclude recurrence of issues that are significant conditions adverse to quality.
- The NNPP and the NRC both require the causes and their corresponding corrective actions to be determined for all events (a.k.a., occurrences or incidents) that are required to be reported to NNPP and NRC headquarters.

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# Identification of Issues

DOE contractors use three basic approaches to identify issues:

- contractor personnel enter all items (e.g., observations, issues, and opportunities for improvement) into the same system and then the items are screened to the appropriate subsystem for managing the item,
- contractor personnel are expected to enter items into the appropriate management system and only enter issues exceeding a threshold into the contractor's issues management system, or
- contractor personnel are expected to report issues to personnel trained to enter new issues into tracking systems

# Identification of Issues

## Strengths

- Contractors each entered 1,000 – 2,100 issues per year and self-identified approximately 80% or more of these issues, demonstrating their willingness to identify issues. There's 7,000 – 15,000 personnel onsite.
- For seven contractors, their computer system or database for managing issues is a module in the computer system used for other contractor assurance activities such as assessments, inspections, audits, management observations of ongoing operations, and event/occurrence notifications.
- Quality assurance personnel of six contractors developed processes and have capabilities in their issues management systems that facilitate analyzing issues for trends.

# Identification of Issues

**Strengths (continued)**

- Savannah River Nuclear Solutions, LLC (SRNS) and Washington River Protection Solutions, LLC (WRPS) have functional area experts and line managers periodically assess the performance of the processes and work under their areas of cognizance to identify trends.
- WRPS and Mission Support and Test Services, LLC (MSTS) have working-level (non-supervisory) personnel identifying a larger percentage of issues than at other sites. This results in the identification of a broader set of issues for resolution before they can manifest into more severe consequences.

# Identification of Issues

## Weaknesses

- For five contractors, only a small portion of their issues were identified by working-level personnel. This may be attributed them getting little or no training or procedural direction on how to enter issues into management systems and the lack of methods to make it easier for working level personnel to enter issues.
- Personnel of four contractors identified hundreds of noncompliances and deficiencies as optional opportunities for improvement, lessons learned, or suggestions rather than issues that are required to be resolved.
- Contractor functional area experts were inadequately involved in the identification of trends allowing 25 adverse trends to persist undetected.

# Identification of Issues

## Best Practices

- WRPS recognizes and rewards employees who identify issues considered to be a "Good Catch." WRPS also requires the manager responsible for the issue to contact the employee identifying the issue within seven days, if requested by the employee.
- A WRPS Engineering Survival Guide promotes the identification and correction of errors prior to issuance of a finished product.
- Bechtel National, Inc. (BNI) trending of issues uses well-defined event codes consisting of "function and process" codes that are combined with "nature of issue" codes for more effective binning of issues.

# Identification of Issues

## Different Approaches and Practices Identified During the Benchmarking

- The threshold for entries in the issues management systems used by the NNPP, NRC, NASA, NEI, INPO, and Entergy are much lower than that of DOE contractors. A typical nuclear power plant staffed by 600 to 1,000 personnel would identify approximately 12,000 issues per year.
  - The lower threshold and higher number of issues managed can significantly increase the engagement, familiarity, and comfort of working-level personnel with issues management systems.
  - The NNPP, NEI, and Entergy also provide all employees training beyond issue identification (e.g., basic elements of causal analyses and attributes of effective corrective actions) to improve their engagement in the resolution of issues.
- NASA includes adverse trends in issues in its risk management strategy and annually publishes the top human factors that led to problems in the previous year to improve performance.

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# Categorization of Issue Significance

DOE contractors typically establish four to six categories for issues. Issues are assigned to a category based on significance by:

- the issue owner,
- a board of functional area experts (including performance assurance personnel with expertise on the contractor's issues management processes), or
- a performance assurance expert with oversight provided by a board of functional area experts.

The contractors' issues management procedures vary the rigor (e.g., the extent and formality of the analysis) of the issues management tools (e.g., root cause, apparent cause analysis, or no causal analysis; the approval of a corrective action plan; and evaluations of the extent of condition and effectiveness) required for issues based on the assigned category.

