ATTACHMENT A

(Existing Technical Specification)

POWER DISTRIBUTION LIMITS

AXIAL SHAPE INDEX

LIMITING CONDITION FOR OPERATION

3.2.7 The core average AXIAL SHAPE INDEX (ASI) shall be maintained within the following limits:

a. COLSS OPERABLE
$-0.28 \leq ASI \leq +0.28$

b. COLSS OUT OF SERVICE (CPC)
$-0.20 \leq ASI \leq +0.20$

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER*

ACTION:

With the core average AXIAL SHAPE INDEX (ASI) exceeding its limit, restore the ASI to within its limit within 2 hours or reduce THERMAL POWER to less than 20% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.7 The core average AXIAL SHAPE INDEX shall be determined to be within its limit at least once per 12 hours using the COLSS or any OPERABLE Core Protection Calculator channel.

*See Special Test Exception 3.10.2.

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DNBR Margin (continued)

A DNBR penalty factor has been included in the COLSS and CPC DNBR calculation to accommodate the effects of rod bow. The amount of rod bow in each assembly is dependent upon the average burnup experienced by that assembly. Fuel assemblies that incur higher average burnup will experience a greater magnitude of rod bow. Conversely, lower burnup assemblies will experience less rod bow. In design calculations, the penalty for each batch required to compensate for rod bow is determined from a batch's maximum average assembly burnup applied to the batch's maximum integrated planar-radial power peak. A single net penalty for COLSS and CPC is then determined from the penalties associated with each batch, accounting for the offsetting margins due to the lower radial power peaks in the higher burnup batches.

3/4.2.5 RCS FLOW RATE

This specification is provided to ensure that the actual RCS total flow rate is maintained at or above the minimum value used in the LOCA safety analyses.

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

This specification is provided to ensure that the actual value of reactor coolant cold leg temperature is maintained within the range of values used in the safety analyses.

2.4.2.7 AXIAL SHAPE INDEX

This specification is provided to ensure that the actual value of AXIAL SHAPE INDEX is maintained within the range of values used in the safety analyses.

3/4.2.8 PRESSURIZER PRESSURE

This specification is provided to ensure that the actual value of pressurizer pressure is maintained within the range of values used in the safety analyses.

ATTACHMENT B

(Proposed Technical Specification)

POWER DISTRIBUTION LIMITS

AXIAL SHAPE INDEX

LIMITING CONDITION FOR OPERATION

3.2.7 The core average AXIAL SHAPE INDEX (ASI) shall be maintained within the following limits:

a. With COLSS operable, the COLSS ASI alarm limit.

b. COLSS OUT OF SERVICE (CPC)
$-0.20 \leq$ ASI $\leq +0.20$

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER*

ACTION:

With the core average AXIAL SHAPE INDEX (ASI) exceeding its limit, restore the ASI to within its limit within 2 hours or reduce THERMAL POWER to less than 20% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.7 The core average AXIAL SHAPE INDEX shall be determined to be within its limit by continuosly monitoring the ASI with COLSS, or with COLSS OUT OF SERVICE, by verifying at least once per 12 hours that the core average ASI is within the COLSS OUT OF SERVICE ASI limit using any operable CPC channel.

*See Special Test Exception 3.10.2.

BASES

DNBR Margin (continued)

A DNBR penalty factor has been included in the COLSS and CPC DNBR calculation to accommodate the effects of rod bow. The amount of rod bow in each assembly is dependent upon the average burnup experienced by that assembly. Fuel assemblies that incur higher average burnup will experience a greater magnitude of rod bow. Conversely, lower burnup assemblies will experience less rod bow. In design calculations, the penalty for each batch required to compensate for rod bow is determined from a batch's maximum average assembly burnup applied to the batch's maximum integrated planar-radial power peak. A single net penalty for COLSS and CPC is then determined from the penalties associated with each batch, accounting for the offsetting margins due to the lower radial power peaks in the higher burnup batches.

3/4.2.5 RCS FLOW RATE

This specification is provided to ensure that the actual RCS total flow rate is maintained at or above the minimum value used in the LOCA safety analyses.

