NEI 16-07 [Revision A]

Improving the Effectiveness of Issue Resolution to Enhance Safety and Efficiency

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Nuclear Energy Institute

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NOTICE

EXECUTIVE SUMMARY

This NEI technical report provides guidance for improving the effectiveness and efficiency of issue resolution. The document material addresses the Corrective Action Program (CAP) and other processes that are used to identify, track, and resolve problems reported by nuclear plant workers.

The guidance in this document will improve the ability of the nuclear power plant workforce to identify and address problems consistent with U.S. Nuclear Regulatory Commission (NRC) regulations and in accordance with licensee quality assurance programs. Over time, the scope of utility corrective action programs has grown beyond regulatory requirements and has been expanded to include items important for business planning and other strategic issues. This initiative standardizes the use of CAP, presents simplified tools and methods, describes the use of other management systems for issue resolution, and eliminates excessive administrative burden for workers and managers. The process elements proposed in this document are consistent with NRC requirements and current inspection and enforcement procedures to meet licensee quality assurance requirements. In addition, the recommended approaches are aligned with the guidance documents and the Performance Objectives and Criteria (PO&Cs) promulgated by the Institute of Nuclear Power Operations (INPO).

The recommended approaches provide flexibility for issue reporting, enhancing corrective actions, and eliminating low value practices. Changes are expected to reduce administrative and process burden, thus giving workers more time to find and correct problems, and facilitate a better organizational focus on conditions affecting safety and reliability.

NEI 16-07 builds upon CAP process enhancements previously identified in NEI Efficiency Bulletin 16-10, *Reduce Cumulative Impact from the Corrective Action Program*. Efficiency Bulletin 16-10 was developed as part of the industry's Delivering the Nuclear Promise (DNP) initiative and provided a number of recommendations related to implementation of INPO 14-004, *Conduct of Performance Improvement*, Revision 0. Consistent with the 16-10 bulletin, licensees are encouraged to use other business processes and management systems to address issues for which CAP does not apply. Licensees are also encouraged to take prompt action and implement basic fixes to simple problems without requiring extensive analysis and oversight reviews. NEI 16-07 is a component of the DNP initiative and presents additional measures for improving issue resolution effectiveness while eliminating requirements driving the unwarranted expenditure of resources.

It is important to note that guidance contained in NEI 16-07 does not change current expectations for problem identification. Station managers are responsible for encouraging employees to raise concerns and maintain a low threshold for issue reporting. To maintain a healthy nuclear safety culture, supervisors, managers and executives must ensure that the workplace environment remains supportive of problem identification and reporting during the implementation of any changes resulting from the guidance in this document.

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IMPROVING THE EFFECTIVENESS AND EFFICIENCY OF ISSUE RESOLUTION

1.1 GUIDELINES ESTABLISHED FOR THE DEVELOPMENT OF THIS DOCUMENT

Central to the development of the guidance in NEI 16-07 was that any proposed improvements must support a culture of continuous improvement through problem identification and resolution. In addition to this goal, the following guidelines were established using input from the Delivering the Nuclear Promise Steering Committee[1]:

1. A low threshold for issue reporting[2] will be maintained and leadership will reinforce this expectation with all employees.

2. Processes will comply with NRC regulations and related guidance associated with the Reactor Oversight Process and traditional enforcement and will also be aligned with INPO guidance documents and Performance Objectives and Criteria (PO&Cs).

3. Changes will promote a better understanding of the significance of issues and resolution using the most effective and efficient means.

4. Corrective Action Program screening processes will ensure a robust and systematic review of issues to ensure that equipment and quality concerns are promptly addressed.

5. Investigations will be conducted with a level of rigor commensurate with the significance of the issue and in the most efficient way practicable.

6. Corrective actions will be created and implemented to fix problems in a timely manner commensurate with the safety significance of the issue.

7. To allow leadership greater flexibility in managing resources, “management action” will be a method for resolving issues for which CAP does not apply.

8. Documentation will be sufficient to support station understanding of issues, including the results of investigations, corrective actions, and issue resolution.

9. Corrective action backlogs will be managed in order to set priorities and drive resolution of issues based on their safety significance.

10. Issue resolution process steps adding minimal value to end products will be eliminated.

[1] The Delivering the Nuclear Promise Steering Committee is an ad hoc team of industry Chief Nuclear Officers that are coordinating through NEI to improve safety and reliability, establish cost savings and find efficiencies for the nuclear industry.
[2] Issue reporting is also referred to as problem or condition reporting.

1.2 SCOPE AND APPLICABILITY

The Corrective Action Program (CAP) attributes described in this document meet the applicable requirements of 10 CFR 50, Appendix B, *Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants*, and the associated Statements of Consideration published in the Federal Register.[3] The CAP process is used to identify, track and resolve a condition adverse to quality (CAQ), including a significant condition adverse to quality (SCAQ).[4] It is also used to address issues for which a corrective action is required by other NRC regulations, and by NRC orders and licenses.

1.3 INTERFACE WITH OTHER PROGRAMS

NEI 16-07 contains references to other programmatic functions that are in place to meet regulatory requirements. Such references include operability and functionality assessments, and reportability.[5] The discussion of other programmatic functions within this document is intended only to describe their interface with the issue resolution process; performance of these functions is controlled by other industry standards.

[3] *Quality Assurance Criteria for Nuclear Power plants [sic]*, 34 Federal Register 6599 (April 17, 1969), and *Quality Assurance Criteria for Nuclear Power Plants*, 35 Federal Register 10498 (June 27, 1970)

[4] A CAQ and SCAQ are identified in accordance with requirements found in a site-specific quality assurance plan/topical report. Alternate definitions which meet generic Quality Assurance plans are described in this document.

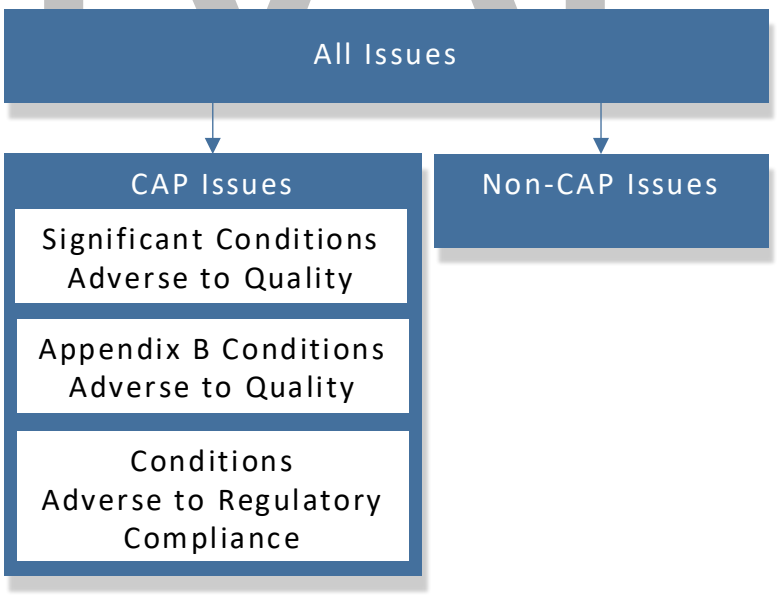
[5] Operability, functionality, and reportability refers to assessments undertaken to assess the condition of certain structures, systems and components and to which controls are applied to ensure availability and reliability. These concepts are described in other industry technical documents.

2 OVERVIEW

The approach to issue resolution described in this document recognizes that the impact of problems on safety and reliability can vary, from considerable to minor. For this reason, programs and procedures direct the reporting of an issue to an appropriate resolution process. CAP issues (e.g., those affecting nuclear safety, quality, or compliance) are documented, managed and resolved by a corrective action program (CAP). A CAP is a formal, rigorous process designed to meet NRC regulations that requires dedicated resources and management commitment to implement. Problems that do not meet threshold for entry into CAP are addressed as Non-CAP issues using other processes outside of CAP. This approach allows leadership to resolve issues using the most effective management systems and programs.

Issues which warrant entry and resolution in the CAP include Significant Conditions Adverse to Quality, Conditions Adverse to Quality, and Conditions Adverse to Regulatory Compliance. In this framework, issues that are adverse to compliance may also be considered "Significant" conditions, especially if the compliance deficiencies reach levels described in either the NRC's significance determination process (i.e. reaching a greater than green severity level within the Reactor Oversight Process) or within the NRC's traditional enforcement process (violations greater than significance level IV). Issues that do not meet criteria for entry into CAP are considered "N-CAP" issues and can be addressed outside the corrective action program by other management systems or by actions taken.

Figure 1



2.1 DEFINITIONS

The definitions of key terms used in this document are presented below.

Approved Process: A process used to resolve a condition. Examples are described in section 4.1.2.

Cause Determination: A process or steps performed as part of an investigation to gain an understanding of the cause of an issue; a cause determination may or may not employ a formal method depending upon the nature of the issue.

Condition Report: A mechanism, either paper or electronic, used to document an issue.

Condition Adverse to Quality: A failure, malfunction, deficiency, deviation, defect, or nonconformance associated with the performance of an activity affecting the safety-related function of a structure, system or component.

Condition Adverse to Regulatory Compliance: A condition where the licensee is not in conformance with NRC regulations, inspection or enforcement processes (such as the Reactor Oversight Process), a failure to comply with a docketed commitment made to the NRC, a non-compliance with the licensee Quality Assurance program that does not consequently affect nuclear safety. Conditions Adverse to Regulatory Compliance are addressed with licensee corrective action programs. Appendix A provides some examples to enhance understanding.

Corrective Action: An action taken to restore a CAP condition to compliance or resolve the degraded or non-conforming condition.

Corrective Action Program Condition: An issue that meets criteria to enter CAP as a Condition Adverse to Quality, Condition Adverse to Regulatory Compliance, or Significant Condition Adverse to Quality.

Corrective Action to Preclude Repetition (CAPR): An action taken to preclude repetition of a significant condition adverse to quality, or to reduce the consequences of additional problems to an acceptable level[6].

Investigation: A process or steps taken to gain sufficient understanding of an issue to formulate an action, which may include a cause determination and an extent-of-condition review.

Issue: An undesired condition, problem, or concern raised by nuclear plant personnel. An issue could be categorized as a condition adverse to quality or regulatory compliance, but could also fall outside of traditional CAP program definitions such as undesired personnel or program performance, concerns about not meeting business objectives or

[6] *IEEE Recommended Practice for the Investigation of Events at Nuclear Facilities*, Institute of Electrical and Electronics Engineers (IEEE) Standards Board (October 2015) describes that in events where the repetition of the condition cannot be conclusive, the corrective actions taken should reduce the consequences of additional problems.

goals, concerns that impact industrial safety, etc.

Leadership: A collective reference to company executives, directors, managers and supervisors.

Management Action: Action taken by station personnel to correct an issue outside of CAP or using other management or business processes.

Non-Corrective Action Program (N-CAP) Condition: An issue that warrants some management resolution but does not meet requirements for resolution in the CAP.

Significant Condition Adverse to Quality (SCAQ): A condition adverse to quality that, if left uncorrected, could have a serious effect on nuclear safety.

