

# NRC INSPECTION MANUAL

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## MANUAL CHAPTER 2514

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### LIGHT WATER REACTOR INSPECTION PROGRAM STARTUP TESTING PHASE

#### 2514-01 PURPOSE

The purpose of startup testing phase inspection activities is to verify that the licensee is meeting the requirements and conditions of the facility license for precritical tests, initial fuel loading, initial criticality, low-power testing, and power ascension tests. This verification is to be achieved through reviewing procedures and records, direct observation, witnessing tests, reviewing test data, and evaluating test results.

#### 2514-02 APPLICABILITY

This phase of the inspection program becomes effective approximately 6 months before issuance of the operating license and continues approximately 1 month after the facility completes the full-power testing program and all results have been reviewed and accepted. This inspection effort will overlap inspection activities directed towards the plant operating activities (MC 2515) and preoperational test and operational preparedness activities (MC 2513).

#### 2514-03 DEFINITIONS

The following definitions are used in this program description:

03.01 Startup Testing. That testing conducted following issuance of the operating license. It starts with initial fuel loading and precritical tests, and continues until the plant reaches commercial operating status at or near its licensed power rating. This testing is normally performed by the operating staff, usually under the technical guidance of the NSSS and AE startup test organization.

03.02 Power Ascension Test. A portion of the startup testing program performed following low-power testing which involves testing and data recording at increasing reactor power levels, temperatures, pressures, and flows.

03.03      Startup Testing Group. A division of the startup test procedures into two groups, A and B, to facilitate the inspection effort and to increase its uniformity (see Table II).

## 2514-04 RESPONSIBILITIES AND AUTHORITIES

04.01 Director, Appropriate Regional Office Division. Overall administration and implementation of the inspection program outlined in this chapter for power reactors within regional boundaries.

04.02 Chief, Appropriate Branch (Regional Office). Administration and implementation of the inspection program outlined in this chapter for power reactors assigned.

04.03 Section Chiefs (Regional Office). Administration and implementation of the inspection program outlined in this chapter for power reactors assigned.

## 2514-05 DISCUSSION

The bases for the licensee's startup testing program are contained in Regulatory Guide 1.68, Initial Test Programs for Water-Cooled Nuclear Power Plants. Chapter 14 of the Final Safety Analysis Report (FSAR) and the Safety Evaluation Report (SER) contain the specifics of the licensee's approved program for startup testing. The series of tests to be performed can be arranged as follows:

- a. Initial Fuel Loading and Precritical Tests
- b. Initial Criticality
- c. Low Power Tests
- d. Power Ascension Tests

The startup testing phase inspection program examines tests from each of these areas.

Appendix A lists all the inspection procedures applicable to the startup test program. Specific facility plans should be prepared for the facility being inspected to accommodate the planned test program, the unique organizational and administrative features, and current regulatory requirements. Startup testing inspection requirements for dual or twin facilities would not normally be reduced because of the typical time lag between the two plants. In dual plant startup testing cases, the inspector must ensure that testing procedures take proper cognizance of the lead facility and its status.

## 2514-06 STARTUP TESTING INSPECTION PROGRAM

The bulk of the Startup Testing Phase Inspection Program is accomplished by three types of inspections: (1) test procedure review; (2) test witnessing; and (3) test data evaluation. The degree of inspection coverage for each inspection type is a function of the system(s) being tested. Table I describes four system test categories (Category I, II, III, & IV) and inspection requirements associated with each category. Table II lists the Category I tests

for both BWRs and PWRs. The tests are split into two groups, Group A and B.

For Category I tests, all three types of inspections (test procedure review, witnessing, and data evaluation) must be accomplished for either Group A or for Group B, Category I tests (Table II). For power ascension plateau testing, certain test data will also be required to be evaluated at selected startup test plateaus. The region has the option of selecting Group A or Group B, Category I tests. With approval of the Regional Administrator, the region has the discretion to substitute some Group A tests with Group B tests and vice versa. The remaining Category I tests must be verified to have been performed under approved procedures and a determination should be made that the evaluation by the licensee indicates satisfactory test results.

