OFFICE OF THE INSPECTOR GENERAL

U.S. NUCLEAR REGULATORY COMMISSION
DEFENSE NUCLEAR FACILITIES SAFETY BOARD

# Audit of NRC's Reactor Oversight Process: Reactor Safety Baseline Inspection Procedures

OIG-16-A-12
April 6, 2016

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
INSPECTOR GENERAL

April 6, 2016

MEMORANDUM TO: Victor M. McCree
Executive Director for Operations

FROM: Stephen D. Dingbaum ***/RA/***
Assistant Inspector General for Audits

SUBJECT: AUDIT OF NRC'S REACTOR OVERSIGHT PROCESS: REACTOR SAFETY BASELINE INSPECTION PROCEDURES (OIG-16-A-12)

Attached is the Office of the Inspector General's (OIG) audit report titled *Audit of NRC's Reactor Oversight Process: Reactor Safety Baseline Inspection Procedures*.

The report presents the results of the subject audit. Following the March 23, 2016, exit conference, agency staff indicated that they had no formal comments for inclusion in this report.

Please provide information on actions taken or planned on each of the recommendations within 30 days of the date of this memorandum. Actions taken or planned are subject to OIG followup as stated in Management Directive 6.1.

We appreciate the cooperation extended to us by members of your staff during the audit. If you have any questions or comments about our report, please contact me at (301) 415-5915 or Paul Rades, Team Leader, at (301) 415-6228.

Attachment: As stated

# Office of the Inspector General

U.S. Nuclear Regulatory Commission
Defense Nuclear Facilities Safety Board

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# Results in Brief

## Why We Did This Review

The U.S. Nuclear Regulatory Commission's (NRC) Reactor Oversight Process (ROP) is a risk-informed, performance-based, tiered approach to assessing plant safety.

Baseline inspections are the minimum level of inspection required to ensure plant safety and security, and are common to all operating nuclear plants. They focus on activities and systems that are "risk significant."

The audit objective was to assess the effectiveness of the ROP in discovery of plant performance issues.

For the purposes of this audit, the assessment of the effectiveness of the ROP was limited to an analysis of how inspection procedures were written, and understood and performed by agency managers and inspection staff. The report appendix contains information on the audit scope and methodology.

## *Audit of NRC's Reactor Oversight Process: Reactor Safety Baseline Inspection Procedures*

### What We Found

NRC needs to ensure mandatory and discretionary language used in inspection procedures is clear and consistent for inspectors and managers responsible for performing and overseeing baseline inspections.

Completion of inspection procedures is a key input into NRC's assessment of whether nuclear reactor licensees operate safely. OIG did not identify specific instances where unclear language led to inadequate assessments; however there is risk associated with how NRC is assured inspectors perform activities deemed mandatory in inspection procedures. For example, NRC risks inspectors not performing mandatory activities and performing unneeded discretionary activities because mandatory and discretionary activities are unclear. NRC also risks inconsistent inspections across regions.

### What We Recommend

This report makes recommendations to make baseline inspection procedures clearer for inspectors and managers performing and overseeing baseline inspections.

Agency management stated their general agreement with the finding and recommendations in this report.

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# ABBREVIATIONS AND ACRONYMS