3 CLASSIFICATION OF ISSUES IN CAP AND OTHER MANAGEMENT SYSTEMS

3.1 CONDITION ADVERSE TO QUALITY (CAQ)

10 CFR 50, Appendix B requires that a CAQ is promptly identified and corrected (e.g., a component is restored to the intended state). An investigation of a CAQ shall be performed if necessary to understand the issue sufficiently to formulate an action to correct the condition. If an investigation is performed, it shall be conducted with a level of rigor commensurate with the significance of the condition and the need for an extent-of-condition assessment shall be considered. It is expected that many CAQ issue causes are self-evident and readily determined without the need to use a cause determination method.

Additional requirements to describe CAQ conditions are established in 10 CFR Parts 71 and 72:

- With respect to the requirements in 10 CFR 71 for the packaging and transportation of radioactive material, a failure, malfunction, deficiency, deviation, defect, or nonconformance associated with activities affecting the safety functions of packaging components.

- With respect to the requirements in 10 CFR 72 for the transfer and possession of power reactor spent fuel, power reactor-related Greater than Class C (GTCC) waste, and other radioactive materials associated with spent fuel storage in an independent spent fuel storage installation (ISFSI), a failure, malfunction, deficiency, deviation, defect, or nonconformance associated with activities affecting the safety functions of a structure, system or component.

Appendix A provides examples of typical nuclear plant conditions that meet CAQ criteria.

3.2 SIGNIFICANT CONDITION ADVERSE TO QUALITY (SCAQ)

10CFR50 Appendix B requires that a SCAQ is promptly identified and corrected (e.g., component is restored to the intended state). In addition, the cause of a SCAQ must be determined and corrective action taken to preclude repetition (i.e., implementation of a CAPR). If the cause of a SCAQ cannot be eliminated or it is not practical to do so, then the CAPR must be able to mitigate the consequences of the condition to an acceptable level should it occur again. The identification of a SCAQ, the cause of the condition, and the corrective action taken must be documented and reported to appropriate levels of management. It is important to note that while the regulations require that the cause of a SCAQ be understood and a CAPR be implemented, regulations do not require that a root cause analysis be performed. In cases where the causes of the event are uncertain or complex, however, use of the root cause tool may be the most logical means to establish the cause and develop corrective actions to preclude repetition.

Additional requirements to describe SCAQ conditions are established in 10 CFR Parts 71

and 72:

- With respect to the requirements in 10 CFR 71 for the packaging and transportation of radioactive material, a condition adverse to quality that, if uncorrected, could result in a loss of a containment system during transport.

- With respect to the requirements in 10 CFR 72 for the transfer and possession of power reactor spent fuel, power reactor-related Greater than Class C (GTCC) waste, and other radioactive materials associated with spent fuel storage in an independent spent fuel storage installation (ISFSI), a condition adverse to quality that, if uncorrected, could result in an exceedance of the dose limits specified in § 72.104(a).

Appendix A provides examples of typical nuclear plant conditions that meet SCAQ criteria.

3.3 CONDITION ADVERSE TO REGULATORY COMPLIANCE (CARC)

The quality assurance requirements presented in 10 CFR 50, Appendix B, apply to the design, manufacture, construction, and operation of structures, systems, and components preventing or mitigating the consequences of postulated accidents that could cause undue risk to the health and safety of the public. Such structures, systems and components, and the functions they perform, are typically referred to as "safety-related." The goal of a quality assurance program described in 10 CFR 50, Appendix B, is to provide adequate confidence that a safety-related structure, system, or component will perform satisfactorily in service. The associated requirements apply to all activities affecting the safety-related functions of structures, systems, and components including designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying.

Criterion XVI of 10 CFR 50, Appendix B, provides requirements for correcting a condition adverse to quality (CAQ) and a significant condition adverse to quality (SCAQ), and the industry has met these requirements through the establishment of corrective action programs. The scope of a CAQ and SCAQ, as defined in licensee quality assurance and corrective action programs, has been expanded over the years to include activities not within the scope of 10 CFR 50, Appendix B. Indeed, the term CAQ is routinely applied to most conditions not in conformance with a regulation or staff-endorsed regulatory guidance, or any aspect of the licensee's current licensing basis, plus a wide range of organizational or individual performance issues.

A site may consider whether additional effectiveness and efficiency enhancements could be realized by creating a separate condition report category for CAP conditions impacting compliance with NRC regulations, orders and licenses, but not within the scope of 10 CFR 50, Appendix B. This category could also be assigned to an issue associated with current NRC inspection or enforcement processes (such as the Reactor Oversight Process), or a failure to comply with a docketed commitment made to the NRC. Depending on several factors, this approach provides greater flexibility in the assignment of cause

determinations and corrective actions, and improved visibility of important issues. Regardless of whether a site chooses to establish a CARC classification, issues impacting compliance with regulations or regulatory standards must still be identified and addressed within the CAP.

Appendix A provides examples of typical nuclear plant conditions that meet CARC criteria.

3.4 NON-CORRECTIVE ACTION PROGRAM (N-CAP) CONDITION

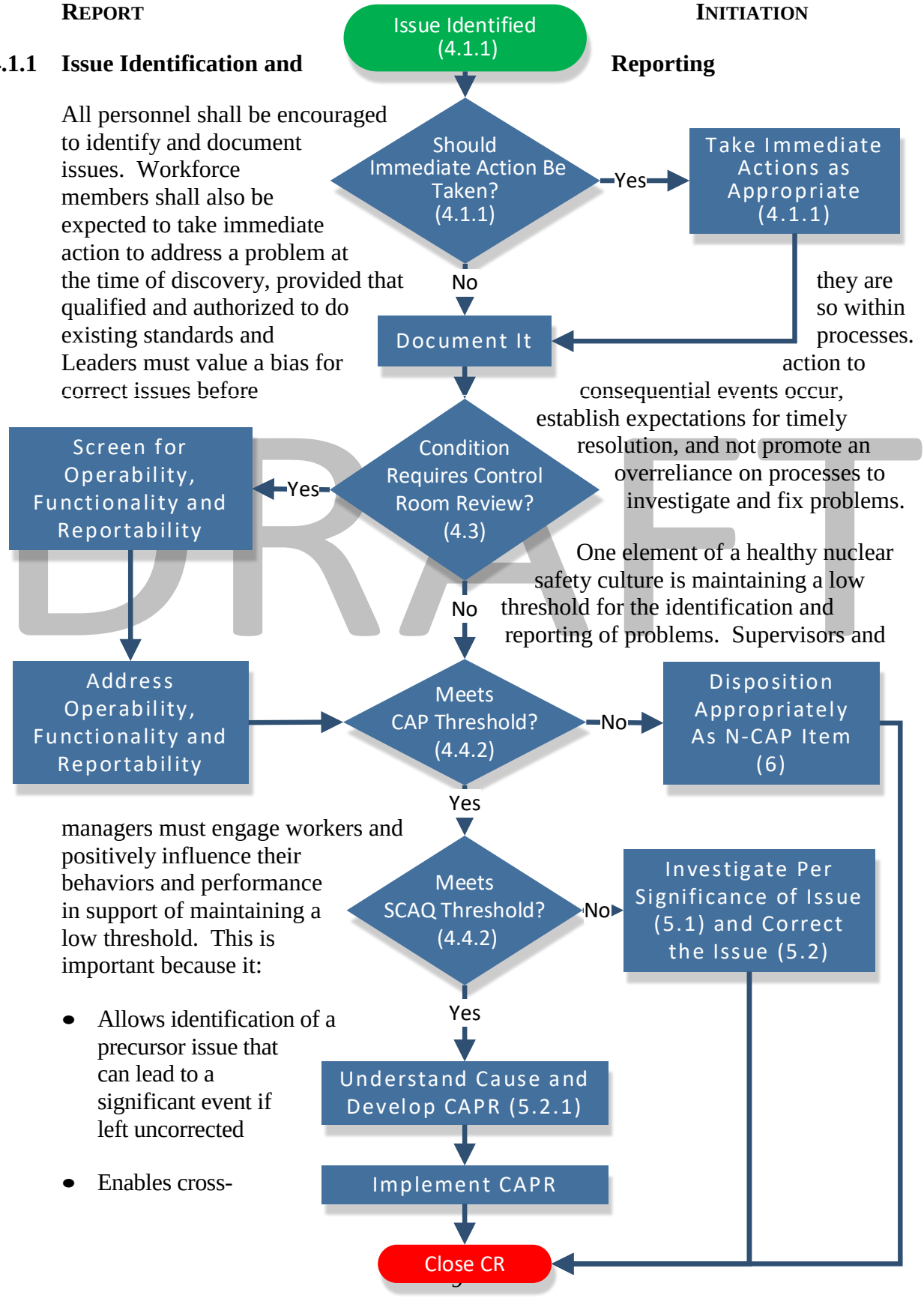
An N-CAP condition is addressed using management action or other processes. The resolution of the issue will be performed under the control of the assigned manager or selected issue resolution system. N-CAP issues are typically resolved without the need for investigations because in most cases, the cause of the issue is obvious. However, some N-CAP issues may be impactful enough to the organization that a more systematic or structured analysis method is warranted to assure a complete understanding. In these cases, management may invest resources to perform some level of investigation to discover the cause and document their findings and actions being taken. This is especially important for N-CAP issues that carry some business risk. If management deems it necessary to investigate, it is conducted with a level of rigor commensurate with the significance of the problem. Many N-CAP issues do not require rigorous oversight by the management team because they represent low risk to nuclear safety, quality, or compliance.

N-CAP is assigned to issues associated with regulatory issues under the jurisdiction of an agency or organization other than the NRC (e.g., Occupational Safety and Health Administration, a State-level environmental protection agency, etc.). The method or process used to assess and resolve the issue shall comply with requirements imposed by the governing agency or organization.

4 ISSUE REPORTING AND SCREENING

The overall process for issue reporting and screening is depicted in Figure 2 below. The process begins with issue identification, proceeds through screening for immediate actions, control room review, and if the issue meets the threshold for CAP. Once past the CAP threshold screen, there is a further screen to identify Significant Conditions Adverse to Quality.

Issue Resolution Process



4.1 CONDITION REPORT INITIATION

4.1.1 Issue Identification and Reporting

All personnel shall be encouraged to identify and document issues. Workforce members shall also be expected to take immediate action to address a problem at the time of discovery, provided that they are qualified and authorized to do so within existing standards and processes. Leaders must value a bias for correct issues before action to consequential events occur, establish expectations for timely resolution, and not promote an overreliance on processes to investigate and fix problems.

One element of a healthy nuclear safety culture is maintaining a low threshold for the identification and reporting of problems. Supervisors and managers must engage workers and positively influence their behaviors and performance in support of maintaining a low threshold. This is important because it:

- Allows identification of a precursor issue that can lead to a significant event if left uncorrected
- Enables cross-

functional reviews of an issue that can result in more effective and efficient resolution of the issue

- Supports effective performance monitoring
- Promotes employee engagement in continuous performance improvement

Managers and supervisors engage workers in the field to continually reinforce the expectation for identifying problems, documenting them, and recommending solutions[7]. Consistent and regular engagement with workers will help identify issues and opportunities to perform on-the-spot corrections when feasible. Employees are encouraged to include all relevant issue information, including actions taken, within a condition report as this will assist the screening team in understanding the issue and making appropriate assignments. For issues that impact plant safety, operability, or immediate notifications to outside agencies, refer to section 4.3 for more guidance.

