

NRC INSPECTION MANUAL

IPAB

INSPECTION PROCEDURE 95001

INSPECTION FOR ONE OR TWO WHITE INPUTS IN A STRATEGIC PERFORMANCE AREA

PROGRAM APPLICABILITY: 2515

CORNERSTONES: ALL

INSPECTION BASIS: The U.S. Nuclear Regulatory Commission's (NRC's) revised inspection program includes three parts: baseline inspections; generic safety issues and special inspections; and supplemental inspections performed as a result of risk-significant performance issues. The inspection program is designed to apply NRC inspection assets in an increasing manner when risk-significant performance issues are identified by inspection findings or performance indicators (PIs). The NRC regional offices will perform a supplemental inspection following the identification of an inspection finding categorized as risk-significant (i.e., white, yellow, or red) in accordance with the significance determination process (SDP) or when a PI exceeds the "licensee response band" threshold. The scope and breadth of these inspections will be based on the guidance provided in the NRC's assessment "Action Matrix," as described in Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program," and the Supplemental Inspection Table included in IMC 2515, "Light-Water Reactor Inspection Program – Operations Phase," Appendix B, "Supplemental Inspection Program." The supplemental inspection program is designed to support the NRC's goals of **ensuring safety and security and achieving organizational excellence.**

This procedure provides the supplemental response for one or two white inputs **(in different cornerstones)** in a

strategic performance area. The guidance provided in this procedure was developed with consideration of the following boundary conditions:

- Supplemental inspections will not be done for single or multiple green issues;
- The baseline inspection procedure (IP) for identification and resolution of problems (i.e., IP 71152, "Identification and Resolution of Problems") is independent of the supplemental response;
- The inspection requirements contained in this procedure will be completed for each white issue and are the same regardless of whether the issue originated from a PI or an inspection finding; and
- New examples of performance issues resulting from supplemental inspections will be evaluated and categorized in a similar manner to that of the baseline inspection program using the SDP.

95001-01 INSPECTION OBJECTIVES

01.01 To provide assurance that the root causes and contributing causes of risk-significant performance issues are understood.

01.02 To provide assurance that the extent of condition and extent of cause of risk-significant performance issues are identified.

01.03 To provide assurance that the licensee's corrective actions for risk-significant performance issues are sufficient to address the root and contributing causes and prevent recurrence.

95001-02 INSPECTION REQUIREMENTS

In order to adequately protect the health and safety of the public once a risk-significant performance issue is identified, the NRC staff must ensure that a licensee identifies the causes and implements actions to preclude repetition of the performance issue. The most effective and efficient way for the NRC to accomplish this objective is to first allow the licensee the opportunity to perform their own evaluation of the performance issue and then review the licensee's evaluation. The following inspection requirements represent a comprehensive set of attributes related to problem identification, root cause analysis, and establishment of corrective actions.

The licensee's evaluation will generally need to address each of the inspection requirements in order to ensure that the causes of the performance issue are identified and

effective corrective actions are taken to prevent recurrence. However, the depth of the licensee's analysis may vary depending on the significance and complexity of the issue. In some cases, the answers to specific inspection requirements will be self-evident with little additional review or analysis required.

This procedure does not intend NRC inspectors to perform an independent evaluation of the performance issue nor to merely verify that an evaluation has been performed without assessing its adequacy. Rather, inspectors should sufficiently challenge aspects of the licensee's evaluation, as necessary, to ensure that the cause(s) of the performance issue have been identified and appropriate corrective actions have been **planned or** taken to prevent recurrence. Inspectors may use information previously obtained from the baseline inspection program to fulfill the inspection requirements; however, the inspection report associated with this inspection should contain the NRC's assessment of the licensee's evaluation for each inspection requirement. The results of this inspection should be documented in accordance with the guidance contained in IMC 0612, **"Power Reactor Inspection Reports," Appendix C, "Guidance for Supplemental Inspection Reports."**

