

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AXIAL FLUX DIFFERENCE (AFD)

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE shall be maintained within the target band about the target flux difference as specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODE 1 ABOVE 50% RATED THERMAL POWER*

ACTION:

- a. With the indicated AXIAL FLUX DIFFERENCE outside of the target band about the target flux difference as specified in the COLR and with THERMAL POWER:
 1. Above 90% of RATED THERMAL POWER, within 15 minutes:
 - a) Either restore the indicated AFD to within the target band limits, or
 - b) Reduce THERMAL POWER to less than 90% of RATED THERMAL POWER.
 2. Between 50% and 90% of RATED THERMAL POWER:
 - a) POWER OPERATION may continue provided:
 - 1) The indicated AFD has not been outside of the target band as specified in the COLR for more than 1 hour penalty deviation cumulative during the previous 24 hours, and
 - 2) The indicated AFD is within the limits as specified in the COLR. Otherwise, reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.
 - b) Surveillance testing of the Power Range Neutron Flux Channels may be performed pursuant to Specification 4.3.1.1.1 provided the indicated AFD is maintained within the limits as specified in the COLR. A total of 16 hours operation may be accumulated with the AFD outside of the target band during this testing without penalty deviation.

* See Special Test Exception 3.10.2

POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION (Continued)

- b. THERMAL POWER shall not be increased above 90% of RATED THERMAL POWER unless the indicated AFD is within the target band as specified in the COLR and ACTION a.2.a) 1), above has been satisfied.
- c. THERMAL POWER shall not be increased above 50% of RATED THERMAL POWER unless the indicated AFD has not been outside of the target band as specified in the COLR for more than 1 hour penalty deviation cumulative during the previous 24 hours. Power increases above 50% of RATED THERMAL POWER do not require being within the target band provided the accumulative penalty deviation is not violated.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The indicated AXIAL FLUX DIFFERENCE shall be determined to be within its limits during POWER OPERATION above 15% of RATED THERMAL POWER by:

- a. Monitoring the indicated AFD for each OPERABLE excore channel:
 - 1. In accordance with the Surveillance Frequency Control Program when the AFD Monitor Alarm is OPERABLE, and
 - 2. In accordance with the Surveillance Frequency Control Program for the first 24 hours after restoring the AFD Monitor Alarm to OPERABLE status.
- b. Monitoring and logging the indicated AXIAL FLUX DIFFERENCE for each OPERABLE excore channel in accordance with the Surveillance Frequency Control Program for the first 24 hours and in accordance with the Surveillance Frequency Control Program thereafter, when the AXIAL FLUX DIFFERENCE Monitor Alarm is inoperable. The logged values of the indicated AXIAL FLUX DIFFERENCE shall be assumed to exist during the interval preceding each logging.

4.2.1.2 The indicated AFD shall be considered outside of its target band when at least 2 or more OPERABLE excore channels are indicating the AFD to be outside the target band. Penalty deviation outside of the target band shall be accumulated on a time basis of:

- a. One minute penalty deviation for each one minute of POWER OPERATION outside of the target band at THERMAL POWER levels equal to or above 50% of RATED THERMAL POWER, and
- b. One-half minute penalty deviation for each one minute of POWER OPERATION outside of the target band at THERMAL POWER levels below 50% of RATED THERMAL POWER.

POWER DISTRIBUTION LIMITS

SURVEILLANCE REQUIREMENTS (Continued)

4.2.1.3 The target flux difference shall be determined by measurement in accordance with the Surveillance Frequency Control Program. The provisions of Specification 4.0.4 are not applicable.

4.2.1.4 The target flux difference shall be updated in accordance with the Surveillance Frequency Control Program. The provisions of Specification 4.0.4 are not applicable.

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SALEM - UNIT 2

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Amendment No. 197

JAN 08 1999

*(Correction letter of 2-23-99) to be implemented
prior to entry into Mode 2 from the upcoming refueling outage (2R10)*

POWER DISTRIBUTION LIMITS

3/4.2.2 HEAT FLUX HOT CHANNEL FACTOR - F_Q(Z)

LIMITING CONDITION FOR OPERATION

3.2.2 $F_Q(z) \leq \frac{F_Q^{RTP}}{P} * K(z)$ for $P > 0.5$, and

$F_Q(z) \leq \frac{F_Q^{RTP}}{0.5} * K(z)$ for $P \leq 0.5$, and

Where F_Q^{RTP} = the F_Q limit at RATED THERMAL POWER (RTP) specified in the CORE OPERATING LIMITS REPORT (COLR),

$P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$, and

$K(z)$ = the normalized $F_Q(z)$ as a function of core height as specified in the COLR.

APPLICABILITY: MODE 1

ACTION:

With $F_Q(Z)$ exceeding its limit:

- a. Reduce THERMAL POWER at least 1% for each 1% $F_Q(Z)$ exceeds the limit within 15 minutes and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours; POWER OPERATION may proceed for up to a total of 72 hours; subsequent POWER OPERATION may proceed provided the Overpower delta T Trip Setpoints have been reduced at least 1% for each 1% $F_Q(Z)$ exceeds the limit. The Overpower delta T Trip Setpoint reduction shall be performed with the reactor in at least HOT STANDBY.
- b. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER above the reduced limit required by a. above; THERMAL POWER may then be increased provided $F_Q(Z)$ is demonstrated through a core power distribution measurement to be within its limit.

