

CONSUMERS POWER COMPANY

PALISADES PLANT - DOCKET 50-255 - LICENSE DPR-20

PROPOSED TECHNICAL SPECIFICATIONS CHANGE REQUEST

PROPOSED PAGES

4 Pages

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2.3 LIMITING SAFETY SYSTEM SETTINGS - REACTOR PROTECTIVE SYSTEM (Cont'd)

Basis (Cont'd)

(TM/LP) trip will occur before these limits are reached. Reference 13 forms the basis for Figure 2-3 for 4-pump operation. For 2- and 3-pump operation the flow instability criterion is more limiting than the MDNBR criterion. Reference 7 forms the basis for Figures 2-1 and 2-2.

The trip is initiated whenever the pressurizer pressure drops below the minimum value given on Table 2.3.1, or a value computed as described below, whichever is higher. The computed value is a function of reactor inlet temperature and reactor outlet temperature, and takes the form $P_{\text{Trip}} = AT_H - BT_C - C$ where A, B and C are constants and T_H and T_C are the hot and cold leg coolant temperatures, respectively. The minimum value of reactor coolant flow and the maximum expected values of axial and radial peaking factors are assumed in generating this trip function.

The TM/LP trip set points are derived from the 4-pump operation core thermal limits (Figure 2-3) through application of appropriate allowances for measurement uncertainties and processing errors. A maximum error of 165 psi is assumed to account for expected instrument drift and repeatability errors, process measurement uncertainties, flow stratification effects, and calibration errors. As such, a maximum error in the calculated set point of -165 psi has been assumed in the accident analysis. (12)

An analysis has been performed (14) which verifies that the TM/LP trip for 4-pump operation provides adequate thermal margin when RTD time delays and conservative assumptions regarding part power radial peaking factors are compensated for by an improved pressurizer model, a primary coolant flow update and the XNB DNB correlation for control rod withdrawal transients. The XNB DNB correlation has been shown to be applicable to the Palisades Plant in Reference 15.

For two- and three-pump coolant pump operation, power is limited to 21% and 39% of rated power, respectively, for a maximum of 12 hours. During either of these modes of operation, the high power level trip in conjunction with the TM/LP trip (minimum set point = 1750 psia) and the secondary system safety valves (set at 1000 psia) assure that the limits shown on Figures 2-1 and 2-2 will not be violated.

5. Low Steam Generator Water Level - The low steam generator water level reactor trip protects against the loss of feed-water flow accidents and assures that the design pressure of the primary coolant system will not be exceeded. The specified set point assures that there will be sufficient water inventory in the steam generator at the time of trip to provide a 15-minute margin before the auxiliary feedwater is required. (9)

2.3 LIMITING SAFETY SYSTEM SETTINGS - REACTOR PROTECTIVE SYSTEM (Cont'd)

References (Cont'd)

- (8) XN-NF-77-18, Section 3.8.
- (9) XN-NF-77-18, Section 3.7.
- (10) FSAR, Amendment No 17, Item 4.0.
- (11) XN-NF-77-18, Section 3.6.
- (12) XN-NF-77-18, Section 3.1.
- (13) XN-NF-77-22, Section 3.4.
- (14) XN-NF-83-57.
- (15) XN-NF-709.

POWER DISTRIBUTION LIMITS

3.23.1 LINEAR HEAT RATE (LHR)

LIMITING CONDITION FOR OPERATION

ACTION 3:

If the incore alarm system is inoperable and the excore monitoring system is not being used, operation at less than or equal to 85% of rated power may continue provided that incore readings are recorded manually.

Readings shall be taken on a minimum of 10 individual detectors per quadrant (to include 50% of the total number of detectors in a 10-hour period) within 4 hours and at least every 2 hours thereafter. If readings indicate a local power level equal to or greater than the alarm setpoints, the action specified in ACTION 1 above shall be taken.

Basis

The limitation on LHR ensures that, in the event of a LOCA, the peak temperature of the cladding will not exceed 2200°F.⁽¹⁾ In addition, the limitation on LHR for the highest power fuel rod, narrow water gap fuel rod and interior fuel rod ensures that the minimum DNBR will be maintained above 1.30 for the W-3 correlation or above 1.17 for the XNB correlation during anticipated transients; and, that fuel damage during Condition IV events such as locked rotor will not exceed acceptable limits.⁽²⁾⁽³⁾⁽⁵⁾

The inclusion of the axial power distribution term ensures that the operating power distribution is enveloped by the design power distributions.

Either of the two core power distribution monitoring systems (the incore alarm system or the excore monitoring system) provides adequate monitoring of the core power distribution and is capable of verifying that the LHR does not exceed its limits. The incore alarm system performs this

POWER DISTRIBUTION LIMITS

3.23.1 LINEAR HEAT RATES (LHR

LIMITING CONDITIONS OF OPERATION

Basis (Cont'd)

uncertainty factor of 1.03, a thermal power measurement uncertainty factor of 1.02 and allowance for quadrant tilt.

References

- (1) XN-NF-77-24
- (2) XN-NF-77-18
- (3) XN-NF-78-16
- (4) XN-NF-80-47
- (5) XN-NF-83-57