# Categorization of Issue Significance

## Strengths

- Most of the identified issues were of lower significance, and over 90% of the reviewed issues were categorized per each contractor's issues management procedure.
- Most contractors have a board of functional area experts assign or review the assigned significance level to ensure consistency.
- BNI and Consolidated Nuclear Security, LLC (CNS) developed very detailed criteria and/or examples to aid in the categorization of issues.

# Categorization of Issue Significance

## Weaknesses

- Six contractors miscategorized up to 17% of the reviewed safety issues or some issues with the potential for significant consequences as lower in significance than required by their procedures. Some contractors have not categorized issues at the highest significance level for several years despite having issues that met their established criteria.
- Seven contractors do not proactively require use of the contractors' more rigorous issues management tools to ensure that issues are resolved before more significant issues occur. For example, the most rigorous issues management tools were only required for:
  - issues resulting in a fatality
  - frequent personnel injuries requiring prolonged hospitalization, or
  - high reporting level occurrences of DOE Order 232.2A.

# Categorization of Issue Significance

Weaknesses in the categorization of issue significance may be attributed to:

- Contractors often categorized issues based on actual consequences rather than potential consequences even though some of their procedures required issues to be categorized considering potential consequences.
- Contractors typically take months or more than a year to document formal causal analyses.
- The "[e]xamples of conditions that may be considered significant under certain conditions" provided in DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, are limited to repeated instances of procedural noncompliance, adverse trends of near misses and in the formality of operations, and widespread training weaknesses or operator knowledge gaps.
- DOE field/site office personnel rarely identified that contractors were categorizing issues lower than required by the approved graded approach and often agreed with categorizing significant issues lower than required by the contractors' procedures.

# Categorization of Issue Significance

## Best Practices

- UT-Battelle, LLC (UT-Battelle) often categorizes issues as "serious" and "important," and its issue owners often choose to use discretionary critiques, causal analyses, and informal effectiveness reviews.
- MSTS intentionally increased the number of issues categorized as more significant issues to resolve more safety issues.
- UT-Battelle, CNS, and Lawrence Livermore National Security, LLC (LLNS) monitor their categorization processes to ensure that issues are categorized per their procedures.

# Categorization of Issue Significance

## Different Approaches and Practices Identified During the Benchmarking

- Nuclear power plants and utilities categorize issues potentially degrading a barrier (layer of defense) that provides safety as significant conditions adverse to quality, while DOE contractors categorized many instances of SSCs not being able to perform their function credited in nuclear safety bases as less significant conditions adverse to quality, contrary to NQA-1.
- Nuclear power plants and utilities similarly categorize significant non-nuclear issues (e.g., industrial safety issues) in order to use the same tools and procedures used to resolve nuclear safety issues.
- The NNPP, NRC, and INPO periodically review the significance of issues to ensure a healthy distribution of issues at all levels, resembling a triangle or a pyramid.
- NNPP executives proactively manage the number and significance of their "pinnacle" (most significant) events by revising, as needed, the threshold of significance levels and criteria for NNPP headquarters' review of specific issues or events.

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# Graded Resolution of Issues

Overall, the nine assessed contractors have structured processes that grade the analysis and actions taken for issues based on their significance.

## Strengths

- All nine contractors require more rigorous techniques, or tools, to be used to determine the causes of significant issues and require qualified or specifically trained personnel to perform these formal causal analyses.
- UT-Battelle, CNS, and MSTS demonstrated that determining the causes of more issues leads to more effective corrective actions, preventing recurrence and reducing the significance or consequences of subsequent safety issues.
- Most extent-of-condition and effectiveness reviews performed for significant issues adequately ensured that issues were resolved.
  - SRNS managers and functional area experts discuss new issues during periodic meetings at different levels of management to ensure that the extent of less significant issues is regularly assessed.
  - Additionally, SRNS often includes measures to assess the effectiveness of actions taken to resolve less significant issues.