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

This specification is provided to ensure that the actual value of reactor coolant cold leg temperature is maintained within the range of values used in the safety analyses.

3/4.2.7 AXIAL SHAPE INDEX

The Axial Shape Index (ASI) is a measure of the power generated in the lower half of the core less the power generated in the upper half of the core divided by the sum of these powers. This specification is provided to ensure that the core average ASI is maintained within the range of values assumed as an initial condition in the safety analyses. This range is specified as $-0.3 \leq ASI \leq 0.3$.

The ASI can be determined by utilizing either the Core Operating Limit Supervisory System (COLSS) or any operable Core Protection Calculator (CPC) channel. The real time monitoring capability and accuracy of COLSS allows COLSS to monitor power limit margins closely. Consequently, the ASI limit is broader than it would be with the same core without COLSS. The COLSS continuously calculates the ASI and compares the calculated value to the parameter established for the COLSS ASI alarm limit. In addition, there is an uncertainty associated with the COLSS calculated ASI, therefore the COLSS ASI alarm limit includes this uncertainty. If the LCO is exceeded, COLSS alarms are initiated. The ASI safety setting is selected so that no safety limit will be exceeded as a result of an anticipated operational occurrence, and so that the consequence of a design basis accident will be acceptable.

AXIAL SHAPE INDEX (continued)

With COLSS out of service, any operable CPC channel may be used to calculate the ASI (using three axially spaced excore detectors). The axial shape synthesis in the CPC's shows the relative power produced as a function of core height in each third of the core. Due to the uncertainty associated with the CPC estimate, the ASI is restricted to a smaller range than the range calculated using the COLSS.

The 20% rated thermal power threshold is imposed due to the inaccuracy of the neutron flux detector below the threshold. Core noise level is too large to obtain usable detector readings.

3/4.2.8 PRESSURIZER PRESSURE

This specification is provided to ensure that the actual value of pressurizer pressure is maintained within the range of values used in the safety analyses.

ATTACHMENT C

(Existing Technical Specification)

POWER DISTRIBUTION LIMITS

AXIAL SHAPE INDEX

LIMITING CONDITION FOR OPERATION

3.2.7 The core average AXIAL SHAPE INDEX (ASI) shall be maintained within the following limits:

a. COLSS OPERABLE
$-0.28 \leq ASI \leq +0.28$

b. COLSS OUT OF SERVICE (CPC)
$-0.20 \leq ASI +0.20$

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER*

ACTION:

With the core average AXIAL SHAPE INDEX (ASI) exceeding its limit, restore the ASI to within its limit within 2 hours or reduce THERMAL POWER to less than 20% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.7 The core average AXIAL SHAPE INDEX shall be determined to be within its limits at least once per 12 hours using the COLSS or any OPERABLE Core Protection Calculator channel.

*See Special Test Exception 3.10.2.

BASES

DNBR Margin (Continued)

A DNBR penalty factor has been included in the COLSS and CPC DNBR calculation to accommodate the effects of rod bow. The amount of rod bow in each assembly is dependent upon the average burnup experienced by that assembly. Fuel assemblies that incur higher average burnup will experience a greater magnitude of rod bow. Conversely, lower burnup assemblies will experience less rod bow. In design calculations, the penalty for each batch required to compensate for rod bow is determined from a batch's maximum average assembly burnup applied to the batch's maximum integrated planar-radial power peak. A single net penalty for COLSS and CPC is then determined from the penalties associated with each batch, accounting for the offsetting margins due to the lower radial power peaks in the higher burnup batches.

3/4.2.5 RCS FLOW RATE

This specification is provided to ensure that the actual RCS total flow rate is maintained at or above the minimum value used in the LOCA safety analyses.

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

This specification is provided to ensure that the actual value of reactor coolant cold leg temperature is maintained within the range of values used in the safety analyses.

2.4.2.7 AXIAL SHAPE INDEX

This specification is provided to ensure that the actual value of AXIAL SHAPE INDEX is maintained within the range of values used in the safety analyses.

