OFFICE OF THE INSPECTOR GENERAL

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

Audit of NRC's Construction Reactor Oversight Process

OIG-15-A-14
June 16, 2015

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

OFFICE OF THE
INSPECTOR GENERAL

June 16, 2015

MEMORANDUM TO: Mark A. Satorius
Executive Director for Operations

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

SUBJECT: AUDIT OF NRC'S CONSTRUCTION REACTOR OVERSIGHT PROCESS (OIG-15-A-14)

Attached is the Office of the Inspector General's (OIG) audit report titled *Audit of NRC's Construction Reactor Oversight Process.*

The report presents the results of the subject audit. Following the May 14, 2015, exit conference, agency staff provided formal comments for inclusion in this report. Agency comments are located at Appendix B to the 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 R.K. Wild, Team Leader, at (301) 415-5948.

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 (NRC) licenses and oversees new nuclear power reactor construction.

Current construction licenses were issued in accordance with Title 10, Code of Federal Regulations, Part 52, *Licenses, Certifications, and Approvals for Nuclear Power Plants*.

NRC uses the Construction Reactor Oversight Process (cROP), to evaluate the quality of construction of four reactors being built in Georgia and South Carolina. The cROP also includes inspections of ongoing construction by inspectors who verify whether licensees are building the new reactors according to NRC approved designs.

Construction inspectors also perform administrative activities, such as adjusting to licensee construction schedule changes and revising inspection guidance, known as SmartPlans, that provide a list of inspection activities such as what should be inspected and sample sizes.

The audit objective was to assess the efficiency and effectiveness of NRC's Construction Reactor Oversight Process.

Audit of NRC's Construction Reactor Oversight Process

What We Found

NRC needs to improve efficiency when adjusting to construction inspection schedules and revising inspection guidance. In Fiscal Year 2014, approximately 60 percent of regional construction inspection staff time was spent on administrative program support activities, such as adjusting to licensee construction schedules and revising SmartPlans rather than conducting inspections.

NRC relies on construction inspection staff for monitoring and adjusting to construction schedule changes because schedules provided by licensees do not contain real-time information as originally envisaged. Further, the process for approving SmartPlan revisions is dominated by multiple levels of review by individuals who do not necessarily need to participate in the review.

Agency efforts to identify process inefficiencies are not comprehensive and have left the agency unable to identify process and functional redundancies, overlap, and gaps. As the pace of new reactor construction increases, unaddressed administrative inefficiencies could affect future cROP effectiveness.

What We Recommend

This report makes recommendations to improve the efficiency of cROP.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

BPI	Business Process Improvement
cROP	Construction Reactor Oversight Process
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
NRC	Nuclear Regulatory Commission
NRO	Office of New Reactors
OIG	Office of the Inspector General

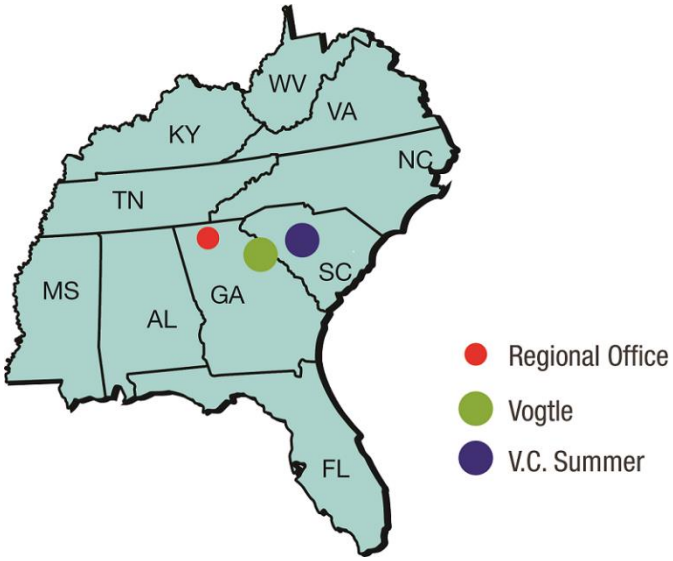
I. BACKGROUND

Oversight of New Reactor Construction

The U.S. Nuclear Regulatory Commission (NRC) licenses and oversees new nuclear power reactor construction. Four reactors are being built under combined operating licenses issued in accordance with Title 10, Code of Federal Regulations, Part 52, *Licenses, Certifications, and Approvals for Nuclear Power Plants*. Two of the new reactors are in Georgia and two in South Carolina. NRC uses the Construction Reactor Oversight Process (cROP), a matrix-based tool for evaluating the quality of construction, to oversee construction of new nuclear power reactors.

