

# POLICY ISSUE INFORMATION

April 16, 2012

SECY-12-0059

FOR: The Commissioners

FROM: R. W. Borchardt  
Executive Director for Operations

SUBJECT: CONSTRUCTION REACTOR OVERSIGHT PROCESS  
SELF-ASSESSMENT FOR CALENDAR YEAR 2011

## PURPOSE:

This paper presents the results of the staff's first annual self-assessment of the Construction Reactor Oversight Process (cROP); gives an update on recent issues associated with inspections, tests, analyses, and acceptance criteria (ITAAC); and gives an update on recent domestic and international construction experience (ConE) being incorporated into the U.S. Nuclear Regulatory Commission's (NRC's) programs. This paper does not address any new commitments or resource implications.

## SUMMARY:

The results of the cROP self-assessment for calendar year (CY) 2011 show that the cROP met its program goals and achieved its intended outcomes. The NRC staff implemented the cROP on a limited basis in CY 2011. In this implementation of the cROP, the staff primarily conducted inspections to review work associated with the limited work authorization (LWA) granted to Southern Nuclear Operating Company (SNC) for Vogtle Electric Generating Plant (Vogtle) Units 3 and 4. The NRC staff also conducted inspection of combined license (COL) application activities at Virgil C. Summer (Summer) Units 2 and 3. The NRC staff found its oversight of construction activities was objective, risk-informed, understandable, and predictable.

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In CY 2011, under Commission direction, the NRC staff completed the development of new reactor construction assessment and enforcement programs that are based on the assessment and enforcement programs in the Reactor Oversight Process (ROP) for operating reactors. A 1-year pilot to exercise these new programs began on January 1, 2012. The NRC staff developed objective measures and predetermined criteria to assess the performance of the cROP during the pilot. The results of the pilot will be incorporated into the CY 2012 cROP self-assessment.

#### BACKGROUND:

In the Staff Requirements Memorandum (SRM) to SECY-07-0047, "Staff Approach to Verifying the Closure of Inspections, Tests, Analyses, and Acceptance Criteria through a Sample-Based Inspection Program," dated May 16, 2007, the Commission directed the staff to submit an annual self-assessment report on the implementation of the construction inspection program (CIP). In SRM-SECY-10-0140, "Options for Revising the Construction Reactor Oversight Process Assessment Program," dated March 21, 2011, the Commission directed that in the annual cROP self-assessment, the staff should assess the construction inspection resource estimate for each construction unit and inform the estimate on the basis of experience in the field.

In SRM-SECY-08-0117, "Staff Approach To Verify Closure of Inspections, Tests, Analyses, and Acceptance Criteria and To Implement Title 10 CFR 52.99, 'Inspection During Construction,' and Related Portion of 10 CFR 52.103(g) on the Commission Finding," dated August 7, 2008, the staff was directed to keep the Commission informed of progress in resolving issues associated with ITAAC. The staff provided annual updates in SECY-09-0119, "Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria," dated August 26, 2009; SECY-10-0100, "Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria," dated August 5, 2010; and SECY-11-0111, "Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria," dated August 9, 2011. With a majority of the policy development work completed, the staff's focus is now on refining and implementing the ITAAC oversight processes and programs.

In SECY-11-0111, the staff proposed that ITAAC and ConE program updates be included with the annual cROP self-assessment report beginning in April 2012. The Commission subsequently approved this proposal; therefore, the staff has transitioned from giving the Commission separate annual ITAAC and ConE program updates to submitting these program updates on an as-needed basis in the cROP self-assessment Commission paper.

