

July 22, 2013

MEMORANDUM TO: Glenn M. Tracy, Director  
Office of New Reactors

FROM: James Luehman, Deputy Director **/RA/**  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

SUBJECT: POST-COMBINED LICENSE PART 52 IMPLEMENTATION  
SELF-ASSESSMENT WORKING GROUP REPORT

The internal communication plan associated with the Post-Combined License of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52 Implementation Self-Assessment Review Report has been completed and the report, which is enclosed, will be made public on the NRC's Agencywide Documents Access and Management System under Accession No. ML13196A403. Issuance of the report concludes the working group's actions under its charter.

Enclosure:  
10 CFR Part Implementation Self-Assessment  
Review Report

cc: M. Johnson, EDO  
V. McCree, Region II  
M. Doane, OGC  
R. Zimmerman, OE

Contact: Phil O'Bryan, NRO/DCIP  
910-399-5393

July 22, 2013

MEMORANDUM TO: Glenn M. Tracy, Director  
Office of New Reactors

FROM: James Luehman, Deputy Director */RA/*  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

SUBJECT: POST-COMBINED LICENSE PART 52 IMPLEMENTATION  
SELF-ASSESSMENT WORKING GROUP REPORT

The internal communication plan associated with the Post-Combined License of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52 Implementation Self-Assessment Review Report has been completed and the report, which is enclosed, has also been made public on the NRC's Agencywide Documents Access and Management System under Accession No. ML13196A403. Issuance of the report concludes the working group's actions under its charter.

Enclosure:  
10 CFR Part Implementation Self-Assessment  
Review Report

cc: M. Johnson, EDO  
V. McCree, Region II  
M. Doane, OGC  
R. Zimmerman, OE

Contact: Phil O'Bryan, NRO/DCIP  
910-399-5393

DISTRIBUTION:

CAder  
TBergman  
FBrown  
LDudes  
SFlanders  
GHolahan  
DMatthews  
MMayfield  
MMiller  
JMunday  
CSchum  
CScott  
AWilson  
JYerokun  
MZobler

**ADAMS ACCESSION No.:** ML13196A403

NRO-002

Office	NRO/DCIP	OGC	NRO
Name	JLuehman	AWilson-SEE ATTACHED	GTracy
Date	07/18 /2013	07/18 /2013	07/22/2013



**TITLE 10 OF THE CODE OF FEDERAL  
REGULATIONS PART 52 IMPLEMENTATION  
SELF-ASSESSMENT REVIEW:  
1 YEAR POST-COMBINED LICENSE ISSUANCE**

**July 2013**

# Executive Summary

---

The U.S. Nuclear Regulatory Commission (NRC) issued the first combined licenses (COL) to Vogtle, Units 3 and 4, on February 10, 2012, and to V. C. Summer, Units 2 and 3, on March 30, 2012. Approximately 1 year after the issuance of these licenses, the NRC initiated a series of self-assessment reviews to identify potential enhancements to the regulatory processes of Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52. This self-assessment review complements a number of other broad programmatic assessments such as the “New Reactor Licensing Process Lessons Learned Review: 10 CFR 52,” (available on the NRC’s Agencywide Documents Access and Management System (ADAMS) using Accession No. ML13059A239) and SECY-13-0042, “Construction Reactor Oversight Process (cROP) Self-Assessment for Calendar Year 2012,” (ADAMS Accession No. ML13045A462).

To facilitate this review, the post-combined license 10 CFR Part 52 implementation self-assessment working group (WG) conducted an extensive outreach effort to solicit feedback from external and internal stakeholders. Specifically, the WG conducted interviews with over seventy current or former NRC staff, held three public meetings, and separately contacted several members of the public with interest in construction activities at the Vogtle and V. C. Summer sites. The WG performed an in-depth review of actions taken by the NRC staff following issuance of the COLs at Vogtle, Units 3 and 4, and V. C. Summer, Units 2 and 3. The WG concludes that: (1) the NRC staff carried out its implementation of post-COL oversight with safety as its primary focus, (2) most aspects of Part 52 implementation were performed effectively and efficiently, (3) those conclusions were confirmed in each area that the WG reviewed, and (4) a few areas would benefit from recommended enhancements.

The WG’s suggested enhancements are drawn from a limited set of licensing and inspection activities taken over a short time period for only two licensees and should be evaluated in that context. In addition, the WG’s review was limited to actions taken by the NRC staff and did not have the benefit of any formal self-assessments or lessons-learned reviews performed by the nuclear industry and, in particular, the licensees.

Noteworthy examples of NRC staff implementation activities include:

- Timely and good quality inspections
- Effective training, preparation, and program support of inspectors

- Prompt, accurate, and well-documented licensing and technical support of Region II by the Office of New Reactors and the Office of General Counsel
- Well-documented bases for both the 10 CFR Part 52 Construction and Vendor Inspection Programs
- Timely processing of preliminary amendment requests and license amendment requests
- Effective feedback processes within the implementation guidance that promote self-correction of the program.

An example of the NRC staff's ability to identify and correct issues is the staff's recognition of needed clarification with regards to the application of 10 CFR Part 50.55a, Codes and Standards, to 10 CFR Part 52 licensed reactor plants. The AP-1000 Design Certification Rule (10 CFR Part 52, Appendix D) does not clearly specify that an exemption to Tier 1 is not required if a licensee complies with an NRC-authorized alternative to a code requirement rather than the code requirement itself. This will be addressed in future design reviews.

Although the WG also identified a number of opportunities for program enhancement (which are listed below and discussed in detail in Section III of this report), the WG concluded that this self-assessment revealed no significant problems or impediments associated with the 10 CFR Part 52 regulatory processes (inspection, assessment, enforcement, licensing, and technical support). As expected with any new process, the first-time implementation of the 10 CFR Part 52 regulatory processes has resulted in challenges. The WG identified the following lessons:

- 1.** Clarity of design control document (DCD) Tier 2\* information (i.e. information for which prior NRC review and approval is needed before changes can be implemented) could be enhanced.
- 2.** Clear and timely regulatory decision making in the construction environment can be enhanced through better communications.
- 3.** NRC staff acceptance of submitted Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) closure notifications (ICN) will require continued, effective interface with licensees.
- 4.** The vendor oversight program would benefit from further clarification of its objectives and its relationship to the Reactor Oversight Program (ROP) and the cROP; and enhanced communications of vendors' performance issues with operating reactor and construction licensees.

5. NRC staff and the licensees should monitor the ongoing implementation of the current licensing basis change processes to identify where additional process enhancements may be warranted.

This self-assessment identified several planned and potential actions that can enhance NRC processes and improve efficiency. Proposed enhancements to address each of the lessons learned are provided below. The WG notes that staff effort is already underway to address some of the WG's proposed actions.