Region II New Reactor Oversight

Figure 1



Source: NRC Region II

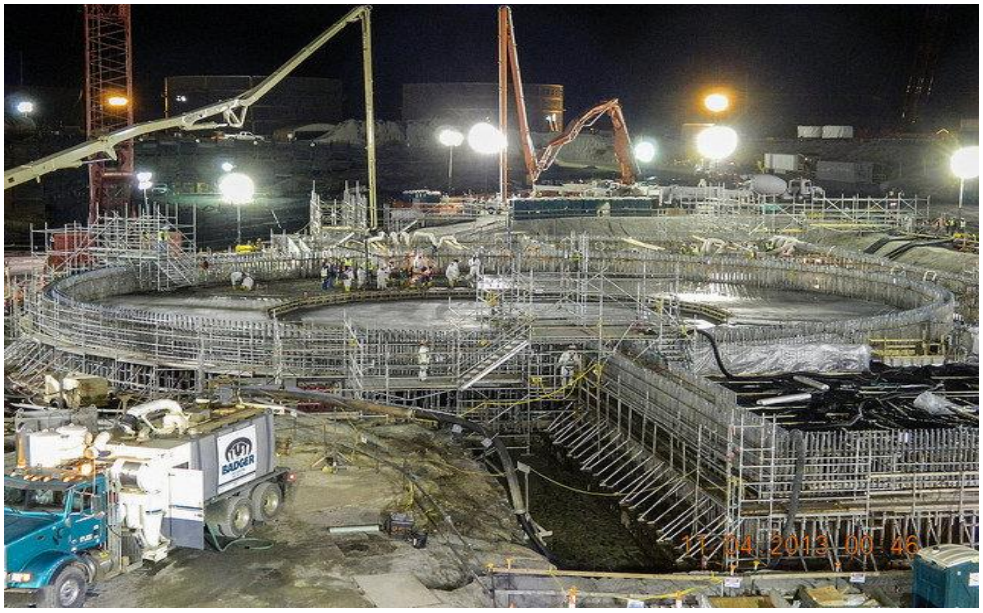
Two organizations in NRC have overall responsibility for overseeing new reactor construction. The Office of New Reactors (NRO) provides overall program management and planning for the oversight of new reactor

construction. NRC's Region II conducts inspections of ongoing construction. As of April 2015, Region II's construction inspection staff consisted of 29 regional construction inspectors and 6 resident construction inspectors (3 in South Carolina and 3 in Georgia). Collectively, their role is to verify that licensees are building the new reactors according to NRC approved designs by sampling licensee Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).[1]

Regional construction inspection staff use SmartPlans to provide detail for inspections. Specifically, SmartPlans provide lists of inspection activities, such as what items should be inspected and sample sizes. According to Region II guidance, SmartPlans are linked to specific ITAAC to provide "reasonable assurance" that licensees meet the intent and requirements of that ITAAC.

V.C. Summer Unit 3 Construction

Figure 2



Source: NRC

[1] ITAAC are a pre-approved set of standards that licensees must meet to show that reactors are built according to approved designs. See *Audit of NRC's Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Process*, OIG-12-A-16, July 12, 2012.

II. OBJECTIVE

The audit objective was to assess the efficiency and effectiveness of NRC's Construction Reactor Oversight Process. Appendix A contains information on the audit's scope and methodology.

III. FINDING

NRC's cROP is generally effective; however, the Office of the Inspector General (OIG) identified opportunities to improve efficiency.

A. cROP Processes Could Be More Efficient

NRC programs should be structured and implemented to provide reasonable assurance that the agency is accomplishing its mission efficiently and effectively. However, NRC regional construction inspection staff currently spend more time on administrative work than on construction inspection. This is because NRC efforts to identify process inefficiencies are not comprehensive, leaving the agency unable to identify process and functional redundancies, overlap, and gaps. As the pace of new reactor construction increases, unaddressed administrative inefficiencies could affect future cROP effectiveness.

What Is Required

NRC Programs Should Be Efficient and Effective

Federal and NRC guidance emphasizes that programs should be structured and implemented to provide reasonable assurance that the agency is accomplishing its mission efficiently and effectively. Office of Management and Budget Circular A-123, *Management's Responsibility for Internal Control*, and NRC Management Directive 4.4, *Internal Control,* specify requirements for creating an environment that assures efficiency and effectiveness. One such requirement is to establish

and maintain internal controls to achieve the objective of efficient and effective operations.

Further, Management Directive 4.4 establishes a framework for identifying and addressing program performance and management challenges, and holds all NRC employees responsible for active participation in achieving this objective.