#### DISCUSSION:

The staff initially implemented the CIP at Vogtle Units 3 and 4 in late 2009 with only a few construction inspections conducted through CY 2010. Execution of the CIP increased in CY 2011; therefore, under Commission direction, the staff conducted its first cROP self-assessment. The staff conducted the CY 2011 cROP self-assessment in accordance with draft Inspection Manual Chapter (IMC) 2522, "Construction Reactor Oversight Process Self-Assessment Program," which is based on applicable portions of IMC 0307, "Reactor Oversight Process Self-Assessment Program," dated March 23, 2009. The staff plans to finalize IMC 2522 in CY 2012 and plans to issue a cROP self-assessment Commission paper

before the Agency Action Review Meeting (AARM) each year going forward. The staff is in the process of revising Management Directive 8.14, "Agency Action Review Meeting," to incorporate guidelines for the participation of the Office of New Reactors (NRO) in the AARM and Commission briefings each year. Subsequent cROP self-assessments will include a more expansive review of cROP programs as the staff more fully implements the respective programs.

The staff conducted many activities and obtained data from many diverse sources for the cROP self-assessment. Data sources included draft cROP performance metrics derived from applicable metrics described in IMC 0307, recommendations from independent evaluations, and feedback from stakeholders at various meetings, workshops, and conferences. The staff analyzed this information to gain insights on the effectiveness of cROP and potential areas for improvement. The limited scope of the staff's self-assessment included three key construction oversight program areas, and also evaluated communication activities, cROP resources, and construction resident inspector staffing.

The cROP does not apply to NRC oversight of construction activities at Watts Bar Nuclear (WBN) Unit 2. Staff guidance for the oversight of WBN Unit 2 is in IMC 2517, "Watts Bar Unit 2 Construction Inspection Program." The staff updated the Commission on the WBN Unit 2 CIP in SECY-12-0020, "Fifth Report on the Status of Reactivation of Construction and Licensing for Watts Bar Nuclear Plant, Unit 2," dated February 1, 2012. The staff plans to incorporate lessons learned from the implementation of the WBN Unit 2 CIP into the cROP, as appropriate.

### **cROP Program Area Evaluations**

The staff evaluated three key program areas of the cROP: the CIP, the construction enforcement program, and the construction assessment program. The results are discussed in detail below:

Construction Inspection Program—The staff conducted inspections to ensure that activities associated with COL applications and the Vogtle ESP and LWA were conducted in compliance with applicable regulatory requirements. The staff ensured that the issues it identified were entered into corrective action programs and were promptly corrected. In particular, the staff identified a violation of regulatory requirements associated with ITAAC-related work on the waterproof membrane at Vogtle Unit 3 that highlighted shortcomings in the rigor with which SNC approached this issue. The staff and SNC have incorporated lessons learned about ITAAC-related work into inspection and construction programs as a result of this issue.

In CY 2011, the staff of the Region II Center for Construction Inspection (CCI) found that the minor violation screening criteria contained in IMC 0613, "Documenting 10 CFR Part 52 Construction Inspections," needed improvement. In response to this issue, the staff convened a multioffice working group to evaluate the existing criteria and recommend any needed changes. The staff plans to incorporate recommended changes into program documents in CY 2012.

In CY 2011, the staff found that additional inspection guidance was needed to clarify roles and responsibilities between CCI and the NRO Vendor Inspection Branches. Because of the modular construction practices employed in new reactor construction, vendors are doing substantial amounts of ITAAC-related work at their facilities. This has challenged the staff's

traditional roles and responsibilities for nuclear supply-chain and construction inspections. To address this issue, the staff developed inspection guidance that clearly defines staff roles and responsibilities for various construction-related scenarios. For inspections of ITAAC activities at vendors such as Shaw Modular Solutions, the CCI staff will inspect the work at the vendor's facility to assess the adequacy of the licensee's oversight of the activities. For more traditional vendor-related work that may support multiple licensees, the NRO Vendor Inspection Branches will lead inspections of the vendors to assess their compliance with design and quality requirements stated in procurement documents. The guidance includes triggers on when to move back and forth between these inspections. The staff will monitor implementation of this approach and make adjustments as necessary.

CIP focus areas for CY 2012 include completing ITAAC inspection planning, completing the AP1000 inspection schedule, fully implementing the CIP at Vogtle and Summer, and deploying the Construction Inspection Program Information Management System (CIPIMS).