# Graded Resolution of Issues

## Weaknesses

- Most contractors rarely use the procedures and resources they developed for determining and resolving the causes of significant and/or complex issues. Contractors determined the causes determined for 1 to 23% of their issues reviewed.
- Most actions taken are only to correct a specific condition. Contractors also often take actions that have only a temporary, non-enduring effect.
- Unactionable causal statements were identified by issue owners (e.g., just identified a causal code or repeated the problem statement).
- Three contractors require formal, detailed extent-of-condition and effectiveness reviews only for the most significant issues.
- Often, effectiveness reviews only ensured that actions were completed or that similar events (e.g., in the same system and facility) had not recurred.
- Effectiveness reviews are typically only performed six months after all the corrective actions are complete, which could be over two years since the issue was identified. This allows weaknesses to persist unabated if actions taken early in the management of the issue are ineffective

# Graded Resolution of Issues

**Weaknesses (continued)**

- Inadequate or no compensatory actions were documented to ensure that similar issues did not occur while the causes of issues and their corrective actions were identified and implemented.
- Frequently, the sole action assigned for an issue was to perform an evaluation (e.g., to evaluate the adequacy of a procedure or training).
- Issues were assumed to be resolved by actions taken for other issues without ensuring the causes of the issues were the same.
- The oversight provided by managers of several contractors was limited to ensuring that corrective actions were completed when scheduled.

# Graded Resolution of Issues

## Best Practices

- Even if a causal analysis is not required, CNS issue owners are expected to use, and are held accountable for using, their judgment to determine "what the causes are (not the problem, but the causes of the problem)" and to develop an action plan to "rectify the issue and significantly reduce the likelihood of recurrence."
- Battelle Energy Alliance, LLC (BEA) managers (other than the condition owners) verify the adequacy and continued implementation of compensatory actions for issues when corrective actions are significantly delayed.
- WRPS allows the issue investigation, causal analysis, and corrective action development to be integrated into one report, avoiding inconsistency.
- The UT-Battelle Corrective Action Institutional Review Board coordinates actions within the corrective action plan with lessons-learned and ongoing initiatives across DOE.
- WRPS causal analysis teams develop success criteria for effectiveness reviews to show that actions taken adequately resolve the identified causes.

# Graded Resolution of Issues

## Different Approaches and Practices Identified During the Benchmarking

- Personnel at nuclear power plants and utilities and NNPP sites perform causal analyses to resolve many issues. For example, NNPP sites perform causal analyses for approximately a third to a half of their issues.
- Nuclear power plants and utilities similarly categorize significant non-nuclear issues (e.g., industrial safety issues) in order to use the same tools and procedures used to resolve nuclear safety issues.
- The differences between an apparent cause and a root cause analysis at nuclear power plants and utilities is in the scope of the review (e.g., an apparent cause is not required to include safety culture assessment) and that outside experts are sometimes used to facilitate root cause analyses.
- Causal analyses performed at nuclear power plants and utilities and NNPP sites also include a comparison between what occurred and what should have happened based on existing procedures and practices to identify gaps for additional analysis.

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# Timely Resolution of Issues

Overall, approximately 90% of the reviewed issues were reported and actions were taken in a timely manner. However, the identification of some issues in the contractor's issues management system and the implementation of some corrective actions were delayed without justification or due to inefficient processes.

## Weaknesses

- The following contributed to delays with identifying issues:
  - Several contractors did not enter issues until the fact-finding report was issued, typically a month after the event occurred.
  - Two contractors allowed draft issues to exist for up to a year.
  - Six of the contractors' issues management procedures did not include expectations or requirements for prompt entry of issues.

# Timely Resolution of Issues

## Weaknesses (continued)

- Two thirds of the assessed contractors did not develop or implement corrective actions in a timely manner for up to 14% of their safety issues or allowed some issues with the potential for significant consequences to remain unresolved for extended periods. For example, two contractors allowed issues with fire protection systems to remain unresolved for over 10 years.
- Untimely evaluation and resolution may be attributed to the following:
  - Contractors commonly take months to document the results of formal apparent cause analyses and over a year for root cause analyses.
  - Five contractors allow issue owners to extend corrective action due dates multiple times with inadequate or no justification or with no additional management oversight or approval.
  - Contractors inadequately monitored the age of issues.
  - DOE Order 414.1D does not include a requirement to resolve issues in a timely manner.