POWER DISTRIBUTION LIMITS

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 F_{xy} shall be evaluated to determine if $F_Q(Z)$ is within its limit by:

- a. Using the movable incore detectors to obtain a power distribution map:
 1. When THERMAL POWER is $\leq 25\%$, but $> 5\%$ of RATED THERMAL POWER, or
 2. When the Power Distribution Monitoring System (PDMS) is inoperable;and increasing the Measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties as specified in the COLR.
- b. Using the PDMS or the moveable incore detectors when THERMAL POWER is $> 25\%$ of RATED THERMAL POWER, and increasing the measured $F_Q(Z)$ by the applicable manufacturing and measurement uncertainties as specified in the COLR.
- c. Comparing the F_{xy} computed (F_{xy}^C) obtained in b, above to:

1. The F_{xy} limits for RATED THERMAL POWER (F_{xy}^{RTP}) for the appropriate measured core planes given in e. and f., below, and
2. The relationship:

$$F_{xy}^L = F_{xy}^{RTP} [1 + PF_{xy} (1-P)]$$

where F_{xy}^L is the limit for fractional THERMAL POWER operation expressed as a function of F_{xy}^{RTP} , PF_{xy} is the power factor multiplier for F_{xy} in the COLR, and P is the fraction of RATED THERMAL POWER at which F_{xy} was measured.

- d. Remeasuring F_{xy} according to the following schedule:
 1. When F_{xy}^C is greater than the F_{xy}^{RTP} limit for the appropriate measured core plane but less than the F_{xy}^L relationship, additional core power distribution measurements shall be taken and F_{xy}^C compared to F_{xy}^{RTP} and F_{xy}^L :
 - a) Either within 24 hours after exceeding by 20% of RATED THERMAL POWER or greater, the THERMAL POWER at which F_{xy}^C was last determined, or
 - b) In accordance with the Surveillance Frequency Control Program, whichever occurs first.

POWER DISTRIBUTION LIMITS

SURVEILLANCE REQUIREMENTS (Continued)

2. When the F_{xy}^C is less than or equal to the F_{xy}^{RTP} limit for the appropriate measured core plane, additional core power distribution measurements shall be taken and F_{xy}^C compared to F_{xy}^{RTP} and F_{xy}^L in accordance with the Surveillance Frequency Control Program.
- e. The F_{xy} limit for Rated Thermal Power (F_{xy}^{RTP}) shall be provided for all core planes containing bank "D" control rods and all unrodded core planes in the COLR per specification 6.9.1.9.
- f. The F_{xy} limits of e., above, are not applicable to the excluded core plane regions as measured in percent of core height from the bottom of the fuel.
- g. Evaluating the effects of F_{xy} on $F_Q(Z)$ to determine if $F_Q(Z)$ is within its limit whenever F_{xy}^C exceeds F_{xy}^L .

4.2.2.3 When $F_Q(Z)$ is measured pursuant to specification 4.10.2.2, an overall measured $F_Q(Z)$ shall be obtained from a core power distribution measurement and increased by the applicable manufacturing and measurement uncertainties as specified in the COLR.

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POWER DISTRIBUTION LIMITS

3/4.2.3 NUCLEAR ENTHALPY HOT CHANNEL FACTOR $F_{\Delta H}^N$

LIMITING CONDITION FOR OPERATION

3.2.3 $F_{\Delta H}^N$ shall be limited by the following relationship:

$$F_{\Delta H}^N = F_{\Delta H}^{RTP} [1.0 + PF_{\Delta H} (1.0 - P)]$$

Where: $F_{\Delta H}^{RTP}$ is the limit at RATED THERMAL POWER in the Core Operating Limits Report (COLR).

$PF_{\Delta H}$ is the Power Factor Multiplier for $F_{\Delta H}^N$ specified in the COLR, and

$$P \text{ is } \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

APPLICABILITY: MODE 1

ACTION:

With $F_{\Delta H}^N$ exceeding its limit:

- a. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to $\leq 55\%$ of RATED THERMAL POWER within the next 4 hours.
- b. Demonstrate through a core power distribution measurement that $F_{\Delta H}^N$ is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 2 hours, and
- c. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER above the reduced limit required by a. or b. above; subsequent POWER OPERATION may proceed provided that $F_{\Delta H}^N$ is demonstrated through a core power distribution measurement to be within its limit at a nominal 50% of RATED THERMAL POWER prior to exceeding this THERMAL POWER, at a nominal 75% of RATED THERMAL POWER prior to exceeding this THERMAL POWER and within 24 hours after attaining 95% or greater RATED THERMAL POWER.

