

POLICY ISSUE
(INFORMATION)

August 12, 2011

SECY -11-0111

FOR: The Commissioners

FROM: Michael R. Johnson, Director */RA/*
Office of New Reactors

SUBJECT: STAFF PROGRESS IN RESOLVING ISSUES ASSOCIATED WITH
INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

PURPOSE:

To inform the Commission of the staff's resolution of issues associated with inspections, tests, analyses, and acceptance criteria (ITAAC) and to provide 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 staff has made significant progress in resolving issues and developing programs on ITAAC and ConE. With a majority of the policy development work completed, the staff's focus is now on refining and implementing these processes and programs. This paper also incorporates the ConE annual update in an effort to reduce multiple submittals to the Commission on similar topics.

The NRC simultaneously published the proposed rulemaking for ITAAC maintenance and the associated draft revision to Regulatory Guide (RG) 1.215, "Guidance for ITAAC Closure under 10 CFR Part 52," in May 2011 for a 75-day public comment period. With no significant comments received, the staff expects to issue a final rule and guidance in May 2012. Also, the

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staff is preparing a draft process for making its recommendation for the Commission's Title 10 of the *Code of Federal Regulations*, Part 52, Section 103(g) (10 CFR 52.103(g)) finding. The Simulated ITAAC Closure and Verification Demonstration Project, which involved NRC staff, the U.S. Department of Energy (DOE), Southern Nuclear Company (SNC), and Westinghouse Electric Company (WEC), was completed in April 2011, and the staff issued a final report that included lessons learned and next steps (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11203A079). The staff also refined the draft ITAAC Closure Verification Process (ICVP), incorporating key lessons learned from the demonstration and from interaction with internal and external stakeholders, and plan to issue it by the end of 2011.

The ConE staff is implementing the programs developed for gathering, processing, and communicating the collected information. The staff reviews domestic and international construction and operating experience information for applicability, communicates this information, and works with the Office of New Reactors (NRO) staff to help identify and provide enhancements to the NRC's programs as necessary. Information exchange with international partners through multilateral activities is a key component of the ConE processes.

As the staff transitions from development to implementation of the processes for ITAAC and ConE, it does not expect significantly new developments in these areas. Going forward, the staff will inform the Commission of developments involving ITAAC and ConE, if any, in the annual construction reactor oversight process (cROP) assessment.

BACKGROUND:

In 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 (ADAMS Accession No. ML081220237), the staff provided an update on plans to inspect and perform the closure verification of ITAAC completed by licensees. The related staff requirements memorandum (SRM), dated January 14, 2009 (ADAMS Accession No. ML090140136), directed the staff to keep the Commission informed of progress in resolving issues associated with ITAAC, including instances in which successfully completed ITAAC are no longer satisfied.

Since 2008, the staff has provided two updates related to ITAAC. In SECY-09-0119, "Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria," dated August 26, 2009 (ADAMS Accession No. ML091980327), the staff discussed progress toward resolving issues concerning ITAAC maintenance and reporting, including the notification thresholds for events that may invalidate a previous determination that an ITAAC was successfully completed (i.e., that acceptance criteria may no longer be met). In SECY-10-0100, "Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria," dated August 5, 2010 (ADAMS Accession No. ML101660583), the staff discussed progress in its efforts to develop a proposed rule and guidance to address ITAAC maintenance during the period between a licensee's submittal of an ITAAC closure notification (ICN) and the Commission's 10 CFR 52.103(g) finding.

The staff hosted seven public workshops in the last 12 months to solicit input and exchange views on issues related to ITAAC closure verification, the Simulated ITAAC Closure and

Verification Demonstration Project, and other Construction Inspection Program (CIP) topics. Members of the public, the Nuclear Energy Institute (NEI), industry representatives, and other external stakeholders participated in these public workshops. SRM-M090922, "Staff Requirements—Periodic Briefing on New Reactor Issues—Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)," dated October 16, 2009 (ADAMS Accession No. ML092890658), asked the staff to provide the Commission with an update on ConE gained from other countries, including oversight and vendor inspection. This request was part of the original Commission tasking to provide periodic updates on the ConE program, as documented by SRM-M071024B, "Staff Requirements—Periodic Briefing on New Reactor Issues," dated November 13, 2007 (ADAMS Accession No. ML073180039). In response, the staff provided two updates via Commissioners' Assistant notes on March 30, 2010 (ADAMS Accession No. ML100910100, routine administrative records, not publically available), and October 14, 2010 (ADAMS Accession No. ML102700167, routine administrative records, not publically available), covering updates up to September 2010.