4.1.2 Use of an Approved Process

Approved Processes at nuclear sites include the formal corrective action program and other systems such as work management, engineering design change processes, procedure revision process and others. CAQ conditions and CAQ corrective actions may be closed to Approved Processes outside the formal corrective action program as these are often a more efficient resolution path because these processes are optimized, integrated into site management systems, and have an adequate amount of oversight to ensure resolution. Double tracking of an issue in the formal corrective action program is unnecessary. SCAQ conditions should be retained in in the formal corrective action program and not be closed to other Approved Processes as the CAPR(s) that resolve SCAQ causes are required to be maintained in the formal corrective action program given their higher safety significance. In order to close a CAQ or CARC condition to an Approved Process, the process must have the following attributes:

- A program document or procedure describes the process
- The process will identify conditions that require the generation of a condition report (e.g., the issue involves a condition adverse to quality)
- Process controls include provisions to identify conditions that shall require a prompt review by the Control Room staff (e.g., for operability, functionality and reportability determinations)
- The process has controls for prioritizing and tracking work based on risk to nuclear safety and equipment reliability
- A management oversight structure is in place to monitor performance of the process (e.g., work schedule and completion)

[7] INPO SOER 10-2, Engaged, Thinking Organizations identified that managers and supervisors play a critical role in ensuring that standards are being upheld.

- The process to cancel, extend, or change the intent of work that is a corrective action must include the same level of review that established the original action

- Process controls ensure that the work performed is traceable

- The process provides for generation and retention of action/work completion documentation suitable for QA record purposes

Site CAP systems may differ between single-entry systems, where all issues are entered into a common software tool and routed to the appropriate processes, versus multiple-entry systems where the software tools for other management systems are separate. For multiple-entry systems, direct entry into an Approved Processes may substitute for entry into the corrective action program.

4.1.3 Anonymous Condition Reports

There are occasions when an individual does not wish to be identified when reporting an issue. A site Employee Concerns Program (ECP) is designed to address issues while maintaining anonymity and is the preferred method to address issues when anonymity is desired. If the ECP process is used, duplicate entry of the issue into the CAP is not required since the ECP process is a recognized program having its own internal controls and monitoring requirements, and is inspected by the NRC. Likewise, issues involving safety conscious work environment or allegations of wrong-doing are best resolved through the ECP. ECP controls must include provisions to identify and report conditions requiring entry into the CAP while maintaining the anonymity of employees (e.g., a condition report is generated if an employee concern identifies a condition adverse to quality)[8].

For sites that have an anonymous condition report capability, the condition report may be closed to a corresponding entry within the ECP and resolved though the ECP if the concern does not involve a CAP condition.

4.2 USE OF N-CAP ISSUE SYSTEMS

Some utilities have established business tracking systems for managing action items that do not warrant entry into CAP. Procedures allow personnel the option of entering a condition into a non-CAP issue system instead of submitting a CAP condition report when the condition is clearly not adverse to quality or impacting compliance with an NRC requirement. If an employee elects to enter this type of condition into the CAP, screening personnel should transfer the condition report or condition information into an appropriate non-CAP reporting system, and close the condition report within the CAP.

4.3 LEADERSHIP COMMUNICATIONS AND REINFORCEMENT OF REPORTING ISSUES

[8] The Nuclear Quality Management Leadership organization established a guideline, Nuclear Employee Concern Program Guide, NEC-05-Guide-001, Rev. 1, 6/8/12, which establishes interfaces between CAP and Employee Concerns Programs.

Leadership expectations concerning use of the CAP and other issue resolution systems should be periodically communicated to the workforce. Employees understand that issues shall be raised at any time and through various methods. The different methods are clearly defined and the associated means for each readily accessible. Examples of the various reporting methods are also communicated. The benefits of reporting low-level issues directly to managers and supervisors should be reinforced; this approach puts a focus on action rather than process to fix problems, builds trust within the organization, and improves teamwork.

4.4 REVIEW BY THE CONTROL ROOM STAFF

Condition reports and issues entered into approved processes are subject to reviews that determine if the operability and functionality of SSCs important to safety has been affected, and whether the issue needs to be reported to an external agency. The control room staff routinely reviews new condition reports, work requests, and other items as an initial screening practice so that immediate determinations are made by Control Room personnel and to assure that they are completed within specified time frames. At the same time, many conditions clearly do not have operability, functionality or reportability implications. In order to minimize administrative burden, the CAP process includes a provision to route only those condition reports that require an operability, functionality or reportability determination to the control room while all other condition reports go directly into to the screening process (discussed in Section 4.5).

Example questions listed below can be used to identify conditions that need to be routed to the Control Room for prompt reviews:

- Plant Safety – Does the condition impact the safe operation of the plant?
- Plant Reliability – Does the condition impact the reliability of the plant?
- Safety-Related Function – Does the condition call into question the capability of any structure, system or component to perform a safety-related function as described in the site Technical Specifications, Technical Requirements Manual or UFSAR?
- Reportable Event – Does the condition require an assessment for reporting an event to the NRC or any federal, state, or local agency? Consider this for any nuclear, industrial, radiological environmental safety, or security issue.

An individual answering “Yes” to one of the above questions contacts the Control Room to immediately relay the concern and provide the basis for the answer and supporting information.

4.5 CONDITION REPORT SCREENING

4.5.1 Screening Personnel

In addition to the initial operations review of condition reports which could impact safety, reliability, or reportability, a routine screening of condition reports is performed by a cross-functional group of knowledgeable individuals representing various work disciplines and technical expertise. Screening personnel have a good understanding of the various processes and methods that can be used to investigate issues and assign actions. At least one of these individuals has senior reactor operator (SRO) knowledge and experience. Station leadership manages the turnover of screening members in order to maintain an acceptable level of performance continuity in the screening process.

4.5.2 Screening Responsibilities

Condition report screening ensures that the significance of each issue is understood and assignments are made to address an issue in the most effective and efficient manner. To this end, the personnel performing the screening function are responsible for:

- Classifying the significance of a condition (e.g. CAQ, CARC, SCAQ, N-CAP)
- Working with site leadership to determine if immediate actions are needed
- Determining the need for additional review of an issue by individuals with specific expertise, such as regulatory compliance or environmental reporting
- Routing a condition report to the Control Room for an operability, functionality and reportability review if needed and not previously performed
- Assigning the functional area or department owner of the issue or an action
- Determine if the issue warrants further action within the CAP or if it can be closed based on the following
    - Actions have already been taken and the issue is resolved AND the station's normal monitoring processes are appropriate to identify a need for further action if the situation recurs
    - Action is being taken in an Approved Process (except for a SCAQ)
    - Actions have NOT been taken but the situation does not warrant action based on management judgement (N-CAP only)
    - Actions are being taken in a Management Action system (N-CAP only)

4.5.3 Additional Condition Report Screening Considerations

Screening is performed in a timely manner, consistent with the urgency of the issue. Screening of a condition report may be delayed if additional information is needed by screening personnel in order to make correct assignments; in these cases, the screening may be completed during a subsequent review after the necessary information has been gathered and considered. The screening of a condition report should occur within five

business days after the day of initiation.

Except in cases where an investigation is required, screening personnel close condition reports if the issue has already been corrected (e.g. an on-the spot correction was made in the field at the time of condition discovery). Screening personnel may need to gather additional information from line managers or supervisors if the action taken to correct the condition was not sufficiently documented in the condition report. Once collected, the action taken to resolve the problem is clearly documented and the condition report closed.

A condition report may also be held open if screening personnel believe that the problem can be addressed quickly and then closed shortly thereafter with documentation of the action taken.

Finally, management conducts a high-level review of screened condition reports to provide oversight of CAP and ensure program requirements are being met. This management review acts as a third barrier to ensure that conditions adverse to safety, quality, or compliance are addressed promptly and appropriately.

4.6 CAP SOFTWARE

Nuclear power plant fleets and/or sites have automated the operation of their CAPs using information technology. In some cases, this has resulted in one software application being used as a single point-of-entry for reporting all undesired conditions, regardless of their significance. To fully realize the anticipated efficiency benefits of the approach described in this document, it will be necessary for the application to allow issues to be differentiated as CAP or N-CAP, and have filtering and sorting capabilities based on these attributes. This will allow generation of reports which clearly distinguish CAP issues from N-CAP issues. Using these reports, leadership personnel will be better able to apply the appropriate level of focus to issues in each category and more effectively prioritize station resources.

This document has been structured to promote improved standardization and efficiency. It is not intended to prompt extensive or costly software changes. Existing utility programs should be changed only to improve workflow and efficiency.

5 ISSUE INVESTIGATION AND CORRECTION

5.1 ISSUE INVESTIGATION

5.1.1 Level of Rigor

CAP procedures shall specify criteria for the extent of issue investigation and acceptable methods for the performance of an investigation. Management should apply a progressive approach to investigating issues and should conduct investigations when necessary to understand a problem sufficiently to determine the right corrective actions. For many issues, the causes may be obvious and may not require extensive efforts to identify them. In these cases, management may elect to take action to restore the condition without expending additional resources beyond correcting the issue. In cases where the issue may

be complex, ambiguous, or uncertain, management invests resources necessary to provide confidence that the causes are sufficiently understood and the appropriate corrective actions are taken. Regardless, management always assures that the resources applied to an issue are commensurate with the risk and significance of the issue.

The risk of the issue (or its potential impact on plant performance) is a measure of probability and consequence. The severity of consequence and the likelihood of recurrence are expressed as the impact on nuclear safety as a result of the issue. Like the progressive approach to investigations, when the risk (probability and consequences) of an issue are high, management needs to assure that the condition and the cause are corrected. If consequences are low, then actions are focused on correcting the condition, but not necessarily on preventing the condition.

The degree of risk and uncertainty helps determine the level of effort needed to investigate and determine the cause of an issue. If the issue is obvious, little or no investigation is required. If the cause of an issue is not known, a structured investigation process is used to guide the investigative efforts. The following table further describes the recommended approach for making these assignments.

		Cause Uncertainty	
		Cause is Clear	**Cause is Ambiguous or Complex**
Risk	**High Consequence**	Issue Investigation Correct Condition and Cause	Root Cause Analysis Correct Condition and Cause
	Medium Consequence	Document Known Cause Correct Condition	Issue Investigation Correct Condition and Cause
	Low Consequence	No Investigation Correct Condition	Investigation Optional Correct Condition

The following examples illustrate an approach for how site-specific guidance could be constructed. The examples are not an all-inclusive list.

<u>High Consequence Issue</u>

- Loss of a safety function (e.g., an event meeting the reporting requirements of 10 CFR 50.72 (b)(3)(v) and (vi)).
- Serious degradation of a fission product barrier (e.g., an event meeting the reporting requirements of 10 CFR 50.72 (b)(3)(ii)).