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# Timely Resolution of Issues

## Best Practices

- Information used to report and manage the recovery from an event by CNS (including the specific gaps in the implementation of requirements that led to the event) is simultaneously available for CNS personnel to use to identify and categorize the associated issues for resolution per CNS's issues management process.
- CNS provides an expected time commitment for a causal analysis of an issue based on its significance level (e.g., a one-to-two-hour analysis for minor issues and one-to-two-week or more analysis for significant or complex issues).

# Timely Resolution of Issues

## Different Approaches and Practices Identified During the Benchmarking

- Personnel at nuclear power plants and utilities and NNPP sites are expected to enter each issue into their issues management systems within a day of identifying or discovering it.
- Causal analyses at nuclear power plants and utilities and NNPP sites are also completed sooner. For example:
  - At NNPP sites, 80% of causal analyses are completed within a day of issue identification.
  - For NRC regulated nuclear power plants and utilities, root cause analyses typically take 30 to 60 days and apparent cause analyses typically take 30 days.
- The goal at nuclear power plants and utilities is to complete corrective actions within six months of identifying the issue or during the next refueling outage if justified. Extensions to corrective action due dates are escalated to higher levels of management for approval, and additional metrics and management oversight are used to monitor actions that extend past six months or the next refueling outage.

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# Documentation Supporting Closure

The issues management procedures of eight of the nine assessed contractors require documentation supporting closure to include the problem statement; results of extent-of-condition, causal analyses, and effectiveness evaluations (if performed); and objective evidence of corrective actions taken.

## Strengths

- The contractors retained evidence supporting closure of over 87% of their reviewed issues.
- Eight contractors hold their assigned issue owners responsible for reviewing documentation used to close their issue to ensure that the actions taken resolved the issue.
- Six contractors have personnel independently review at least a sample of the closure documentation to ensure adequacy.

# Documentation Supporting Closure

## Weaknesses

- A few significant issues were closed with no, incomplete, or irrelevant evidence.
- A few issues were closed when corrective actions were transferred into another tracking system (e.g., into systems tracking document change requests) before the action was completed (e.g., issues were closed to a promise of future action).
- Most contractors required extensive documentation for all issues irrespective of risk. Requiring this extensive documentation for issues with low risk reduces available resources for resolving more significant issues.

# Documentation Supporting Closure

## Best Practice

- Reviews of closure documentation by performance assurance personnel of BNI, MSTS, and WRPS led to additional actions resulting in more effective corrective actions and the closure of more issues with supporting documentation. As a result, over 97% of their reviewed issues were adequately documented.

# Documentation Supporting Closure

## Different Approaches and Practices Identified During the Benchmarking

- For very simple issues (e.g., personnel not wearing safety glasses), the issue or condition report has the description of the issue and a description of the action taken (e.g., coaching was provided and the worker donned their safety glasses).
- For other issues, there needs to be enough documentation to accurately describe the action taken (e.g., an action to revise a procedure could reference the revision that included the change).
- For more significant issues (including significant conditions adverse to quality), detailed problem statements; results of extent-of-condition, causal analyses, and effectiveness evaluations (if performed); and objective evidence of corrective action completion is warranted to, for example, determine what needs to be done if the issue recurs. For more significant issues, the documentation is also retained longer.

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# Monitoring Issues Management Performance

DOE contractors have:

- performance assurance divisions monitor each contractor's issues management performance, or
- each contractor's directorate monitors its own performance.

Eight of the nine assessed contractors have assurance personnel monitor issues management performance, including the management of safety issues.

The directorates of the other assessed contractor inadequately monitored and oversaw their issues management performance.

# Monitoring Issues Management Performance

## Strengths

- Three contractors improved their issues management performance by self-assessing elements of their issues management processes.
- Several contractors appropriately developed processes to separately track actions that require a long time to implement and exclude them, as outliers, from metrics monitoring their typical management of issues.