DISCUSSION:

Proposed ITAAC Maintenance Rulemaking and Status of Associated Draft Revision to Regulatory Guide 1.215

The NRC published both the proposed ITAAC maintenance revisions to 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," and to 10 CFR 52.99 and the associated draft Revision 1 to RG 1.215 for a 75-day public comment period on May 13, 2011. The rulemaking addresses language changes to 10 CFR Part 2 and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants", and adds notifications to 10 CFR Part 52 that will be required once an ITAAC is closed and there are material changes to the basis for completion of that ITAAC. The proposed rule also adds a notification requirement for licensees to inform the NRC that all ITAAC have been completed and that the facility is ready for the finding by the Commission under 10 CFR 52.103(g).

Draft Revision 1 of RG 1.215 endorses the methodologies described in the industry guidance document, NEI 08-01, "Industry Guideline for the ITAAC Closure Process under 10 CFR Part 52," Revision 4, issued July 2010. The NRC originally published RG 1.215 in October 2009. In addition to the new reporting requirements particular to ITAAC maintenance, the revised RG 1.215 and NEI 08-01 contain guidance on early notifications made by the licensee that will provide additional inspection opportunities for reworked ITAAC that had previously been closed. The revised RG 1.215 and NEI 08-01 also add expanded guidance on "as-built" ITAAC, specifically on inspections, tests, and analyses conducted at remote locations.

The comment period ended on July 27, 2011, and the agency received no significant comments. This represents significant progress in completing the ITAAC maintenance rulemaking effort. The staff's preparation for the rulemaking and regulatory guidance development involved extensive industry and public interactions, primarily through the ITAAC public workshop series. These regular interactions with industry and the public helped to create a proposed rule and guidance package that already captured significant input from interested stakeholders. The staff will deliver the final rule to the Commission in January 2012, and will issue Revision 1 to RG 1.215 with the final rule publication. The current schedule allows for resolution of comments, followed by staff, Committee to Review Generic Requirements,

Advisory Committee on Reactor Safeguards, Commission, and Office of Management and Budget reviews.

Preparation for Staff's Recommendation on 10 CFR 52.103(g)

The NRC staff is developing a process for its recommendation to the Commission on making a finding in accordance with 10 CFR 52.103(g). The staff is preparing an office instruction, which provides guidance to the staff on collecting the necessary information and communicating the staff's determination that all inspections, tests, and analyses are performed and the acceptance criteria are met for a given facility, and on communicating the staff's recommendation to the Commission.

Currently, the staff anticipates that the office instruction will:

- Ensure that the licensee has submitted notifications in accordance with 10 CFR 52.99.
- Verify that all ITAAC are successfully completed, and ensure that *Federal Register* notices have been published for every verified ITAAC until such notices are no longer required.
- Ensure that inspection activities required under Inspection Manual Chapter (IMC) 2503, "Construction Inspection Program: Inspections of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)," and IMC 2505, "Periodic Assessment of Construction Inspection Program Results," are completed.
- Provide templates for the SECY vote paper and determination basis document.

The staff will continue to refine this process and its supporting documents by incorporating solicited input from the working group and other stakeholders.

Simulated ITAAC Closure and Verification Demonstration Exercise

The NRC staff and stakeholders participated in the Simulated ITAAC Closure and Verification Demonstration Project from July 2010 through April 2011. In addition to the NRC, participants included DOE as the project sponsor, NEI, WEC, and SNC. The primary objective of the demonstration was to verify that the ITAAC closure and verification processes could reliably and efficiently support ITAAC closure. A secondary objective of the demonstration was to evaluate the expected surge in ICNs submitted during the last year of facility construction, when a substantial number of ITAAC are scheduled for completion.