- Exceedance of a safety limit described in the plant technical specifications.
- A condition causing an increase in core damage frequency (CDF) ≥ 1E-6/year or large early release frequency (LERF) ≥ 1E-7/year.
- Repetitive/recurring conditions associated with a Medium Consequence Issue indicating that the corrective actions have been ineffective.
- A breakdown in Quality Assurance program controls to the extent that the satisfactory performance of safety-related structures, systems or components can no longer be assured.
- A condition that could lead to a White, Yellow or Red finding using criteria found in the NRC Significance Determination Process.
- Any other condition which, if uncorrected, could have a serious effect on nuclear or public safety (e.g., a condition with consequences of similar magnitude to these examples).

Medium Consequence Issue

- The failure of a safety-related structure, system or component, or a non-safety-related structure, system or component within the scope of the Maintenance Rule.
- A condition that has the potential to inhibit satisfactory performance of a safety-related structure, system or component, or a non-safety-related structure, system or component within the scope of the Maintenance Rule.
- A condition adversely affecting licensee performance assessed in a ROP Safety Cornerstone (e.g., an event that contributes negatively to a performance indicator or a substantive cross-cutting aspect or theme is identified).
- A condition resulting in non-compliance with a docketed commitment made to the NRC.
- Repetitive/recurring conditions associated with a Low Consequence Issue indicating that the corrective actions have been ineffective.
- A condition that could lead to a Green finding using criteria found in the NRC Significance Determination Process.
- Any other condition with consequences of similar magnitude to these examples.

Low Consequence Issue

- A condition that could lead or has led to an NRC Minor Violation.
- Nuclear Oversight Deficiency that does not impact nuclear safety
- Missed Surveillance
- Errors in calculations, data reduction, data transmittal, or data verification that are relatively straight-forward and does not affect nuclear safety
- Training program issues
- Fatigue Rule violations

It is understood that a low consequence condition does not mean an unimportant condition. Rather, a ranking system using risk-based criteria is intended to promote the efficient allocation of resources by understanding the relative importance of issues.

An assessment of the uncertainty of the cause of a condition is based on professional judgment and could be accomplished in several ways. For example, the assessment could be made by screening personnel, designated managers, or a station committee. Management will need to determine if the cause is simple and obvious, or if it is not readily apparent, requiring an investigation to fully understand why the issue occurred.

There are instances where CAP investigation guidance does not require a root cause analysis for a condition, but one may be assigned due to requirements contained in current NRC regulations, orders, licenses, or inspection and enforcement processes. For example, greater than green findings, even if they are not prompted by Appendix B conditions, may require a root cause analysis to meet NRC expectations contained in inspection procedures.

It is essential that an adequate level of documentation be developed and maintained for a CAP investigation as this information may be needed for a future assessment if the initial action plan did not resolve the condition (e.g., an action plan to address a Maintenance Rule-related issue). The amount of documentation is commensurate with the significance and complexity of the condition. The quality of the information is more important than the quantity; it is expected that the documentation will be brief.

CAP procedures specify the information and other attributes required for acceptable documentation of a CAP condition. At a minimum, the documentation includes:

- A statement of the condition issue/problem
- Corrective action taken or created/planned

5.1.2 Investigation

An issue investigation can be performed by one or more individuals.

There are many methods and tools available to help investigate and understand the most likely or direct cause of an issue. CAP procedures identify acceptable methods and tools, and direct the user to the most effective and efficient one for a given type of issue (e.g., a people, organization or equipment problem). As noted in the table above, the most consequential and complex issues may require performance of a root cause analysis.

Activities such as prompt investigations, quick human performance investigations, and human performance review boards capture key aspects of a problem before important details are lost. These investigations often identify the cause of the issue, appropriate corrective actions, and yield other insights that management can address through other processes. For issues that are not at the highest risk or uncertainty level, prompt investigations are often sufficient to correct the issue and provide sufficient management insight to reduce the likelihood of similar issues. In these cases, additional investigation is not necessary.

Checklist-type issue investigation tools are useful for investigating some issues such as a

maintenance rule functional failure, or issues associated with equipment failure, human performance or organizational effectiveness. Example templates for these types of investigation tools are presented in Appendices B, C, D and E, respectively; use of the templates is recommended and can be modified as deemed appropriate (e.g., incorporate site-specific approaches and terminology). Checklists can be used independently or concurrently with other investigation techniques based on management direction and the complexity of the problem. When an issue requires a Licensee Event Report (LER), the cause investigator contacts licensing personnel to ensure that all LER process requirements are met (e.g., a checklist alone may not meet LER investigation requirements).

5.1.3 Root Cause Analysis

A root cause analysis is performed to ensure a complete understanding of the cause(s) leading to a significant event or issue. The analysis report clearly and concisely communicates the problem, the cause of the problem, the action that restores the condition to compliance and, for a SCAQ, the CAPR. The length of a report does not necessarily correlate with its quality and effectiveness. In fact, an unnecessarily voluminous report can hinder a broader understanding of the issue and associated actions. Similarly, a root cause analysis does not need to result in a large number of corrective actions to be effective.

CAP requirements shall not drive the establishment of excessively-sized root cause analysis teams, i.e., a team comprised of more personnel than is necessary to ensure a thorough investigation and identification of appropriate corrective actions. In cases where the cause of a condition is well understood, cross-functional support from other departments may not be necessary. Personnel assigned to perform a root cause analysis must have the background and experience necessary to understand and investigate the issue, and create an appropriate corrective action plan.

Line management provides the resources needed to adequately analyze an issue, and monitor the performance of the analysis and development of corrective actions. The manager supporting a particular root cause analysis has overall accountability for effective implementation of the corrective actions.

If a knowledge or skills gap is being considered as a root or contributing cause, a training needs analysis should be performed as part of the root cause analysis to help determine if knowledge or skill gaps contributed to the event and if training is an appropriate corrective action.

A root cause analysis report has the following content attributes:

Problem Statement: The problem statement concisely describes what happened (the object), the issue to be resolved (the defect) and the actual or potential consequence to the station. The problem statement establishes the scope of the root cause analysis because it explains the undesirable or unacceptable consequences, conditions, or results.

For Example: The Residual Heat Removal Pump suction relief valve failed surveillance testing resulting in entry into Technical Specification 3.0.3.

Immediate Actions: Actions that are taken directly after the event to place the equipment, the plant, or the people into a safe condition. Immediate actions are normally taken before a root cause analysis is begun.

Extent of Condition: The extent to which the condition is present in other plant processes, equipment or human performance activities. Actions must be taken to address vulnerabilities identified from an extent-of-condition review. For this reason, it is desirable to perform the review as soon as practicable.

Root Cause Analysis: A systematic approach to determining the root and contributing causes, and recommended actions to preclude repetition. Different root cause analysis methods provide different perspectives on the problem, and a combination of methods helps to ensure a more thorough analysis. The root cause analysis must identify the organizational, programmatic, or behavioral contributors to the event.

Direct Cause: An action, situation, or condition which directly produced the problem; normally, it immediately precedes the event.

Root Cause: The most basic reason for the failure, problem, or deficiency which, if corrected, would preclude repetition. A root cause must meet three criteria:

- The problem would not have occurred had the root cause not been present
- The problem will not recur if the root cause is corrected or eliminated
- Correction or elimination of the root cause will preclude repetition of similar conditions

Contributing Cause: Causes that by themselves would not create the problem but are important enough to be recognized as needing corrective action. Contributing causes are sometimes referred to as causal factors. Causal factors are those action, conditions, or events that directly or indirectly influence the outcome of a situation or problem.

Interim Actions: Actions that are necessary to reduce the probability, or mitigate the consequence, of condition recurrence pending completion of the corrective action(s) [or CAPR(s) for a SCAQ].

Corrective action: An action that restores the CAQ, SCAQ, or CARC

condition to compliance with the licensing basis or other applicable standard.

Corrective Action to Preclude Repetition (CAPR): Required only for a SCAQ and at least one CAPR is required for a SCAQ. An action that eliminates the root cause of the SCAQ or, when the cause cannot be eliminated, implements barriers to mitigate the consequences to an acceptable level.

Analysis of Risk and Safety Consequences: The root cause evaluates the risk and safety consequences of the issue, which includes a qualitative or quantitative review, and assesses compliance in order to adequately inform and prioritize the action plan.

Extent of Cause: The extent to which the root cause of a problem is present in other plant processes, equipment or human performance activities.

Safety Culture Assessment: An assessment to determine if a weakness in any safety culture component was a root cause or contributing cause of the condition and, if so, support development of actions for identified weaknesses.

Review of Previous Internal Occurrences: The root cause analysis determines if previous root cause analyses, self-assessments, maintenance histories or other adverse condition reports at the facility identified similar issues so as to better define the cause and strengthen action plans.

Review of Relevant External Operating Experience: The root cause analysis reviews relevant external operating experience including NRC information notices and generic letters, vendor communications and INPO event reports so as to assist with better definition of the cause and strengthening of action plans.

Effectiveness Review: A review of the overall action plan which establishes a method to quantitatively or qualitatively measure the effectiveness of the corrective actions. Effectiveness review methods include, but are not limited to, assessments, audits, inspections, tests, trending of plant data, or follow-up discussions with plant staff.

A recommended root cause analysis template is provided in Appendix F.

5.2 CORRECTIVE ACTIONS

5.2.1 General Guidance

A corrective action is assigned to resolve a problem being addressed in the CAP. The number of corrective actions for a given issue, as well as the resources needed to implement and sustain the actions, are commensurate with the scope and significance of

the problem. It is acceptable to assign a single action if it will likely resolve the issue or restore compliance. Corrective actions are intended to effectively resolve the condition, and to facilitate effective implementation. Corrective actions should be:

- Specific
- Measurable
- Actionable
- Reasonable
- Timely

At least one CAPR must be developed and implemented for a SCAQ and 10 CFR 50, Appendix B requires that the cause and corrective actions taken must be reported to appropriate levels of management, which is typically done through an oversight body or committee. The CAP must be used to track and manage CAPRs, even when an Approved Process (such as work management) implements the action; double-tracking of a CAPR is necessary because of the significance of SCAQ issues. Actions that support implementation of a CAPR are not CAPRs and should not be designated as such.

A progressive approach is taken to implementation of corrective actions (i.e., adjusted as additional information becomes available). This is not to imply that problems remain only partially solved. Rather, an action plan recognizes that as actions are taken to solve an issue, the understanding of the problem may increase, and result in a need to adjust the corrective actions.

While an organization is expected to have a bias for taking corrective actions, personnel avoid creating actions that are not directly related to solving an issue (i.e., actions not aligned with the problem statement and cause). Unnecessary or low-value actions dilute operational focus, divert resources from more productive uses and hamper effective monitoring of the CAP backlog. All personnel feel free to question proposed actions that are not aligned with the cause of a problem, or that add little or no correction value (i.e., to restoring the condition to compliance). Leadership challenges the quality of action plans when the number of actions appears to be excessive, or they contain actions that are essentially enhancements and not corrective in nature.

CAP user guidance promotes the consideration of efficiency during the formulation of corrective actions. For example, guidance could state that issues are to be corrected in the most efficient manner possible, and with the least amount of actions and resources necessary to correct a problem. With respect to low consequence conditions, the organization needs balance between the cost and value of corrective actions and the acceptance of some residual risk of condition recurrence (e.g., perhaps less resources are needed to address an infrequent occurrence of a low consequence condition than would be required to attempt its prevention).