What We Found

More Time Spent on Administrative Work Than On Construction Inspections

Regional construction inspection staff spend a majority of their time on administrative work rather than on construction inspections. As shown in Figure 3, approximately 60 percent of staff time in Fiscal Year 2014 was spent on administrative program support activities rather than conducting inspections. Based on OIG analysis of agency data, it is important to note that Region II originally envisaged regional inspectors to focus primarily on conducting inspections rather than on administrative activities. One experienced senior manager opined that if it could be done over again, all construction inspectors would be located at the construction sites and they would not have hired any regional inspectors.

Examples of administrative activities include:

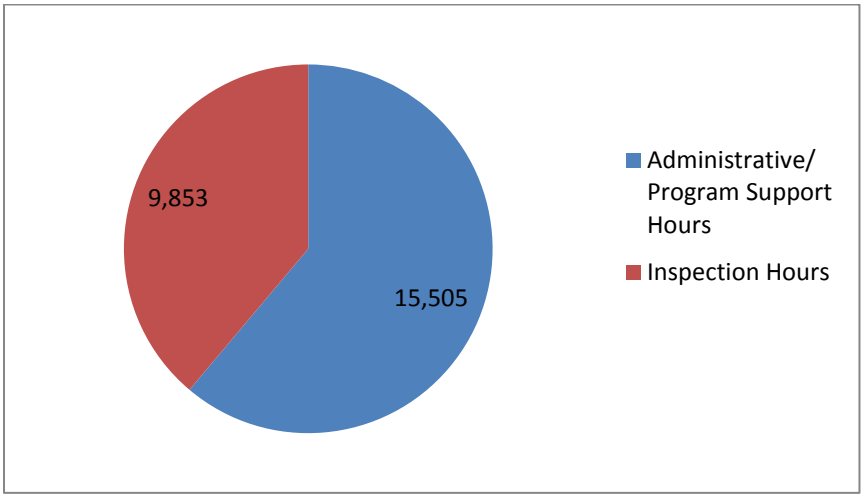
- Adjusting to Licensee Construction Schedule Changes — NRC planned for a construction oversight process based on a licensee-provided electronic construction schedule that would be updated regularly by the licensee. However, the licensee does not provide real time information; rather, licensees provide a projection of upcoming construction at 13- and 26-week intervals. Region II construction inspection staff are relied upon for monitoring and adjusting to construction schedule changes.

- Participating in the SmartPlan Revision Process — The process for approving SmartPlan revisions is cumbersome and inefficient. Construction inspection staff contend that the review process is dominated by multiple levels of review by individuals who do not necessarily have the need to participate in the review. Furthermore, the large number of reviewers makes it very difficult to obtain concurrences in a timely fashion.

Administrative Hours and Inspection Hours

Fiscal Year 2014

Figure 3



Source: Region II

Management Representation of Current Process Review Efforts

At the May 14, 2015, exit conference, NRO management officials acknowledged OIG's findings and noted that the agency has undertaken a new process review effort that should address the process inefficiencies identified by OIG. However, the results of this process were not mentioned until the exit conference and was, therefore, not audited by OIG. OIG has no opinion as to the effectiveness of this new process.

Why This Occurred

NRC Efforts To Identify Process Inefficiencies Are Not Comprehensive

NRC's previous and ongoing efforts to identify process inefficiencies fail to yield significant process improvements because efforts are not comprehensive. Specifically, a Business Process Improvement (BPI) effort and annual self-assessments were methodologically limited from exploring fully the interplay of requirements and processes across various offices and functions, as described below:

- BPI Effort Not Comprehensive—Between April 2013 and September 2013, NRC headquarters and Region II conducted a BPI effort to streamline the construction inspection scheduling process associated with cROP. One of the first steps in a BPI is to lay out the current process and structure of an organization. Yet, there was no consensus among BPI team members on construction program staff roles and responsibilities. Additionally, the BPI team could not agree on solutions to the inefficiencies identified by the BPI. Nonetheless, the BPI team recommended options to improve construction inspection scheduling, including the SmartPlan revision process, but management did not commit to the specific recommendations or develop a comprehensive action plan with milestones to address the identified administrative inefficiencies. A senior manager stated it was difficult to proceed with the recommendations because there was no consensus on the recommendations provided by the BPI team.

- cROP Annual Self-Assessments Did Not Identify Administrative Inefficiencies—NRO and Region II conducted cROP self-assessments in 2012 and 2013, and are in the process of evaluating the results for 2014. The self-assessment for 2013 concluded that the cROP met its program goals and achieved its intended outcomes. However, the self-assessment is more of an annual status report and is not designed to comprehensively identify administrative inefficiencies.