The lessons learned from the demonstration have already proven valuable in refining both the draft ICVP office instruction and the draft office instruction on the 10 CFR 52.103(g) process. Recommendations have been made on how to further improve the industry ITAAC closure and the NRC ITAAC verification processes, which may aid in managing the ITAAC surge. Industry participants recommended that the NRC staff review the 10 CFR 52.99(c)(2) uncompleted ITAAC notifications (225-day letters), as this could reduce ICN review time requirements by previewing the completed work as well as work planned to complete the ITAAC. Problems with the completed or planned work could be communicated to the licensee. The staff is currently

reviewing this proposal and will continue to discuss this with stakeholders during the public workshop series. As an additional step, the staff has begun to categorize ITAAC with similar attributes into specific groups. Each specific group will then have an ICN template developed so that better coverage of ITAAC is represented in the industry guidance document, NEI 08-01, which is endorsed by RG 1.215. The staff may incorporate these additional templates into future revisions to NEI 08-01 and RG 1.215.

The demonstration was extremely valuable in exercising many aspects of the ITAAC closure and verification processes. Some significant aspects include the technical assistance request (TAR) process, the Construction Inspection Program Information Management System (CIPIMS), and the Verification of ITAAC Closure Evaluation and Status (VOICES) information technology system. The TAR process was improved by facilitating two-way communication between NRC Headquarters and Region II for coordination of inspection support activities. The staff recognized that CIPIMS did not meet all users' requirements, and confirmed that several features need enhancements in version 2.0. CIPIMS 2.0 is currently under development, and is scheduled to be completed in early calendar year 2012. VOICES was identified as a key component of the ITAAC closure and verification processes. However, it was not built at the time of the demonstration. VOICES is scheduled to be completed by the middle of calendar year 2012.

The demonstration served as a proactive assessment of the process as the NRC staff prepares for future ITAAC closure and verification activities. Based on the results of the demonstration and interactions between participants, the staff issued a final report in July 2011 summarizing the demonstration, capturing lessons learned, and proposing next steps (ADAMS Accession No. ML11166A182).

ITAAC Closure Verification Process

Over the past year, the staff has refined the ICVP to support its activities under the regulatory requirements of 10 CFR 52.99 to verify the successful completion of each combined license ITAAC by the licensee. The staff expects to issue a draft office instruction in calendar year 2011 that provides instructions for the NRC staff for ITAAC closure and verification.

The verification of successful completion of an ITAAC is based on (1) sufficient information in its ICN, (2) confirmation by NRC inspection results documented in CIPIMS, and (3) other pertinent information sources when warranted. The staff will use an ICN determination review template designed to focus the staff's review of each ITAAC closure notification so that an efficient and effective determination on its successful completion may be made. The completed determination for all combined license ITAAC will be part of the basis for the staff's recommendation to the Commission for its finding under 10 CFR 52.103(g). In addition, the ICVP includes publishing the NRC verification of an ITAAC in the *Federal Register* in accordance with 10 CFR 52.99(e).

To aid the ICVP, the staff determined the specifications for VOICES that will work in conjunction with CIPIMS. The staff expects that development and integration with CIPIMS will be completed in fiscal year 2012. The VOICES system will track, record the status, and provide relevant information for each combined license ITAAC. The NRO staff will use this system during its reviews to verify the successful completion of ITAAC.

Since its inception over 2 years ago, the ICVP has been refined by integrating substantial input from internal and external stakeholders. Its development is a major milestone in the staff's preparation for new reactor construction.

Construction Experience Update

Since the establishment of the ConE program in 2007, it has steadily matured and stabilized into a reliable program that provides NRC inspectors and NRO technical reviewers with insights from the design, construction, and operation of new reactors. The ConE team continues to screen and evaluate daily event issues (through the Operating Experience Clearinghouse meetings) to determine their applicability to new reactor construction. The staff issued Office Instruction NRO-REG-112, "New Reactor Construction Experience Program," on March 31, 2009 (and Revision 1 on December 31, 2010), to provide a systematic process for incorporating lessons learned and insights from the design, construction, and operation of international and domestic commercial reactors into the licensing reviews, inspections, and construction of new reactors. The staff also deployed a Web-based database in September 2010 to enable the NRC staff to search and retrieve international and domestic ConE event reports. This database collects information on construction and operational events that have been screened and evaluated for applicability to new reactor construction in accordance with NRO-REG-112.