When a corrective action is being formulated, consideration is given to including a “sunset” provision if appropriate. Such a provision could specify that the correction action will be suspended or ended when certain conditions are met (e.g., performance standards in a given area show sustained improvement).

Corrective actions are not used in lieu of addressing individual performance and accountability issues.

Corrective actions must be tracked and managed within the CAP or an Approved Process. Actions that support completion of a corrective action do not need to be tracked by the CAP (e.g., if a corrective action is implementation of a design change, then supporting actions related to funding, developing and approving the design change need not be tracked in the CAP).

Only the actions needed to correct the condition and, where required, preclude repetition are required corrective actions. All other actions, such as enhancements, are considered management actions and are not required to be tracked in the CAP. When the actions to correct a condition and, if needed, preclude repetition are complete, any remaining actions can be reassigned to an N-CAP-level condition report or directly to another process, and the condition report closed.

5.2.2 Closing a Corrective Action to an Approved Process

With the exception of a SCAQ, the action to correct a CAP condition may be assigned to an Approved Process for tracking and completion, and then closed in the CAP (i.e., double tracking the issue in the CAP is not necessary).

5.2.3 Other Considerations for Corrective Actions

Actions that support implementation of a corrective action are not themselves corrective actions. The following are examples of what a corrective action is and is not:

- If replacing main steam isolation valves is a corrective action, then the supporting activities such as engineering, procurement, and installation are not corrective actions. The actual replacement of the valves is what resolves the issue.
- If a business process is being changed to incorporate a new regulatory requirement, then supporting activities such as benchmarking other plants and change management considerations are not corrective actions. The issue is actually addressed by making the change to the process is the corrective action.

The level of approval required for a request to extend a corrective action due date is commensurate with the significance of the issue and the risk associated with delaying implementation of the corrective action. For example, approval by a senior leadership team member is not necessary for extension requests where delaying the corrective action would have relatively low impact or consequence. In general, the level of approval to extend corrective actions should correspond to the level in the organization that initially established the action.

5.3 MANAGEMENT ACTION

Management actions are a method to address N-CAP conditions. The issue could have a limited scope affecting a single department or team, or have broader impacts and require a station-wide improvement plan. Managers have the broad perspective, experience and professional judgment necessary to correct a wide range of problems. Management action is a tool that allows managers greater flexibility to understand and fix problems.

A management action assignment is also made for enhancements associated with a CAP condition; however, a management action assignment cannot be made to correct a CAP condition or preclude repetition of a SCAQ.

Upon receiving a management action assignment, the designated manager ensures that they understand the issue sufficiently to take the right action to address it. In some cases, a manager determines that no action is required and will continue to monitor performance. Managers understand that being assigned a management action does not mean the issue is unimportant or imply that untimely resolution is acceptable.

When assigned a management action, the responsible manager considers the following points:

- Is the issue part of a broader one that is already being addressed elsewhere? If so, it is appropriate to include the new problem as part of an existing plan.

- How does the priority of this issue compare to others in the department or at the station? The most important issues require more attention with lower-importance issues prioritized appropriately. In some cases, a lower priority issue is resolved ahead of one with a higher priority if the lower priority issue can be corrected during an upcoming outage and a delay would cause it to linger for an additional cycle. Looking for – and taking advantage of – these types of opportunities is important to fixing problems in a timely manner.

- If assigned to a process other than an Approved Process, will the action be appropriately tracked to completion with the right priority?

- Is the documentation of the problem and solution sufficient to support trending and reviews of aggregate data?

- Is the issue included as part of a business plan?

If, while following up on an issue, it is determined that the issue is within the scope of CAP, the original condition report must be re-screened or a new condition report generated to ensure the issue is entered into the CAP.

A manager assigns additional levels of oversight if needed to monitor a problem, complete actions, or achieve the desired results. The manager also chooses a more rigorous method to provide oversight of a particularly important issue, such as

commissioning an independent assessment/review team to examine the issue and the proposed solution.

Managers are responsible for tracking, scheduling and resolving their assigned management actions; these are not functions of a CAP. Excessive and sustained backlogs of management actions affect the ability of station personnel to focus on more important station issues and are not supportive of a low threshold condition reporting culture. Managers periodically review and prioritize their management action backlogs to ensure that potential impacts to personnel and the plant are understood, and the assignment of resources is aligned with changing performance needs and organizational priorities. Manager or supervisor concurrence is not required for the closure of N-CAP condition reports (e.g., an electronic sign-off before a tracking system will close an item).

Individual and organizational accountability are key factors for successfully resolving issues through management action. As a result, it is important that line managers provide follow-up and oversight so problems do not go unaddressed. To help maintain a healthy safety culture, timely feedback is provided to employees regarding the status and closeout of their reported issues.

6 CAP DATA REVIEWS

6.1 REVIEW OF AGGREGATE CAP DATA

CAP procedures contain guidance for conducting periodic aggregate reviews of CAP data (e.g., conditions involving a particular topic or occurring during a specific timeframe). This type of review is useful for identifying new issues and gaining a better understanding of known ones. The results from an aggregate review can be used to create a corrective action to address a new issue, adjust actions for a previously identified issue, or confirm the effectiveness of previously implemented actions. These aggregate review assessments are also important for identifying potential nuclear safety culture issues.

In many cases, it is more effective to monitor low consequence problems and investigate those problems in aggregate rather than one at a time. An analysis of individual issues is less complete than performing an aggregate analysis because the behaviors and organizational factors that contribute to the issue are not as clear. An aggregate review of similar lower-level issues will likely yield a more robust cause determination and corrective action than those developed for a single event.

The provision for performing periodic aggregate reviews of lower risk issues does not preclude taking timely action to correct problems. Appropriate actions to address these issues include coaching individuals, highlighting the problem at key meetings, changing a procedure, or other actions to influence positive change. Managers can determine the need for and implement most of these actions without formal investigations.

Newly identified problems that need additional investigation and action require generation of a condition report. In some cases, common cause investigative approaches may be appropriate to determine the necessary action(s). Action plans are developed, when necessary, to address identified gaps in performance. If the issue was not screened into the CAP, the action plan is developed and implemented outside the CAP.

The aggregate review does not have to be formal for data not retained in the CAP. In many cases, a review of the data by an individual or team is sufficient to identify a common cause and to develop an action plan that will mitigate or fix the issue.

6.2 MANAGING THE CORRECTIVE ACTION BACKLOG

The CAP tracks actions to closure, and some actions require months or even years to complete. When actions are not completed, not appropriately prioritized, or frequently extended, the risk exposure and backlog of work increases. It is important for managers to understand what is in the CAP backlog and how unresolved issues affect plant performance. A periodic review of the CAP backlog is useful to verify that corrective actions being tracked within the process have the right priority and completion dates, the potential impacts are understood, and the actions are still required to be managed within the CAP. Utilities should also track, within the CAP backlog or other approved processes, degraded or nonconforming equipment issues which could require resolution prior to the next plant start-up or require reasonable justification within existing regulatory expectations.

7 REFERENCES

1. 10 CFR 20, *Standards for Protection Against Radiation*
2. 10 CFR 21, *Reporting of Defects and Noncompliance*
3. 10 CFR 26, *Fitness for Duty Programs*
4. 10 CFR 37, *Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material*
5. 10 CFR 40, *Domestic Licensing of Source Material*
6. 10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*
7. 10 CFR 55, *Operators' Licenses*
8. 10 CFR 70, *Domestic Licensing of Special Nuclear Material*
9. 10 CFR 71, *Packaging and Transportation of Radioactive Material*
10. 10 CFR 72, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste*
11. 10 CFR 73, *Physical Protection of Plants and Materials*
12. *Quality Assurance Criteria for Nuclear Power Plants* [*sic*], 34 Federal Register 6599 (April 17, 1969)
13. *Quality Assurance Criteria for Nuclear Power Plants*, 35 Federal Register 10498 (June 27, 1970)
14. NRC Regulatory Guide 1.33, *Quality Assurance Program Requirements (Operation)*, Revision 2
15. NRC Regulatory Guide 4.15, *Quality Assurance for Radiological Monitoring Programs (Inception Through Normal Operations to License Termination) — Effluent Streams and the Environment*
16. NRC Enforcement Manual
17. NRC Inspection Manual, Manual Chapter 0609, *Significance Determination Process*
18. NRC Inspection Procedure 35101, *QA Program Implementation Inspection for Operational Programs*
19. NRC Inspection Procedure 71152, *Problem Identification and Resolution*

20. NRC Inspection Procedure 95001, *Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area*

21. NRC Inspection Procedure 95002, *Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area*

22. NRC Inspection Procedure 95003, *Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input in a Strategic Performance Area*

23. NRC Regulatory Issue Summary, 2005-20, Rev. 2, Revision to NRC Inspection Manual Part 9900 Technical Guidance, *"Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety"*

24. American National Standards Institute (ANSI) N45.2-1971, *Quality Assurance Program Requirements for Nuclear Power Plants*

25. American Nuclear Society (ANS) 3.2/American National Standards Institute (ANSI) N18.7-1976, *Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants*

26. American Society of Mechanical Engineers (ASME) NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*

27. North American Electric Reliability Corporation (NERC), *NUC-001-3—Nuclear Plant Interface Coordination,* (November, 2014)

28. Institute of Electrical and Electronics Engineers (IEEE) Standards Board, *IEEE Recommended Practice for the Investigation of Events at Nuclear Facilities,* (October 2015)

29. INPO 14-004, *Conduct of Performance Improvement*, Revision 0

30. NEI Efficiency Bulletin: 16-10, *Reduce Cumulative Impact From the Corrective Action Program*, (March, 2016)

APPENDIX A – CONDITION REPORT SIGNIFICANCE EXAMPLES

Significant Condition Adverse to Quality (SCAQ)

A condition adverse to quality that, if left uncorrected, could have a serious effect on nuclear safety.

Examples

1. Entry into Standard Technical Specification Limiting Condition for Operation 3.0.3, or its equivalent, for the loss of a safety-related function.

2. System failures resulting in the total loss of a safety-related function described in a licensing basis accident analysis (e.g., Chapter 15 of the UFSAR).

3. The failure of one train of a safety-related system and the extent-of-condition investigation indicates a high degree of certainty that the other train is similarly impacted, such as a common mode failure.

4. Reactor Coolant System activity that is greater than Technical Specification allowable limits.

5. Reactor Coolant System or steam generator tube leakage greater than Technical Specification allowable limits.

6. Containment leakage greater than Technical Specification allowable limits, or inability to isolate containment during operating modes or conditions where isolation capability is required.

7. A generic breakdown of a program implementing quality assurance requirements resulting in the loss of one or more safety functions.

Condition Adverse to Quality (CAQ)

A failure, malfunction, deficiency, deviation, defect, or nonconformance associated with the performance of an activity affecting the safety-related function of a structure, system or component.