# Monitoring Issues Management Performance

## Weaknesses

Six of the nine assessed contractors did not monitor or assess the implementation of their categorization processes, allowing more significant issues to be repeatedly categorized below that required by procedures.

The following weaknesses contributed to the untimely resolution of issues:

- Metrics and management oversight of several contractors were focused on completing actions as scheduled, or rescheduled, and did not adequately monitor how long issues had remained unresolved.
- A few contractors had metrics repeatedly not meeting performance goals but took inadequate action (e.g., divisions not meeting performance goals were notified, but the cause of the delay or systematic changes needed to improve performance were not identified or corrected).
- Metrics were based on averages which obscured cases of poor performance and allowed them to persist without senior management visibility.

# Monitoring Issues Management Performance

## Best Practices

- The SRNS contractor assurance group performs quarterly assessments of the implementation of its procedure by reviewing 5% of the issues closed.
- LLNS assesses the implementation of its categorization process approximately every two years, and appropriately responds to emerging trends.
- UT-Battelle:
  - biennially assesses the implementation of its issues management procedures by reviewing a representative sample of issues in certain areas (e.g., nuclear safety). UT-Battelle also
  - incorporates lessons learned from similar assessments across DOE into its assessments
  - takes action based on its assessments to improve its issues management.

  Resultantly, UT-Battelle resolved and adequately documented nearly all the reviewed issues in a timely manner.

# Monitoring Issues Management Performance

## Best Practices (continued)

- 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.
- CNS and LLNS readily display and monitor the distribution of issue significance levels to detect changes in implementation. As a result, CNS and LLNS categorize issue significance more accurately than most other assessed contractors.

# Monitoring Issues Management Performance

## Different Approaches and Practices Identified During the Benchmarking

- Nuclear power plants and utilities set aggressive goals for the completion of corrective actions (i.e., within six months of identifying the issue or during the next refueling outage, but only if justified).
- Extensions to corrective action due dates are escalated to higher levels of management for approval
- Additional metrics and management oversight are used to monitor actions that extend past six months or the next refueling outage.
- Independent review teams or boards at NASA periodically review resolution of issues related to safety within projects and report their results to the next level of authority for disposition.

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# Questions?

# Overview of the Remaining Presentation

- Assessment Scope and Methodology
- Results
  - Flowdown of Issues Management Requirements and Expectations
  - Identification of Issues
  - Categorization of Issue Significance
  - Graded Resolution of Issues
  - Timely Resolution of Issues
  - Documentation Supporting Closure
  - Monitoring Issues Management Performance
  - Contractors' Issues Management Performance by Functional Area
- Detailed Recommendations

# Contractors' Issues Management Performance by Functional Area

- The percentage of emergency management (71%), fire protection (65%), conduct of operations (36%), and hazardous energy control issues (37%) inadequately managed was considerably higher than the overall average (26%).
- EA previously recommended actions to improve emergency management and fire protection programs based on more comprehensive assessments.
- Analyses of the management of conduct of operations and hazardous energy control issues indicate that contractor safety culture assessments and actions focused on organizational behaviors supporting issues management are key to improving the resolution of safety issues attributable to these functional areas.
- The percentage of issues in the other assessed functional areas was considerably lower than the average.

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# Questions?

# Overview of the Remaining Presentation

- Assessment Scope and Methodology
- Results
- Detailed Recommendations to:
  - Increase the Involvement in Issue Identification
  - Correct the Causes of More Issues
  - Improve the Timeliness of Issue Resolution
  - Improve the Management of Conduct of Operations and Hazardous Energy Control Issues
  - Other Recommendations to Improve the DOE Contractors' Issues Management

# Break

**The presentation will resume in 5 minutes.**

# Recommendations to Increase the Involvement in Issue Identification

| To have working-level personnel proactively identify more issues or concerns and to remove obstacles hindering them from entering issues: | |
|---|---|
| **Contractors** | During outreach activities such as Energy Facility Contractors Group (EFCOG) meetings:<br>• Share practices for encouraging and facilitating more proactive issue identification.<br>• Consider lowering thresholds for entries into the issues management systems and expanding training on basic elements of causal analyses and attributes of effective corrective actions.<br>• Share practices and tools facilitating issue identification by working-level personnel, including those workers who do not frequently access computer systems.<br>• Share practices used to measure whether working-level personnel have embraced "a strong safety culture" by identifying issues. |