Construction Enforcement Program—In CY 2011, the staff implemented the NRC's Enforcement Policy to take appropriate enforcement actions for identified violations on the basis of their safety significance. During a review of the guidance in the NRC's Enforcement Policy, the staff determined that additional interim guidance was needed to encourage applicants and licensees to identify deficient conditions early. In response, the staff issued Enforcement Guidance Memorandum (EGM) 11-002, "Enforcement Discretion for Licensee-Identified Violations at Power Reactor Construction Sites Pursuant to Title 10 of the Code of Federal Regulations Part 52." This EGM authorizes the staff to disposition licensee-identified Severity Level IV violations as non-cited violations.

Implementation of the cROP pilot program on January 1, 2012, included a construction significance determination process (SDP) to determine the significance of findings and a new enforcement approach. The construction SDP is described in IMC 2519P, "Construction Significance Determination Process—Pilot," and the enforcement approach is described in EGM-11-006, "Enforcement Actions Related to the Construction Reactor Oversight Process." The staff developed both processes in accordance with Commission direction and modeled them after the assessment and enforcement programs used in the ROP. The NRC staff developed objective measures and predetermined criteria to assess the performance of the enforcement program during the pilot. The staff will incorporate the results of the pilot into the CY 2012 cROP self-assessment.

Construction Assessment Program—Implementation of the NRC's assessment program ensured that staff and licensees focused on performance issues commensurate with their safety significance. The staff first implemented the formal assessment program described in IMC 2505, "Periodic Assessment of Construction Inspection Program Results," at Vogtle Units 3 and 4 on July 1, 2010. The staff has not deviated from the guidance in the construction action matrix and Vogtle Units 3 and 4 have remained in the Baseline Program column of the construction action matrix since the construction assessment program was implemented. The COL has been issued.

IMC 2505, "Periodic Assessment of Construction Inspection Program Results," states that the NRC will hold a public meeting after every second semiannual performance review. Although the staff completed the second semiannual performance review for Vogtle Units 3 and 4 in August 2011, after careful consideration, the staff decided to defer the public meeting to the first

quarter of CY 2012. The staff made this decision for a number of reasons, including the facts that only LWA work was being done at the site, and the NRC's inspection and assessment results were readily available on the NRC public Web site. In addition, the staff transitioned to an annual assessment cycle beginning on January 1 and ending on December 31 of each year to align with the operating plant assessment cycle and the AARM, and the details of the new assessment program were not yet final at that time. The staff will conduct its first public assessment meeting for Summer Units 2 and 3 in the first quarter of CY 2013.

The NRO staff has participated with an internal working group to develop actions for ensuring alignment of the ROP with the safety culture policy statement. The NRO staff plans to model the actions taken in the ROP as it develops actions to align the cROP with the safety culture policy statement.

The implementation of the cROP pilot program on January 1, 2012, included a new assessment program that was closely modeled after the operating reactor assessment program. As mentioned above, the staff will transition to an annual assessment cycle that includes midcycle and end-of-cycle reviews. The staff developed a new construction action matrix with the same column designations as those in the ROP. The significance of findings will be represented by green, white, yellow, or red, and this will determine the appropriate construction action matrix column for each unit being assessed. The NRC staff developed objective measures and predetermined criteria to evaluate the performance of the assessment program during the pilot. The staff will incorporate the results of the pilot into the CY 2012 cROP self-assessment.

### **cROP Communication Activities**

The staff promoted stakeholder involvement and open communications about the cROP in CY 2011. External stakeholder engagement consisted of periodic cROP meetings, workshops to discuss changes to the assessment program, the Regulatory Information Conference, use of the NRC's public Web site, and other methods to address construction activities and program issues as needed. Internal stakeholders participated in periodic meetings and calls to discuss current issues; provided feedback through the procedure revision process; accessed cROP guidance and information through the NRO Web site and SharePoint; and shared best practices through the inspector counterpart meetings and seminars. The staff also conducted the Simulated ITAAC Closure and Verification Demonstration with the U.S. Department of Energy (as project sponsor), the Nuclear Energy Institute (NEI), Westinghouse Electric Company, and SNC. Based on the results of the demonstration and interactions among participants, the staff identified several lessons learned and next steps, as discussed in SECY-11-0111.

