SUSQUEHANNA SES UNIT 2 CYCLE 2

PROPOSED STARTUP PHYSICS TESTS SUMMARY DESCRIPTION

MAY 1986

PENNSYLVANIA POWER & LIGHT COMPANY PP&L

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Susquehanna SES Unit 2 will be shutting down for its first refueling outage on August 2, 1986. Prior to resumption of full power commercial operation for Cycle 2, PP&L plans to perform a series of startup tests to assure that the reload core conforms to the design. A list of these proposed 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, and locations. In addition, a height check will be performed to assure that all assemblies are properly seated in their respective locations. 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 2 startup.

2) Control Rod Functional (Insert and Withdrawal Checks)

Purpose: a) To assure proper control rod function.

b) To ensure that no gross local reactivity discrepancies exist, and that criticality will not occur due to the withdrawal of a single rod.

Description: Following core loading, a control rod functional test, which includes mobility, overtravel, and subcriticality checks, will be performed on each control cell.

3) Subcritical Shutdown Margin Demonstration

Purpose: To assure that at least the minimum required Shutdown Margin exists with the strongest worth control rod fully withdrawn.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. The analytically determined strongest worth control rod (or its symmetric counterpart) is fully withdrawn; diagonally adjacent control rods (one at a time) are then slowly notched out, verifying subcriticality at each step, until the analytically determined reactivity worth of the 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.

4) 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.

5) TIP Asymmetry

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

b) To check core symmetry.

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