### **1. Clarity of DCD Tier 2\* Information**

- The AP-1000 DCD Tier 2\* information should be reviewed to determine if ambiguity is problematic in areas of the AP-1000 DCD other than those noted by the WG. If so, then the DCD Tier 2\* information for future design certification reviews and combined licenses should also be reviewed and the guidance for designation and documentation of DCD Tier 2\* information should be enhanced. In addition, for the AP1000 design, specific effort should be undertaken to ensure common understanding between the NRC staff and the AP1000 licensees relative to Tier 2\* information. The WG noted that the NRC staff has begun that effort for the remaining critical sections discussed in Section 3H.5 of the AP1000 DCD.

### **2. Regulatory Decision Making during Construction**

- The NRC staff should consider a process for escalating engagement with licensee management to resolve significant unresolved construction inspection findings. Internally, to ensure clear and timely regulatory decisions, prompt enforcement action should be taken when the evidence available to inspectors indicates that a violation has occurred.

### **3. ITAAC Closure**

- NRC staff should continue to conduct workshops or other stakeholder interactions to identify and resolve differences on the expected level of detail in ICNs, and to enhance ICN guidance as the result of ongoing lessons learned. Additionally, for future design reviews such as those anticipated for Small Modular Reactors, the NRC staff should consider the use of standard terms or formats across designs to make ITAAC closure lessons more generally applicable.

### **4. Vendor Oversight**

- The NRC staff should continue to communicate and clarify the Vendor Inspection Program objectives and the program's relationship to the cROP, and document its relationship to the ROP. The NRC staff should also consider

formulating a process to enhance communications with licensees about their vendors. This would provide the NRC staff with additional information about trends in vendor performance, and facilitate the NRC providing specific licensees notice when there are indications of vendor quality issues affecting their facilities. Additional information exchange as part of the Multinational Design Evaluation Program should be considered to help prioritize vendor inspections.

## **5. Changes to the Licensing Basis during Construction**

- The NRC staff should continue to assess the implementation of the processes for making licensing basis changes as additional experience is gained during construction. The NRC staff should continue to engage industry on additional process enhancements.
- To increase the efficiency of the licensee evaluations, the NRC Changes during Construction Working Group should finalize its recommendation regarding industry use of the screening process used in the operating fleet for evaluating plant changes against 50.59 as an acceptable method of evaluating changes during construction.

# Table of Contents

---

I. Background.....1

II. Scope and Methodology.....2

III. Lessons Learned.....4

IV. Enhancements .....13

Appendix A – Working Group Charter.....A1

Appendix B – Industry Input (from March 28, 2013 Public Meeting).....B1

Appendix C – References.....C1

## I. BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) issued the first combined licenses (COLs) to Vogtle, Units 3 and 4, on February 10, 2012, and to V. C. Summer, Units 2 and 3, on March 30, 2012. Since the issuance of the COLs, the NRC has exercised first-of-a-kind regulatory processes associated with construction of plants licensed under Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52. In a memorandum dated March 8, 2013, the Director of the Office of New Reactors approved the charter of a working group (WG) to assess the NRC’s requirements, policies, procedures, and practices during the first year of post-COL implementation of Part 52 (the WG charter is included in this report as Appendix A). As discussed in the charter, the WG was directed to select, with internal and external stakeholder input, the most significant licensing, inspection, and other regulatory actions during the first phase of post-COL Part 52 implementation. The WG was directed to evaluate whether the outcomes of new reactor program activities have been effective, realistic, and timely. Where improvements could be made in keeping with the NRC’s Principles of Good Regulation (Independence, Openness, Efficiency, Clarity, and Reliability), the WG was directed to make appropriate recommendations. This report summarizes the WG’s efforts and provides its recommended program enhancements.

## II. SCOPE AND METHODOLOGY

The WG reviewed the NRC regulatory processes using a vertical slice approach to identify enhancements that would increase the effectiveness and efficiency in 10 CFR Part 52 regulatory processes. The vertical slice method of evaluating specific issues and identifying broader lessons from these issues was useful in focusing the WG on key topics of concern. The WG chose three actions through which to evaluate the outcomes of new reactor program activities during the first year of post-COL implementation. These actions were identified through discussions with NRC staff, input from representatives of the nuclear industry collected at a public meeting held on March 28, 2013, and conversations with interested members of the public. The topics of industry interest presented to the WG during the March 28, 2013 public meeting are included in Appendix B to this report.

During its review, the WG interviewed or held discussions with more than seventy current and former members of the NRC staff. The WG also reviewed many NRC policies, procedures, and other guidance documents, which are listed in Appendix C to this report. Where appropriate, the WG created timelines of both internal and external interactions related to the activities and determined at various points on the timelines:

- Which office or division had the lead?
- Which offices or divisions were in support?
- What was the task or the deliverable?
- Did the existing regulations, policies, procedures and practices adequately support those roles, and were they understood by the involved staff?

The results are discussed in Section III of this report.

The WG and stakeholders made several observations that were more appropriately considered in other processes and were already being addressed. As directed by the WG charter, observations which were referred included three issues to the construction reactor oversight process (cROP) self-assessment program, one issue to the Vendor Inspection Program's self-assessment process, and one issue referred to the Changes during Construction Working Group.

The first issue referred to the cROP self-assessment program involved the cROP significance-determination process contained in Inspection Manual Chapter (IMC) 2519P, "Construction Significance Determination Process – Pilot," and was related to an inspection finding affecting a structure that had not been constructed. The inspection finding was characterized as potentially greater-than-green by an NRC Significance and Enforcement Review Panel. However, the guidance for significance determination in IMC 2519P does not clearly state that a structure, system or component that has not yet been constructed can be considered non-functional, which is one of the criteria for a potentially

greater-than-green finding. Thus, clarity in the related guidance is warranted. This issue will be addressed in the 2013 cROP self-assessment.

The second issue referred to the cROP assessment process concerns the requirement in paragraph (e)(3), "Procedures," of Section 55, "Conditions of Construction Permits, Early Site Permits, Combined Licenses, and Manufacturing Licenses," of 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities" (10 CFR 50.55(e)(3)). This paragraph requires that a licensee report to the NRC any "significant breakdown in any portion of the quality assurance program..." External stakeholders questioned how this provision is to be interpreted and implemented for a reactor plant being constructed and is subject to the cROP. This issue will be addressed in the 2013 cROP self-assessment.