The staff did not conduct internal or external surveys to solicit input on the effectiveness of the cROP during this self-assessment. Similar to the ROP self-assessment process, the staff plans to conduct internal and external surveys in October 2012 as part of the cROP pilot to evaluate its effectiveness and gather insights from stakeholders. The staff also will explore additional alternatives to encourage internal and external stakeholder participation and interest in the surveys. The CY 2012 cROP self-assessment will summarize the insights gained from internal and external stakeholders.

**cROP Resources**

The limited implementation of the CIP has not given the staff enough data to evaluate the initial estimate of 35,000 inspection hours per unit under construction. In CY 2012, the staff will closely monitor expenditures of CIP resources and, as construction and inspection activities increase, the staff will inform the estimated inspection resources per unit based on experience gained in the field.

**Construction Inspector Qualification and Staffing**

In CY 2011, the Region II CCI expended considerable resources in qualifying the construction inspection staff. Substantial progress was made in this area—35 of 47 full-time employees assigned to CCI have achieved full inspector qualification. An additional eight employees have achieved basic qualification. In CY 2012, the staff will continue to aggressively pursue the full qualification of those employees who have not yet achieved full qualification.

Construction resident inspector (CRI) staffing is largely based on the amount and type of safety-related activities occurring on site. The basic model for CRIs at a site consists of one senior CRI who will oversee and manage the resident inspection activities for that site and at least two CRIs for each unit under construction at the site during the bulk of the construction activity. CRIs may be added to supplement the inspection effort as construction activities at the site increase.

The NRC had one senior CRI and one CRI on staff throughout CY 2011 assigned to the CRI office at Vogtle Units 3 and 4. The senior CRI initially reported to the site in August 2010 and the CRI reported in October 2010. In January 2012, NRC added one more CRI to the CRI office staff at Vogtle. The NRC opened its CRI office at Summer Units 2 and 3 in August 2011, when the senior CRI reported to the site. In February 2012, two CRIs reported to the CRI office at Summer Units 2 and 3.

**Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria**

Since the last ITAAC update in August 2011, the staff facilitated three public workshops to solicit input and exchange views on issues of industry guidance on ITAAC closure, lessons learned from the recently completed Simulated ITAAC Closure and Verification Demonstration project, and other CIP topics. Members of the public, NEI, industry representatives, and other external stakeholders participated in these public workshops.

**ITAAC Maintenance Rulemaking and Regulatory Guide 1.215**

The staff has been working to complete the proposed ITAAC maintenance rulemaking and the associated revision to Regulatory Guide (RG) 1.215, "Guidance for ITAAC Closure Under 10 CFR Part 52." The revision to RG 1.215 endorses the methodologies described in the industry guidance document NEI 0801, "Industry Guidance for the ITACC Closure Process Under 10 CFR Part 52" Revision 4, Issued July 2010. The staff delivered the rule package to the Commission in February 2012, and both the final rule and revision to RG 1.215 are scheduled to be published in May 2012.

### Simulated ITAAC Closure and Verification Demonstration Exercise

As reported in SECY-11-0111, the Simulated ITAAC Closure and Verification Demonstration exercise served as a proactive assessment of the NRC and industry processes. Building on the success of this exercise, the staff expanded this effort by working with public stakeholders to develop additional ITAAC closure notification examples to include in NEI 08-01. NEI expects to add 27 additional closure notification examples, representing 327 ITAAC, to NEI 08-01. The set of example closure notifications will then cover approximately 80 percent of the Westinghouse AP1000 ITAAC. This will give the industry clear expectations for preparing ITAAC closure notification submittals.

The lessons learned from the demonstration continue to prove valuable, and the staff continues to work toward completing the next steps identified in the final report (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11166A182). The staff has applied refinements to CIPIMS and the Verification of ITAAC Closure Evaluation and Status information technology system, as both systems are now operational. The use of these systems to support the staff's verification of the highly anticipated first ITAAC closure notifications from the Vogtle and Summer new plant construction sites will mark a milestone in implementing the ITAAC programs developed in the last several years.