Significant weaknesses in the licensee's actions to address the performance issue, *including weaknesses involved with the failure to identify the safety culture components described in IMC 0305 [C1] or to perform an adequate evaluation of the performance issue*, may be subject to additional agency actions, including: (1) *those specified in IMC 0305; [C1]* (2) additional enforcement actions; or (3) an expansion of this procedure as necessary to independently acquire the information necessary to satisfy the inspection requirements. **Expansion of this IP may be necessary if inspectors need to independently evaluate the performance issue(s) or safety culture aspects as a result of the licensee not performing its own analysis. It is not expected for inspectors to perform this evaluation as a separate supplemental inspection.**

In general, licensees should be given an opportunity to correct any identified deficiencies prior to re-inspection. For **significant weaknesses in the licensee's actions to address a performance issue associated with an inspection finding, including a substantial inadequacy in the licensee's evaluation of the root causes of the original performance issue, determination of the extent of the performance issue, or the actions taken or planned to correct the issue**, the original performance issue will remain open and will not be removed from the action matrix until the weaknesses are addressed and corrected. For significant weaknesses in the licensee's actions to address a performance issue that is associated with a PI, a parallel **PI** inspection finding will be opened and given the same color as the PI; however, the finding will not be double counted in the action matrix. **Refer to IMC 0305 for guidance on parallel PI inspection findings and related significant enforcement review panels.** Programmatic weaknesses associated with the licensee's evaluation of the performance issue will also be documented in the inspection report **by briefly describing the weaknesses in the transmittal letter and the summary of findings section. An amplified discussion of the weaknesses should be provided in the report details.** Additional focus will be given to those areas during the next **biennial** problem identification and resolution (PI&R) baseline inspection **performed in accordance with IP 71152.**

If new or additional examples of performance issues (non-programmatic) are identified during this inspection or by the licensee during their evaluation, then the new issues will be

evaluated using the SDP, and the corresponding supplemental IP will be performed. Supplemental inspections will also be performed if additional examples of performance issues are reported by PIs that result in crossing a new PI threshold. Additional supplemental inspections will generally not be performed if the new or additional examples of performance issues reported by PIs do not result in crossing a new PI threshold.

The following inspection requirements are generally applicable for both single inspection findings and for performance issues reported by PIs that might represent more than one independent event (e.g. multiple scrams). If a white performance issue is due to multiple events or occurrences, then it is expected that the licensee's evaluation would address each of the events or occurrences. This could be accomplished by doing either independent evaluations for each occurrence or one collective evaluation.

02.01 Problem Identification

- a. Determine that the evaluation documented who identified the issue (i.e., licensee-identified, self-revealing, or NRC-identified) and under what conditions the issue was identified.
- b. Determine that the evaluation documented how long the issue existed and prior opportunities for identification.
- c. Determine that the evaluation documented the plant-specific risk consequences, as applicable, and compliance concerns associated with the issue.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. Determine that the problem was evaluated using a systematic methodology to identify the root and contributing causes.
- b. Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.
- c. Determine that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.
- d. Determine that the root cause evaluation addressed the extent of condition and the extent of cause of the problem.
- e. *Determine that the root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0305. [C1]*

02.03 Corrective Actions

- a. Determine that appropriate corrective actions are specified for each root and contributing cause or that the licensee has an adequate evaluation for why no corrective actions are necessary.

- b. Determine that corrective actions have been prioritized with consideration of risk significance and regulatory compliance.
- c. Determine that a schedule has been established for implementing and completing the corrective actions.
- d. Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.
- e. Determine that the corrective actions planned or taken adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable.

02.04 Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues

This part of the IP is to be implemented when the licensee has requested credit for self-identification of an old design issue and when sufficient information was not previously available to allow the NRC staff to determine whether the finding met the old design issue criteria in IMC 0305. IMC 0305 allows credit to be given to licensees for self-identification of certain old design issues, such as those pertaining to engineering calculations, engineering analyses, associated operating procedures, or plant equipment installations. In such cases, the inspectors should evaluate whether the performance issue meets the criteria in IMC 0305 to determine if the issue is an old design issue.