Examples

1. A condition that has the potential to inhibit, or has inhibited, a safety-related structure, system or component from satisfactory performance of a safety-related function, such as:

    - A component failure (e.g., a pump seizes or a valve fails to open)
    - A design or manufacturing deficiency or defect (e.g., a safety-related pump is found to have inadequate baseplate anchor bolts that call into question the ability of the pump to perform a safety function during or following a design basis seismic event)
    - Exceeding a design limit (e.g., by improper operation or maintenance)
    - Loss of configuration control (e.g., a wrong part is installed, a component mis-positioning, a Clearance Order error, an FME event, etc.)
    - Errors in calculations, data reduction, data transmittal, or data verification
    - Non-conservative setting caused by an M&TE issue
    - Underground/buried piping or tank leak

2. A condition that has the potential to inhibit, or has inhibited, a non-safety-related structure, system or component from satisfactory performance of a function necessary for a safety-related structure, system or component to fulfill its safety-related function, as required by the plant licensing basis, such as:

    - The loss of the non-safety Starting Air for the Emergency Diesel Generator resulting in the inability to start the Emergency Diesel Generator
    - The loss of compressed air to safety related AOVs if it results in the inability of the AOV to maintain its required safety function
    - The loss of cooling to the Control Rod Drive Exhaust Fans if it results in the inability of the Control Rod Drives to shut down the reactor or mitigate the consequences of a Control Rod malfunctions to offsite exposures comparable to the applicable guideline exposures set forth in § 50.34(a)(1) or § 100.11
    - The loss of Shutdown Cooling Heat Exchanger cooling if it results in the inability to maintain the reactor in a safe shutdown condition

3. A condition resulting in a Safety System Functional Failure (as defined in NEI 99-02).

4. A condition reported to the NRC under the requirements of 10 CFR 50.72(b)(3)(v).

5. Suspected fuel cladding failure (e.g., an unexpected and sustained increase in RCS activity levels).

6. A failure to meet quality assurance requirements, such use of out of calibration test equipment used to adjust safety components resulting in as-left results inconsistent with the design requirement.

Condition Adverse to Regulatory Compliance (CARC)

Condition Adverse to Regulatory Compliance: A condition where the licensee is not in conformance with NRC regulations, inspection or enforcement processes (such as the Reactor Oversight Process), a failure to comply with a docketed commitment made to the NRC, any failure to comply with the licensee Quality Assurance program that does not consequently affect nuclear safety. Conditions Adverse to Regulatory Compliance are addressed within the licensee corrective action program.

Examples

1. A performance deficiency that screens to a Green, White, Yellow or Red Finding as described in NRC ROP. It is important to note that it is the performance deficiency that is the CARC and not the resultant consequence of a regulatory finding.

2. A regulatory finding by the NRC or an unsatisfactory/non-green performance indicator including an event or condition that negatively contributes to an indicator such as:

   - Unplanned reactor scram, power change, turbine trip, or other initiating event where safety systems functioned as expected.
   - Unplanned engineered safety feature or safety system actuation where safety systems functioned as expected.

3. Exceeding Maintenance Rule plant-level or condition monitoring criteria (INPO 12-009) such as failure of a risk-significant non-safety component (e.g., a startup transformer)

4. Failure to meet an augmented quality commitment

5. A condition adversely affecting performance in Initiating Events, Mitigating Systems or Barrier Integrity. This includes issues involving:

   - Adverse weather protection
   - Equipment alignment
   - Fire protection
   - Flood protection
   - Heat sink performance
   - In-service inspection activities
   - Licensed operator requalification program
   - Maintenance effectiveness, maintenance risk assessments and emergent work control, and post-maintenance testing
   - Operability evaluations
   - Changes to structures, systems, and components, risk significant normal and emergency operating procedures, test programs, and the updated final safety analysis report (UFSAR) [*per 10 CFR 50.59*]
   - Temporary or permanent plant modifications

- Refueling and other outage activities
- Component design bases
- Missed or improper technical specification surveillance testing or maintenance
- A beyond-design-basis (BDB) event response capability (FLEX, B.5.b or SAMGs)

6. A condition adversely affecting performance in the Emergency Preparedness (EP) program. This includes issues involving:

   - Emergency Response Organization (ERO) performance in a drill or exercise (e.g., a failed Drill/Exercise Performance [DEP] Indicator opportunity or drill objective)
   - The Alert and Notification System (ANS)
   - ERO staffing or augmentation system/process
   - Changes to an Emergency Action Level (EAL) or the Emergency Plan
   - A failure to maintain compliance with the Emergency Plan
   - EP facilities and equipment
   - Drill or exercise implementation issues, including scenarios and critiques

7. A condition adversely affecting performance in radiation protection program. This includes issues involving:

   - Controls on radiation areas or radioactive material
   - Exceeding a regulatory limit for an occupational worker
   - A radiological hazard assessment, or ALARA planning and controls
   - Radiological exposure controls
   - In-plant airborne radioactivity control and mitigation
   - Occupational dose assessment
   - Radiation monitoring instrumentation

8. A condition adversely affecting implementation of the Offsite Dose Calculation Manual (ODCM) or Radiological Effluent Technical Specifications (RETS). This includes issues involving:

   - Exceedance of a gaseous or liquid radioactive effluent discharge limit
   - Incorrect radiological effluent monitor calibrations
   - Inadvertent release of solid contaminated material
   - The offsite transport of radioactive materials and wastes.
   - The Radiological Environmental Monitoring Program (REMP)
   - Radioactive solid waste processing or radioactive material handling, storage, and transportation

9. A condition adversely affecting performance in the security program. This includes issues involving:

- A loggable/reportable safeguards event (per requirements of 10 CFR 73, Appendix G)
- A loggable/reportable fitness-for-duty program event (per requirements of 10 CFR 26.719)
- Force-on-Force drill failure
- Fatigue rule violation
- Weapons or ammunition storage or control issues

10. Station-identified training assessment findings, INPO accreditation team identified findings, or training program probation

11. License examination security event

12. A condition that identifies vulnerabilities, weaknesses, failures, and deficiencies in the cyber-security program.

Non-Corrective Action Program (N-CAP) Condition

A condition not classified as a SCAQ, CAQ or CARC.

Examples

The purpose of these examples is to help illustrate what, by itself, is not a CAP issue; the associated issue cause or consequence could be classified as a SCAQ, CAQ or CARC significance, but the downstream categorization later may not warrant CAP categorization:

1. Fleet or site performance issues, such as:

    - INPO Area for Improvement
    - Offsite/independent review board finding or recommendation
    - Corporate oversight issues such as CFAM elevations or escalations
    - Violation of an ANI/NEIL requirement

2. Minor Training Program implementation issues, such as:

    - Unsatisfactory operations crew performance identified through simulator training or as-found scenarios
    - Job Performance Measure (JPM) or Task Performance Evaluation (TPE) failure
    - Late arrival or missed training

3. Miscellaneous plant operation issues, such as:

    - Industrial or personal safety events, including OSHA recordable events
    - Failure to properly post Protected Train equipment
    - Work scheduling, coordination or performance issues
    - Leaks or spills
    - Pre-outage milestones that are in jeopardy or not met
    - Critical path delays during outages, or exceeding outage duration or budget
    - Extensions to the planned pre-outage critical path of more than 12 hours

4. Miscellaneous plant issues, such as:

    - Non-compliance with a technical or administrative program, process or procedure
    - Procedure or documentation errors
    - Hardware or software problems
    - An inaccurate evaluation (e.g., a risk assessment)
    - Vendor errors/deficiencies or performance issues
    - CAP compliance concerns or over-dues
    - Adverse trends or event precursors
    - Meeting conduct not aligned with management expectation

APPENDIX B – EXAMPLE MAINTENANCE RULE FUNCTIONAL FAILURE INVESTIGATION TEMPLATE

This template is provided for use by sites that conduct maintenance rule program evaluations within the CAP process.

1. Determine whether a causal determination in accordance with Maintenance Rule requirements is required. Any "Yes" response requires a causal determination, otherwise not required for Maintenance Rule.

    a. If a Maintenance Rule function lost:
        i. Was the Maintenance Rule function risk significant?
    b. Was any Maintenance Rule goal not met?
    c. Was any Maintenance Rule performance criteria not met?

    IF 1.a.i, 1.b, and 1.c ARE ALL "NO" – STOP and Exit.

2. Determine the cause of the Maintenance Rule risk significant or repeat functional failure, failure to meet Maintenance Rule goals, and/or failure to meet Maintenance Rule performance criteria. Include circumstances surrounding the failure, characteristics of the failure, whether the failure is isolated or has generic or common cause implications. Consider intentionally run-to-maintenance, or inherently reliable. Identify actions to preclude recurrence or designate as intentionally run-to-failure.

3. Determine whether the cause was maintenance preventable. If so, determine if the cause was indicative of ineffective corrective actions from a previous failure.

4. Determine whether the SSC requires (a)(1) goal setting and monitoring.

5. If the action involves a modification
    a. Determine whether the modification is cost effective and whether consequences of future failures or degraded performance are acceptable. If yes, this should be designated as run-to-maintenance for future events.
    b. Determine whether additional preventive maintenance or inspection activities are necessary to compensate for the design deficiency.

APPENDIX C – EXAMPLE EQUIPMENT FAILURE INVESTIGATION

1.0 Equipment Failure Description		
CR NO.:	**TITLE:**	
STATION:	**UNITS:**	**SYSTEM:**
EQUIP ID:	**FAILURE DESCRIPTION:** *(Major system or component that initiated the event,, the affected component , failed subcomponent)* Example: RHR Pump trip due to loss of control circuit caused by a relay failure	**EQUIP CLASSIFICATION:** ☐ SPV ☐ Crit ☐ Non-Crit ☐ RTM ☐ Excluded
Failed Subcomponent or Part:	**Failure Rate:** ☐ Non-Recurring ☐ Repeat (2 in 2 yrs) ☐ Chronic (3+ in 2 yrs)	

Equipment Failure Analysis Exit Criteria:

If response to classification/maintenance strategy is Yes, then document the basis, obtain approval) (Section 5) and exit the investigation.

☐ Y	☐ N	☐ NA	Classification / Maintenance Strategy	**Is the failure consequence consistent with the maintenance strategy applied to the equipment?** (If the consequence and maintenance strategy are aligned, no further investigation is required.) **Basis:**

2.0 Equipment Failure Summary

Problem Statement: *(Write to standards of INPO 12-009 Appendix B to support the core of the ICES Description paragraph. Include problem and resulting consequences.)*

Example: The reactor coolant pump tripped which resulted in a reactor scram with complications.

CAUSE of Equipment Failure (that resulted in the identified failure mechanism): *(Write to standards of INPO 12-009 Appendix B to support the core of the ICES Abstract. Include problem and the cause(s) and corrective actions.)*

Example: The reactor coolant pump trip resulting in a reactor scram was caused by a malfunction of the RCP control card. The failure was corrected by changing the card testing procedure and replacing the failed card with a new card.

ICES Reporting Required: ☐ **Yes** ☐ **No** **If Yes, complete Attachment 1.**

Refer to INPO 12-009 ICES Reporting Guidance Requirements and Standards.

Use of Attachment 1 to support ICES inputs is optional. Other methods of data gathering and reporting for ICES may be used based on specific utility processes.

