SUSQUEHANNA SES UNIT 2 CYCLE 6

PROPOSED STARTUP PHYSICS TESTS SUMMARY DESCRIPTION

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PENNSYLVANIA POWER & LIGHT COMPANY

PP&L

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Susquehanna SES Unit 2 is planned to be shut down for its fifth refueling and inspection outage on September 12, 1992. During startup and initial Cycle 6 operation, PP&L plans to perform a series of startup activities and tests to assure that the reload core conforms to the design. A list of these proposed activities and tests along with a brief description for each is provided below.

1) Core Loading Verification

Purpose: To assure the core is correctly loaded per design.

Description: The core will be visually checked to verify correct loading. An underwater video camera or suitable device will be used to record fuel assembly serial numbers, orientations, core locations, and proper core plate seating. A review of the videotape will be performed and will serve as an independent verification of the core loading. Any discrepancies discovered will be promptly corrected and the affected areas reverified prior to Unit 2 Cycle 6 (U2C6) startup.

2) POWERPLEX Input Deck Validation

Purpose: To ensure the POWERPLEX Core Monitoring System input deck is updated correctly before the start of the new operating cycle.

Description: The validation will ensure that POWERPLEX, the SNP software system designed to perform in-core monitoring of BWR cores, is correctly updated for monitoring U2C6 operation. Core monitoring calculations within POWERPLEX are performed by XTGBWR, a three-dimensional reactor simulation code. The POWERPLEX input deck consists of all data needed for the execution of this code and subsequent calculation of the margin to each fuel thermal limits. This data must be updated to reflect the new core loading prior to the start of a reload operating cycle in order to ensure satisfactory core monitoring. The deck will be updated by PP&L and independently verified by PP&L.

3) Control Rod Functional (Insert and Withdrawal Checks)

Purpose: To assure proper control rod function.

Description: A control rod functional test, which includes mobility and overtravel checks, will be performed on each control cell loaded in its final configuration. Core subcriticality will be demonstrated and documented as each control rod is functionally tested.

4) Subcritical Shutdown Margin Demonstration

Purpose: To assure that at least the minimum required Shutdown Margin exists with the analytically determined strongest worth control rod fully withdrawn.

Description: This test will verify that at least the required amount of Shutdown Margin is maintained without determining the actual amount of Shutdown Margin in the core. The analytically determined strongest worth control rod (or its symmetric counterpart) is fully withdrawn. One or more diagonally adjacent control rods are then slowly notched out (one at a time) and sub-criticality verified at each step, until the analytically determined reactivity worth of the diagonally adjacent control rods at their respective notch position just equals or slightly exceeds the required amount of Shutdown Margin. Verification at this step that the core is still subcritical demonstrates that at least the required amount of Shutdown Margin exists.

5) In-Sequence Critical and Shutdown Margin Determination

Purpose: a) To determine the actual amount of Shutdown Margin.

b) To compare predicted versus actual critical control rod positions.

Description: This test will be performed as part of the normal startup. Control rods are pulled in group order in their normal sequence until criticality is achieved. Taking into account the period and moderator temperature coefficient corrections, the Shutdown Margin is determined by calculation. In addition, to assure that there is no reactivity anomaly, the actual critical control rod position is verified to be within 1% $\Delta k/k$ of the predicted critical control rod position.

6) Control Rod Scram Time Testing

Purpose: To demonstrate that the scram insertion times are within the appropriate Technical Specification requirements following core alterations.

Description: This test satisfies Susquehanna SES Technical Specifications 3/4.1.3.2, 3/4.1.3.3, and 3/4.1.3.4. These specifications place limits on control rod scram performance. The results of the control rod scram time testing will be used to determine that the control rod scram performance is acceptable.

7) <u>TIP Asymmetry</u>

Purpose: a) To assure proper operation of the TIP system.

b) To check core symmetry.

Description: A gross asymmetry check will be performed as wel detailed statistical uncertainty evaluation of t system. A complete set of TIP data will be obta steady-state power level greater than 75% of rat A total average deviation or uncertainty will be determined for all symmetric TIP pairs as well a maximum absolute deviation. The results will be to assure proper operation of the TIP system anc of the core loading.