95001-03 INSPECTION GUIDANCE

General Guidance

This IP is used to assess the adequacy of the licensee's evaluation of a white performance issue. As such, a reasonable time (generally within 30-60 days) should be allowed for the licensee staff to complete their evaluation; however, all corrective actions may not be fully completed upon commencement of this supplemental inspection. The inspection should not be scheduled until the licensee has completed its problem identification, evaluation, and corrective action plan. In the event that the licensee has not defined their corrective action plan within a reasonable time, regional management should prompt the licensee to provide the basis, including risk insights, for the delay. Implementation of the licensee's corrective actions may be verified during subsequent baseline inspections, such as the biennial PI&R inspection performed in accordance with IP 71152.

The following guidance is provided to help the inspector fulfill the specific inspection requirements contained in Section 95001-02. It is not intended that the inspector verify that the licensee's evaluation contains every attribute contained in the inspection guidance section. The intent is that the inspector uses the guidance sections of this procedure to look for weaknesses in the licensee's evaluation that might indicate an issue associated with one of the inspection requirements.

Definitions

Root Causes are defined as the basic reasons (e.g., hardware, process, or human performance) for a problem, which if corrected, will prevent recurrence of that problem.

Contributing Causes are defined as 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 actions, conditions, or events that directly or indirectly influence the outcome of a situation or problem.

Repeat occurrences are defined as two or more independent conditions resulting from the same basic cause(s).

Common Cause is defined as multiple failures (i.e., two or more) of plant equipment or processes attributable to a shared cause.

Extent of Condition is defined as the extent to which the actual condition exists with other plant processes, equipment, or human performance.

Extent of Cause is defined as the extent to which the root causes of an identified problem have impacted other plant processes, equipment, or human performance.

Consequences are defined as the actual or potential outcome of an identified problem or condition.

Specific Guidance

03.01 Problem Identification

- a. The evaluation should state how and by whom the issue was identified. When appropriate, the licensee's failure to identify the problem at a precursor level should be evaluated. Specifically, the licensee's failure to identify a problem **before it becomes risk-significant** may indicate a more substantial problem. Examples include the licensee's failure to: (1) enter a recognized non-compliance into the corrective action program; (2) raise safety concerns to management; or (3) complete corrective actions for a previously identified problem that resulted in further degradation. If the NRC identified the white performance issue, the evaluation should address why the licensee's processes, such as peer review, supervisory oversight, inspection, testing, self-assessments, or quality activities, did not identify the problem.
- b. The evaluation should state when the problem was identified, how long the condition(s) existed, and whether there were prior opportunities for correction. For example, if a maintenance activity resulted in an inoperable system that was not detected by post-maintenance testing or quality assurance oversight, the reasons that the testing and quality oversight did not detect the error should be included in the problem identification statement and addressed in the root cause evaluation.

- c. The evaluation should address the plant-specific risk consequences of the issue. A plant-specific assessment may better characterize the risk associated with the issue due to the generic nature of the PIs. For conditions that are not easily assessed quantitatively, such as the unavailability of security equipment, a qualitative assessment should be completed. The evaluation should also include an assessment of compliance. As applicable, some events may be more appropriately assessed as hazards to plant personnel or the environment. The inspector's review of the risk assessment should be coordinated with a senior reactor analyst.

03.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. The licensee's evaluation should generally make use of systematic methods to identify root and contributing causes. The root cause evaluation methods that are commonly used in nuclear facilities include:
 - 1. Events and causal factors analysis – to identify the events and conditions that led up to an event;
 - 2. Fault tree analysis – to identify relationships among events and the probability of event occurrence;
 - 3. Barrier analysis – to identify the barriers that if present or strengthened would have prevented the event from occurring;
 - 4. Change analysis – to identify changes in the work environment since the activity was last performed successfully that may have caused or contributed to the event;
 - 5. Management Oversight and Risk Tree (MORT) analysis – to systematically check that all possible causes of problems have been considered;
 - 6. Critical incident techniques – to identify critical actions that if performed correctly would have prevented the event from occurring or would have significantly reduced its consequences;
 - 7. Why Staircase – to produce a linear set of causal relationships and use the experience of the problem owner to determine the root cause and corresponding solutions; and
 - 8. Pareto Analysis – a statistical approach to problem solving to determine where to start an analysis.