Process enhancements have already been completed for the third issue referred to the cROP assessment process. This issue involved the NRC's assessment of the Part 52 licensees' corrective action programs (CAP). Specifically, the NRC staff did not formally validate that the licensees' CAPs were effective until the end of 2012. However, the original intent of the NRC inspection program was to provide a validation of the licensees' CAPs soon after each licensee received its COL or early site permit. The delay was primarily due to ambiguity in NRC guidance for the CAP effectiveness evaluation which implied that the results of a CAP inspection were the sole basis for the evaluation. NRC staff recognized problems with the CAP evaluation process and changed the associated NRC inspection and assessment program guidance to allow NRC management to consider all CAP inspection activity cumulatively and perform the CAP evaluations during the mid-cycle and end-of-cycle evaluations. This issue was resolved as part of the "Construction Reactor Oversight Process (cROP) Self-Assessment for Calendar Year 2012" ( Agencywide Document Access and Management System (ADAMS) Accession No. ML13045A462).

The issue referred to the Vendor Inspection Program self-assessment process is related to inspections occurring at vendor facilities that could inform the NRC staff's review of inspections, tests, analyses, and acceptance criteria (ITAAC) closure notifications (ICN). The WG observed that, though there were tools in use by NRC staff to track these issues, there was no formal procedural guidance for NRC staff to provide feedback to licensees that ITAAC at their facility were potentially affected. External stakeholders also noted that they perceived ambiguity concerning whether the vendors or the licensees were responsible for findings at vendor facilities. The WG noted that these issues were previously identified by the NRO Division of Construction Inspection and Operational Programs and program enhancements were being formulated at the time of this WG report. They include identifying findings that could impact licensee's ICNs and listing the associated ITAAC numbers in vendor inspection reports, providing this information to all affected licensees, and following up on vendor ITAAC findings to verify satisfactory resolution.

The issue referred to the Changes during Construction WG relates to their ongoing review of Nuclear Energy Institute (NEI) 96-07 Appendix C, "Guidelines for Implementation of Change Control Processes for New Nuclear Power Plants Licensed Under 10 CFR Part 52."

The NRC staff should continue to assess the implementation of the processes for making licensing basis changes as additional experience is gained during construction.

### III. LESSONS LEARNED

#### Lesson 1: Clarity of DCD Tier 2\* Information

Observation: Clarity of design control document (DCD) Tier 2\* information (i.e. information for which prior NRC review and approval is needed before changes can be implemented) could be enhanced.

Discussion: As established in 10 CFR Part 52 Appendices A through D, information contained in the DCD is divided into three categories (Tier 1, Tier 2, and Tier 2\*). The definitions of these categories are uniform across the Part 52 appendices. Tier 1 information is the portion of design related information in the generic DCD that is approved and certified by the Part 52 appendices and requires prior NRC approval to change. Tier 2 information is approved by the Part 52 appendices but not certified, and can be changed via the change process outlined in Section VIII of the appendices. With some exceptions, Tier 2 information can be changed without prior NRC approval. Like Tier 2 information, Tier 2\* information is not certified by the Part 52 appendices, but unlike Tier 2 information, Tier 2\* information requires prior NRC approval to change per Section VIII.B.6 of the Part 52 appendices.

The guidance for the designation of Tier 2\* information is contained in section 14.3 of the Standard Review Plan (SRP). Section 14.3 of the SRP states that documentation of the basis for each “area” of Tier 2\* information should be included in the safety evaluation report. However, the term “area” appears to be inconsistent with SRP structure and may have resulted in overly general statements documented as the basis for Tier 2\* information. Documenting the basis for Tier 2\* information in a general way may be appropriate when that information is programmatic, but may not be appropriate for detailed and specific information because it can create ambiguity regarding the scope of changes that may require prior NRC approval.

For example, Revision 19 of the AP1000 DCD, as incorporated into the Vogtle Units 2 and 3 Final Safety Analysis Report (FSAR), contains a note in section 3H.5 that states “[The design implemented in fabrication and construction drawings and instructions will have the design shown, an equal design, or a better design for key structural components]\*.” The basis for this statement is not clearly documented in the safety evaluation report or the DCD, and this has led to different interpretations by NRC staff and licensees. The WG found through interviews with NRC staff that the NRC staff’s interpretation of this statement is that it only applies to minor dimensional deviations. The licensee has interpreted it more broadly to include more general design changes.

Another example of ambiguity in Tier 2\* information is the use of the word “typical” on figures in the DCD, such as in the title “Typical Wall Section Column Line 1” of figure 3H.5-3 of the AP1000 DCD, revision 19. Since the basis for the use of the word “typical” is not clearly documented in the safety analysis report or the DCD, different interpretations of the meaning of the word arise. The NRC staff generally interpreted the meaning to be that the

drawing represents one of many identical or very similar wall sections, whereas the licensee interpreted it to mean that information contained in the drawing was generally representative of the construction of various wall sections. Neither the note in section 3H.5 or the use of the word “typical,” as discussed in the preceding paragraphs are clarified further in the DCD or the safety evaluation report.

To demonstrate how the lack of clarity in DCD Tier 2\* information can lead to delays in regulatory decision making, a discussion of the inspection findings associated with rebar in the nuclear island basemat and walls at Vogtle Unit 3 is useful (Inspection Report 05200025-008, ADAMS Accession No. ML12173A289). The inspection findings involved: 1) a design control violation due to the licensee making a design change that did not comply with the applicable construction code, American Concrete Institute (ACI) code 349-01, and 2) changing Tier 2\* information without prior NRC approval. The WG found that, although the root cause of the issue was the failure of the licensee to comply with the ACI 349-01 code, the NRC staff delayed enforcement action during interactions between NRC Region II, the NRC Office of New Reactors, and the licensee concerning interpretation of Tier 2\* information. Specifically, Region II required clarification of the statement “[The design implemented in fabrication and construction drawings and instructions will have the design shown, an equal design, or a better design for key structural components]\*” contained in section 3H.5 of the Vogtle FSAR, and requested formal response from NRO via the Technical Assistance Request (TAR) process (TAR # AP-V3-C-006 “Licensing Question on the Last Paragraph in Tier 2 Section 3H.5”). Additional ambiguity, such as the use of the word “typical” discussed above, was dealt with outside the TAR process but also contributed to delays.

While the delays were appropriate and necessary in this example to ensure satisfactory resolution of the issue, the WG concludes that for the AP1000 design, specific effort should be undertaken to ensure common understanding between the NRC staff and the AP1000 licensees relative to Tier 2\* information. If the NRC staff finds additional areas of the AP-1000 DCD Tier 2\* information contain potential ambiguities, then the DCD Tier 2\* information for future design certification reviews and combined licenses should also be reviewed and the guidance for designation and documentation of DCD Tier 2\* information should be enhanced.

## Lesson 2: Regulatory Decision Making during Construction

Observation: Clear and timely regulatory decision making in the construction environment can be enhanced through better communications.