For Category II tests, the results of test data should be evaluated for 50% of the tests (IP 72301). For the remaining Category II tests, ascertain that approved procedures exist and make a determination that the evaluation by the licensee indicates satisfactory test results.

For Category III tests, ascertain that approved procedures exist and that evaluations made by the licensee indicate satisfactory test results. No inspection activities are required for Category IV tests.

Certain procedures included in this phase of the inspection program cannot by their nature be completed during a single inspection. Activities such as review of procedures and manuals may also be conducted over a relatively long time period. For these activities, inspection time will be coded to the procedure reflecting the end product of the inspection; however, the procedures shall not be reported as completed until the final product inspection has been performed. As an example, review of draft test procedures should be coded to the inspection procedure for review of the applicable test procedure; however, it should not be reported as complete until the approved issue of the test procedure has been inspected.

Regulatory Guide 1.68, Revision 2, Appendix B, states that not less than 60 days before initial fuel loading the licensee should have available for NRC regional inspectors' review, copies of the procedures for fuel loading, initial startup testing, and supporting activities. This is to permit sufficient time for review before issuance of the operating license. Failure to meet this 60-day requirement could, in some instances, result in a delay in issuance of the Operating License. In order to ensure that the licensee's final procedure meets regulatory requirements, the inspector may review a draft copy in parallel with the licensee's final review before approval. The possession of such procedures by the inspectors should not impede the review, revision, and refinement of the procedures by the licensee.

Inspectors must keep informed of the expected dates of testing in order to witness the licensee tests. Inspectors are cautioned to be certain that licensees do not interpret requests for notification

of expected tests as "hold points" for the tests. Licensees are not expected to delay conduct of a test until the inspector arrives.

Following issuance of a facility license and completion of initial fuel loading, the power ascension testing program is normally conducted on a preplanned schedule with minimal delays. However, the schedules for conducting power ascension testing programs may be delayed, for various reasons, and the facilities may operate at less than full power levels for extended periods of time. To ensure the safety of operations, licensees must conduct a certain minimum level of testing to demonstrate that safety-related plant systems and equipment meet design objectives of the licensed power levels and are capable of controlling the anticipated transients discussed in the FSAR.

The minimum testing that must be conducted in the event of delays in the power ascension testing schedule at reactor facilities will normally be documented as a license condition. If unanticipated delays occur, this information should be brought to the attention of NRR to determine if licensing action is warranted. In no event shall testing be conducted at power levels greater than that authorized by the facility license.

#### 2514-07 RESIDENT INSPECTION PHILOSOPHY

A Resident Inspector is assigned to each construction site at which construction is more than 15 percent complete. At single-unit construction sites, a second Resident Inspector for operations is assigned at the beginning of preoperational testing. The Resident Inspector for construction activities is normally reassigned elsewhere at some point during startup testing, after the OL has been issued. For multi-unit sites, units under construction have one dedicated Resident Inspector assigned for that function. One or two Resident Inspectors for operations are also assigned, depending on the number of units in operation or in preoperational testing.

Once the operating license is issued, the Resident Inspector is responsible for conduct of inspections required by MC 2515. In addition, the Resident Inspector will likely be called upon to do inspections described herein. It should be recognized that many of the inspections required by the start-up testing inspection program also satisfy routine inspection requirements in MC 2515. As an example, witnessing of a test would likely include most of the elements of the operating reactor inspection program requirement for control room and plant tours (IP 71707). For reporting purposes, if an inspection is being done that covers MC 2514 and MC 2515 activities, the time should be reported with the appropriate MC 2514 inspection procedure.

The Resident Inspector provides the major onsite NRC presence for direct observation and verification of a licensee's activities. The Resident Inspectors are also the primary onsite evaluators for the NRC inspection effort stemming from events or incidents. It is expected that the greater part of initial event-related inspection effort will be performed by the Resident Inspector (who may be

supplemented by other inspectors depending on the type of event). Regional managers will decide when normal inspection activities will be resumed by those involved with inspecting the event.

The operating reactor inspection program provides for 20 percent independent inspection for Resident Inspectors. Because of the increased level of activities during start-up testing and increased inspection requirements placed on the Resident Inspector during this time, it may be difficult to attain this goal during the startup testing phase.