The licensee may use other methods to perform root cause evaluations. A systematic evaluation of a problem using one of the above methods should normally include:

- 1. A clear identification of the problem and the assumptions made as a part of the root cause evaluation.

For example, the evaluation should describe the initial operating conditions of the system or component identified, staffing levels, and training requirements as applicable.

2. A timely collection of data, verification of data, and preservation of evidence to ensure that the information and circumstances surrounding the problem are fully understood. The analysis should be documented such that the progression of the problem is clearly understood, any missing information or inconsistencies are identified, and the problem can be easily explained and/or understood by others.
 3. A determination of cause and effect relationships resulting in an identification of root and contributing causes that consider potential hardware, process, and human performance issues. For example:
 - (a) Hardware issues could include design, materials, systems aging, and environmental conditions;
 - (b) Process issues could include procedures, work practices, operational policies, supervision and oversight, preventive and corrective maintenance programs, and quality control methods; and
 - (c) Human performance issues could include training, communications, human-system interface, and fitness for duty.
- b. The root cause evaluation should be conducted to a level of detail that is adequate for the significance of the problem. Different root cause evaluation methods provide different perspectives of the problem. In some instances, using a combination of methods helps ensure the analysis is thorough. Therefore, the root cause evaluation should consider evaluating complex problems, which could result in significant consequences, using multi-disciplinary teams and/or different and complimentary methods appropriate to the circumstances. For example, problems that involve hardware issues may be evaluated using barrier analysis, change analysis, or fault trees.

The depth of a root cause evaluation is normally achieved by **completely and systematically applying the methods of analysis described in Section 03.02.a and by** repeatedly asking the question “Why?” about the occurrences and circumstances that caused or contributed to the problem. Once the analysis has developed all of the causes for the problem (i.e., root, contributing, and programmatic), the evaluation should also look for any relationships among the different causes. The depth of the root cause evaluation may be assessed by:

1. Determining that the questioning process appeared to have been conducted until the causes were beyond the licensee’s control.

For example, problems that were initiated by an act of nature, such as a lightning strike or tornado, could have the act of nature as one of the causes

of the problem. The act of nature would not be a candidate root cause, in part, because the licensee could not prevent it from happening again. However, a licensee's failure to plan for or respond properly to acts of nature would be under management control and could be root causes for the problem.

2. Determining that the problem was evaluated to ensure that other root and contributing causes were not inappropriately ruled out due to assumptions made as a part of the analysis.

For example, a root cause evaluation may not consider the adequacy of the design or process controls for a system if the problem appears to be primarily human performance focused. Consideration of the technical adequacy of the assumptions used in the root cause evaluation and their impact on the root causes would also be appropriate.

3. Determining that the evaluation collectively reviewed all root and contributing causes for indications of **more fundamental** problems with a process or system.

For example, a problem that involved a number of procedural inadequacies or errors may indicate a more fundamental or higher level problem in the processes for procedural development, control, review, and approval. Issues associated with personnel failing to follow procedures may also be indicative of a problem with supervisory oversight and communication of standards.

4. Determining that the root cause evaluation properly ensured that correcting the causes would prevent recurrence of the same and similar problems. Complex problems may have more than one root cause as well as several contributing causes. The evaluation should include a process to verify that corrective actions for the identified root causes do not rely on unstated assumptions or conditions that are not controlled or ensured.

For example, root causes evaluations that are based on normal modes of operation may not be valid for accident modes or other "off normal" modes of operation.

5. Determining that the evaluation appropriately considered other possible root causes. Providing a rationale for ruling out alternative possible root causes helps to ensure the validity of the specific root causes that are identified.