The staff refined its process to obtain and review domestic and international construction and operating experience information for applicability, and to incorporate lessons learned into the NRC's programs. From October 2010 through June 2011, the ConE program issued, or supported the issuance of, the following products (details attached in Enclosure 1):

- 11 operating experience communications on construction-related insights and lessons learned
- 11 ConE issues for resolution for events that required further technical evaluation
- Four information notices

During this same period, the staff incorporated lessons learned from the ConE program's event evaluations and reviews into NRC programs as follows:

- Initiated a revision request for Inspection Procedure (IP) 65001.10, "Inspection of ITAAC-Related Installation of Instrument Components and Systems," dated October 20, 2008 (ADAMS Accession No. ML081640241), to enhance inspection guidance for gas- and liquid-sensing-line installation.
- Initiated a revision request for IP 65001.11, "Construction Inspection Program Inspection of ITAAC-Related Containment Integrity and Containment Penetrations," dated August 9, 2008 (ADAMS Accession No. ML080930102), to enhance inspection guidance for containment-liner installation.
- Initiated a new ITAAC concerning the advanced boiling-water reactor (ABWR) turbine building (TB) seismic design: a site-specific ITAAC is being added to the South Texas

Project's combined license application. The added ITAAC will specifically delineate a requirement for the performance of a dynamic analysis of the TB, such that the ABWR design control document dynamic input requirements for the main steamline are satisfied for the final design of the TB. Related actions are planned for the ABWR design certification renewal application.

The NRC staff successfully completed information exchanges on ConE with international partners through multilateral activities. From October through November 2010, the Center for Construction Inspection (CCI) supported an information exchange with the Finnish Center for Radiation and Nuclear Safety (STUK). The inspector observed and participated in ongoing inspections of electrical instrumentation-related construction activities for Olkiluoto Nuclear Power Plant, Unit 3 (OL3), to gain insights that might be applicable to the NRC's construction oversight program. The inspector also accompanied STUK on a vendor inspection of instrumentation and control software development in Germany in November 2010. The exchange also validated portions of the NRC's electrical construction inspection program while at OL3.

From October through December 2010, CCI supported an information exchange with the National Nuclear Safety Authority (NNSA) of China. The inspector observed and participated in ongoing inspections of the containment vessel welding and other related construction activities at the Sanmen AP1000 site to gain insights that might be applicable to the NRC's construction oversight program. The exchange validated portions of the NRC's welding and structural inspection program. In both cases, the inspector's trip report was evaluated for potential lessons learned that could be applied to NRC's programs. The NRC is finalizing the details to place an NRC vendor inspector with the Chinese vendor inspection group for a 3-month rotational exchange with the NNSA. Through this rotation, the staff will gain additional insights from construction activities at the Sanmen AP1000 site.

The Multinational Design Evaluation Program's Vendor Inspection Cooperation Working Group participated in several observed vendor inspection activities, such as inspectors observing vendor inspections done by other regulators. The first joint inspection, a vendor inspection led by one country supported by inspectors from another country, is planned for October 2011 at Doosan Heavy Industries in the Republic of Korea. By communicating these experiences, the NRC staff will be better able to leverage insights from foreign inspection reports to inform future NRC vendor inspections and to target the use of NRC resources.

The ConE staff has successfully provided significant new reactor construction insights, lessons learned, and related recommendations. The staff continues to work closely with the agency's operating experience program staff to ensure that all relevant construction experience, both domestic and international, is evaluated for applicability to the NRC's new reactor licensing, vendor, and CIPs.

Transition from Annual Update to As-Needed Paper

SRM-SECY-08-0117, dated January 14, 2009 (ADAMS Accession No. ML090140136), directed the staff to keep the Commission informed of progress in resolving issues associated with ITAAC, including instances where successfully completed ITAAC are no longer satisfied. Additionally, SRM-M071024B (ADAMS Accession No. ML073180039) directed the staff to keep the Commission informed on how lessons from recent domestic construction experience,

international experience in design, construction, and inspection of new reactors are being incorporated into NRC's programs. This paper is the third annual update to the Commission in response to SRM-SECY-08-0117, and the fourth annual update to SRM-M071024B. The staff has made significant progress in program development and in the resolution of ITAAC and ConE issues since the Commission issued the SRMs. With the majority of ITAAC and ConE program development now completed, current work is focused on refinements of the programs as well as implementation of the processes developed.

Based on the completed work in these areas, the staff believes that annual updates are no longer necessary. As new issues arise, the staff will include updates with the annual cROP self-assessment update (per SRM-SECY-10-0140, "Options for Revising the Construction Reactor Oversight Process," dated March 21, 2011), beginning in April 2012.

COORDINATION:

This paper has been coordinated with the Office of the General Counsel, which has no legal objection to this paper.