This inspection program prescribes inspection activities likely to be performed on backshifts or weekends each week. Backshift and weekend inspections will be performed by both the Senior Resident Inspector and Resident Inspector. The goal during the operating reactor inspection program for backshift and weekend inspection activities is 10 percent of an inspector's normal work week, averaged over a year. It is expected that this effort will include normal inspector coverage of items in the program (e.g., test witnessing) as well as those specifically designated for the backshifts. During startup testing it is anticipated that normal inspector coverage of items required by the startup testing inspection program will fulfill this goal.

#### 2514-08 REGIONAL INSPECTION PHILOSOPHY

Region-based inspectors will conduct inspection procedures as directed by their supervisors. Region-based inspectors often will be involved in inspection activities of a more specialized nature than those inspection activities performed by the Resident Inspectors. Certain aspects of their inspection activity (i.e., portions of procedure review) may be conducted in the regional office.

The region-based inspector may also conduct independent inspection activities. There is no stated goal for region-based inspections on backshift or for independent inspection. However, backshift inspection will be performed whenever required to complete the inspection.

The Senior Resident Inspector must be kept apprised of region-based inspector activities at the facility. The appropriate Section Chief shall ensure coordination of regional inspection activities and keep the Senior Resident Inspector informed.

Region-based inspectors should contact the Senior Resident Inspector before a planned inspection to obtain information concerning the availability of specific licensee personnel and the status of plant conditions which may affect the planned inspection. In addition, region-based inspectors shall make contact with the Senior Resident Inspector as soon as is convenient after their arrival at the site to ensure a coordinated NRC presence at the facility. They should advise the Senior Resident Inspector of changes to their planned inspection effort and schedule for the licensee exit interview. The Senior Resident Inspector will inform the region-based inspectors of any unique activities in progress and the region-based inspectors

will brief the Senior Resident Inspectors about the results of their inspection before the exit interview with licensee management. The Senior Resident Inspector should attend all exit meetings at which significant enforcement action or other significant unresolved issues are expected to be discussed.

#### 2514-09 OPERATIONAL READINESS ASSESSMENT TEAM INSPECTIONS

The conduct of Operational Readiness Assessments Team Inspections (IP 93806) is required before issuance of the low-power license and before issuance of the full-power license or during power escalation. The inspection schedule and scope of these inspections is to be tailored to the individual plant circumstances.

The purpose of this inspection effort is to focus on the effectiveness of management oversight, corrective action programs, root cause analysis, and the readiness to support operations. Results from these inspections will provide a major input and basis for an NRC determination of startup readiness.

#### 2514-10 GENERAL GUIDANCE

Although each inspection procedure contains many line items, the individual inspector is expected to apply professional judgement regarding the need for completing each specific line item in order to make a decision that the objectives of the inspection procedure have been met. The inspector may have knowledge that a basic line item requirement has been satisfied via some other source (i.e., independent inspection effort or temporary instruction followup). In such cases the inspector should not perform the requirements of that specific line item. In summary, the line items in Section 02 of inspection procedures list the attributes which should be considered when evaluating the area covered by the inspection procedure.

NRC inspectors perform a basic mission in determining that a licensee operates the plant in a safe manner and meets current regulatory requirements and commitments. Because the number of inspectors is limited and the inspection program covers only a very small sample of licensee activities, it is important that the inspector verify that the licensee is addressing the root cause of identified problems rather than just the correction of symptoms. Thus the inspector should verify that the licensee has a program that evaluates whether or not a noncompliance or a deficiency represents an isolated case or whether it may signify a broader more serious problem in that area. To provide the perspective to perform this evaluation of the licensee's performance, the inspector should:

- a. Keep currently informed of deficiencies, audit findings, and plant problems identified by the licensee's own organization.
- b. Ascertain whether additional personal inspection effort is merited in the area under consideration.

Where the evidence indicates that an uncorrected problem may exist, Regional action should be employed to require the licensee to demonstrate to the NRC that it has not lost control of that area. Regional supervision should be consulted whenever enforcement action appears appropriate to the individual inspector.

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