



Office of Enterprise Assessments

Office of Environment, Safety and Health Assessments

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

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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 nine contractors of the DOE Offices of Environmental Management (EM), Science (SC), and Nuclear Energy (NE), and the National Nuclear Security Administration (NNSA). In total, EA reviewed 3,898 issues.
- 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. Representatives of the Nuclear Energy Institute (NEI), the Institute of Nuclear Power Operations (INPO), and Entergy Corporation also elected to participate in this meeting.

## Summary of the Assessment Results

DOE contractors adequately managed only approximately three of every four safety issues and 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 some 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

# 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.
- Quality assurance personnel of six contractors developed processes and have capabilities in their issues management systems that facilitate analyzing issues for trends.
- 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.

# 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.
- Functional area experts of 6 contractors were inadequately involved in the identification of trends allowing 25 adverse trends to persist undetected.
- 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.

# 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.



# Identification and Correction of the Causes 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.

# Identification and Correction of the Causes of Issues

## Weaknesses

- Eight contractors determined the causes of only 1 to 23% of their issues.
- Most contractors rarely use the procedures and resources they developed for determining and resolving the causes of significant and/or complex issues.
- Contractors often categorized issue significance based on actual consequences rather than potential consequences even though some of their procedures required issues to be categorized considering potential consequences.
- Seven contractors do not proactively require use of the contractors' more rigorous issues management tools (including causal analyses) to ensure that issues are resolved before more significant issues occur.

# Identification and Correction of the Causes 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.”
- 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 the causes of more safety issues.

# Identification and Correction of the Causes 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 use the same tools for significant non-nuclear issues (e.g., industrial safety issues) as 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.

# 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 and the implementation of some corrective actions were delayed.

## 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.

The following weaknesses contributed to the untimely resolution of issues:

- Contractors commonly take months to document the results of formal apparent cause analyses and over a year for root cause analyses.
- 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.
- Metrics were based on averages which obscured cases of poor performance and allowed them to persist without senior management visibility.

# 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).
- 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.

# 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.



## 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.

# Ensuring Visibility to and Facilitating Action on the Overall Assessment Results

In addition to issuing our report, assessment results have been shared via:

- [\*\*OE-3: 2024-01, Effectively Managing Safety Issues Across the Complex: Challenges, Successes, and Recommendations\*\*](#) posted on May 30, 2024 and linked to National Safety Month activities
- NNSA Worker Safety & Health Metrics Summit (also serving as a facilitator to task team revising Safety Performance Objectives, Measures, and Commitments (SPOMCs) for FY 2025 for the new NNSA focus area, contractors' management of safety issues)
- EFCOG working group meetings and a webinar including board members
- Nuclear Facilities and Safety Program Workshop
- The integrated product team and the RevCom process for DOE Order 414.1E, *Quality Assurance*

# Questions?

“I believe it is the duty of each of us to act as if the fate of the world depended on him. Admittedly, one man by himself cannot do the job. However, one man can make a difference. Each of us is obligated to bring his individual and independent capacities to bear upon a wide range of human concerns. It is with this conviction that we squarely confront our duty to prosperity. We must live for the future of the human race, and not of our own comfort or success.” (ADM Rickover)

# *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*

# 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.