

ATTACHMENT 65001.D

INSPECTION OF THE ITAAC-RELATED OPERATIONAL TESTING PROGRAM

PROGRAM APPLICABILITY: 2503

65001.D-01 INSPECTION OBJECTIVES

01.01 To provide guidance for inspection of **all types** of operational testing at a new nuclear power plant licensed under 10 CFR 52 to accomplish Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) as required by the facility license.

01.02 To ensure that the testing is technically adequate, consistent with regulatory requirements, and licensee commitments.

65001.D-02 INSPECTION REQUIREMENTS

Operational testing **involves testing activities to verify operational performance of structures, systems and components (SSCs) prior to fuel load, and includes** pre-operational testing activities. The NRC inspection plan for operational testing will select a representative sample of tests for evaluation. This evaluation process will include the performance of detailed procedure review, test witnessing, and test results review. Additionally, it is anticipated that some operational tests will be used to accomplish ITAAC. The inspector must review the NRC approved Design Control Document (DCD) pertaining to the specific plant being inspected to determine which ITAAC are accomplished by operational testing.

02.01 Procedure review.

- a. Obtain a current revision of the selected test procedure(s) and associated documentation (e.g., **calculations**, diagrams, drawings, calibration records, etc.) in sufficient time to allow a procedure review to be completed prior to the date scheduled for the test. Review the procedure(s) for technical adequacy and completeness. **Notify the licensee of all test deficiencies in a timely manner.**
- b. Review the **current licensing basis, such as the** DCD, FSAR, SER, Technical Specifications, docketed correspondence, and facility license. Verify that the test procedure adequately addresses licensee commitments and NRC requirements relating to ITAAC.
- c. Review the test procedure(s) in accordance with the guidance provided in Attachment A of this procedure. The review should **ensure** that important equipment performance attributes are adequately confirmed by the operational test program. The focus of this review should be on the technical adequacy of the test to accomplish the ITAAC rather than the format of the document.

02.02 Test Witnessing.

- a. The inspector shall review the following attributes for each of the tests selected for witnessing:
 1. Before witnessing a test, the inspector shall have completed a content review of the test procedure. The inspector must be familiar with the test procedure in order to adequately witness the testing described in the procedure. Communication must be maintained between the inspector and the licensee so that the licensee's test dates are known far enough in advance for the inspector to be ready to witness the selected tests. The inspector should determine the current procedure revision by examining the licensee's document control system. Confirm that a current revision of a technically adequate procedure is available at the test location and in use by test personnel. **Ensure** by observation and discussions that test personnel are using the current procedure revision and are familiar with the procedural requirements, especially the limitations and precautions. **If a pre-test brief is conducted, the inspectors should attend.**
 2. Confirm that test personnel minimum staffing requirements are met. The procedure may **include the responsibilities and qualifications of test personnel.** The inspector should **ensure** that both requirements are met.
 3. All test prerequisites and initial conditions are met and/or those which are waived are reviewed and approved in accordance with current approved administrative procedures. Verification should be performed by the inspector's review of the required records (valve lineup list, instrumentation calibration procedure, system checklist, or signoff item in the test procedure) or by direct observation (monitoring instrumentation indications, valve positions, equipment status, etc. or observation of personnel actions).
 4. **All** measuring and test equipment (M&TE) required by the procedure is calibrated and in service at the time of the test. Test data recording equipment required by procedure is calibrated to a common time base. Test equipment with possibly greater accuracy than installed control instrumentation is normally required for measuring important parameters to demonstrate equipment performance in accordance with design criteria. This M&TE must be properly calibrated within the prescribed time period. If the M&TE was calibrated in the appropriate time period, it does not normally need to be recalibrated each time that piece of equipment is used.
 5. **Confirm that the testing personnel have the required level of training necessary to conduct the test.** Pretest briefings are conducted and appropriate shift turnover is performed to ensure continuity in ongoing test activities. Test personnel actions and coordination activities are adequately performed. Specifically, coordination can be an important aspect of a test if several personnel are involved in performing procedural steps. Many of these steps may involve coordinated activities between two or more personnel.

The inspector should confirm through observation that the assigned individual directing the test activities is knowledgeable and that time sequencing, when required, is performed appropriately. On a sampling basis, the inspector should verify adherence to the procedural limitations and precautions, and the individual test steps.