2.0 Equipment Failure Summary (Continued)			
Cause Corrective Actions (include actions required to address Cause attributes)			
Action Identifier	**Responsible**	**Due Date**	**Action Description**
		MM/DD/YYYY	
		MM/DD/YYYY	
CONTRIBUTING CAUSE of Equipment Failure:			
EXTENT OF CONDITION:			
PREVENTION / DETECTION: (Conclusion of Section 4.0: Why the failure was not prevented or detected?)			
Contributing Cause – EOC – Prevention Corrective Actions (include actions required to address Contributing Causes, Extent of Condition, Prevention & Detection attributes)			
Action Identifier	**Responsible**	**Due Date**	**ACTION REQUIRED**
		MM/DD/YYYY	
		MM/DD/YYYY	

3.0 Equipment Failure Analysis Methods
Equipment Failure Support / Refute or FMEA
Tools Used in Determination of Cause **(**Note: Use of Support / Refute or FMEA Recommended. Use additional causal analysis tools, as necessary.) ☐ Support / Refute - Source: ☐ Cause Tree - Source: ☐ Event Specific FMEA or Component FMEA - Source: ☐ Other Cause Analytical Tools Used: ☐ No causal analysis beyond the equipment failure analysis checklist required:
Degradation / Failure Mechanism: If the Failure Mechanism cannot be identified, explain why and discuss the station's risk for recurrence of the equipment failure:
Failure Mode: ☐ Failure mode does not meet any other criteria or is unknown, Explanation:

Instructions for Equipment Failure Analysis Checklist Completion:
Check "Yes", "No" or "NA" with corresponding information. At least one "Yes" attribute expected.

4.0 Equipment Failure Analysis Checklist				
4.1 PREVENTION				
YES	**NO**	**NA**	**ATTRIBUTE**	**ADDITIONAL INFORMATION**
☐	☐	☐	Work Practices	**A. Did work practices, behavior, or training contribute to or cause equipment failure?** (Consider procedure adherence, workmanship, communications, tool usage, attention to detail, FME)
☐	☐	☐	Work Instructions, Maint Procedures, Post Maint Testing	**B. Did work instruction contribute to or cause equipment failure?** (Review work order instructions, procedures, post maintenance testing instruction for adequacy)
☐	☐	☐	Parts / Vendor Quality	**C. Did the quality of parts, shipping, handling or storage contribute to or cause equipment failure?** (Include review of manufacturing defects, workmanship of parts, vendor workmanship, shelf life, storage environment, shipping issues)
☐	☐	☐	Operation	**D. Did equipment operation contribute to or cause failure?** (Review operating procedures and practices and other operations tasks that may interface or impact equipment such as operator rounds)
☐	☐	☐	Design / Design Changes	**E. Did an inadequate design contribute to or cause failure?**(Original design was not adequate, component was not appropriate for its configuration/application, design change by plant staff inadequate, design change by vendor inadequate)
☐	☐	☐	Preventive Maintenance	**F. Did the failure result from lacking or inadequate maintenance strategy?** (PM did not exist, inappropriate frequency or scope, inadequate basis or feedback not implemented incorrect ER classification)
☐	☐	☐	Operation	**G. Did equipment operation contribute to or cause failure?** (Was equipment was operated outside its design?)
☐	☐	☐	Operating Experience	**H. Is there a deficiency in how OE applicable to this component was evaluated and applied?** (Both internal and industry OE)
☐	☐	☐	Risk Management	**I. Was failure due to inadequate risk management (untimely or ineffective bridging, mitigating or corrective measures)?**
☐	☐	☐	IER Implementation	**J. If a SCRAM occurred, was the implementation of SCRAM reduction actions ineffective?** (Consider station responses to IER L2 11-2 (2009-2010 SCRAM Analysis) and IER L4-14-17 (SCRAM Analysis - Use of OE). Include reference to Station's IER Evaluation Records.)

☐	☐	☐	Long Range Plan	**K. Were aging / obsolescence concerns, asset management / LCM plans adequate? Were previous Business Plan related items implemented timely?**

4.2 DETECTION				
Yes	**No**	**NA**	**ATTRIBUTE**	**ADDITIONAL INFORMATION**
☐	☐	☐	PMT	**A. Was functional testing or post maintenance/modification testing ineffective in detecting the failure or precursors?** Note: Inadequate or missing PMT design is captured in Prevention.
☐	☐	☐	Performance or System Monitoring Implementation	**B. Was system/component monitoring ineffective in identifying equipment degradation?** (Scope, frequency or implementation of PdM, ISI, walkdowns or operator rounds?)
☐	☐	☐	Trending and Asset Management	**C. Was system or component health monitoring deficient in identifying equipment degradation?** (Scope, frequency or implementation of strategies to address aging, obsolescence, trends, margin, aggregate risk)
☐	☐	☐	Troubleshooting	**D. Was troubleshooting of a degraded condition inadequate?**

4.3 CORRECTION				
Yes	**No**	**NA**	**ATTRIBUTE**	**ADDITIONAL INFORMATION**
☐	☐	☐	Untimely Action	**A. Was failure due to untimely implementation of corrective actions?** Note: This includes untimely CM/DM work or mitigation actions
☐	☐		Ineffective Actions	**B. Have previous issues not been adequately addressed? (mitigation and elimination actions)**

5.0 Equipment Failure Analysis Review and Approval	
EVALUATOR: (PRINT NAME)	**DATE:** MM/DD/YYYY
APPROVER: (PRINT NAME)	**DATE:** MM/DD/YYYY

6.0 Equipment Failure Analysis Self-Checks (apply as needed):

- ☐ Support / Refute or FMEA used in causal analysis attached or loaded in document retrieval systems as applicable
- ☐ Degradation Mechanism / Failure Location specified
- ☐ At least one causal analysis attribute is declared “Yes” in Section 4.0
- ☐ Direct Cause documented in Section 2.0
- ☐ Indicate why the failure was not Prevented / Detected in Section 2.0
- ☐ Actions identified (or completed) addressing direct cause & prevention of the equip failure
- ☐ Initiate Organizational / Programmatic Evaluation if causal analysis for Organizational Behaviors / Human Performance required . Tracked by:
- ☐ If no cause can be found, has risk analysis been completed? Tracked by:
- ☐ Tracking action created or supporting ICES information provided (Refer to Attachment 1)

APPENDIX D – EXAMPLE HUMAN PERFORMANCE INVESTIGATION TEMPLATE

1.0 Issue Description			
CR NO.:	**TITLE:**		**STATION:**
ICES Reportable: ☐YES ☐NO	**Personnel Safety Event:** ☐YES ☐NO	**HU Clock Reset:** ☐CREW ☐DEPT ☐SITE	**LER / Reportable Event:** ☐YES ☐NO

2.0 Investigation Summary
Problem Statement: < *Problem* > *resulting in* < *Consequence* >
EVENT NARRATIVE:
CAUSE OF EVENT AND CONCLUSIONS (Summarized from Section 3.0, 4.0, and/or 5.0):

Action Tracking	**Responsible Individual**	**Due Date**	**ACTION REQUIRED** ***(in addition to using the conclusions section, evaluate section 6.0 Lessons learned to help formulate necessary actions)***
		MM/DD/YYYY	
		MM/DD/YYYY	

INVESTIGATOR: (PRINT NAME)	**DATE:** MM/DD/YYYY
REVIEWER: (PRINT NAME)	**DATE:** MM/DD/YYYY

3.0 Worker Behaviors

The section that follows is intended to help investigate worker behaviors that lead to the event. The checklist serves to identify problems and help establish corrective actions to resolve the issues.

- *If a statement can be answered as a "YES," the investigator should document the basis for this determination in the appropriate field below.*
- *Once this section is completed, the weaknesses identified should be summarized in the "Conclusions" section on page 1 to document the findings.*
- *It is expected that most investigations can be concluded by completing this section alone.*

However, if in the course of the investigation it is believed that there were problems in job-site conditions or organizational factors, Section 4.0 and Section 5.0 provide tools that can be used to assess those behaviors or potential vulnerabilities. Sections 3.0, 4.0, and 5.0 may be used independent of each other or jointly, as needed.

3.1 Task Preparation

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Should a pre-job brief have been performed for this task, but was not?
☐	☐	B. Did the pre-job brief fail to identify error-precursors or fail to identify actions to mitigate those?
☐	☐	C. Was there a problem identifying or understanding critical steps?
☐	☐	D. Was there a failure to put proper controls in place to ensure critical steps were performed as intended?
☐	☐	E. Was there a failure to apply relevant operating experience for this task?

3.2 Task Performance

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Is this a first time task or was the proficiency of the work performer insufficient?
☐	☐	B. Was the task initially assumed to be a simple task but turned out to be more complex during execution?
☐	☐	C. Should this task have required written governance, but did not?
☐	☐	D. Did the task occur over multiple shifts or multiple workgroups?
☐	☐	E. Were there problems with the turnover of the task (unclear communications, information shares, etc.)?

3.3 Procedure Adherence		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Was the written standard defining the task vague, confusing, or provides inaccurate information?
☐	☐	B. Would place-keeping tools or flagging have helped with task performance, but was not used?

3.4 Verification Practices		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Was there a failure to receive a peer-check, concurrent verification, or independent verification that was required by the written standard for the task?
☐	☐	B. Would using a peer-check, concurrent verification, or independent verification for this task have resulted in a successful outcome?

3.5 Communication Practices		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Was the information conveyed during this task incorrect?
☐	☐	B. Did the work performer(s) fail to use station accepted clear communication practices?

4.0 Job-Site Conditions

The section that follows is intended to investigate the job-site conditions that may have contributed to this event.

- *If a statement can be answered as a "YES," the investigator should document the basis for this determination in the appropriate field below.*
- *Once this section is completed, the weaknesses identified should be summarized in the "Conclusions" section on page 1 to document the findings.*

Sections 3.0, 4.0 and 5.0 may be used independent of each other or jointly, as needed.

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Was there confusion about the roles and responsibilities during the work activity?
☐	☐	B. Were there environmental or ergonomic conditions which contributed to this problem?

☐	☐	C. Were there work-arounds during task performance that were not mitigated by the job package, procedures, or work planning?
☐	☐	D. Was the condition of the equipment at the job site different than was expected?
☐	☐	E. Were there labeling deficiencies with the equipment?
☐	☐	F. Were there instrument indications at the job site that were different than expected?

5.0 Organizational Factors

The section that follows is intended to investigate the organizational factors that may have contributed to this event.

- *If a statement can be answered as a "YES," the investigator should document the basis for this determination in the appropriate field below.*
- *Once this section is completed, the weaknesses identified should be summarized in the "Conclusions" section on page 1 to document the findings.*

Sections 3.0, 4.0 and 5.0 may be used independent of each other or jointly, as needed.

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Did leaders establish unreasonable or low standards or expectations for this task?
☐	☐	B. Does unacceptable or inappropriate behavior for this task go uncorrected?
☐	☐	C. Are there conflicting priorities that negatively influenced the work performance?
☐	☐	D. Did the organization fail to provide adequate resources for this task?
☐	☐	E. Was there time pressure to perform this task?
☐	☐	F. Were there weaknesses in the knowledge or skill of the performer?
☐	☐	G. Have supervisors or group leaders failed to provide adequate coaching on how to successfully perform this task?
☐	☐	H. Are there positive reinforcements or rewards for performing inappropriately? (Are we rewarding poor/bad behaviors even if inadvertently?)

6.0 Lessons Learned
This section should capture ideas that come up in the course of the investigation and should be considered in the development of corrective actions.
ADDITIONAL INFORMATION
A. Is there a better way to do this task?
B. If you performed this task again, what would you do differently?
C. At what level should this event be communicated – who is the appropriate audience (Department – Site – or Fleet)?