/RA/

Michael R. Johnson, Director
Office of New Reactors

Enclosure:
Summary of ConE Products October 2010
through June 2011

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Enclosure:

Summary of ConE Products October 2010
through June 2011

WITS 201100096/EDATS: SECY-2011-0094
WITS 200900019/EDATS: SECY-2010-0405
WITS 200700454

ADAMS Accession Number: ML11174A304

*via e-mail

SECY-012

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Summary of Construction Experience (ConE) Products October 2010 thru June 2011

Operating Experience Community Communications (COMMs)

| Title | Posted Date |
|--|--------------------|
| Oconee - Defect Discovered in Tube Steel that could have Applications in Various Safety Related Structural Systems | December 3, 2010 |
| Robinson - Excessive Hunting of the Auxiliary Feed Water Pump Governor Caused by the Incorrect Oil Used During Preventive Maintenance | January 21, 2011 |
| Browns Ferry - Drywell Pressure Instrument Channel Inoperability due to Improper Instrument Tubing Slope | January 25, 2011 |
| Stuxnet Malware and Cyber Security | March 2, 2011 |
| Fessenheim - High Oxygen Content in Two Gaseous Waste Treatment Tanks Constituting Fire Risk Caused by Shelf Life And Maintenance Issues | April 1, 2011 |
| Kewaunee Power Station - Calibration Procedure for Protective Instrumentation not Compliant with Technical Specification | April 14, 2011 |
| Summary of the 2010 Joint Meeting to Exchange Information on Recent Events in NPPS and Annual Meeting of the IRS National Coordinators | April 27, 2011 |
| Inadequate Design Change Implementation Involving Abandoned In Place Equipment | May 2, 2011 |
| Containment Liner Corrosion / Degradation Issues | May 12, 2011 |
| LES NEF - Commercial Grade Dedication Issues Identified By NRC Inspection | May 17, 2011 |
| Turkey Point Power Plant - Latent Design Deficiency of Main Steam Line High Range Noble Gas Effluent Monitor | June 29, 2011 |

Issues For Resolution (IFRs)

| Title | Initiated Date | Evaluation Status |
|---|-----------------------|--------------------------|
| ConE 2011-01: ABWR Turbine Building Calculated Seismic Repsonse Spectra exceed those in DCD | October 21, 2010 | Complete - ML111730526 |
| ConE 2011-02: Velan's Part 21 regarding Limitorque's Limit Switches Contacts | November 10, 2010 | Pending |
| ConE 2011-03: Review of BWR Pressure Boundary Piping Leaks due to IGSCC | December 13, 2010 | Complete - ML110470364 |
| ConE 2011-04: 2007 Kashiwazaki-Kariwa Earthquake | February 23, 2011 | Pending |
| ConE 2011-05: Dual Unit Tripping Design Considerations for New Reactors | March 8, 2011 | Pending |
| ConE 2011-06: Understanding the Fukushima Daiichi Event | March 28, 2011 | Pending |
| ConE 2011-07: Understanding the Fukushima Daini Event | April 1, 2011 | Pending |

ENCLOSURE

| Title | Initiated Date | Evaluation Status |
|---|-----------------------|--------------------------|
| ConE 2011-08: Crystal River 3 Containment Delamination | April 28, 2011 | Pending |
| ConE 2011-09: Adverse Concrete Conditions Due to Distress from Alkali-Silica Reaction | June 23, 2011 | Pending |
| ConE 2011-10: Browns Ferry 1 Failure of a Low Pressure Coolant Injection Flow Control Valve | June 23, 2011 | Pending |
| ConE 2011-11: Flamanville 3 Vessel Head Welding Issues | June 23, 2011 | Pending |

Supported Generic Communications

| Title | Date/Status |
|---|---------------------------------|
| NRC INFORMATION NOTICE 2010-26: Submerged Electrical Cables | December 2, 2010 - ML102800456 |
| NRC INFORMATION NOTICE 2010-27: Ventilation System Preventive Maintenance And Design Issues | December 16, 2010 - ML102450114 |
| NRC INFORMATION NOTICE 2011-01: Commercial-Grade Dedication Issues Identified During NRC Inspections | February 15, 2011 - ML103220180 |
| NRC INFORMATION NOTICE 2011-05: Tohoku-Taiheiyoku-Oki Earthquake Effects On Japanese Nuclear Power Plants | March 18, 2011 - ML110760432 |