Entergy

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

Subject: River Bend Station
Docket No. 50-458
License No. NPF-47
Additional Information Related to License Amendment Request (LAR) 97-16, Final Feedwater Temperature Reduction Analysis

File No.: G9.5, G9.4.2

Reference: Entergy Operations, Inc. (EOI) Letter to NRC dated April 9, 1998 (RBG-44457)

RBF1-00-0149
RBG-45393

Ladies and Gentlemen:

In the referenced letter, Entergy Operations, Inc. (EOI) requested an amendment to the River Bend Station (RBS) operating license related to final feedwater temperature reduction operation. The attachment to this letter provides additional information that supports NRC review of the original amendment request.

If you have an questions, please contact Mr. Joseph W. Leavines of my staff at 225-381-4642.

Sincerely,

JW Leavines for

Rick J. King

RJK/dnl

Attachment

A001

cc: U. S. Nuclear Regulatory Commission
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Attachment

Additional Information Related to License Amendment Request 97-16
Final Feedwater Temperature Reduction Analysis
River Bend Station

Question 1: In Section 3.1 of GE NEDO- 32549P, Revision 1, you stated that the cumulative fatigue usage factors (CUF) were calculated and documented in Revision 0 for the FWH-OOS or FFWTR for the feedwater nozzles. However, the previously calculated CUFs were based on the increase in CUF due to the increased rapid thermal cycling only, so that the CUFs that were reported were the portion of the feedwater nozzle CUF due to the rapid cycling. Therefore, the Revision 1 has been revised to provide the total fatigue usage which includes the system cycling plus rapid cycling, as required by the ASME Code. Please clarify whether the previous analysis in GE NEDO-31 583, May 1988, which was used for the FWHOS operation at River Bend considered both the rapid cycling and system cycling in the calculation of the feedwater sparger fatigue values which was used to determine the number of days of FWHOS operation allowable per year for various amount of feedwater temperature reduction.

Response 1: For the previous analysis documented in NEDO-31583, both rapid cycling and system cycling were considered in determining the number of days per year for the feedwater heater out of service condition with the feedwater at 370 F and 320 F.

Question 2: On Page 6 of your FWHOS safety evaluation, you stated that the AP loads for River Band Station due to the feedwater line break results in the greatest pressure differentials across the biological shield wall. The jet reaction force and the pipe break restraint loads due to the feedwater line break will increase for the case of a temperature reduction due to the increase in fluid density at a lower temperature. Please confirm that the increases in loads mentioned above were included in the analysis to assess the effects of FWHOS and FFWTR for the structure and pressure boundary integrity reactor internals and NSSS safety related components and supports for River Bend Station.

Response 2: In page 6 of the original FWHOS transmittal, it was concluded that ... "A study was performed to assess the impact of FWHOS operation on the annulus pressurization (AP) loads for River Bend Station. The feedwater line break case results in the greatest forces upon the reactor pressure vessel and the greatest pressure differentials across the biological shield wall. The break flow for this case with FWHOS operation was determined to be less than that presented in the USAR during the inventory depletion period when the peak AP loads occur. Therefore, the normal operation AP loads calculated in the RBS USAR bound those expected to result under FWHOS." This conclusion is applicable to both FWHOS and FFWTR since both analyses assumed a temperature reduction of identical magnitude.

Question 3: In your January 13, 1989 [January 17, 1989], transmittal, you stated that the

additional fatigue usage for piping outside the break exclusion area is 0.0604 with a cumulative fatigue usage of 0.6512. In your August 5, 1988, transmittal, you stated that with continuous FWHOS operation, the fatigue usage factor for the feedwater nozzle would increase by 0.0214 over 40 years of continuous FWHOS operation. In your January 13, 1998 [1999], transmittal, you stated that the critical current CUFs for FW nozzle safe end are 0.95 and 0.98 for nozzles N4B-D and N4A. These values are not calculated based on system cycling and not affected by the feedwater temperature reduction. The usage due to system cycling plus rapid cycling at the blend radius is up to 0.82 for the FWHOS or FFWTR condition. Provide a brief discussion as to why the CUFs for FW nozzle safe ends are not affected by the FWHOS. Please also provide a comparison of CUFs for FW nozzle safe-end, nozzle blend, and spray sparger at the joint with thermal sleeve.

Response 3: The calculated fatigue usage factor of 0.95 and 0.98 due to system cycling for safe end nozzles N4B-D & N4A is not affected by the feedwater temperature reduction since System Cycling is caused by major temperature changes associated with the system transient such as startup being imposed on the nozzle. The nozzle blend radius is the limiting location for rapid fatigue cycling that results from small, high frequency temperature fluctuations caused by mixing of relatively cold nozzle annulus water with hot reactor water. During FFWTR and FWHOS the transient temperature swing and rate of changes associated with these modes of operation is relatively small, and thus do not affect the system cycling usage factor significantly.

The most limiting condition for each component is a reduction in feedwater temperature of 100°F with an average operation of 61 days per year. Therefore, the fatigue usage values for each component are reported for this condition. Only the most limiting section for component is reported in the table below.

Fatigue Usage for the Feedwater Nozzle Components

Component	System	Rapid	Total
Nozzle Safe End N4A	0.98	0.00	0.98
Nozzle Safe End N4B-D	0.95	0.00	0.95
Nozzle Blend Radius N4B-D	0.14	0.68	0.82
Sparger	0.26	0.74	1.00