



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

July 24, 2007

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

SUBJECT: STAFF APPROACH TO VERIFYING THE CLOSURE OF
INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA
THROUGH A SAMPLE-BASED INSPECTION PROGRAM

Dear Chairman Klein:

In a May 16, 2007 Staff Requirements Memorandum related to SECY-07-0047, "Staff Approach to Verifying the Closure of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Through a Sample-Based Inspection Program," the Commission stated that the staff and the Advisory Committee on Reactor Safeguards (ACRS) should discuss whether it would be feasible for the Committee to review the sampling methodology and statistical thresholds and, if so, the scope and timing of the review. During the 544th meeting of the ACRS, July 11-13, 2007, we met with the NRC staff and discussed the staff's proposed sampling methodology and statistical thresholds. We had the benefit of the documents referenced.

CONCLUSIONS

1. We concur with the staff's ITAAC closure verification process which uses a sample-based inspection program as described in SECY-07-0047.
2. The threshold value that was used to select the ITAAC to be inspected should result in adequate samples for the advanced boiling water reactor (ABWR) and AP1000.

DISCUSSION

In accordance with 10 CFR Part 52, a Combined License (COL) applicant must propose, and the staff shall identify, ITAAC necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in accordance with the license, the provisions of the Atomic Energy Act, and the Commission's rules and regulations. The COL holder must then complete all of the ITAAC during the construction phase and submit closure letters to the staff as ITAAC are completed. The staff will verify closure of all the ITAAC through a documentation review and will also inspect a sample of ITAAC to verify proper ITAAC closure. This latter inspection process is part of the larger Construction Inspection Program (CIP) that the staff is implementing via procedures documented in Inspection Manual Chapters (IMCs) for early site permits (IMC-2501), quality assurance and engineering activities (IMC-2502), ITAAC (IMC-2503), preparation for operations (IMC-2504), and assessment guidance activities for all these areas (IMC-2505).

The staff has always performed sample-based inspections during construction to evaluate licensee performance. The proposed ITAAC inspection program uses an explicit, structured methodology based on the significance of the ITAAC and the value of the inspection to determine the sample.

The first step in developing the ITAAC inspection sample involved grouping the ITAAC. The ITAAC groups can be envisioned in terms of a matrix with rows that represent common plant elements (such as buildings, piping, valves, and electrical components) and columns that represent various types of inspection activities (i.e., as-built inspection, welding, construction testing, operational testing, quality assurance criteria, and design/fabrication requirements). ITAAC that involve a specific type of inspection activity for a set of plant systems or components form a "family." Thus, the matrix consists of a logical set of ITAAC families with similar plant components and inspection procedures.

The next step used multi-attribute utility theory to rank ITAAC based on five key attributes: safety significance, licensee oversight attention, opportunity to verify by other means, construction and testing experience, and propensity for errors. Expert panels, comprised of NRC staff with extensive nuclear construction and inspection experience, were convened to assign relative weights to each attribute. These expert panels rated ITAAC with respect to each attribute on a scale of 1 to 5 (1-low, 5-high). The panels also rated the significance of not inspecting each ITAAC on a scale of 1 to 5 (1-high, 5-low). The weighted sum of the differences between these ratings is computed, with the weights being those assigned to each attribute. These sums are normalized (0-low, 1-high) and used to rank ITAAC.

For the baseline ITAAC inspection program, a threshold of 0.4 was selected based on engineering judgment to provide an initial list of ITAAC to be inspected. In addition, at least one ITAAC was selected for inspection from families where no ITAAC exceeded the threshold value. This resulted in approximately 35% to 45% of all ITAAC being selected for inspection for the AP1000 and ABWR. The staff performed a sensitivity analysis and determined that using a threshold value less than 0.4 did not result in adding ITAAC that would improve the sample. A threshold value of 0.4 should result in adequate samples for the ABWR and AP1000. The staff expects that NRC inspectors will select additional ITAAC for inspection on a limited basis to provide additional assurance that the sample is representative of the total population. Also, licensee performance will be monitored as part of the NRC assessment process and the staff can expand the selection of ITAAC samples based on poor performance, using the assessment processes in IMC-2505.

The staff has developed a sound sample-based inspection program and documented its technical basis adequately. Sensitivity analyses provide confidence that the proposed methodology will lead to the inclusion of ITAAC that are of high safety significance. We concur with the staff's ITAAC closure verification process which uses a sample-based inspection program as described in SECY-07-0047.

Sincerely,



William J. Shack
Chairman

References:

1. Memorandum dated May 16, 2007, from Annette L. Vietti-Cook, Secretary, NRC, to Luis A. Reyes, Executive Director for Operations, NRC, Subject: "Staff Requirements — SECY-07-0047 — Staff Approach to Verifying the Closure of Inspections, Tests, Analyses, and Acceptance Criteria Through a Sample-Based Inspection Program."
2. SECY-07-0047 dated March 8, 2007, "Staff Approach to Verifying the Closure of Inspections, Tests, Analyses, and Acceptance Criteria Through a Sample-Based Inspection Program."
3. Letter dated December 12, 2003, from Mario V. Bonaca, Chairman, ACRS to Dr. William D. Travers, Executive Director for Operations, NRC, Subject: "Draft 10 CFR Part 52 Construction Inspection Program Framework Document."
4. Memorandum dated May 22, 2006, from Michael J. Case, Director, Division of Inspection and Regional Support, NRR to John T. Larkins, Executive Director, ACRS, Subject: "Sampling of Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) During Construction Inspections."
5. Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants.

References:

1. Memorandum dated May 16, 2007, from Annette L. Vietti-Cook, Secretary, NRC, to Luis A. Reyes, Executive Director for Operations, NRC, Subject: "Staff Requirements — SECY-07-0047 — Staff Approach to Verifying the Closure of Inspections, Tests, Analyses, and Acceptance Criteria Through a Sample-Based Inspection Program."
2. SECY-07-0047 dated March 8, 2007, "Staff Approach to Verifying the Closure of Inspections, Tests, Analyses, and Acceptance Criteria Through a Sample-Based Inspection Program."
3. Letter dated December 12, 2003, from Mario V. Bonaca, Chairman, ACRS to Dr. William D. Travers, Executive Director for Operations, NRC, Subject: "Draft 10 CFR Part 52 Construction Inspection Program Framework Document."
4. Memorandum dated May 22, 2006, from Michael J. Case, Director, Division of Inspection and Regional Support, NRR to John T. Larkins, Executive Director, ACRS, Subject: "Sampling of Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) During Construction Inspections."
5. Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants.

DOCUMENT NAME: G:\ACRS\LTRS\544\544 - SRM Response ITAAC Inspections Final Draft.doc

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure
"E" = Copy with attachment/enclosure "N" = No copy
* See previous concurrence

Accession #: ML071980063

OFFICE	ACRS	E	ACRS	E	ACRS/SUNSI	ACRS/ACNW	ACRS	
NAME	DFischer		CSantos		JFlack	FGillespie	WJShack	
DATE	07/23/07*		07/23/07*		07/23/07*	07 / /07	07 / /07	

OFFICIAL RECORD COPY