Why This Is Important

Existing Inefficiencies Could Negatively Affect cROP Effectiveness

As the pace of new reactor construction increases, unaddressed administrative inefficiencies could affect future cROP effectiveness. Absent a comprehensive review of cROP and related construction inspection activities, the agency may not be positioned to proactively identify process and functional redundancies, overlap, and gaps, including among offices, branches, and positions, and between headquarters and Region II. The pace and complexity of construction today is primarily limited to relatively straightforward structural and civil engineering ITAAC. As more complex components and systems are installed at licensee sites, NRC's ability to effectively oversee and inspect licensee construction activities would be seriously challenged if the pendulum of administrative-to-direct inspection hours does not swing more favorably towards inspection.

Recommendations

OIG recommends that the Executive Director for Operations

1. Develop and implement a comprehensive review that identifies process inefficiencies associated with cROP.

2. Implement the results of the comprehensive review through a formal action plan, with milestones, in order to address process inefficiencies associated with cROP.

IV. AGENCY COMMENTS

An exit conference was held with the agency on May 14, 2015. At this meeting, agency management provided supplemental information that has been incorporated into this report as appropriate. On May 22, 2015, the agency generally agreed with the draft report and recommendations and notified OIG that it would provide formal comments.

On May 29, 2015, NRC provided formal comments to the draft report. The agency expressed concerns about how the report findings and recommendations could be broadly interpreted as requiring a wholesale review of cROP policies, procedures, and practices. While OIG identified specific opportunities for improvement, the recommendations are intended to allow the agency to identify the best approach to addressing OIG and agency-identified inefficiencies.

Appendix B contains a copy of the agency's formal comments.

Appendix A

OBJECTIVE, SCOPE, AND METHODOLOGY

Objective

The audit objective was to assess the efficiency and effectiveness of NRC's Construction Reactor Oversight Process (cROP).

Scope

This audit focused on evaluating NRC's cROP efficiency and effectiveness. We conducted this performance audit from October 2014 through February 2015 at NRC headquarters in Rockville, MD, and Region II in Atlanta GA, through interviews, telephone, email, and attendance at Region II's Regional Counterpart Meeting in December, 2014. Additionally, auditors interviewed staff from the Office of New Reactors, Region II construction staff, Office of Enforcement, and Office of the General Counsel. 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

To address the audit objective within the scope of this audit, OIG auditors reviewed the following Federal and agency guidance, key data, and documents:

- OMB Circular A-123, Management's Responsibility for Internal Control, December 2004.
- Government Accountability Office's (GAO) Standards for Internal Control in the Federal Government, 1999.
- NRC Principles of Good Regulation and Strategic Plan 2014-18.

- Management Directive 4.4, Internal Control, October 2012.
- Title 10, Code of Federal Regulations, Part 52, Licenses, Certifications, and Approvals for Nuclear Power Plants.
- NRC Inspection Manual Chapters.
- NRC Enforcement Manual, August 2014.
- NRC Enforcement Policy, January 2013.
- NRO COM-108, NRO Construction Inspection Interfaces with Region II June 2014.
- Region II Desktop Guides pertaining to new reactor construction.

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 audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The audit was conducted by RK Wild, Team Leader; Levar Cole, Audit Manager; Timothy Wilson, Senior Management Analyst; Roxana Hartsock, Auditor, Kevin Nietmann, Senior Technical Advisor, and Meredith Johnson, Student Analyst.

Appendix B

AGENCY FORMAL COMMENTS

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

May 29, 2015

MEMORANDUM TO: Stephen D. Dingbaum
Assistant Inspector General for Audits
Office of the Inspector General

FROM: Michael R. Johnson
Deputy Executive Director for Reactor
and Preparedness Programs
Office of the Executive Director for Operations

SUBJECT: FORMAL COMMENTS ON THE OFFICE OF THE INSPECTOR GENERAL DRAFT REPORT ON THE U.S. NUCLEAR REGULATORY COMMISSION'S CONSTRUCTION REACTOR OVERSIGHT PROCESS

This memorandum responds to the May 19, 2015, e-mail from Mr. Timothy Wilson, Office of the Inspector General (OIG), transmitting the OIG's final draft report, "Audit of NRC's [U.S. Nuclear Regulatory Commission] Construction Reactor Oversight Process." OIG revised the report following receipt of the agency's informal written comments of May 12, 2015, and verbal comments provided during the May 15, 2015, exit conference.

