



U.S. NUCLEAR REGULATORY COMMISSION  
**STANDARD REVIEW PLAN**  
 OFFICE OF NUCLEAR REACTOR REGULATION

SECTION 14.1

INITIAL PLANT TEST PROGRAMS - PSAR

REVIEW RESPONSIBILITIES

Primary - Quality Assurance Branch (QAB)

Secondary - None

I. AREAS OF REVIEW

The QAB reviews the following areas, relating to initial plant test programs, described in Chapter 14 of the preliminary safety analysis report (PSAR) submitted by the applicant as part of his construction permit (CP) application:

1. Scope of Test Program

The initial plant test program is normally divided into four major phases: preoperational tests; initial fuel loading and precritical tests; low power tests; and power ascension tests. The following descriptive information provided for each phase is reviewed: (1) the definition of each phase; (2) the general testing objectives for each phase and the general prerequisites to be completed before each phase is begun; (3) the extent to which the test program will be used to verify the adequacy of construction and design of both the nuclear portion of the facility and the balance-of-plant; (4) the organizations, including those of the applicant, nuclear steam system (NSS) supplier, and architect-engineer, that will participate in the development and execution of the test program along with the general responsibilities of these organizations; (5) the applicant's planned involvement in the development and approval of test procedures, conduct of the tests, and review and approval of test results; and (6) the extent that the applicant will use his NSS supplier, architect-engineer, his own engineering units, or other system designers to provide scoping documents containing testing objectives and acceptance criteria for use in developing detailed test procedures.

2. Plant Design Features That are Special, Unique, or First-of-a-Kind

The applicant's description of the preoperational and startup tests planned for principal plant design features that are special, unique, or first-of-a-kind is reviewed. The applicant's plans relative to special prototype or in-plant functional testing requirements for such features are reviewed to establish the extent that such test requirements will verify design performance objectives.

3. Regulatory Guides and Industry Standards

The applicant's plans for utilizing applicable regulatory guides and industry standards in the development of his test program are reviewed. The extent to which the applicant

---

**USNRC STANDARD REVIEW PLAN**

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to Revision 2 of the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20545.

---

9511020246 751124  
 PDR NUREG  
 75/087 R PDR

11/24/75

intends to conform to the general recommendations of Regulatory Guide 1.68, "Preoperational and Initial Startup Test Programs for Water-Cooled Power Reactors," in the development of his test program is reviewed. Exception to Regulatory Guide 1.68 are reviewed on a case-by-case basis, considering the justification provided.

4. Utilization of Plant Operating and Testing Experience at Other Reactor Facilities  
The applicant's plans relative to the review and evaluation of plant operating experiences at other reactor facilities and his plans appropriately to factor the results of this study into his test program are reviewed. The applicant's schedule for conducting such studies, the organizational units that will conduct the studies, and the scope of the study are reviewed.
5. Test Program Schedule  
The applicant's schedule for developing and conducting the different phases of the test program is reviewed and is compared with the expected fuel loading date to determine if adequate time has been allotted to develop and conduct a comprehensive test program. The schedule is examined to determine the availability of the plant operating and technical staff to participate in the test program and to determine if interference exists with the schedules for hiring or training of the plant operating and technical staff. The schedule is also examined to establish the availability of plant operating and emergency procedures that will be use-tested during the test program.
6. Trial Use of Plant Operating and Emergency Procedures  
The applicant's plans for trial use of plant operating and emergency procedures during the test program is reviewed to determine the extent such procedures will be trial tested.
7. Augmenting of the Applicant's Staff During the Test Program  
The descriptive information pertaining to the applicant's plans for augmenting his staff during the development and conduct of each phase of the test program is reviewed considering the prior nuclear experience of the applicant's staff and the degree of planned augmentation. The schedule for providing augmenting personnel is also reviewed.

## II. ACCEPTANCE CRITERIA

The acceptance criteria for the areas of review described above are as follows:

1. Scope of Test Program  
The primary objectives of the review of information on the scope of test programs in the PSAR are to assure that the applicant recognizes the need to develop and conduct comprehensive test programs and that the applicant has performed the necessary early planning for successful achievement of these goals. Particular criteria that should be satisfied are as follows:

- a. The description of the test program should identify and define the major phases of preoperational testing, fuel loading and precritical testing, low power testing, and power ascension testing. The definitions provided should be consistent with those included in Regulatory Guide 1.68 or justification provided for exceptions.
  - b. The applicant's stated test program objectives should provide assurance that the adequacy of construction, as well as design, will be verified for safety-related structures, systems, and components.
  - c. The applicant should designate the responsible organizations that will participate in the test program and there should be reasonable assurance that such designated organizations can collectively provide the necessary skills and experience to develop and conduct the test program.
  - d. The applicant should plan to utilize the plant operating and technical staff in the development and conduct of the test program and in the review of test results.
  - e. The applicant should establish plans for the designers of structures, systems, and components, which may include the NSS supplier, architect-engineer, or other design groups, to provide test objectives and acceptance criteria to be used in the development of detailed test procedures.
  - f. The applicant's program should provide assurance that construction of structures, systems and components will be essentially complete prior to beginning pre-operational testing.
  - g. The applicant's program should provide assurance that construction tests and inspections will be essentially completed before preoperational testing is begun. Such testing or inspection may include system flushing and cleaning, wiring checks, leak tightness tests, initial calibration of instrumentation, and subsystem and component functional tests.
  - h. The applicant should describe the administrative controls to assure that preoperational test prerequisites will be satisfied.
2. Plant Design Features That Are Special, Unique, or First-of-a-Kind
    - a. The applicant should identify all principal safety-related plant design features or systems that are special, unique, or first-of-a-kind.
    - b. The applicant's description of planned tests should establish that such design features and systems will be functionally tested to demonstrate performance requirements.
3. Regulatory Guides and Industry Standards

The applicant should commit to following the guidelines of Regulatory Guide 1.68 in developing his test program or should justify any exceptions. Exceptions to these guidelines will require evaluation on a case-by-case basis. The applicant should also commit to reviewing other regulatory guides at the time the detailed test procedures are being developed to establish which guides have applicability to his test program.

4. Utilization of Plant Operating and Testing Experiences at Other Reactor Facilities  
The applicant should plan to conduct a study of reactor operating experiences and to factor the results into his test programs as appropriate. The schedule for conducting the study should be consistent with the schedule for development of the detailed test procedures.
5. Test Program Schedule
  - a. The applicant should provide a schedule, relative to the expected fuel loading date, for the beginning and end of each major phase of the test program. The schedule for conducting preoperational testing should provide for at least nine months of actual testing.
  - b. The preoperational testing phase should be scheduled such that most of the plant operating and technical staff can participate in the development, conduct, and review of test results. The hiring and training schedules for these personnel, as presented in Chapter 13 of the PSAR, must be compatible with the preoperational testing schedule. In general, the schedule for hiring and training of such personnel should be completed at least one year prior to the expected fuel loading date.
  - c. The schedule for development of plant operating and emergency procedures should establish that they will be available for trial use during the test program.
6. Trial Use of Plant Operating and Emergency Procedures  
The applicant's plans and commitments in this area should establish that plant operating and emergency procedures will be tested, to the extent practical, during the test program.
7. Augmenting of the Applicant's Staff During the Test Program
  - a. The applicant should plan to augment the plant staff throughout the entire test program.
  - b. The organizations designated by the applicant to be utilized to augment the plant staff should have applicable previous nuclear power plant testing or operating experience.

### III. REVIEW PROCEDURES

Preparations for the review of Chapter 14 of the PSAR should include familiarization with the applicant's commitments in Chapter 13 pertaining to organization and staffing, plant procedures, and training, and commitments in Chapter 17 pertaining to transfer of plant structures, systems, and components from the vendor or constructors to the applicant when construction or installation is completed. The reviewer should also be familiar with the contents of Regulatory Guide 1.68 and ANSI N18.7-1972. Although the specific tests discussed in Regulatory Guide 1.68 are applicable to water-cooled power reactors, the general test program requirements contained therein should be applicable to test programs for gas-cooled power reactors and can be used as a basis for evaluation of such programs.

The review consists of an analysis of the information submitted in Chapter 14 of the PSAR and a detailed comparison with each of the acceptance criteria contained in II above. Coordination of the review with the assigned reviewer in the Operator Licensing Branch may be necessary for items 5, 6, and 7 listed in I above. Coordination of the review with the assigned licensing project manager may be necessary for item 2 listed in I above.

When the reviewer has determined that each of the acceptance criteria listed in II above has been satisfied, based upon the information presented in the PSAR, the review is complete. Any unjustified deviations from the acceptance criteria should be identified and this information transmitted to the assigned project manager for resolution with the applicant.

#### IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information has been presented in the PSAR to support conclusions of the following type, to be included in the staff's safety evaluation report:

"The applicant has committed to conduct a comprehensive initial test program for the facility. The program described by the applicant is considered to be acceptable and should, when implemented, provide for further verification of the functional adequacy of the facility."

#### V. REFERENCES

1. ANSI N18.7-1972, "Administrative Controls for Nuclear Power Plants," American National Standards Institute.
2. Regulatory Guide 1.68, "Preoperational and Initial Startup Test Programs for Water-Cooled Power Reactors."

11/24/75



SRP 14-2