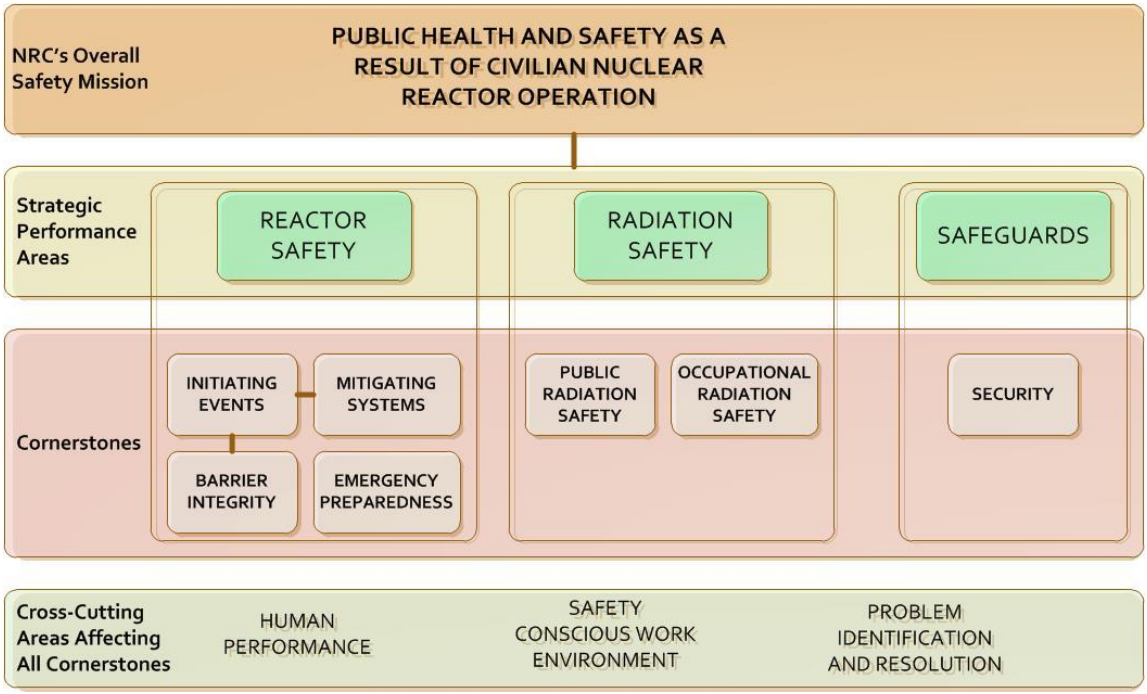
| | |
|---|---|
| NRC | Nuclear Regulatory Commission |
| OIG | Office of the Inspector General |
| PI | Performance Indicator |
| ROP | Reactor Oversight Process |

# I. BACKGROUND

### NRC's Reactor Oversight Process

The U.S. Nuclear Regulatory Commission's (NRC) Reactor Oversight Process (ROP) is a risk-informed, performance-based, tiered approach to assessing plant safety consisting of three strategic performance areas: Reactor Safety, Radiation Safety, and Safeguards. Each strategic performance area has cornerstones that reflect the essential safety aspects of facility operation. Licensee compliance with NRC requirements and satisfactory licensee performance in the cornerstones provide reasonable assurance of safe facility operation.

**Figure 1. ROP Regulatory Framework**




Source: NRC

## Reactor Safety Cornerstones

The Reactor Safety cornerstones include inspectable areas designed to (1) limit the frequency of initiating events; (2) ensure the availability, reliability, and capability of mitigating systems; and (3) ensure the integrity of fuel cladding, reactor coolant system, and containment boundaries.[1] As part of the ROP, NRC developed the baseline inspection program to align with the cornerstones of safety.

## Baseline Inspection Program

Baseline inspections are the minimum level of inspection required to ensure plant safety and security, and are common to all operating nuclear plants. They focus on activities and systems that are "risk significant." Baseline inspection procedures allow NRC to verify performance indicators (PI) provided by the licensee and inspect areas not covered by the PIs. Licensee performance is assessed using the inspection results and PIs. Any findings from inspections and PIs are further evaluated for significance and then placed in an action matrix to determine the response required from the licensee.

The baseline inspection program includes inspection procedures aligned to each of the cornerstones. This audit concentrated on baseline Inspection Procedure 71111, "Reactor Safety-Initiating Events, Mitigating Systems, Barrier Integrity," and its attachments.

NRC's Office of Nuclear Reactor Regulation is responsible for the overall management, support, and oversight of baseline inspections including the language used in the inspection procedures. Each inspection procedure describes mandatory activities that must be done and optional activities that provide inspectors information to consider or guide inspections. Inspectors are responsible for performing baseline inspection procedures while regional managers oversee baseline inspections and are responsible for ensuring baseline inspections are completed.

[1] The Reactor Safety Strategic Performance Area includes a fourth cornerstone related to emergency preparedness that was not included in the scope of this audit.

## II. OBJECTIVE

The audit objective was to assess the effectiveness of the ROP in discovery of plant performance issues.

For the purposes of this audit, the assessment of the effectiveness of the ROP was limited to an analysis of how inspection procedures were written, and understood and performed by agency managers and inspection staff. The report appendix contains information on the audit scope and methodology.