POWER DISTRIBUTION LIMITS

SURVEILLANCE REQUIREMENTS

4.2.3.1 $F_{\Delta H}^N$ shall be determined to be within its limit by obtaining a core power distribution measurement:

- a. Prior to operation above 75% of RATED THERMAL POWER after each fuel loading, and
- b. In accordance with the Surveillance Frequency Control Program.
- c. The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 The measured $F_{\Delta H}^N$ of 4.2.3.1 above, shall be increased by the applicable $F_{\Delta H}^N$ uncertainties* specified in the COLR.

* For Cycle 11, when the number of available movable detector thimbles is greater than or equal to 50% and less than 75% of the total, the 4% measurement uncertainty shall be increased to $[4\% + (3-T/14.5)(1\%)]$ where T is the number of available thimbles.

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SALEM UNIT 2

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SALEM UNIT 2

3/4 2-12

Amendment No. 72
Correction Letter
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POWER DISTRIBUTION LIMITS

3/4.2.4 QUADRANT POWER TILT RATIO

LIMITING CONDITION FOR OPERATION

3.2.4 The QUADRANT POWER TILT RATIO shall not exceed 1.02.

APPLICABILITY: MODE 1 above 50% of RATED THERMAL POWER*.

ACTION:

- a. With the QUADRANT POWER TILT RATIO determined to exceed 1.02 but less than or equal to 1.09:
 1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until:
 - a) Either the QUADRANT POWER TILT RATIO is reduced to within its limit, or
 - b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.
 2. Within 2 hours:
 - a) Either reduce the QUADRANT POWER TILT RATIO to within its limit, or
 - b) Reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1.0 and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours.
 3. a) Verify that the QUADRANT POWER TILT RATIO is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within the next 2 hours and reduce the Power Range Neutron Flux-High Trip setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.

* See Special Test Exception 3.10.2.

POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION (Continued)

- b) Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL power may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified acceptable at 95% or greater RATED THERMAL POWER.
- b. With the QUADRANT POWER TILT RATIO determined to exceed 1.09 due to misalignment of either a shutdown or control rod:
1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until:
 - (a) Either the QUADRANT POWER TILT RATIO is reduced to within its limit, or
 - (b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.
 2. Reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1.0, within 30 minutes.
 3. Verify that the QUADRANT POWER TILT RATIO is within its limit within 2 hours after exceeding the limit or reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within the next 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.
 4. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL POWER may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified acceptable at 95% or greater RATED THERMAL POWER.
- c. With the QUADRANT POWER TILT RATIO determined to exceed 1.09 due to causes other than the misalignment of either a shutdown or control rod:

POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION (Continued)

1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until:
 - (a) Either the QUADRANT POWER TILT RATIO is reduced to within its limit, or
 - (b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.
2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.
3. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL POWER may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified at 95% or greater RATED THERMAL POWER.

SURVEILLANCE REQUIREMENTS

4.2.4.1 The QUADRANT POWER TILT RATIO shall be determined to be within the limit above 50% of RATED THERMAL POWER by:

- a. Calculating the ratio in accordance with the Surveillance Frequency Control Program when the alarm is OPERABLE.
- b. Calculating the ratio in accordance with the Surveillance Frequency Control Program during steady-state operation when the alarm is inoperable.

4.2.4.2 The QUADRANT POWER TILT RATIO shall be determined to be within the limit when above 75% of RATED THERMAL POWER with one Power Range Channel inoperable by obtaining a core power distribution measurement* to confirm that the normalized symmetric power distribution is consistent with the indicated QUADRANT POWER TILT RATIO in accordance with the Surveillance Frequency Control Program.

* Using either the movable incore detectors in the four pairs of symmetric thimble locations or the power distribution monitoring system.

POWER DISTRIBUTION LIMITS

3/4.2.5 DNB PARAMETERS

LIMITING CONDITION FOR OPERATION

3.2.5 The following DNB related parameters shall be maintained within the limits shown on Table 3.2-1:

- a. Reactor Coolant System T_{avg} .
- b. Pressurizer Pressure.
- c. Reactor Coolant System Total Flow Rate.

APPLICABILITY: MODE 1

ACTION:

With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.5.1 Each of the parameters of Table 3.2-1 shall be verified to be within their limits in accordance with the Surveillance Frequency Control Program.

4.2.5.2 The Reactor Coolant System Total Flow Rate shall be determined to be within the limits of Table 3.2-1 by performing a precision heat balance within 24 hours after achieving steady state conditions $\geq 90\%$ RATED THERMAL POWER in accordance with the Surveillance Frequency Control Program. The provisions of Specification 4.0.4 are not applicable.

TABLE 3.2-1

DNB PARAMETERS

<u>PARAMETER</u>	<u>LIMITS</u>
Reactor Coolant System T _{out}	4 Loops in <u>Operation</u> ≤ 582.9°F
Pressurizer Pressure	≥ 2200 psia*
Reactor Coolant System Total Flow Rate	≥ 341,000 gpm#

* Limit not applicable during either a THERMAL POWER ramp in excess of 5% RATED THERMAL POWER per minute or a THERMAL POWER step in excess of 10% RATED THERMAL POWER.

Includes a 2.4% flow uncertainty plus a 0.1% measurement uncertainty due to feedwater venturi fouling.