3/4.2.8 PRESSURIZER PRESSURE

This specification is provided to ensure that the actual value of pressurizer pressure is maintained within the range of values used in the safety analyses.

ATTACHMENT D

(Proposed Technical Specification)

POWER DISTRIBUTION LIMITS

AXIAL SHAPE INDEX

LIMITING CONDITION FOR OPERATION

3.2.7 The core average AXIAL SHAPE INDEX (ASI) shall be maintained within the following limits:

a. With COLSS operable, the COLSS ASI alarm limit.

b. COLSS OUT OF SERVICE (CPC)
$-0.20 \leq ASI \leq +0.20$

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER*

ACTION:

With the core average AXIAL SHAPE INDEX (ASI) exceeding its limit, restore the ASI to within its limit within 2 hours or reduce THERMAL POWER to less than 20% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.7 The core average AXIAL SHAPE INDEX shall be determined to be within its limit by continuosly monitoring the ASI with COLSS, or with COLSS OUT OF SERVICE, by verifying at least once per 12 hours that the core average ASI is within the COLSS OUT OF SERVICE ASI limit using any operable CPC channel.

*See Special Test Exception 3.10.2.

DNBR Margin (continued)

A DNBR penalty factor has been included in the COLSS and CPC DNBR calculation to accommodate the effects of rod bow. The amount of rod bow in each assembly is dependent upon the average burnup experienced by that assembly. Fuel assemblies that incur higher average burnup will experience a greater magnitude of rod bow. Conversely, lower burnup assemblies will experience less rod bow. In design calculations, the penalty for each batch required to compensate for rod bow is determined from a batch's maximum average assembly burnup applied to the batch's maximum integrated planar-radial power peak. A single net penalty for COLSS and CPC is then determined from the penalties associated with each batch, accounting for the offsetting margins due to the lower radial power peaks in the higher burnup batches.

3/4.2.5 RCS FLOW RATE

This specification is provided to ensure that the actual RCS total flow rate is maintained at or above the minimum value used in the LOCA safety analyses.

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

This specification is provided to ensure that the actual value of reactor coolant cold leg temperature is maintained within the range of values used in the safety analyses.

3/4.2.7 AXIAL SHAPE INDEX

The Axial Shape Index (ASI) is a measure of the power generated in the lower half of the core less the power generated in the upper half of the core divided by the sum of these powers. This specification is provided to ensure that the core average ASI is maintained within the range of values assumed as an initial condition in the safety analyses. This range is specified as $-0.3 \leq ASI \leq 0.3$.

The ASI can be determined by utilizing either the Core Operating Limit Supervisory System (COLSS) or any operable Core Protection Calculator (CPC) channel. The real time monitoring capability and accuracy of COLSS allows COLSS to monitor power limit margins closely. Consequently, the ASI limit is broader than it would be with the same core without COLSS. The COLSS continuously calculates the ASI and compares the calculated value to the parameter established for the COLSS ASI alarm limit. In addition, there is an uncertainty associated with the COLSS calculated ASI, therefore the COLSS ASI alarm limit includes this uncertainty. If the LCO is exceeded, COLSS alarms are initiated. The ASI safety setting is selected so that no safety limit will be exceeded as a result of an anticipated operational occurrence, and so that the consequence of a design basis accident will be acceptable.

AXIAL SHAPE INDEX (continued)

With COLSS out of service, any operable CPC channel may be used to calculate the ASI (using three axially spaced excore detectors). The axial shape synthesis in the CPC's shows the relative power produced as a function of core height in each third of the core. Due to the uncertainty associated with the CPC estimate, the ASI is restricted to a smaller range than the range calculated using the COLSS.

The 20% rated thermal power threshold is imposed due to the inaccuracy of the neutron flux detector below the threshold. Core noise level is too large to obtain usable detector readings.

3/4.2.8 PRESSURIZER PRESSURE

This specification is provided to ensure that the actual value of pressurizer pressure is maintained within the range of values used in the safety analyses.