## III. FINDING

Opportunities exist to make baseline inspection procedures clearer for inspectors and managers performing and overseeing baseline inspections.

### A. Baseline Inspection Procedures Could Be More Clear

Mandatory and discretionary activities listed in some baseline inspection procedures are unclear to NRC staff and managers because NRC does not have controls in place to ensure clear language is used to differentiate mandatory and discretionary activities. As a result, NRC risks inspectors not performing activities deemed mandatory and performing unneeded discretionary activities. NRC also risks inadequate assessment of safety cornerstones and inconsistent inspections across regions.

## What Is Required

### Mandatory and Discretionary Activities Must Be Clear

NRC requires baseline inspection procedures be written to clearly convey which activities are mandatory and which are discretionary. Inspection Manual Chapter 0040, "Preparing, Revising and Issuing Documents for the NRC Inspection Manual," requires inspection procedure originators to make clear which activities are mandatory and which are discretionary. The inspection manual chapter identifies words such as, "must," "shall," and "will" to indicate mandatory requirements, and "can," "may," "might," and "should" to convey discretion. Further, the inspection manual chapter requires guidance to be clearly identified so it will not be mistaken for additional inspection requirements.

Inspection requirements in inspection procedures describe the requirements for completing the procedure and achieving its objectives. Inspection guidance provides information on how the requirements are expected to be accomplished, and in some inspection procedures, reflects experience gained or problems encountered in performing the inspection. Inspection Manual Chapter 0040 also requires staff writing inspection procedures to ensure it is clear to the inspector which portions are mandatory and which, if any, are optional.

In addition, Federal internal control standards require that NRC programs be structured and implemented in a way to provide reasonable assurance that the agency is accomplishing its mission.

## What We Found

### Mandatory and Discretionary Activities Unclear

Mandatory and discretionary activities in baseline inspection procedures are unclear to NRC staff and managers responsible for performing and overseeing baseline inspections. Some inspection procedures contain language that is unclear as to which steps are mandatory and which steps are discretionary. For example, under "Inspection Requirements" in

Figure 2, "shall" in the first sentence is a mandatory requirement and other words, such as "should" and "consider," are discretionary yet appear under the same heading, "Inspection Requirements."

**Figure 2. Inspection Procedure 71111.01 Adverse Weather Protection**

71111.01-02 INSPECTION REQUIREMENTS
This review shall be performed for the types of weather-related risks identified for the site. The inspector should review the licensee's operating experience, corrective action program, UFSAR, etc., to determine the types of seasonal and/or storm-related adverse weather challenges to which the site is susceptible. The actual inspection for the adverse weather condition should then be performed prior to experiencing expected seasonal temperatures extremes and when expected adverse weather conditions are imminent at the site. When selecting a sample, it is recommended that the inspector consider multiple systems that are collectively risk-significant.

Source: NRC

Some inspectors explained they were uncertain whether "should" or other discretionary words in the inspection procedure were meant to be mandatory or discretionary. To avoid uncertainty, several inspectors said they treated "should" as a mandatory requirement and performed the specified activities.

As another example, the inspection requirements section identified in Figure 3 begins with discretionary language. It states that the inspector should review the licensee fire plan and then should use it as an evaluation tool. The inspection procedure indicates that reviewing the fire plan is discretionary, yet the inspection procedure relies on the fire plan as an evaluation tool. Inspectors are left to determine if reviewing the fire plan is meant as mandatory or discretionary.

**Figure 3. Inspection Procedure 71111.05AQ Fire Protection (Annual/Quarterly)**

| |
|---|
| 71111.05AQ-02 INSPECTION REQUIREMENTS<br>02.01 Quarterly Inspection. The inspector should review the fire plan for the area selected against the fire protection program defined hazards and DID features to verify that the fire plan is adequate. The fire plan should then be used as a tool in evaluating the attributes below for the selected fire areas. |

Source: NRC

NRC staff and managers expressed difficulty distinguishing mandatory and discretionary activities in some baseline inspection procedures. OIG interviewed 41 staff and managers[2] responsible for performing and overseeing inspections, and managing inspection procedures. Sixty-three percent acknowledged some inspection procedures were not clear. Further, 63 percent of inspectors noted issues with inspection procedure clarity. Several inspectors also mentioned they rely on experience to judge which activities are mandatory and which are discretionary rather than solely rely on inspection procedures. Several inspectors also said they completed inspection activities whether activities were mandatory or discretionary and 37 percent of inspectors explained they viewed words such as "should" as indicating a mandatory activity. Further, a headquarters director concluded inspectors in the regions and headquarters staff responsible for managing the inspection procedures do not always interpret inspection procedure mandatory and discretionary language the same way.

