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AUTH.NAME AUTHOR AFFILIATION
COLEMAN,D.W. Washington Public Power Supply System
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SUBJECT: Forwards supplemental evaluation of effect of revised safety limit on Cycle 8 operations at WNP-2.

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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **WNP-2 OPERATING LICENSE NPF-21**
NRC INSPECTION 50-397/98-01
SUBMITTAL OF ADDITIONAL INFORMATION

References: 1) Letter dated November 6, 1998, AT Howell (NRC) to JV Parrish (SS), "NRC Inspection Report 50-397/97-11"

2) Letter GO2-97-215 dated November 25, 1997, DW Coleman (SS) to NRC "Submittal of Additional Information"

The NRC staff identifed in Inspection Report 97-11 (Reference 1) two unresolved issues regarding the effect of a revised safety limit on previous operational cycles at WNP-2. An evaluation of these issues was provided by the Supply System in Reference 2. This evaluation was reviewed by NRC staff and discussed with the Supply System during an inspection visit the week of February 9, 1998 (NRC Inspection 50-397/98-01). It was agreed during the inspection visit that the NRC evaluation would benefit from the submittal of additional information to enhance the understanding of the original response.

In accordance with the request of the inspection team, attached is a supplemental evaluation of the effect of a revised safety limit on Cycle 8 operations at WNP-2. This evaluation reinforces the conclusion that a revised safety limit (SLMCPR) would not have been exceeded during limiting transients occurring under actual plant conditions. Should you have any questions or desire additional information regarding this matter, please contact Mr. P.J. Inserra at (509) 377-4147.

Respectfully,

D.W. Coleman

D.W. Coleman (Mail Drop PE20)
Acting Manager, Regulatory Affairs

Attachment

cc: EW Merschoff - NRC RIV
KE Perkins, Jr. - NRC RIV, WCFO
C Poslusny, Jr. - NRR
NRC Resident Inspector - 927N
PD Robinson - Winston & Strawn
JE Whittemore - NRC RIV
T Huang - NRR
J March-Leuba - ORNL
DL Williams - BPA/399

ATTACHMENT
NRC INSPECTION 50-397/98-01
SUPPLEMENTAL EVALUATION OF CYCLE 8 (LRNB at EOC)

During NRC inspection 50-397/98-01 (February 9-12, 1998) the Supply System agreed to perform additional transient analysis to determine if the revised SLMCPR would have been exceeded for the SPC 9x9 fuel assuming a limiting transient occurred under the most limiting actual conditions experienced in Cycle 8.

The case selected for evaluation was near the end of Cycle 8 at an exposure of 5121.9 MWD/MT (April 4, 1993 at 10:54:53). The operating conditions are summarized in the following table.

Table 1 - Input Conditions

Plant Parameter	Actual Plant Condition	Licensing Bases Value**
MFLCPR	0.993 (based on old SLMCPR)	1.000
Core Power (MWth)	3290.3 *	3468.0
Core Flow (Mlb/hr)	101.70	115.01
Dome Pressure (psia)	1020.5	1035.0
Control Rod Pattern	4 Rods at Position 08 1 Rod at Position 46	All-Rods-Out
Core Burnup(MWD/MT)	5121.9	5877.0 (EOFPL+25 FPDs)

* An additional 1% power was added to this value to account for the feedwater flow calibration error discovered in Cycle 11, which affected Cycle 8.

** These values are required for the determination of original OLMCPR for Cycle 8 operation (actual OLMCPRs for Cycle 8 were calculated by Siemens Power Corporation with SPC codes using these same values).

The NRC approved WNP-2 RETRAN/VIPRE model (WPPSS-FTS-131, Rev.1) was used for the simulation of the most limiting transient (Load Rejection without Bypass or LRNB). The transient analysis was run using the actual plant conditions specified in Column 2 of Table 1. For comparison, a parallel transient analysis was also performed using the licensing bases values specified in Column 3. No credit for partial arc operation of the turbine control valves was assumed. The RETRAN model was used to calculate system response to the transient (including peak power). The VIPRE model was used to calculate the hot channel response (ΔCPR). The results of these analyses are shown in Table 2. It should be noted that these numbers have not been subjected to the same rigorous verification as the reload licensing analysis for each cycle.

As can be seen from Table 2, considerable margins in ΔCPR (i.e., OLMCPR) exist under actual operating conditions as compared to those calculated for the licensing bases analyses. The case using Technical Specification Scram Speeds (TSSS) under actual plant conditions resulted in a gain in ΔCPR margin of 0.125 (0.259 - 0.134 = 0.125) over the licensing bases assumptions. For the case using Normal Scram Speeds (NSS), the gain in margin was 0.131. This is more than the margin of 0.06 that is needed to account for the errors associated with Siemens' CPR methodology.

Table 2 - Cycle 8 Transient (LRNB) Analysis Results

Transient Case	Actual Conditions at TSSS**	Licensing Assumptions at TSSS	Actual Conditions at NSS***	Licensing Assumptions at NSS
Peak Power (%NBR*)	263	442	202	384
Time at Peak Power (sec)	0.98	0.86	0.95	0.86
Peak Average Core Heat Flux (%NBR)	113	134	106	128
Time at Average Peak Heat Flux (sec)	1.15	1.07	1.15	1.08
ΔCPR for SPC 9x9 Fuel	0.134	0.259	0.075	0.206

* NBR - Nuclear Boiler Rated before power uprate

** TSSS - Technical Specification Scram Time (0.430 sec to Notch 45, 0.868 sec to Notch 39, 1.936 sec to Notch 25, 3.497 sec to Notch 5)

*** NSS - Normal Scram Time (0.380 sec to Notch 45, 0.690 sec to Notch 39, 1.500 sec to Notch 25, 2.750 sec to Notch 5)

Analysis of other points in Cycle 8 was not performed because the end of cycle case evaluated above is known to be most limiting. This conclusion is supported by the evaluation of the limiting transient performed above (at EOC), where control rod reactivity insertion was determined to be the most significant factor in the reduction of the power excursion for LRNB (and thus ΔCPR). For that case, only five partially inserted rods provided significant reduction in peak power and ΔCPR.

This conclusion can be used to qualitatively evaluate a potential limiting point that occurred during the beginning of Cycle 8 (BOC8) with a MFLCPR of 0.997 (July 24, 1992 at a core burnup of 51 MWD/MT). In this case, there were many more control rods partially inserted at the initiation of the postulated LRNB transient to help mitigate the power excursion (i.e., eight rods at position 08, four rods at position 16, four at position 42). As a result, the operating conditions at the beginning of the cycle with this rod pattern will result in a transient that is much milder than the one that was evaluated for the end of cycle (Table 2). Accordingly, the conclusion that adequate margins exists at the end of Cycle 8 holds for other points in the cycle as well.