

# NRC INSPECTION MANUAL

---

## INSPECTION PROCEDURE 70324

---

### PREOPERATIONAL TEST RESULTS EVALUATION - INTEGRATED HOT FUNCTIONAL TEST

#### PROGRAM APPLICABILITY:

#### 70324-01 INSPECTION OBJECTIVES

01.01 Assure that the licensee is performing an adequate evaluation of test results.

01.02 Assure that all test data are either within previously established acceptance criteria, or that deviations are properly dispositioned.

01.03 Evaluate the adequacy of the licensee's methods for correcting deficiencies and for retesting if necessary.

01.04 Evaluate the adequacy of the licensee's administrative practices in maintaining proper test discipline concerning test execution, test alteration, and test records.

01.05 Verify that the licensee is following his procedures for review, evaluation, and acceptance of test results.

#### 70324-02 PROGRAM INSPECTION REQUIREMENTS

The inspector shall:

02.01 Review and evaluate approximately 10% of the hot functional test data and the licensee's review and evaluation to determine the testing was adequate and systems functioned as designed. The following should be included in the review:

- a. Verify that items listed in paragraph two were as stated in the procedures, that the conditions or testing requirements were met and that problem areas were investigated and adequate corrective action taken.
- b. Complete paragraph 3.

#### 02.02 Procedural Requirements

- a. All related procedures (operating, administrative, etc.) were approved.

- b. The cold functional testing program results were evaluated and adequate corrective action was taken, as necessary. Variations made to conduct the cold functional testing have been reset or returned to normal.
- c. The integrated hot functional testing procedure was the "controlling" document for testing performed.
- d. The procedure had provisions to document satisfactory completion of the various steps and sequence that were accomplished. Each test was evaluated and demonstrated to be satisfactory before proceeding to the next point.
- e. Initial conditions were indicated as having been met.
- f. Water quality criteria were indicated as satisfied.
- g. Test criteria
  - (1) The criteria for startup and test procedures were satisfied.
  - (2) The criteria for functional tests were met.
- h. The required checks were performed as listed.
- i. An inspection of piping hangers and a check for leakage was satisfactory.
- j. Integrated systems operation at low power (minimum sustaining power level) was indicated as performed.
  - (1) Normal plant routines
  - (2) Plant operated at lowest practicable power level.
  - (3) Demonstration that all staff personnel and shifts functioned as planned.
  - (4) Equipment performance was normal.
  - (5) Review and evaluation of test and system results verified that plant was operating, as required prior to power level increase to next test plateau.
- k. RHR system demonstrated the performance and capacity requirements.
- l. The following reactor shutdown capabilities were checked and results documented:
  - (1) RHR system operation
  - (2) Pressure regulatory control maintained the cooldown rate at specified value.
  - (3) Feedwater control system maintained water level within specified limits.
  - (4) The rod worth minimizer adequately monitored rod positions.
- m. At each plateau, all safety-related equipment and the applicable procedures were checked out by comparison with cold functional testing results, surveillance tests, startup testing and hot functional testing.
- n. Errors in operating procedures were corrected per approved administrative procedure.

02.03 Complete the standard evaluation of licensee's review and evaluation of test results using the method of procedure 70400.

#### 70324-03 PROGRAM INSPECTION GUIDANCE

- 2.a. All related procedures for testing, administrative control, and other items of safety significance should be completed, evaluated and approved by the licensee. The inspector should have completed review requirements listed in applicable portions of Regulatory Guides and instructions. Testing is basically of two types - Startup Tests and Specific Plant Operations.
- 2.b. The cold functional testing should have been evaluated, approved and appropriate action taken to assure that altered systems or identified deficiencies are corrected or returned to normal.
- 2.d. Each test listed in the HFT Program must be evaluated and found acceptable prior to proceeding to the next power level or major change in plant operating parameters. The licensee may alter the time sequence of tests to be conducted under the same operating conditions, if no affects to the individual tests can occur.
- 2.e. This will be the first time many plant systems are exposed to operating conditions. The performance of the systems and the adequacy of the operating procedures should be verified as soon as possible. This is the primary purpose of the HFT program.
- 2.f. Water quality must be maintained. Determine that sampling, systems and water analyses maintain water quality within specified limits.
- 2.g. Startup procedures should contain clearly defined criteria in each procedure.

Functional test procedures generally demonstrate by successful completion and adequate operation that the criteria is met. Since a judgment factor is the major method of acceptance, assure that the equipment, etc., operated within acceptable limits and that good judgement was used in accepting the test as satisfactory.

- 2.h. The systems that have not changed during the ascension from ambient temperature and pressure to rated temperature and pressure may not require additional checks. The operations and tests to be performed during initial nuclear heatup to rated temperature and pressure, with appropriate references and description and summary should be listed. Examples are:
  - (a) Operational hydrostatic test
  - (b) Pre-startup check list completion
  - (c) Nuclear and other safety related calibration
  - (d) Systems inspection (visual and instrumentation)
  - (e) Equipment startup and operation
  - (f) Safeguards operation
  - (g) Pump and motor or turbine operation

- 2.i. Completion of Procedure 70370 satisfies this requirement.
- 2.j. Minimum sustaining power level is normally about 7% of full power. Determine that maximum allowable heatup rate was not exceeded. Determine that adequate checking and comparisons were made at each established power level (examples: Ambient, 100°F, 250°F, etc.) The maximum amount of operator training should be conducted during the HFT program (examples: Each shift should have several opportunities to bring the plant to critical, operating safety related equipment, starting and placing the turbine in service, etc.) Licensee evaluation should determine that each system and all systems performance was adequate. Proper management concurrence should be required prior to raising the power level to the next test plateau.
- 2.k. It is not necessary to include a planned cooldown in the test program. It is expected that during the first cooldown of the reactor and the primary system, the performance and capacity of the RHR system operating in the shutdown mode should be verified. It is of significance that the decay heat generation rate will be almost nil during this period in plant life.
- 2.l.(2) The pressure regulator control should maintain the reactor cooldown within the specified limit (normally less than 100°F).

General: Lines containing fluid must be protected from freezing.

END