6. Review the Test Engineers Log (or equivalent), the Control Room Log, and the Shift Supervisor's Log, as applicable. Test anomalies, problems, interruptions, and/or deficiencies should be recorded in the logs and reviewed for inclusion in the licensee's corrective action program.
7. Cognizant test personnel should perform a preliminary review of test results to determine that the observed test results meet the established acceptance criteria and that the test does not need to be repeated. The acceptance criteria shall be clearly stated in the test procedure. If practicable, verify by direct observation that overall test acceptance criteria have been satisfied. Review the preliminary test results to ensure that the licensee's initial test evaluation is consistent with inspector observations. The inspector should also, independent from the licensee evaluation, observe and evaluate certain critical events or data gathering during and following testing activities. These events or data gathering activities should be selected during the inspector's preparatory review of the procedure.
8. For inspection of reactor internals testing, the Standard Review Plan calls for a test program to demonstrate the design adequacy of the reactor internals to withstand the effects of flow-induced vibration. This consists of verifying the applicant's vibration test measurement and inspection results meet the acceptance criteria for flow-induced vibration. First determine the test measurement and verification scope for the prototype or non-prototype reactor internals is in accordance with Regulatory Guide (RG) 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals during Preoperational and Initial Startup Testing" guidance. According to RG 1.20, the verification of the prototype reactor internals to withstand flow-induced vibration consists of vibration measurement and inspection; while the verification of non-prototype reactor internals relies only on measurement or inspection. Given this option in RG 1.20, most applicants for non-prototype reactor internals have chosen to perform only inspection. For the ITAAC related to inspection, review the inspection results to determine that the internals have no damage or loose parts after the flow test. It would be best to be on site for the inspections to verify first hand that there is no damage or loose parts.

02.03 Test Results Review.

- a. The inspector should evaluate the following attributes for each test selected for results review. Two alternate levels of inspection are provided in this procedure for test results review:

The first level involves **NRC detailed review** of test results: For the tests for which the inspection plan requires **evaluation detailed review** of test results, complete steps 1 - 5 below in their entirety.

The second level involves Verification of Licensee Evaluation of Tests Results: For the remainder of the tests the inspection plan only requires verification that the licensee has successfully evaluated the test results, and only steps 4 and 5 below need to be completed.

1. Following test completion, test data packages are assembled by licensees. Review the "as-run" copy of the test procedure. Verify that individual test steps and data sheets have been properly initialed and dated. Verify that data sheets have been completed. Verify that all data is recorded where required and is within acceptance tolerances. Verify that test deficiencies and test procedure changes are properly identified in accordance with established administrative procedures.
2. Review all test changes made during the performance of the test, including testing deletions. Verify that each was approved in accordance with the pertinent administrative procedures. Verify that the procedure is annotated to identify test changes. Verify that none of the changes have altered the basic objectives of the test.
3. Review all test anomalies and deficiencies. Verify that these conditions have been documented, resolved, that the resolution has been accepted by appropriate management, and that retest requirements, if any, have been completed. Verify that **all** system performance problems identified by a test deficiency have been properly documented and reviewed. Verify that **all** deficiencies which constitute a reportable occurrence as defined in 10CFR 50.55e **and/or** 10CFR50 Part 21 have been properly reported.
4. Review the licensee's test summary and results evaluation. The inspector should apply independent technical analysis and judgment to **ensure** that the licensee's evaluation of test results has been performed correctly. Verify that those personnel, responsible for review and acceptance of test results, have documented their review and acceptance of the data package and the results evaluation. Verify that the licensee's engineering staff has evaluated the test results and concluded that the testing demonstrated that the equipment met design requirements. Verify that the evaluation, specifically, compared test results with established acceptance criteria.
5. Verify that the Test Review Committee or equivalent group has examined the results in accordance with established administrative requirements. Verify that the Quality Assurance group or other independent review of test results has been accomplished as prescribed in the FSAR or other licensee commitments.

- b. For the ITAAC related to the reactor internals flow-induced vibration test for the prototype, verify that the test measurements of the reactor internals components meet the vibration acceptance criteria stated in the reactor internals comprehensive vibration assessment program and the ASME Code Section III high cycle fatigue stress limit. The scope of the ITAAC differs depending on the reactor technology. For a PWR, the vibration measurement and verification can be performed prior to fuel load. For a BWR, the ITAAC scope is limited to parts of the vibration measurement and verification scope (e.g., lower internals) that can be performed before fuel load. For example, for BWRs, the measurement and verification of the steam dryer can only be performed after fuel load because steam is needed for the test, hence ITAAC does not apply. Natural circulation design can also affect the timing of this test, requiring all reactor internals testing be delayed until after fuel load.