# Recommendations to Increase the Involvement in Issue Identification (continued)

| To facilitate functional area experts' identification of adverse trends and indications of system weaknesses within their area of cognizance: | |
|---|---|
| **Contractors** | • During EFCOG meetings, benchmark and advocate for practices similar to those used by SRNS and WRPS. |
| **DOE Field/Site Offices** | • During DOE Nuclear and Facility Safety Program Workshops, share practices for independently identifying adverse trends and precursors of systemic weaknesses in contractors' programs and management systems. |

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# Questions?

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# Recommendations to Correct the Causes of More Issues

| To resolve the documented misunderstandings of DOE requirements and expectations for identifying and correcting issues and their causes: | |
|---|---|
| **DOE Office of Environment, Health, Safety and Security (EHSS)** | Ensure that DOE policy directives and orders adequately "[e]stablish high level expectations" and "clearly and concisely specify the goals and requirements that must be met" for the timely identification and correction of issues, adverse trends, and their causes using a graded approach considering the risk of safety issues.<br><br>As part of the ongoing development of DOE Order 414.1E:<br>• Clarify whether elements of the quality assurance criterion in attachment 2 can be graded to zero (graded out).<br>• Revise DOE Order 414.1D, attachment 2, criterion 3, to require contractors to establish and implement processes that ensure all levels of personnel identify quality problems (issues). |

# Recommendations to Correct the Causes of More Issues (continued)

| To resolve the documented misunderstandings of DOE requirements and expectations for identifying and correcting issues and their causes: (continued) | |
|---|---|
| **EHSS** | As part of the ongoing development of DOE Order 414.1E: (continued)<br>• Revise the definition of the graded approach (specifically section 6.h(1)) to be based on the relative importance of improving and maintaining safety, for example, maintaining the defense-in-depth approach to hazard control required by DOE Policy 420.1.<br>• Revise DOE Order 414.1D, attachment 2, criterion 3, to clarify for what issues actions to correct the causes of the issues are required (e.g., require actions that correct the causes of broad and systematic issues and issues indicating degradation in a control established to ensure safety and/or quality and require less significant safety and quality issues be corrected and monitored for trends). |

# Recommendations to Correct the Causes of More Issues (continued)

| To resolve the documented misunderstandings of DOE requirements and expectations for identifying and correcting issues and their causes: (continued) | |
|---|---|
| **EHSS** | As part of the ongoing development of DOE Order 414.1E: (continued)<br>• Resolve issues (problems) in a timely manner consistent with the approved graded approach (e.g., commensurate with their relative importance to maintaining safety and the magnitude of any hazard involved).<br>• Have senior contractor management annually review issues over two years old and, within areas of their authority or influence, remove barriers preventing resolution. |

# Recommendations to Correct the Causes of More Issues (continued)

| | |
|---|---|
| To resolve the documented misunderstandings of DOE requirements and expectations for identifying and correcting issues and their causes: (continued) | |
| **EHSS** | Revise DOE Order 232.2A to:<br>• Clarify for which reportable occurrences facility managers are required to determine the causes and generic implications of.<br>• Require low and informational level occurrences be reported to DOE via a final report and remove the requirement for the initial notification reports for these occurrences. Requiring final reports for low and informational level occurrences would provide DOE contractors time to determine and report causes and corrective actions for these occurrences to headquarters personnel and enable EHSS to identify trends in the causes (via identified cause codes) of these lower reporting level occurrences.<br>• Define "generic implications" and their relationship with the extent of condition of reportable occurrences. |