Discussion: One of the themes of the “New Reactor Licensing Process Lessons Learned Report,” April 2013, is “Identification and Resolution of Technical Issues.” Specifically, the review acknowledges that challenges remain with the Request for Additional Information (RAI) process. The report states, “These challenges are often exacerbated when multiple rounds of RAIs and responses result in little progress toward resolution. One lesson learned from the RAI and issue-resolution experience is that both the staff and the applicant need to enhance the identification of such situations and elevate them

expeditiously, openly, and candidly so that the root of disagreement can be identified and addressed.” While the requirements and procedures in the inspection process are different than those in the licensing process, similar challenges exist.

An example of a situation where the exchange of information between the NRC staff and a Part 52 construction licensee could have been more efficient is the inspection finding at V. C. Summer related to rebar in the nuclear island basemat (Inspection Report 05200027/2013008, ADAMS Accession No. ML13085A058). This issue was identified by NRC inspectors on September 12, 2012, and involved a deviation of the as-built configuration of the rebar from the description in the V. C. Summer FSAR. On the next day, September 13, 2012, the NRC inspectors characterized the issue as an unresolved item because the licensee asserted that information was available to show that the rebar configuration met the applicable code requirements. Over the next 3 months, the NRC staff and the licensee exchanged information concerning the issue several times. None of these exchanges of information resulted in the NRC staff changing its position that the issue was a potential violation. On December 21, 2012, the licensee indicated that it would submit a license amendment request (LAR) to change rebar configuration requirements. The LAR was accepted and approved by the NRC. The NRC staff held a final exit meeting for the issue on February 12, 2013, and characterized the issue as an apparent violation.

The period of time from initial identification of the issue until a LAR was submitted was over 3 months. The period of time from initial identification to characterization of this finding as an apparent violation was 5 months. The WG found that a significant amount of the time was spent after the licensee requested additional time to prepare various submittals of additional information for NRC staff consideration. The WG also found that once the licensee provided additional information for NRC staff consideration, that information was commented on by the NRC staff in a relatively expeditious manner. NRC staff stated during WG interviews that as the information exchanges continued without resolution, it appeared clear to NRC staff members that an apparent violation relating to design control existed. At the public meeting held on March 28, 2013, to gather stakeholder input for this assessment, licensee staff opined that, in retrospect, if the NRC staff had made this an apparent finding earlier, it would likely have brought this issue to resolution sooner. It was also the licensee staff’s general view that the NRC staff’s ongoing willingness to accept additional information was an indication that there was still an opportunity to convince the NRC of the acceptability of their positions.

The multiple rounds of information exchange described have strong parallels with the Licensing Lessons Learned Report’s discussion of the challenges in the RAI process and resolving technical differences. The WG concludes that the NRC staff should strive to resolve such issues more efficiently than was the case for the V. C. Summer basemat rebar finding. In the WG’s view, there are two components to such a process, one being externally focused and the other internally focused.

The levels of management involvement for both the NRC and the licensee should increase as it becomes clear that issues are not coming to timely resolution. Because the complexity of issues varies, there is no specific timeframe or number of information exchanges that

should trigger this escalation. However, factors such as the amount of time the issue has been under discussion, the number of rounds of information exchanged, and repeated disagreements on the same technical or regulatory positions are all indicators of when such escalation may be appropriate. When the NRC provides its view that compliance has not been demonstrated, the NRC should clearly communicate that it is the licensee's prerogative to pursue alternative approaches to achieve compliance. However, at the time a noncompliance is identified, the enforcement process should begin, with significance and corrective actions determined as a function of that process.

The NRC staff should communicate with the licensee in a clear, reliable, and timely manner. The NRC staff should consider interfacing with the licensee in a series of escalating steps rather than parallel engagement at multiple levels. Under such an engagement approach, it would be easier to assure that the licensee receives communication of a consistent NRC position at every level of the organization. Engagement at successively higher levels of NRC and licensee management would send a clear message that the issue is not getting resolved in a timely manner at the lower levels of the respective organizations.

NRO and Region II have different, but complementary, roles in implementing the cROP. A key element in the success of this program is the ability of the NRC to make clear and timely regulatory decisions. Therefore, the WG concludes that the NRC staff should promptly initiate enforcement action when sufficient information is available to support a violation of regulatory requirements, even though the NRC may not yet be able to fully characterize all aspects of the non-compliance(s) or the extent of the condition. Licensees will have the opportunity to formally contest the violation if they subsequently are able to provide information relevant to the issue.

### Lesson 3: ITAAC Closure

Observation: NRC staff acceptance of submitted ICN will require continued, effective interface with licensees.

Discussion: The concept of ITAAC and its implementation for construction of a nuclear power plant under 10 CFR Part 52 represents a significant difference from the process for construction under 10 CFR Part 50. For construction under 10 CFR Part 52, accurate ITAAC completion is instrumental in ensuring that plants are built in accordance with their approved licenses. Therefore, the ITAAC ICN submitted to the NRC by the licensees must provide adequate information for the NRC staff to conclude that the "ITAAC were performed, and that the prescribed acceptance criteria are met." (10 CFR Part 52.99(c)(1)).

Additional guidance for writing ICNs is contained in NEI 08-01, "Industry Guidance for the ITAAC Closure Process Under 10 CFR Part 52," Revision 4, July 2010 (ADAMS Accession No. ML102010051). The guidance in NEI 08-01, revision 4, is endorsed by the NRC via Regulatory Guide 1.215 "Guidance for ITAAC Closure Under 10 CFR Part 52," Revision 1, dated May 2012. NEI 08-01 quotes from NRC guidance on what constitutes sufficient information in an ICN, stating in part that "[t]he NRC expects the notification to be sufficiently complete and detailed for a reasonable person to understand the bases..." In

keeping with the NRC's transparency policy and 10 CFR Part 52.99(e)(2), the ICNs are made public, and this level of detail is necessary for public understanding of the ICNs.

Understanding the difficulty in gauging the level of detail required for "a reasonable person" to understand the bases for ICNs, the NRC staff and the industry spent significant time planning and preparing for ICN submittals. NEI 08-01, Revision 4, has several ICN templates and represents extensive efforts by the industry and the NRC staff. In addition, the NRC staff has ensured internal reviews of ICNs are done in an efficient and effective manner through the development of the Verification of ITAAC Closure, Evaluation, and Status system and its integration with the Construction Inspection Program Information Management System.

However, in its first ICN submittal to the NRC (ADAMS Accession No. ML12328A160), one licensee did not include key information and the NRC staff concluded that the ICN contained insufficient information. In a letter dated January 8, 2013, (ADAMS Accession No. ML12356A469), the NRC notified the licensee that the ICN did not contain sufficient information to demonstrate the ITAAC had been successfully completed and explained the basis for that determination. The letter also stated that this conclusion was not a determination by the NRC of whether the ITAAC was met. On February 1, 2013, the licensee submitted a revised ICN (ADAMS Accession No. ML13032A592). The NRC subsequently accepted the revised ICN.