02.04 Quality Assurance Program (Problem Identification and Resolution). Evaluate the adequacy of the implementation of the specific quality assurance program requirements related to operational testing. Confirm that problems identified associated with operational testing are entered into the licensee's corrective action program in accordance with program requirements. The inspector may review licensee actions to address similar or related problems that were previously identified, in order to check the extent of condition and confirm the effectiveness of the licensee's corrective measures.

Guidance. This inspection is to **ensure** that problems are entered into the applicable process to **ensure** corrective actions appropriate to the circumstances, are developed and prioritized. Inspections of Quality Assurance Program implementation, effectiveness of Problem Identification and Resolution, and Self-Assessment will be performed under the MC 2504 process.

65001.D-03 RESOURCE ESTIMATE

This procedure will be repeated over the period of time when operational testing is in process. Therefore no meaningful resource estimate can be made for this procedure.

65001.D-04 REFERENCES

Facility Final Safety Analysis Report (FSAR) and Design Control Document (DCD)

| IMC 2503, Appendix B, **The** ITAAC Matrix

| IP 65001, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Matrix Inspections

| IP 35007, **Assurance Program Implementation During Construction and Pre-Construction Activities**

END

Appendix A:
Procedure Review Guidance

Attachment:
Revision History

APPENDIX A

PROCEDURE REVIEW GUIDANCE

Each procedure should be reviewed for the following attributes:

- a. Appropriate licensee staff and management approval is indicated on the document.
- b. Test objectives are clearly stated. Verify that **all** related FSAR commitments are included. **Ensure that the latest codes and standards, etc. are referenced where applicable.**
- c. **All** required testing prerequisites are identified, e.g.:
 1. Required plant systems availability is specified.
 2. Any associated facility procedures are specified.
 3. Prior completion of calibration checks, limit switch setting, protective device settings, etc. are included where applicable.
 4. **All** special supplies and test equipment needs are specified.
 5. Special environmental conditions and hold times, if any, are identified.
 6. Test precautions and limitations are specified.
 7. **If computer software is involved in the testing, inspectors should confirm that the software has received the appropriate validation and verification.**
- d. Test acceptance criteria clearly identified and the procedure requires comparison of results with acceptance criteria. The source of the acceptance criteria is also identified e.g., ITAAC, FSAR, technical specifications, facility license, etc.
- e. Initial test conditions are specified.
 1. Valve lineups.
 2. Electrical power and control requirements.
 3. **All** temporary installations or equipment modifications (instrumentation, electrical, and piping).
 4. **All** necessary special conditions e.g. temperatures, pressures, flows, water chemistry, etc.

- f. The procedure includes a section listing references to appropriate ITAAC, FSAR sections, technical specifications, drawings, design specifications, industry codes, and other requirements.
- g. Step-by-step instructions for the performance of the procedure, including hold points if needed, are included to the extent necessary to ensure that the test is performed correctly and the test objectives are met.
- h. Blank spaces are provided for initialing that all items, including prerequisites, are verified as having been performed.
- i. Provisions are made for recording details of the conduct of the test, including **all** test anomalies or observed deficiencies, their resolution, and **all** necessary retesting.
- j. Procedure requires that **all** temporary connections, blind flanges, disconnections or jumpers be restored to normal at the end of the test, or references their control by another procedure.
- k. Procedure provides for the identification of both personnel conducting the testing and those evaluating the test data. Provision is made for the evaluator to document acceptability of the data.
- l. Procedure provides for quality control or quality assurance verification of critical steps or test parameters.
- m. **All** special precautions for personnel and equipment safety are specified.
- n. Expected performance of **all** automatic functions or controls, e.g. response to step and ramp control changes, is specified.

END

Attachment 1 - Revision History for IP 65001.D

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number
N/A	08/05/09 CN 09-019	Initial issuance to support ITAAC related inspections under 10 CFR 52. Researched commitments for four years and found none.	N/A	N/A
	ML14083A387 05/09/14 CN 14-011	Periodic update. Researched commitments for four years and found none.	N/A	ML14083A388