# Recommendations to Correct the Causes of More Issues (continued)

| To resolve the documented misunderstandings of DOE requirements and expectations for identifying and correcting issues and their causes: (continued) | |
|---|---|
| **EHSS** | Revise DOE Order 226.1B to:<br>• Require issue owners to identify and correct the causes of issues, consistent with DOE Order 414.1.<br>• Define "high [or higher] significance findings" (issues) in DOE Order 226.1B to include significant conditions adverse to quality as defined in NQA-1 and potential indications of broad or systemic weaknesses in safety programs (unless the extent of the condition (issue) is verified to be isolated) and issues indicating degradation in a control established to ensure safety and/or quality. |

# Recommendations to Correct the Causes of More Issues (continued)

| To ensure that causes and their corrective actions are identified and implemented for more issues using a graded approach: | |
|---|---|
| **Contractors** | • Require personnel serving in the role of an issue owner to participate in annual training on:<br>– techniques (e.g., the five-why method) and lessons learned that can be used to efficiently determine the causes of relatively simple issues,<br>– when support by personnel qualified in more advanced causal analysis techniques would be appropriate, and<br>– enduring actions that can prevent recurrence. |

# Recommendations to Correct the Causes of More Issues (continued)

| To ensure that causes and their corrective actions are identified and implemented for more issues using a graded approach: (continued) | |
|---|---|
| **Contractors** | • Require issue owners to document actionable (specific) statements of the cause(s) for their issues and take action(s) to correct the issues and their causes per the graded approach.<br>• Provide working-level personnel training on basic principles and elements of issues management (e.g., causal analyses and corrective action development) to enable them to be more involved in the identification and resolution of issues.<br>• In coordination with their DOE field/site offices, assess processes for categorizing issue significance, and their implementation for a representative sample of issues, to verify that DOE issues management requirements are met and issues are categorized per the graded approach in the approved quality assurance program. |

# Recommendations to Correct the Causes of More Issues (continued)

| To ensure that causes and their corrective actions are identified and implemented for more issues using a graded approach: (continued) | |
|---|---|
| **DOE Line Management (Program Offices and/or Field/Site Offices)** | • Establish an expectation for each contractor (e.g., in annual performance evaluation and monitoring plans) to use all their issues management tools with some nominal frequency to ensure that the tools maintained by the contractor are being used to resolve significant issues each year and to maintain contractor personnel's proficiency with each of these tools. |

# Questions?

# Overview of the Remaining Presentation

- Assessment Scope and Methodology
- Results
- Detailed Recommendations to:
  - Increase the Involvement in Issue Identification
  - Correct the Causes of More Issues
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  - Improve the Management of Conduct of Operations and Hazardous Energy Control Issues
  - Other Recommendations to Improve the DOE Contractors' Issues Management

# Recommendations to Improve the Timeliness of Issue Resolution

| To ensure that issues are entered into contractors' issues management systems in a timely manner: | |
|---|---|
| **Contractors** | • Require that issues be promptly entered into their issues management systems and categorized (e.g., within two working days of being identified) and monitor or assess compliance with this requirement as needed. |

# Recommendations to Improve the Timeliness of Issue Resolution (continued)

| To ensure that causes and their corrective actions are identified in a timely manner: | |
|---|---|
| **Contractors** | • Improve processes for determining and documenting causes and corrective actions to prevent recurrence more rapidly and efficiently.<br>• Document in their issues management procedures expected time commitments for causal analysis and corrective action development of issues based on their significance level. Monitor performance of these expectations to ensure the efficient use of resources and help prevent prolonged causal analyses and corrective action development. |

# Recommendations to Improve the Timeliness of Issue Resolution (continued)

| To ensure that issues and their causes are corrected in a timely manner: | |
|---|---|
| **Contractors** | • Require that the issue owner's manager approve corrective action due dates (including extensions) greater than general timeliness goals established by contractor management and agreed to by the DOE field/site office manager (e.g., in each contractor's quality assurance program).<br>• Monitor the age of issues and prioritize corrective actions using a graded approach to ensure that safety issues are resolved in a timely manner.<br>• Annually require issue owners to present to senior contractor and DOE field/site office management barriers precluding resolution of any issue over two years old and to propose actions, as appropriate, to overcome these barriers |

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# Questions?