Considering the large number of ITAAC for an AP1000 plant (over 800 individual ITAAC in several different technical areas), the WG concludes that ongoing interactions concerning ITAAC closure reporting should continue. As ICNs are submitted for each successive AP1000 ITAAC, increased quality and efficiency is expected. Lessons learned from AP1000 ITAAC should continue to be documented and communicated to licensees, and applied to future AP1000 construction projects.

The WG also concludes that any lessons learned from the AP1000 ITAAC closure process may have limited applicability to the ITAAC for other plant designs. Specifically, even accounting for design differences, the number, types, and specific wording of ITAAC for similar systems and functions vary widely across designs. Those variations limit the applicability of lessons learned from the AP1000 ICNs. Additionally, the WG concluded that for future design reviews (e. g. Small Modular Reactors), the NRC staff should consider the use of standard terms or formats to make ITAAC closure lessons more generally applicable.

#### **Lesson 4: Vendor Oversight**

Observation: The vendor oversight program would benefit from: further clarification of its objectives and its relationship to the Reactor Oversight Program (ROP) and cROP; and enhanced communications of vendors' performance issues with operating reactor and construction licensees.

Discussion: The Vendor Inspection Program (VIP) Plan, Revision 6, dated April 2013 (ADAMS Accession No. ML13092A421) is the document that provides an overall approach for vendor inspection, including goals, priorities, performance metrics, and resource-management strategies. Appendix A of the plan outlines the strategies for identifying primary and sub-tier vendors, and Appendix B of the plan outlines the strategies used to prioritize vendor inspection efforts. Presently, there are over 400 domestic and 160 foreign vendors in at least 17 countries supplying the U.S. nuclear industry.

Reactor licensees are responsible for the quality of the components used in their facilities. The licensees check vendor quality through a number of mechanisms, including approval of vendor programs, detailed procurement requirements, direct audits, Nuclear Procurement Issues Committee (NUPIC) audits, and third-party oversight such as by the American Society of Mechanical Engineers (ASME). Reactor licensees are in direct contact with vendors, receive and inspect vendor products, and provide vendors feedback on issues affecting quality. NRC inspection oversees the licensee programs through a limited, but informed sampling process. NRC programs and processes should continue to communicate and clarify the different roles and responsibilities of vendors and licensees.

The VIP also uses other sources of information about vendor performance. In addition to NRC vendor inspections, the NRC staff has access to insights from interactions with groups such as NUPIC and ASME. Internationally, the NRC staff has benefited from participation in the Multinational Design Evaluation Program (MDEP) Vendor Inspection Cooperation Working Group. However, information exchanges between MDEP members and the NRC could be further enhanced. Despite differences in regulatory approaches amongst the various members of MDEP, additional routine exchanges of information related to quality issues at common vendors would be useful input to help further inform NRC vendor inspection priorities.

In addition, enhanced communications with licensees could provide the NRC with more details of vendor performance that do not reach the threshold of reporting to the NRC in accordance with 10 CFR Part 21, "Reporting of Defects and Noncompliance." For example, vendor issues trended in licensees' corrective action programs could be used by the NRC staff when formulating vendor inspection plans.

Communications from the NRC staff to licensees could also be improved in the area of vendors' performance. If a significant vendor quality issue affects many licensees, the NRC staff uses the generic communications process to inform the industry. Additionally, the NRC makes the results of all vendor inspections available to all reactor licensees. In the case of vendor inspections affecting Part 52 COL holders, the NRC provides copies of the reports directly to the Part 52 licensees. However, beyond sharing inspection reports, there is no formal process in the VIP to engage a single licensee or small group of licensees if a significant quality issue exists at one of their vendors. Such a process could aid the NRC in understanding the licensees' resolutions of the issues.

## Lesson 5: Changes to the Licensing Basis during Construction

Observation: NRC staff and the licensees should monitor the ongoing implementation of the current licensing basis change processes to identify where additional process enhancements may be warranted.

Discussion: Implementation of 10 CFR 52.63, 52.98, and Section VIII of each DCD ensures that licensees construct to their current licensing basis. Since 2010, the nuclear industry and the NRC have been engaged in public discussions on ways to provide additional flexibility to continue construction during the NRC evaluation of a license amendment request (LAR).

The current change processes build upon the well-established change processes used for the current nuclear reactor operating fleet. As with the 10 CFR Part 50 licensed operating plants, a licensee must conduct evaluations to determine if prior NRC approval is required prior to making a change to its facility, via a license amendment or exemption, or if the licensee may implement the change with no prior NRC approval. If prior NRC approval is required, the licensee would follow the LAR process. One difference from Part 50 is that the Part 52 combined licenses issued to date have included provisions that permit the licensees to follow the guidance of COL-ISG-25 (ISG-25) "Interim Staff Guidance on Changes during Construction under 10 CFR Part 52," also referred to as the Preliminary Amendment Request (PAR) process.

ISG-25, together with the authorizing license condition, provides for a process by which a licensee may engage in construction (related to a specific licensing basis change request) while the NRC staff is evaluating a LAR, but only when a PAR has been submitted and the licensee has received a No Objection Letter from the NRC. The PAR No Objection Letter is strictly conditioned on the licensee's commitment to return the plant to its current licensing basis if the LAR is subsequently denied or withdrawn.

The WG looked at three areas in its evaluation of changes permitted by 10 CFR Part 52, all of which have been, or are being, addressed by the NRC staff's "Changes during Construction Working Group."

### *Changes Not Requiring Prior NRC Approval:*

A licensee must evaluate all changes to the Updated Final Safety Analysis Report to determine if prior NRC approval is necessary. A licensee documents all changes not requiring prior NRC approval in a report submitted to the NRC semiannually. To date, the NRC has received reports from each of the current Part 52 licensees documenting departures. The NRC staff has evaluated these reports and found no need for further inspection. Additionally, the NRC staff inspects the licensees' change evaluation processes as part of routine quality assurance (QA) inspections for each of the sites and, to date, has not identified any issues.

### *Interim Staff Guidance (ISG)-25/PAR Process:*

For changes that do require prior NRC approval, the licensee must submit a LAR to change the licensing basis of the plant. In order to avoid unnecessary construction delays related to changes during construction, the NRC has implemented the PAR process, as described in ISG-25.

The NRC staff and industry have participated in a series of public meetings over a 27-month period to address the challenges of changes to the licensing basis during construction. The NRC issued ISG-25 for use and comment in January 2011. The ISG-25 process is incorporated into the licensing basis of Vogtle, Units 3 and 4, and V.C. Summer, Units 2 and 3, by a license condition. The NRC can deny or grant the PAR. If granted, the NRC will issue a No Objection Letter, which allows the licensee to proceed with the construction activities associated with the LAR, pending the outcome of the NRC staff's detailed technical review of the LAR. However, if the LAR is subsequently denied or withdrawn, the licensee is obligated to return the plant to its current licensing basis. As of May 1, 2013, the NRC staff has issued No Objection Letters for eleven PARs.

