

NRC INSPECTION MANUAL

INSPECTION PROCEDURE 72502

INITIAL CRITICALITY PROCEDURE REVIEW (BWR)

PROGRAM APPLICABILITY:

72502-01 INSPECTION OBJECTIVES

Ascertain whether the procedure to be used for the initial approach to criticality is consistent with FSAR commitments, regulatory requirements, regulatory guidance and applicable codes and standards.

72502-02 INSPECTION REQUIREMENTS

02.01 Review the FSAR, technical specifications, and other license provisions and identify specific requirements applicable to the initial approach to criticality.

02.02 Review the format of the procedure to confirm that it contains the following:

- Test Objectives
- Special Precautions and Limiting Conditions
- System Initial Conditions
- Environmental Conditions
- Acceptance Criteria
- Data Collection Provisions
- Step-by-Step Instructions
- Provision for Step Signoff
- Provision for Selective Quality Control
- Verification

02.03 Assure that the procedure has been properly reviewed and approved for use in accordance with technical specifications.

- a. Verify review by the independent review group.
- b. Verify authorized management approval.

02.04 Review the procedure to be used by the licensee to assure that it contains:

- a. Procedural steps to satisfy all items identified in 1 above.

- b. Specific prerequisites to assure that:
 - 1. Nuclear instrumentation calibration meets surveillance requirements.
 - 2. Special non-coincidence trip requirements for IRM and SRM instrumentation have been specified.
 - 3. Acceptable signal-to-noise ratios and the minimum acceptable countrate are specified for the SRM's.
 - 4. A list of systems which are required to be operable is included.
 - 5. Special test instrumentation is identified.
 - 6. Temporary jumpers, lifted leads, etc., will be reviewed for impact.
- c. Personnel and equipment precautions.
- d. Identification of the rod sequence or sequences to be used.
- e. Adequate acceptance criteria including a prediction of the rod pattern at criticality.
- f. References to applicable facility blueprints, FSAR sections, technical specifications, etc.

72502-03 INSPECTION GUIDANCE

03.01 During this review confirm that the test procedure to be used is in agreement with the FSAR test description.

03.02 Provisions of ANSI N 18.7 and Regulatory Guide 1.68 should be used as guidance during format review. The licensee's procedure must consist of a detailed step-by-step procedure. The minimum requirements can be met by having the procedural details either stated in this procedure which is under review or by a specific reference to an existing topical or to an operating procedure provided the title and the paragraph references are explicit, and the referenced procedures have received the same review and approval required of this procedure.

03.03 The proposed technical specifications and FSAR normally define the review and approval requirements for testing performed after issuance of an operating license. This review is normally performed by a test review group consisting of representatives of the NSSS, the A/E, the Constructor, and the plant operations group. In addition, technical specifications may also require on-site or off-site safety committee review. Normally, the Plant Superintendent (or equivalent) will be identified as the authorized management approval.

The inspector should verify that the procedure reflects the above reviews and approvals, and that revisions receive equivalent review

and approval. He should also review the appropriate committee minutes to assure that meaningful reviews were conducted.

03.04 The approved issue of the procedure to be used should be available for review 90 days prior to performance of the test if the licensee has committed to Regulatory Guide 1.68 (cf. Appendix B).

- a. All license requirements are considered applicable during the initial approach to criticality, and should either be specifically identified in the procedure, or specifically referenced, e.g. by reference to technical specifications.

Certain licensees may choose to use other than normal rod sequences, e.g. shutdown margin test, for their initial approach to criticality. The inspector should assure that this test is specifically discussed in the FSAR, and that the FSAR clearly states that the reactor is to be operated in this nonstandard manner for this test. If it is not, the inspector should identify this as a variation to the described program requiring either an FSAR revision, or review by the NRC per 10 CFR 50.59 as an unreviewed safety question.

- b. Prerequisites should be identified in the test procedure, and require individual signoff for control.

The procedure should specifically require verification that all nuclear instrumentation has been properly calibrated and adjusted in accordance with procedural and frequency requirements of the technical specifications. Reduced trip points may be prescribed, and should be verified by instrument trip checks. For BWR's, special non-coincidence trip logic for IRM and SRM systems, and high power RPS trips for the SRM's are provided for this and other low power tests by the physical removal of "shorting links" from the logic wiring. Since this change is neither physically apparent, nor annunciated, this procedure must define controls to assure proper trip protection. Special trip checks must be specified to assure removal of the "shorting links."

- d. The rod sequence should be detailed and specified. Two complementary rod withdrawal sequences, sequence A and B, should be presented as figures within the procedure. These figures completely specify rod withdrawals from the all-rods-in condition to the rated power configuration. Each sequence will normally be used to obtain cold criticality. Movement of rods in the prescribed sequence is monitored by the Rod Worth Minimizer, which will prevent out-of-sequence withdrawal. Also, not more than two rods may be inserted out of sequence. Intentional errors should be made during the approach to critical to test for proper operation of Rod Worth Minimizer. This system will be programmed to control each sequence from all-rods-in to approximately 20% of rated power.
- e. Prediction of the rod pattern at the cold-critical condition will require parametric treatment to account for variations in temperature from the point of calculation.

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