The NRC staff has reviewed the report and found no sensitive, proprietary, personally identifiable, classified, or other information that would necessitate redaction before issuing the report as publically available.

The NRC staff appreciates the independent audit function performed by the OIG, as well as the way this audit of the Construction Reactor Oversight Process (cROP) was conducted and the responsiveness to concerns voiced during the exit conference. The staff understands the revised draft report and recommendations, and the staff agrees that additional gains in process efficiency and effectiveness can be made through enhancements resulting from recent and future internal process review that was not included in the scope of this audit.

The following specific comments are relevant to how portions of the audit report could be interpreted by those who did not have the benefit of the discussions that occurred during the audit and at the exit conference. The NRC staff is concerned that one statement in the final draft report, if taken out of context, could cast an unduly negative perspective on this important staff function. Additionally, if applied too broadly, the recommendation to perform a "comprehensive" assessment of the cROP could actually make the inspection staff less efficient

CONTACT: Thomas J. Kozak, NRO/DCIP
301-415-6892

and effective rather than achieving the mutual goal of increasing inspection staff efficiency and effectiveness. Specifically, the staff requests that the following specific points be considered:

- In the section entitled "cROP Processes Could Be More Efficient," Page 4, last paragraph, the OIG report states:

  > *... NRC regional construction inspection staff currently spend more time on administrative work than on construction inspection. This is because NRC efforts to identify process inefficiencies are not comprehensive, leaving the agency unable to identify process and functional redundancies, overlap, and gaps.*

  The NRC staff would like to provide clarification on this point. Most importantly, all construction activities that were required by the program to be inspected during the subject period were inspected. The NRC's confidence in this assessment is based on weekly reviews and discussions held within the region that included verifying there were no critical construction activities targeted for inspection for which an inspection had not been or would not be performed. It is further supported by the results of the NRC's mid-year and end-of-cycle assessments where all involved staff were asked to identify any construction issues for which they believed additional inspections should be performed.

  On this same point, the number of direct inspection hours was smaller than had been planned because of the delays in construction schedules caused by the late delivery of modules to the sites. Inspection activities that the NRC had planned to inspect in fiscal year 2014 will now have to be inspected in fiscal years 2015 or 2016. A second point is that many of the activities included in the "Administrative Hours" portion of this assessment are associated with planning the effective and efficient execution of future inspections. These activities are not and should not be characterized as "administrative." They are necessary for the effective operation of the inspection program. Although the staff agrees that the processes for tracking schedule changes and executing SmartPlan changes can and should be improved, this portion of the report could be misinterpreted as demonstrating that important inspections had not been performed or that the improvement would result in significant reductions in the inspection resources. The staff does not believe that either of these potential misinterpretations is accurate or supported by the findings of the audit.

- In the section, titled "Recommendations," Page 10, the OIG report states:

  > *Develop and implement a comprehensive review that identifies process inefficiencies associated with cROP.*

  Also, in the section titled "NRC Efforts To Identify Process Inefficiencies Are Not Comprehensive," Page 7, the OIG report states:

  > *NRC's previous and ongoing efforts to identify process inefficiencies fail to yield significant process improvements because efforts are not comprehensive. Specifically, a Business Process Improvement (BPI) effort and annual*

self-assessments were methodologically limited from exploring fully the interplay of requirements and processes across various offices and functions...

The NRC staff believes that it is appropriate to clarify the use of the word "comprehensive," especially with respect to "methodological limitations." Both the staff's self-assessments and the OIG audit have identified two inefficiencies in the way the region implements the cROP program. The staff is committed to effectively resolving these identified inefficiencies in a manner in which the cost for corrective action and follow-on controls is justified by the known or identifiable benefit.

However, the audit report could be interpreted as recommending that the staff review every aspect of policy, procedure, and practice associated with new reactor construction oversight, looking for "inefficiencies. This interpretation of the OIG recommendation requires a significant staff expenditure of resources (resources that would otherwise be devoted to implementing the inspection program and other priority work), and it would also create a great deal of uncertainty for the regulated community.

Of further note, the staff has recently conducted a more appropriate focused review, not included in the scope of this audit that identified many potential efficiency and effectiveness benefits. This focused review was completed at minimal cost. Given the benefits being realized from the reviews already conducted, the cost of performance of a broad "comprehensive" review of the entire cROP program would appear to outweigh its potential, additional efficiency and effectiveness benefits.

The NRC staff appreciates the opportunity to provide the aforementioned clarifying comments. If you need additional information, please contact Thomas Kozak of my staff at 301-415-6892.

cc: Chairman Burns
Commissioner Svinicki
Commissioner Ostendorff
Commissioner Baran
SECY

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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.