The NRC staff has identified areas for improvement related to the timing and interaction of the PAR and LAR reviews and to the required content of PARs. Prior to the first use of the ISG-25 process, the NRC staff identified a potential problem with ISG-25 in that it allowed for issuance of the PAR No Objection Letter after receipt of the LAR, but prior to the completion of the LAR acceptance review. The NRC staff adopted a practice of not issuing the PAR No Objection Letter until after the LAR acceptance review was completed. This practice allows the staff time to determine whether the LAR contains sufficient information to enable the NRC staff to complete its detailed technical review. This practice also avoids the possibility of the licensee proceeding in accordance with a LAR that is subsequently not accepted for review.

With this change to the timing of the No Objection Letter, it is unnecessary for the NRC staff to review the independent submission of the no significant hazards consideration determination or the categorical exclusion from environmental review (which are prerequisites for invoking the PAR process) as part of the PAR evaluation. Instead, the licensee includes this information in the LAR submittal and it is considered as part of the staff's acceptance review. ISG-025 is being revised to eliminate the duplicative information in PARs and LARs, which will improve the NRC staff's efficiency when reviewing PARs. The revised ISG will also ensure the completion of the NRC staff's acceptance review of the LAR prior to issuance of the PAR No Objection Letter.

### *Emergent Conditions:*

ISG-25 allows for construction during the NRC staff's safety evaluation of a LAR. However, industry is concerned with construction impacts during the period of time needed to evaluate an unanticipated change in order to determine if prior NRC approval is required. Industry views halting construction during this evaluation period as an unnecessary delay.

NEI submitted NEI 96-07 Appendix C, *"Guideline for Implementation of Change Control Processes for New Nuclear Power Plants Licensed Under 10 CFR Part 52,"* to the NRC for endorsement. Industry proposed a resolution in Appendix C, Subsection 4.1.1.1, *"Nonconforming conditions during construction,"* which would allow a licensee to continue constructing in parallel with the licensees' evaluation to determine if prior NRC approval is required. Over the past 10 months, the NRC, industry representatives, and other stakeholders have participated in three public meetings and three public teleconferences to discuss the industry proposed change to the implementation of the Part 52 departure process as presented in Subsection 4.1.1.1.

As part of its consideration of NEI 96-07 Appendix C, the NRC Changes during Construction WG is finalizing its recommendation regarding industry use of the screening process used in the operating fleet for evaluating plant changes against 50.59 as an acceptable method of evaluating changes during construction. The WG agrees that finalizing this recommendation will provide further clarity regarding the change processes already available to licensees under 10 CFR Part 52. However, the Changes during Construction WG has reaffirmed the NRC staff's position that construction that differs from the current licensing basis cannot continue concurrently with the licensee's evaluation to determine whether "prior NRC approval" is required. If construction activities and licensee evaluation activities (which are in part undertaken to determine if NRC approval is necessary) continue concurrently, changes requiring NRC approval might be made prior to the licensee's evaluation. This position was communicated to the industry in a May 9, 2013, letter to NEI.

Overall, the WG concludes that the NRC staff (principally through the efforts of the Changes during Construction WG) has remained focused on ensuring that licensees continue to construct to their current licensing basis, consistent with what is allowed by the regulations in 10 CFR Part 52. The NRC staff has considered the industry views relative to additional process changes, while at the same time maintaining its view of what changes can be made consistent with 10 CFR Part 52 without prior NRC review and approval. The WG concludes that, at this time, the NRC staff has explored the flexibilities allowed to the licensees with regard to the treatment of emergent (and potentially nonconforming) conditions during construction within the limits of the current regulations. The NRC staff positions on these processes are consistent with the current regulations, and the WG agrees with the NRC staff that no changes to Part 52 related to the licensing basis change processes are needed at this time.

## **IV. ENHANCEMENTS**

The WG has identified areas where enhancements could be of benefit to further implementation of 10 CFR Part 52. Where appropriate, the working group has provided specific suggestions for implementation of those enhancements. However, the WG fully expects that upon further review of this report by the NRC staff, additional or different approaches may be found to address the lessons learned and different priorities might be established to address those lessons learned.

### **1. Clarity of DCD Tier 2\* Information**

- The AP-1000 DCD Tier 2\* information should be reviewed to determine if ambiguity is problematic in areas of the AP-1000 DCD other than those noted by the WG. If so, then the DCD Tier 2\* information for future design certification reviews and combined licenses should also be reviewed and the guidance for designation and documentation of DCD Tier 2\* information should be enhanced. In addition, for the AP1000 design, specific effort should be undertaken to ensure common understanding between the NRC staff and the AP1000 licensees relative to Tier 2\* information. The WG noted that the NRC staff has begun that effort for the remaining critical sections discussed in Section 3H.5 of the AP1000 DCD.

### **2. Regulatory Decision Making during Construction**

- The NRC staff should consider a process for escalating engagement with licensee management to resolve significant unresolved construction inspection findings. Internally, to ensure clear and timely regulatory decisions, prompt enforcement action should be taken when the evidence available to inspectors indicates that a violation has occurred.

### **3. ITAAC Closure**

- NRC staff should continue to conduct workshops or other stakeholder interactions to identify and resolve differences on the expected level of detail in ICNs, and to enhance ICN guidance as the result of ongoing lessons learned. Additionally, for future design reviews such as those anticipated for Small Modular Reactors, the NRC staff should consider the use of standard terms or formats across designs to make ITAAC closure lessons more generally applicable.

### **4. Vendor Oversight**

- The NRC staff should continue to communicate and clarify the Vendor Inspection Program objectives and the program's relationship to the cROP,

and document its relationship to the ROP. The NRC staff should also consider formulating a process to use enhanced communications with licensees about their vendors in order to provide the NRC staff with additional information about trends in vendor performance and facilitate the NRC staff with providing specific licensees notice when there are indications of vendor quality issues affecting their facilities. Additional information exchange as part of the MDEP should be considered to help prioritize vendor inspections.

## **5. Changes to the Licensing Basis during Construction**

- The NRC staff should continue to assess the implementation of the processes for making licensing basis changes as additional experience is gained during construction. The NRC staff should continue to engage industry on additional process enhancements.
- To increase the efficiency of the licensee evaluations, the NRC Changes during Construction WG should finalize its recommendation regarding industry use of the screening process used in the operating fleet for evaluating plant changes against 50.59 as an acceptable method of evaluating changes during construction.