Enhancements planned for the next revision to NEI 08-01, which were also identified as lessons learned, include details on how to use ITAAC closure notification examples and expectations for the content of closure notifications. During the demonstration exercise, the staff and industry identified that further clarification and guidance were needed for the AP1000 "functional arrangement" ITAAC. Specifically, the staff and industry questioned the scope of structures, systems, and components covered by this ITAAC. The staff worked closely with both internal and external stakeholders in several public workshops to reach a shared understanding of the scope of inspection that will be required to successfully complete these ITAAC. As a result, a detailed section describing the scope of "functional arrangement" and a "functional arrangement" example closure notification are expected to be added to the next revision to NEI 08-01. Also planned for the revision are clarifications on the intent of ITAAC, such as those that specify a "report" in their acceptance criteria. These and other planned additions to the industry guide will foster consistent ITAAC performance and promote effective ITAAC closure verification reviews.

### ITAAC Closure Verification Process

The staff expects to issue the NRO office instruction (OI) for the ITAAC closure verification process by June 2012. Since the previous update in SECY-11-0111, the workflow has been refined to enhance efficiency, and the OI describing the ITAAC verification process will more clearly delineate roles and responsibilities. The OI will provide the framework by which the staff will verify ITAAC closure and will standardize the processing of the ITAAC closure notifications.

### **Construction Experience Update**

The staff continued to screen daily event issues (through the Operating Experience Clearinghouse meetings) to ensure that all relevant construction experience (ConE), both domestic and international, was evaluated for applicability to the NRC's new reactor licensing,

vendor, and construction inspection programs. The staff also exchanged ConE information with international partners and domestically with the Institute of Nuclear Power Operations. Through these efforts, insights were offered to internal and external stakeholders on the design, construction, and operation of new reactors. For instance, during July-December 2011, the ConE staff co-authored an Information Notice related to the delayed Alkali-Silica Reaction in safety related concrete and issued 7 operating experience communications to the staff on construction-related insights and lessons learned. The staff will continue to focus on the timely evaluation and dissemination of domestic and international construction experience.

The staff established a center of expertise between the Office of Nuclear Reactor Regulation and NRO for operating and construction experience programs. The purpose of this effort is to combine ConE program activities with those of the operating experience program to improve the overall efficiency and effectiveness of both programs and to ensure that the technical consistency between the two program offices is maintained.

### CONCLUSIONS:

The self-assessment results for CY 2011 show that the cROP provided effective oversight by meeting program goals and achieving its intended outcomes. During CY 2011, the staff continued to identify opportunities to strengthen program effectiveness and implementation. These include:

- The staff and SNC identified lessons learned about the conduct and oversight of ITAAC-related work and incorporated appropriate changes into their respective programs.
- During CY 2011, the Region II CCI staff found that the minor violation screening criteria needed improvement. In response to this issue, the staff convened a multioffice working group to evaluate the existing criteria and recommend any needed changes. The staff plans to incorporate recommended changes into program documents in CY 2012.
- In CY 2011, the staff determined that additional interim enforcement guidance was needed to promote early identification of deficient conditions by applicants and licensees. In response, the staff issued EGM-11-002 authorizing the staff to disposition licensee-identified Severity Level IV violations as noncited violations under certain circumstances.
- In CY 2011, the staff developed guidance to clarify roles and responsibilities between CCI and the NRO vendor branches. The staff will monitor this approach moving forward and make any adjustments as necessary.
- The ITAAC closure verification process workflow has been refined to enhance efficiency, and the ITAAC verification process OI will more clearly delineate roles and responsibilities.
- The staff is in the process of combining ConE program procedures and databases with NRR's Operating Experience program procedures and databases to improve search capabilities and the efficiency and effectiveness of the ConE program.

COORDINATION:

The Office of the General Counsel has reviewed this Commission paper and has no legal objection. The Office of the Chief Financial Officer has reviewed this Commission paper and determined that there is no financial impact.

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