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# Recommendations to Improve the Management of Conduct of Operations and Hazardous Energy Control Issues

- Provide additional monitoring and assessment of the management of conduct of operations and hazardous energy control issues to ensure that these issues are categorized and resolved as required per the approved quality assurance program and the contractor's issues management procedures. For example, this could include management observations and independent surveillances of:
  - meetings used to categorize issue significance, and
  - documentation used to close issues to ensure that warranted rigor was effectively employed.
- Assess organizational behaviors supporting issues management and take action to sustain behaviors that improve the resolution of conduct of operations and hazardous energy control issues considering the guidance in DOE Guide 450.4-1C, *Integrated Safety Management System Guide*, section 6.4 and attachment 10, and the assessment approach for objective SC.3 of EA CRAD 30-08, *Safety Culture Assessment*.

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# Other Recommendations to Improve the DOE Contractors' Issues Management

- Revise issues management procedures to:
  - Require that issue owners evaluate the extent of a condition (issue) and effectiveness of corrective actions more often. For example, state that issue owners should consider whether specific actions to evaluate extent of condition and effectiveness of corrective actions are warranted.
  - Require that issue owners consider performing one or more interim effectiveness reviews when corrective actions will take a long time to implement or are significantly delayed.
  - Implement a graded approach for closure documentation retained for issues. For example, provide issue owners the option of providing a clear description of action(s) taken to resolve less significant issues.

# Other Recommendations to Improve the DOE Contractors' Issues Management (continued)

- Triennially assess the flowdown of issues management requirements and the management of a representative sample of issues in high-risk areas or functions to verify issues and their causes are resolved in a timely manner per DOE requirements, the approved graded approach, and contractor performance goals.
- Contractors, in consultation with the DOE line management overseeing their contract, establish performance objectives for improving each year their timely identification and correction of issues, adverse trends and their causes, and for increasing the use of simple, informal causal analysis techniques and more rigorous issues management tools.

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  - Other Recommendations to Improve the DOE Contractors' Issues Management
- Summary

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# Summary

DOE contractors adequately managed approximately three of every four safety issues but less than two thirds of the hazardous energy control and conduct of operations issues reviewed.

Issues that were inadequately managed tended to be more complex or near misses to significant safety issues.

Unresolved, the significant and extensive identified weaknesses in the management of safety issues increase the likelihood of safety issues with more significant consequences.

However, many identified strengths and practices of DOE contractors and of other Federal agencies can be the basis for improving the management of safety issues and other issues.

# EA's *Independent Assessment of DOE Contractors' Management of Safety Issues*

EA's overall assessment is available via the following link:

*Independent Assessment of U.S. Department of Energy Contractors' Management of Safety Issues - April 2024*

# EA Assessments of DOE Contractor's Management of Safety Issues

For the National Nuclear Security Administration:

- *Assessment of the Management of Nuclear Safety Issues at the Los Alamos National Laboratory* - April 2019
- *Assessment of Mission Support and Test Services, LLC Issues Management at the Nevada National Security Site* - December 2020
- *Independent Assessment of the Consolidated Nuclear Security, LLC Management of Safety Issues at the Y-12 National Security Complex* - December 2022
- *Independent Assessment of the Management of Safety Issues at the Lawrence Livermore National Laboratory* - April 2023

For the Office of Nuclear Engineering:

- *Independent Assessment of the Battelle Energy Alliance, LLC Management of Safety Issues at the Idaho National Laboratory Materials and Fuel Complex* - May 2022

# EA Assessments of DOE Contractor's Management of Safety Issues (continued)

For the Office of Environmental Management:

- *Assessment of Issues Management at the Hanford Site Waste Treatment and Immobilization Plant* - November 2019
- *Assessment of Issues Management at the Savannah River Site SRNS Facilities* - November 2020
- *Independent Assessment of the Washington River Protection Solutions, LLC Management of Safety Issues at the Hanford Site* - December 2021

For the Office of Science:

- *Independent Assessment of the UT-Battelle, LLC Management of Safety Issues at the Oak Ridge National Laboratory* - September 2022