**Appendix A – Post-Combined License Part 52 Implementation Self-Assessment Working Group Tasking Memo and Charter**

March 8, 2013

MEMORANDUM TO: James G. Luehman, Deputy Director  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

FROM: Glenn M. Tracy, Director */RA/*  
Office of New Reactors

SUBJECT: POST-COMBINED LICENSE PART 52 IMPLEMENTATION  
SELF-ASSESSMENT

This memorandum transmits the enclosed Post-Combined License (COL) Part 52 Self-Assessment Working Group Charter. The purpose of the Working Group is to assess the U.S. Nuclear Regulatory Commission's (NRC's) licensing and inspection requirements, policies, procedures, and practices during the first year of post-COL implementation of Part 52. The Working Group is comprised of inter-office staff that have broad knowledge of, and experience in, agency licensing and inspection practices and procedures.

As the lead for the assessment, you should ensure the Working Group focuses on solutions that, going forward, enhance existing NRC requirements and guidance related to Part 52 implementation, where necessary. In addition to the members in your group, additional Headquarters or Regional support will be provided to you, as requested. The Working Group should document its recommendations and their bases in a report to me on June 7, 2013. In addition, documentation of the recommendations should be completed in accordance with Management Directive 6.8 "Lessons-Learned Program," and submitted to the contact for that program.

Enclosure:  
Post-Combined License Part 52  
Implementation Self-Assessment  
Working Group Charter

## **Post-Combined License Part 52 Implementation Self-Assessment Working Group Charter**

### **PURPOSE**

The purpose of this working group (WG) is to assess the implementation of U.S. Nuclear Regulatory Commission (NRC) licensing and inspection requirements, policies, procedures, and practices during the first year of Post-Combined license (COL) implementation of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52. It is being established by the Office of New Reactors (NRO) as a continuous improvement initiative. The assessment should evaluate whether the outcomes of new reactor program activities have been effective, realistic, and timely, and where improvements can be made in keeping with the NRC's Principles of Good Regulation (Independence, Openness, Efficiency, Clarity, and Reliability).

### **WORKING GROUP MEMBERSHIP**

The WG will be led by James Luehman, Deputy Director, Division of Construction Inspection and Operational Programs (DCIP), NRO. The other full time members are David Matthews, Director, Division of New Reactor Licensing, NRO, and Mark Miller, Deputy Director, Division of Construction Projects, Region II. Catherine Scott, Acting Assistant General Counsel for New Reactors or her designee will provide the WG legal support with additional technical support provided by staff from the Division of Advanced Reactors and Rulemaking and DCIP, NRO.

### **SCOPE**

The WG should select a group of the most significant licensing, inspection, and other regulatory actions taken during the first phase of post-COL Part 52 implementation to assess. While this assessment will be an internal agency review, the WG should provide early opportunity for external stakeholders to suggest areas for review by the WG and ensure due consideration of those actions that external stakeholders view as significant. The significance of the staff actions to be reviewed should be based on considerations, such as safety significance and NRC or licensee staff resources required.

### **PROCESS**

As there are several ongoing new reactor program reviews associated with 10 CFR Part 52, the WG should endeavor to remain well informed and avoid duplicating work already in process or completed as part of those efforts. This specific assessment should include vertical slice reviews of the major licensing, inspection and other regulatory actions and decisions made during initial post-COL Part 52 implementation. Vertical slice reviews are examinations of the portions of the requirements, policies, procedures or guidance applicable to the specific actions considered significant within this assessment. WG observations that are best suited for incorporation into other new reactor program reviews, such as the Vendor Inspection Program Self-Assessment, the Part 52 Licensing Lessons-Learned Assessment and the Construction Reactor Oversight Process Pilot Self-Assessment, should be coordinated and submitted for such consideration. The WG should develop specific opportunities for external stakeholder input and comment regarding the content of the report and its recommendations.

## **DOCUMENTATION**

The WG should provide a written report to the Office Director of NRO, by June 7, 2013, which at a minimum documents the areas of review, findings, and any WG recommendations. The report will be made publically available.

**Appendix B—Industry Issues Presented at the March 28, 2013 NRC Working Group Public Meeting**

Activity	Challenges
Basemat rebar construction and interpretation of Tier 2* figures in the Updated Final Safety Analysis Report (UFSAR) leading to rework activities.	<p>Interpretation of the Licensing Bases under Part 52</p> <ul style="list-style-type: none"> <li>● Level of detail in UFSAR</li> <li>● Clarity of Tier 1 and Tier 2* scope</li> </ul>
T-headed shear reinforcement Unresolved items and licensee response concerning the design basis compliance with the licensing basis which lead to two license amendment request (LAR)	<p>Interpretation of the Licensing Bases under Part 52</p> <ul style="list-style-type: none"> <li>● Differing views on the application of ACI code requirements</li> <li>● Licensee authority/flexibility to make technically based code interpretations which are not explicitly addressed in the licensing basis</li> <li>● Open, timely communications between Region II, the Office of New Reactors (NRO) and Licensee</li> <li>● Clarification of the definition of a ‘construction activity,’ when a construction activity is subject to Nuclear Regulatory Commission (NRC) inspection; and therefore, when must the safety significance of an issue be assessed for enforcement</li> <li>● Documentation of licensee position as reviewed by the NRC</li> </ul>
Development and submittal of the first ITAAC closure notice and its subsequent non-acceptance by the Staff	<p>Part 52 process first-time implementation</p> <ul style="list-style-type: none"> <li>● Level of detail provided in ITAAC Closure Notifications (ICN) did not meet NRC interpretations or expectations for fulfilling spirit of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) 52.99</li> <li>● Learning curve associated with first-time Part 52 process and level of detail for Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) closure notifications</li> <li>● NRC ITAAC Closure Verification Process <ul style="list-style-type: none"> <li>○ Timely feedback to licensees</li> <li>○ Timely completion of ICN acceptance process</li> </ul> </li> <li>● Longer term, need for disciplined ICN reviews that avoid subjective judgments of “sufficient” information or second-guessing of settled guidance and examples</li> <li>● Similar challenges for existing construction related regulatory processes that have not been exercised in many years, e.g., 10 CFR 50.55(e)</li> </ul>

**Appendix B—Industry Issues Presented at the March 28, 2013 NRC Working Group  
Public Meeting (continued)**

<b>Activity</b>	<b>Challenges</b>
Vendor inspections that involve ITAAC supporting activities	<p>Part 52 process first-time implementation</p> <ul style="list-style-type: none"> <li>● Clarity regarding vendor vs. licensee inspections               <ul style="list-style-type: none"> <li>○ Based on inspection purpose</li> <li>○ Based on inspection team</li> <li>○ Can this change mid-inspection?</li> </ul> </li> <li>● Tracking of ITAAC items that are identified during vendor inspections and subsequent inclusion in the ITAAC closure notice</li> </ul>
Resolution of generic process issues, e.g., changes during construction	<p>Need for more timely and efficient resolution of key issues to support ongoing construction activities</p> <ul style="list-style-type: none"> <li>● What process improvements are needed to more rapidly understand and resolve these types of issues?</li> <li>● Need NRC to clearly document position or identified deficiency</li> </ul>