## *Why This Occurred*

### Inadequate Controls to Ensure Clarity

Mandatory and discretionary activities listed in some baseline inspection procedures are unclear to NRC inspectors and managers because NRC does not have controls in place to ensure clear and consistent language is used to differentiate mandatory and discretionary activities.

[2] OIG interviewed 41 staff and managers: 19 resident inspectors, 18 senior agency managers, and 4 staff responsible for managing inspection procedures.

## *Why This Is Important*

**Missing Mandatory Activities, Inadequate Assessment, and Inconsistent Inspections**

NRC risks inspectors not performing activities deemed mandatory and performing unneeded discretionary activities because mandatory and discretionary activities in inspection procedures are unclear. NRC also risks inadequate assessment of safety cornerstones and inconsistent inspections across regions.

OIG did not identify specific instances where unclear language led to inadequate assessments; however there is additional risk associated with how the agency is assured inspectors perform activities deemed mandatory in inspection procedures, given the varying interpretations of mandatory and discretionary. NRC relies on completion of inspection procedures for assurance that each safety cornerstone has had an adequate assessment, and this assessment is a key input into NRC's assessment of whether nuclear reactor licensees operate safely.

Further, unclear language for mandatory and discretionary activities could lead to inconsistent inspections. A headquarters director contended that sometimes regional staff interpret mandatory and discretionary language differently, which leads to inconsistent performance of baseline inspection procedures across the regions.

## Recommendations

OIG recommends that the Executive Director for Operations

1. Develop and implement controls to ensure mandatory and discretionary language used in inspection procedures is clear and consistent.

2. Notify staff and managers of controls developed to ensure that mandatory and discretionary language used in inspection procedures is clear and consistent.

# IV. AGENCY COMMENTS

An exit conference was held with the agency on March 23, 2016. Agency managers reviewed a discussion draft prior to this meeting. During the exit conference, agency managers agreed with the report's finding and recommendations and opted not to provide formal comments for inclusion in this report.

**Appendix A**

# OBJECTIVE, SCOPE, AND METHODOLOGY

## Objective

The audit objective was to assess the effectiveness of the ROP in discovery of plant performance issues.

For the purposes of this audit, the assessment of the effectiveness of the ROP was limited to an analysis of how inspection procedures were written, and understood and performed by agency managers and inspection staff.

## Scope

The audit focused on evaluating inspection procedures used to identify plant performance deficiencies. We conducted this performance audit from September 2015 through January 2016. Internal controls related to the audit objective were reviewed and analyzed. Throughout the audit, auditors were aware of the possibility of fraud, waste, and abuse in the program.

## Methodology

OIG reviewed relevant criteria for this audit, including the NRC Inspection Manual; Government Accountability Office's *Standards for Internal Control in the Federal Government*; NRC Management Directive 8.13, *Reactor Oversight Process*; NUREG 1379 Revision 2, *NRC Editorial Style Guide*; and *NRC Plain Language Writing Techniques*.

To understand how NRC staff and managers write, interpret, and oversee performance of inspection procedures, OIG reviewed additional sources such as inspection procedures, inspection reports, and inspection tracking tools. OIG also interviewed NRC staff and management from the Office of Nuclear Reactor Regulation, Region I, Region II, Region III, Region IV, and observed inspections performed by resident and senior resident inspectors at nine nuclear power plants throughout the regions.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The work was conducted by RK Wild, Team Leader; Paul Rades, Team Leader; Levar Cole, Audit Manager; John Thorp, Technical Advisor; Larry Vaught, Senior Auditor; Jenny Cheung, Auditor; Roxana Hartsock, Auditor; and Janelle Wiggs, Auditor.

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## COMMENTS AND SUGGESTIONS

If you wish to provide comments on this report, please email OIG using this link.

In addition, if you have suggestions for future OIG audits, please provide them using this link.