FNP Unit 1

Technical Specifications

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Unit 1	Revision
B 3/4 2-5	Replace

3/4.2.4 QUADRANT POWER TILT RATIO

The quadrant power tilt ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during startup testing and periodically during power operation.

The limit of 1.02, at which corrective action is required, provides DNB and linear heat generation rate protection with x-y plane power tilts.

The two hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned control rod. In the event such action does not correct the tilt, the margin for uncertainty on F_Q is reinstated by reducing the maximum allowed power by 3 percent for each percent of tilt in excess of 1.0.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the movable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of four symmetric thimbles. The two sets of four symmetric thimbles is a unique set of eight detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8.

3/4.2.5 DNB PARAMETERS

The limits on the DNB related parameters assure that each of the parameters are maintained within the normal steady state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial FSAR assumptions and have been analytically demonstrated adequate to meet the DNB design criterion throughout each analyzed transient. The indicated T_{avg} value of 580.7°F is based on the average of two control board readings and an indication uncertainty of 2.5°F. The indicated pressure value of 2205 psig is based on the average of two control board readings and an indication uncertainty of 20 psi. The indicated total RCS flow rate is based on two elbow tap measurements from each loop and an uncertainty of 2.4% flow (0.1% flow is included for feedwater venturi fouling).

The 12 hour surveillance of T_{avg} and pressurizer pressure through the control board readings are sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

The 18 month surveillance of the total RCS flow rate may be performed by one of two alternate methods. One method is a precision calorimetric performed at the beginning of each fuel cycle. The other method is based on the Δp measurements from the cold leg elbow taps, which are correlated to past precision heat balance measurements. Correlation of the flow indication channels with selected precision loop flow calorimetrics for this method is documented in WCAP-14750. Use of the elbow tap Δp measurement method removes the requirement for performance of a precision RCS flow calorimetric measurement for that cycle. The monthly surveillance of the total RCS flow rate is a reverification of the RCS flow requirement using process computer indications of loop elbow tap measurements that are correlated either to the precision RCS flow measurement or the elbow tap measurement at the beginning of the fuel cycle. The 12 hour RCS flow surveillance is a qualitative verification of significant flow degradation using the control board indicators fed by elbow tap measurements.

FNP Unit 2

Technical Specifications

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Unit 2	Revision
B 3/4 2-5	Replace

3/4.2.4 QUADRANT POWER TILT RATIO

The quadrant power tilt ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during startup testing and periodically during power operation.

The limit of 1.02, at which corrective action is required, provides DNB and linear heat generation rate protection with x-y plane power tilts.

The two hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned control rod. In the event such action does not correct the tilt, the margin for uncertainty on F_Q is reinstated by reducing the maximum allowed power by 3 percent for each percent of tilt in excess of 1.0.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the movable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of four symmetric thimbles. The two sets of four symmetric thimbles is a unique set of eight detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8.

3/4.2.5 DNB PARAMETERS

The limits on the DNB related parameters assure that each of the parameters are maintained within the normal steady state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial FSAR assumptions and have been analytically demonstrated adequate to meet the DNB design criterion throughout each analyzed transient. The indicated T_{avg} value of 580.7°F is based on the average of two control board readings and an indication uncertainty of 2.5°F. The indicated pressure value of 2205 psig is based on the average of two control board readings and an indication uncertainty of 20 psi. The indicated total RCS flow rate is based on two elbow tap measurements from each loop and an uncertainty of 2.4% flow (0.1% flow is included for feedwater venturi fouling).

The 12 hour surveillance of T_{avg} and pressurizer pressure through the control board readings are sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

The 18 month surveillance of the total RCS flow rate may be performed by one of two alternate methods. One method is a precision calorimetric performed at the beginning of each fuel cycle. The other method is based on the Δp measurements from the cold leg elbow taps, which are correlated to past precision heat balance measurements. Correlation of the flow indication channels with selected precision loop flow calorimetrics for this method is documented in WCAP-14750. Use of the elbow tap Δp measurement method removes the requirement for performance of a precision RCS flow calorimetric measurement for that cycle. The monthly surveillance of the total RCS flow rate is a reverification of the RCS flow requirement using process computer indications of loop elbow tap measurements that are correlated either to the precision RCS flow measurement or the elbow tap measurement at the beginning of the fuel cycle. The 12 hour RCS flow surveillance is a qualitative verification of significant flow degradation using the control board indicators fed by elbow tap measurements.