## Appendix C – References

### Publicly Available Documents

1. *U.S. Code of Federal Regulations*, “Domestic Licensing of Production and Utilization Facilities,” Part 50, Chapter I, Title 10, “Energy.”
2. *U.S. Code of Federal Regulations*, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” Part 52, Chapter I, Title 10, “Energy.”
3. U.S. Nuclear Regulatory Commission, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,” NUREG-0800, Section 14.3, “Inspections, Tests, Analysis, and Acceptance Criteria,” Initial Issuance, March 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML070660618).
4. Southern Nuclear Operating Company, Inc., “Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Updated Final Safety Analysis Report (Public Version),” August 31, 2012 (ADAMS Accession No. ML12249A432). (In particular, see Section 3.8, “Design of Category I Structures” (ADAMS Accession No. ML12254A964), and Appendix 3H, “Auxiliary and Shield Building Critical Sections” (ADAMS Accession No. ML12254A994).)
5. South Carolina Electric and Gas Company, Inc., “V. C. Summer Nuclear Station Units 2 & 3 Combined Operating License Application (Final Safety Analysis Report)” June 28, 2011 (ADAMS Accession No. ML11187A074).
6. U.S. Nuclear Regulatory Commission, “Interim Staff Guidance on Changes during Construction under 10 CFR Part 52,” COL-ISG-025 (ADAMS Accession No. ML111530026).
7. U.S. Nuclear Regulatory Commission, “Combined License Applications for Nuclear Power Plants (LWR Edition),” Regulatory Guide 1.206, June 20, 2007 (ADAMS Accession No. ML070720184).
8. U.S. Nuclear Regulatory Commission, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design,” NUREG-1793, Initial Report, September 2004, Supplement 1, December 2005, and Supplement 2, September 2011.
9. U.S. Nuclear Regulatory Commission, “Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design,” NUREG-1503, Main Report and Appendices, July 1994, and Supplement 1, May 1997 (ADAMS Accession No. ML080670592).
10. U.S. Nuclear Regulatory Commission, “Construction Inspection Program: Inspections of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Related Work,” NRC Inspection Manual Chapter 2503, Appendix A, “IMC-2503 Inspection Procedures,” Attachment and Inspection Procedure (IP) 65001.01, “Inspection of ITAAC-Related Foundations & Buildings” (ADAMS Accession No. ML071580740).

11. U.S. Nuclear Regulatory Commission, "Construction Inspection Program: Inspection of Construction and Operational Programs," NRC Inspection Manual Chapter (IMC) 2504 (ADAMS Accession No. ML12298A106).
12. U.S. Nuclear Regulatory Commission, "Periodic Assessment of Construction Inspection Program Results – Pilot," NRC IMC 2505P, Revision 1 (ADAMS Accession No. ML13002A227).
13. U.S. Nuclear Regulatory Commission, "Construction Reactor Oversight Process General Guidance and Basis Document," NRC IMC 2506 (ADAMS Accession No. ML12297A077).
14. U.S. Nuclear Regulatory Commission, "Construction Inspection Program: Vendor Inspections," NRC IMC 2507 (ADAMS Accession No. ML110871798).
15. U.S. Nuclear Regulatory Commission, "Construction Significance Determination Process – Pilot," NRC IMC 2519P (ADAMS Accession No. ML113180355).
16. U.S. Nuclear Regulatory Commission, "Quality Assurance Program Implementation during Construction and Pre-Construction Activities," Inspection Procedure 35007 (ADAMS Accession No. ML12355A330).
17. U.S. Nuclear Regulatory Commission, "Interim Staff Guidance: Finalizing Licensing-Basis Information," DC/COL-ISG-011, November 2009 (ADAMS Accession No. ML092890623).
18. U.S. Nuclear Regulatory Commission, "Vendor Inspection Program Plan," Revision 6, April 2013.
19. Westinghouse Electric Co., "AP1000 Design Control Document," Revision 19 (ADAMS Accession No. ML11171A500).
20. Southern Nuclear Operating Company, Inc., "Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment: Basemat Concrete/Rebar Details," LAR-12-007, August 1, 2012 (ADAMS Accession No. ML12215A084).
21. Southern Nuclear Operating Company, Inc., "Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment: Basemat Shear Reinforcement Design Details," LAR-13-004, January 18, 2013 (ADAMS Accession No. ML13024A054).
22. U.S. Nuclear Regulatory Commission, "South Carolina Electric and Gas (SCE&G), V.C. Summer Nuclear Station Unit 2 – U.S. Nuclear Regulatory Commission ITAAC Inspection," Inspection Report (IR) No. 05200027/2013008, March 26, 2013 (ADAMS Accession No. ML13085A058).
23. U.S. Nuclear Regulatory Commission, "Southern Nuclear Operating Company Vogtle Electric Generating Plant Unit 3 - NRC ITAAC Inspection," IR No. 05200025/2012-008, May 18, 2012 (ADAMS Accession No. ML12139A192).

24. Southern Nuclear Operating Company, Inc., "Southern Nuclear Company Vogtle Electric Generating Plant Unit 3 Completion of ITAAC E.2.5.04.05.05.01 [Index Number 874]," November 6, 2012, (ADAMS Accession No. ML12328A160).
25. U.S. Nuclear Regulatory Commission, "Notice of Insufficient Information to Support Inspection, Test, Analysis, and Acceptance Criterion Closure Verification of Vogtle Electric Generating Plant Unit 3, ITAAC E.2.5.04.05.05.01, "Backfill Compaction," January 8, 2013, (ADAMS Accession No. ML12356A469).
26. Southern Nuclear Operating Company, Inc., "Southern Nuclear Company Vogtle Electric Generating Plant Unit 3 Completion of ITAAC E.2.5.04.05.05.01 [Index Number 874]," February 1, 2013, (ADAMS Accession No. ML13032A592).
27. U.S. Nuclear Regulatory Commission, "Summary of October 4, 2012 Meeting with Southern Nuclear Company Operating Company to Discuss Repairs Made to the Reactor Vessel Nozzle-to-Safe-End Welds for Vogtle Electric Generating Station Unit 3," October 25, 2012, (ADAMS Accession No. 12298A300).
28. U.S. Nuclear Regulatory Commission, Letter to Russ Bell, Director of New Plant Licensing, Nuclear Generation Division, Nuclear Energy Institute (NEI) from Michael Mayfield, Director, Division of Advanced Reactors and Rulemaking, subject "Changes During Construction," May 9, 2013, (ADAMS Accession No. ML13044A443).