APPENDIX E – EXAMPLE ORGANIZATIONAL EFFECTIVENESS INVESTIGATION TEMPLATE

1.0 Issue Description			
CR NO.:	**TITLE:**		**STATION:**
ICES Reportable: ☐YES ☐NO	**Personnel Safety Event:** ☐YES ☐NO	**HU Clock Reset:** ☐CREW ☐DEPT ☐SITE	**LER / Reportable Event:** ☐YES ☐NO

2.0 Investigation Summary

Problem Statement: < *Problem* > *resulting in* < *Consequence* >

EVENT NARRATIVE:

CAUSE OF EVENT AND CONCLUSIONS (Summarized from Section 3.0 and/or Section 4.0):

Action Tracking	Responsible Individual	Due Date	ACTION REQUIRED
		MM/DD/YYYY	
		MM/DD/YYYY	

INVESTIGATOR: (PRINT NAME)	**DATE:** MM/DD/YYYY
REVIEWER: (PRINT NAME)	**DATE:** MM/DD/YYYY

3.0 Organizational / Programmatic Investigation

The section that follows is intended to help investigate organizational or programmatic contributors that lead to the event. The checklist serves to identify problems and help establish corrective actions to resolve the issues.

- *If a statement can be answered as a "YES," the evaluator should document the basis for this determination in the appropriate field below.*
- *Once this section is completed, the weaknesses identified should be summarized in the "Conclusions" section on page 1 to document the findings.*
- *It is expected that most investigations can be concluded by completing this section alone.*

If in the course of the investigation it is believed that leadership or team weaknesses contributed to the event, Section 4.0 establishes tools that can be used to assess those behaviors or potential vulnerabilities. Section 3.0 and 4.0 may be used independent of each other or jointly, as needed.

3.1 Process Weaknesses		
Was there a problem that occurred entirely within a particular process or program? If YES, continue with additional questions below.		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Are there deficiencies in the governing standard describing all activities needed to successfully complete the task?
☐	☐	B. Does the governing standard have vague or confusing steps that contributed to the problem?
☐	☐	C. Does the governing standard have excessive implementation requirements that make it hard to use?
☐	☐	D. Are there weaknesses in the governing standard that impede the implementation of regulatory or required standards?
3.2 Interface Between Controlling Processes		
Was there a problem that arose during hand-offs or interfaces between procedures, policies, work orders, manuals, or other written standards? If YES, continue with additional questions below.		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Are interface(s) missing in all written standards when multiple standards are required to accomplish the task or goal?
☐	☐	B. Are there conflicting requirements between 2 or more written standards?
3.3 Organizational problems with program execution		
Was there a problem that occurred when a work group does not establish or implement a program properly? If YES, continue with additional questions below. If there are cross-functional issues, these questions may lead the evaluator to Section 4.0, a Diagnostic Tool on Leadership and Teamwork behaviors.		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Are there problems with clear ownership of a process or program?
☐	☐	B. Are the roles or responsibilities of the implementing organization poorly defined or not understood?

☐	☐	C. Are there insufficient resources or a lack of authority to implement the process or program?
☐	☐	D. Are there weaknesses in program monitoring (such as metrics, self-assessment, condition reports, etc.) such that problems were not detected?
☐	☐	E. Are there difficulties in correcting known problems in the program?
☐	☐	F. Are there other challenges in program implementation?

3.4 Coordination Between Work Groups

Was there a problem that occurred when work groups had to collaborate or coordinate together to achieve a task? If YES, continue with additional questions below. If there are cross-functional issues, these questions may lead the evaluator to Section 4.0, a Diagnostic Tool on Leadership and Teamwork behaviors.

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Was there a lack of effective stakeholder participation?
☐	☐	B. Was there a lack alignment around a common goal?
☐	☐	C. Was there a lack of understanding about ownership, roles, or responsibilities between work groups?
☐	☐	D. Did resources, physical work spaces, technology, or infrastructure affect the ability for work groups to effectively interface?
☐	☐	E. Was there inadequate communication between work groups?

3.5 Problems within a Work Group		
Was there a problem in a single organization that affected broad functions within the organization? If YES, continue with additional questions below. If there appear to be issues that cross multiple work-groups, these questions may lead the evaluator to Section 4.0, a Diagnostic Tool on Leadership and Teamwork behaviors.		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Is there a lack of resources?
☐	☐	B. Is there inadequate supervisory oversight?
☐	☐	C. Is there inadequate communication within the work group?
☐*	☐	D. Is there a problem with the work group's vision, values, or standards? *NOTE: IF 3.5, ITEM D IS MARKED "YES," CONTINUE TO SECTION 4.0

4.0 Leadership and Team Investigation

The section that follows is intended to help investigate leadership and teamwork behaviors or attributes that contributed to the event. The basis of this tool is INPO 15-005, Leadership and Teamwork Attributes. The checklist serves to identify problems and help establish corrective actions to resolve the issues.

- *If a statement can be answered as a "YES," the investigator should document the basis for this determination in the appropriate field below.*
- *Once this section is completed, the weaknesses identified should be summarized in the "Conclusions" section on page 1 to document the findings.*

Section 3.0 and 4.0 may be used independent of each other or jointly, as needed.

4.1 SET DIRECTION		
Did supervisors, managers, or executives NOT establish a clear and compelling vision and strategy to achieve organizational alignment? If YES, continue with additional questions below.		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Are goals unclear or unrealistic; are there shortcomings involving tactical or strategic goals intended to address equipment health or proficiency of people?

☐	☐	B. Are there conflicting departmental priorities which have not been properly resolved amongst team members that affect the ability to meet stated goals; have rewards or incentives been established that reinforce the wrong behaviors?
☐	☐	C. Is there a misalignment in the organization around the stated vision, goals, and priorities?
☐	☐	D. Did supervisors, managers, or executives direct actions that were not aligned to the stations direction or priorities?

4.2 MAXIMIZE COMPETENCE

Are there weaknesses in the knowledge, skills or proficiency of the workforce, deficient staffing levels, or organizational changes are not well managed? If YES, continue with additional questions below.

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Did workforce planning negatively impact performance? (Workforce planning functions may include: hiring strategies, pipelines, succession planning, personnel development, diversity, knowledge transfer and retention programs or organizational change management.)
☐	☐	B. Did the organization fail to provide adequate well-qualified, prepared candidates with the behaviors necessary?
☐	☐	C. Did the organization not adequately incorporate industry best practices; have leaders not applied lessons learned from operating experience?
☐	☐	D. Were there weaknesses in the skills of supervisors or managers that directly impacted performance of a task?

4.3 ENGAGE WORKFORCE

Are there weaknesses in leadership's ability to foster a positive environment of healthy ownership, trust, and accountability? If YES, continue with additional questions below.

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Are there issues with timely, accurate, and transparent flow of information?
☐	☐	B. Do workers express concerns about morale, do not believe their work is valued or important; leaders do not create an environment where people their work is appreciated. Rewards and recognition do not celebrate individual or team success?

☐	☐	C. Do supervisors inconsistently reinforce and coach expected behaviors; field interactions between workers and supervisors are not routine and supervisors are not skilled at providing feedback?
☐	☐	D. Do supervisors not hold personnel accountable for behaviors that deviate from standards?
☐	☐	E. Are there problems with how people listen, act, and communicate which impacts trust?
☐	☐	F. Is feedback delivered in ways that does not reinforce positive behaviors; candid feedback on performance and development areas is not provided?

4.4 COPE WITH RISK

Are there weaknesses in recognizing, understanding and addressing risk and leveraging organizational expertise to promote informed decision-making? If YES, continue with additional questions below.

YES	NO	ADDITIONAL INFORMATION
☐	☐	A. Are the roles and responsibilities of decision-making not clear and the ultimate responsibility for a decision is not identified; technical expertise and diverse skill sets are not employed?
☐	☐	B. Are people are not encouraged or expected to identify risk?
☐	☐	C. Does the organization allow long-standing or aggregate issues to go unrecognized or uncorrected?
☐	☐	D. Does the organization fail to identify differing views which affects decision-making?
☐	☐	E. Were there problems associated with coordination/planning between cross-functional work groups to address infrequently performed, high-risk activities?
☐	☐	F. Were there problems associated with assessing, integrating and executing emergent work activities with planned (online and outage) schedules?
☐	☐	G. Were there problems with the integration of risk elimination/mitigation activities with business planning processes at the department, site, or enterprise levels?

4.5 ACHIEVE SUSTAINABLE RESULTS		
Are there weaknesses in achieving sustainable results with the appropriate sense of urgency? If YES, continue with additional questions below.		
YES	**NO**	ADDITIONAL INFORMATION
☐	☐	A. Does the organization fail to act with sufficient urgency when declines in performance are identified?
☐	☐	B. Are there shortfalls in behaviors and actions that impede achieving the desired results?

APPENDIX F – EXAMPLE ROOT CAUSE ANALYSIS TEMPLATE

SHORT DESCRIPTION OF EVENT

APPROVED ON DATE

ROOT CAUSE ANALYSIS / CONDITION REPORT DESIGNATOR

Analyst Name
Responsible Manager Name
Reviewed by Site CARB DATE

EXECUTIVE SUMMARY

Narrative of Event:

Briefly describe what happened, when it happened, the major activities on-going at the time of the event, work groups involved and who identified the problem, how long the issue existed and if prior opportunities existed to identify it, and consequences of event. This is no more than two paragraphs.

Problem Statement:

Must include the object, deviation and consequence.

Immediate Actions:

Describe the actions that were taken to correct the condition, and protect the plant and people.

Extent of Condition:

Describe the extent to which the condition may be present in other plant processes, equipment or human performance activities.

Discussion of Cause(s) of the Event and Corrective Actions:

Describe the compensatory actions, if needed, until the corrective action(s) [or CAPR(s) for a SCAQ] is implemented.

Describe the root cause(s) of the event which were identified during the investigation and the corrective action(s) to address [a SCAQ requires a CAPR(s) to address].

Describe the contributing cause(s) of the event which were identified during the investigation and the corrective action(s) to address.

Identify the extent of cause of the event and corrective action(s), if needed, to address.

Proof Statement

Problem is caused by *cause or root cause* is corrected by *corrective action.*

REPORT DETAILS

Analysis Methodology and Results:

Briefly describe analysis tools used and findings.

Analysis of Risk and Safety Consequences:

Briefly describe the risks to the plant.

Analysis of Extent of Condition:

Briefly describe extent of condition methodology and results.

Analysis of Extent of Cause:

Briefly describe extent of cause methodology and results.

Safety Culture Assessment:

Briefly assess the root and contributing causes for safety culture applicability and describe the applicable findings.

Review of Previous Internal Occurrences:

Describe previous facility events, assessments or other condition reports which are related to this event and determine if actions were missed or issues were mischaracterized.

Review of Relevant External Operating Experience:

Identify any Significant Industry Operating Experience that could help to establish corrective actions or identifies a gap in implementing OE. Describe the search parameters used.

Effectiveness Review:

Describe the methodology and measures for the effectiveness review.

Team Composition:

References and Personnel Contacted:

Attachments:

Analysis products