

TECHNICAL SPECIFICATION MARKUPS

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PDR ADDCK 05000387
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REACTOR COOLANT SYSTEM

RECIRCULATION LOOPS - SINGLE LOOP OPERATION

LIMITING CONDITION FOR OPERATION

3.4.1.1.2 One reactor coolant recirculation loop shall be in operation with the pump speed $\leq 80\%$ of the rated pump speed and the reactor at a THERMAL POWER/core flow condition outside of Regions I and II of Figure 3.4.1.1.1-1, and

a. the following revised specification limits shall be followed:

1. Specification 2.1.2: the MCPR Safety Limit shall be increased to 1.07.
2. Table 2.2.1-1: the APRM Flow-Biased Scram Trip Setpoints shall be as follows:

Trip Setpoint	Allowable Value
$\leq 0.58W + 54\%$	$\leq 0.58W + 57\%$

3. Specification 3.2.2: the APRM Setpoints shall be as follows:

Trip Setpoint	Allowable Value
$S \leq (0.58W + 54\%) T$ $S_{RB} \leq (0.58W + 45\%) T$	$S \leq (0.58W + 57\%) T$ $S_{RB} \leq (0.58W + 48\%) T$

4. Specification 3.2.3: The MINIMUM CRITICAL POWER RATIO (MCPR) shall be greater than or equal to the largest of the following values:
 - a. the MCPR determined from Figure 3.2.3-1 plus 0.01, and
 - b. the MCPR determined from Figure 3.2.3-2, Figure 3.2.3-3, or Figure 3.2.3-4, as appropriate, plus 0.01.

6. ~~5~~ Table 3.3.6-2: the RBM/APRM Control Rod Block Setpoints shall be as follows:

a. RBM - Upscale

Trip Setpoint	Allowable Value
$\leq 0.66W + 36\%$	$\leq 0.66W + 39\%$

b. APRM - Flow Biased

Trip Setpoint	Allowable Value
$\leq 0.58W + 45\%$	$\leq 0.58W + 48\%$

APPLICABILITY: OPERATIONAL CONDITIONS 1* and 2*+, except during two loop operation.#

5. Specification 3.2.4: the LHGR limits shall be the limits specified in Figure 3.2.4-1, multiplied by 0.70.



RESPONSE TO NRC QUESTIONS

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REACTOR SYSTEMS BRANCH

QUESTION 3

If single loop operation (SLO) yields a higher peak cladding temperature (PCT) than two loop operation, why is the upper bound peak cladding temperature (UBPCT) based on two loop operation applicable for SLO? Does the limiting single failure and break size remain the same for SLO as for two loop operation? Discuss the applicability of SAFER/GESTR for SLO in view of the fact SLO results in a higher PCT.

RESPONSE

Operation with one recirculation loop out of service is allowed, but it is not considered a normal mode of operation. SLO is a special operational condition when only one of the two recirculation loops is operable. In this operating condition, the reactor power will be limited to less than 80% of rated by the maximum achievable core flow, which is typically less than 60% of rated core flow. A postulated LOCA occurring in the active recirculation loop during SLO would cause a more rapid coastdown of the recirculation flow than would occur in two loop operation, where one active loop would remain intact. This rapid coastdown causes an earlier boiling transition time and deeper penetration of boiling transition into the bundle, which tends to increase the calculated PCT. However, the PCT effects of the early boiling transition are substantially offset by the mitigating effect of the lower power level achievable at the start of such an event. The SAFER/GESTR-LOCA analysis results for Susquehanna (NEDC-32071P) for SLO and two loop operation are well below 2200°F.

The ECCS performance for Susquehanna under SLO was evaluated using SAFER/GESTR-LOCA. Calculations for the DBA were performed using both nominal and Appendix K inputs. The SLO SAFER/GESTR-LOCA analysis for the DBA assumes that there is essentially no period of recirculation pump coastdown. Thus, dryout is assumed to occur simultaneously at all axial locations of the hot bundle shortly after initiation of the event. Dryout is assumed to occur in one second for the nominal case and 0.1 second for the Appendix K case. These assumptions are very conservative and provide bounding results for the DBA under SLO.

The two-loop Appendix K break spectrum documented in NEDC-32071P is representative of SLO because the two-loop spectrum was analyzed assuming a one second dryout time for all axial locations of the hot bundle. As shown by the two-loop break spectrum, the DBA is the limiting case for SLO. In addition, SLO will affect the DBA results more than the smaller breaks. With breaks smaller than the DBA, there is a longer period of nucleate and/or film boiling prior to fuel uncover to remove the fuel stored energy.

An LHGR reduction (multiplier) of 0.70 will be imposed when the plant is in SLO. As shown in Table 5-6 of NEDC-32701P, the SLO results are less limiting (i.e., lower PCTs) than the results for the two loop DBA LOCA.

Thus, the licensing PCT is based appropriately on two loop operation rather than SLO.





Errata and Addenda Sheet

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Applicable to:

Publication No. NEDC-32071P

Title Susquehanna Steam Electric Station

Units 1 and 2 SAFER/GESTR-LOCA Loss-Of-Coolant Accident Analysis

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Note: *Correct all copies of the applicable publication as specified below.*

Item	References (Section, Page Paragraph, Line)	Instructions (Corrections and Additions)
1	Pages 5-6 and 5-7	Replace with new Pages 5-6 and 5-7
2	Page 5-13	Replace with new Page 5-13
(change brackets in right hand margin indicate areas where report has been changed)		

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