- c. The root cause evaluation should include a proper consideration of prior occurrences of the same or similar problems at the facility and knowledge of prior operating experience. This review is necessary to help develop the specific root and contributing causes and also to provide indication as to whether the issue is due to a more fundamental concern involving weaknesses in the licensee's corrective action program.

The licensee's root cause evaluation should:

1. Broadly question the applicability of other similar events or issues with related root or contributing causes.

For example, root cause evaluations associated with outage activities and safety-related systems could include a review of prior operating experience involving off-normal operation of systems, unusual system alignments, and infrequently performed evolutions.

2. Determine if previous root cause evaluations and/or corrective actions missed or inappropriately characterized the issues. Determine those aspects of the corrective actions that did not prevent recurrence of the problem.

For example, the evaluation should review the implementation of the previously specified corrective actions and a reassessment of the identified root causes to determine process or performance errors that may have contributed to the repeat occurrence.

3. Determine if the root cause evaluation for the current problem specifically addresses those aspects of the prior root cause evaluation or corrective actions that were not successfully addressed.

For example, if during the review of a tagging error that resulted in a mispositioned valve the licensee determines that a previous similar problem occurred, and the corrective actions only focused on individual training, then the root cause evaluation for the repeat occurrence should document why the previous corrective actions were inadequate.

4. Include a review of prior documentation of problems and their associated corrective actions to determine if similar incidents have occurred in the past.

For example, the licensee staff should consider the following during their review of prior operating experience: internal self-assessments; maintenance history; adverse problem reports; and external databases developed to identify and track operating experience issues. Examples of external databases may include Information Notices, Generic Letters, and vendor/industry generic communications.

The inspectors should discuss the problem and associated root causes with other resident, regional, or headquarters personnel to assess whether previous similar problems or root causes should have been considered.

- d. The root cause evaluation should include a proper consideration of the extent of condition and the extent of cause of the problem and of whether other systems, equipment, programs, or conditions could be affected.

1. The extent of condition review should assess the degree that the actual condition (failed valve, inadequate procedure, improper human action, etc.) may exist in other plant equipment, processes, or human performance.
2. The extent of cause review should assess the applicability of the root causes across disciplines or departments for different programmatic activities, human performance, or different types of equipment.

For example, the licensee's fire protection staff considered that the root causes identified for the misalignment associated with the safety injection system could potentially affect fire suppression systems since the systems shared a common tagging and alignment method. As a result, feedback was provided to the incident review committee to include modification of the fire suppression system control procedure and provide formal training to all fire protection personnel.

The extent of condition review differs from the extent of cause review in that the extent of condition review focuses on the actual condition and its existence in other places. The extent of cause review should focus more on the actual root causes of the condition and on the degree that these root causes have resulted in additional weaknesses.

- e. *The root cause evaluation should include a proper consideration of whether a weakness in any safety culture component was a root cause or significant contributing cause of the performance issue (PI or inspection finding), and if so, that weakness should be addressed through adequate corrective actions. Therefore, for each performance issue that prompted this inspection, consider whether the performance issue, the licensee's evaluation methodology, results obtained using that methodology, or any related circumstance indicates that a weakness in any safety culture component could reasonably have been a root cause or significant contributing cause of the performance issue. If so, then for each such weakness, determine if the licensee considered in their evaluation if the weakness was a root cause or significant contributing cause of the deficiency and documented that consideration in their evaluation. [C1]*

03.03 Corrective Actions

The licensee's proposed corrective actions to the root and contributing causes should:

- a. Address each of the root and contributing causes **and any weakness associated with the extent of condition and extent of cause** of the performance issue. The corrective actions should be clearly defined. Examples of corrective actions may include but are not limited to modifications, inspections, testing, process or procedure changes, and training. The proposed corrective actions should not create new or different problems as a result of the corrective actions. If the licensee determines that no corrective actions are necessary, then the basis for this decision should be documented in the evaluation.
- b. Include consideration of the licensee's risk assessment results of the issue in prioritizing the type of corrective actions chosen. Attention should be given to solutions that involve only changing procedures or providing training because they are sometimes overused. In such cases, consideration should be given to more comprehensive corrective actions such as design modifications. The corrective action plan should also include a review of the regulations to ensure that it achieves compliance if compliance issues exist.
- c. Be assigned to the appropriate individuals or organizations to ensure that the actions are **planned or** taken in a timely manner. The licensee should also establish a formal tracking mechanism for each of the specific corrective actions.
- d. Establish a method to validate the effectiveness of the overall corrective action plan. Specifically, a method should be established to quantitatively or qualitatively measure the effectiveness of the corrective actions. Effective methods would include but are not limited to assessments, audits, inspections, tests, trending of plant data, or follow-up discussions with plant staff.

The licensee's response to an NOV that directly corresponds with the performance issue that was the basis for the supplemental inspection should address the reason for the violation, corrective actions that have been taken and the achieved results, corrective actions that will be taken, and the date when full compliance was or will be achieved. The adequacy of the corrective actions should be reviewed in accordance with the guidance above to determine if they address the violation.

03.04 Evaluation against IMC 0305 Criteria for Treatment of Old Design Issues

When this part of the IP is implemented, the inspection report should contain a discussion of why or why not the performance issue is or is not being considered as an old design issue. For those cases where the issue is not being considered, the discussion can be brief. For those cases where the performance issue is being considered as an old design issue, a more detailed discussion should be **documented in the inspection report** that explains how each of the four criteria contained in **IMC 0305** were met. A synopsis of this discussion should also be contained in the summary of findings and cover letter of the inspection report. Additional guidance pertaining to the treatment of old design issues is contained in IMC 0305.

95001-04 RESOURCE ESTIMATE

It is estimated that this procedure will take between 16 and 40 hours to complete for each white issue. The inspector(s) assigned should be familiar with the discipline associated with the subject of the licensee's evaluation. For planning purposes, a resource estimate near the lower end of the scale should be used for licensees with corrective action programs that have been determined to be thorough during the annual PI&R inspection. A resource estimate near the higher end of the scale should be used for licensees with corrective action programs that have been previously determined to be ineffective **or for the expansion of this procedure to independently acquire the information necessary to satisfy the inspection requirements.**

END

ATTACHMENT

Revision History for IP 95001

| Commitment Tracking Number | Issue Date | Description of Change | Training Needed | Training Completion Date | Comment Resolution Accession Number |
|----------------------------|-----------------------|--|-----------------|--------------------------|-------------------------------------|
| C1 | 06/22/06 CN-06-015 | Incorporate safety culture initiatives described in, Staff Requirements - SECY-04-0111 - "Recommended Staff Actions Regarding Agency Guidance in the Areas of Safety Conscious Work Environment and Safety Culture" dated August 30, 2004 | Yes | July 1, 2006 | ML061570117 |
| N/A | 10/16/06 CN-06-027 | This IMC has been revised to incorporate comments from the Commission in which the term public confidence has been change to openness | None | N/A | N/A |
| N/A | 04/09/09 CN 09-011 | This IP has been revised to address the following ROP feedback forms: 95001-1121, 95001-1122, 95001-1123, 95001-1126, 95001-1127, 95001-1133, and 95001-1243. This revision: clarifies that all safety culture components should be considered; removes discussion pertaining to PI fault hours and NEI 99-02; updates the NRC's goals to reflect the Strategic Plan for FY 2008-2013; references IMC 0612 for documentation | None | N/A | ML083220122 |

| Commitment Tracking Number | Issue Date | Description of Change | Training Needed | Training Completion Date | Comment Resolution Accession Number |
|----------------------------|------------|--|-----------------|--------------------------|-------------------------------------|
| | | guidance; updates old design issue guidance; clarifies expansion of the IP; adds guidance to follow-up on NOVs; and expands the list of root cause evaluation methods. | | | |