Entergy

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Rick J. King
Director
Nuclear Safety Assurance

RBG-46011

September 16, 2002

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

SUBJECT: River Bend Station, Unit 1
Docket No. 50-458
Response to Requests for Additional Information
Appendix K Measurement Uncertainty Recovery – Power Uprate Request (License Amendment Request (LAR) 2002-15)

REFERENCE:
1. Entergy letter dated May 14, 2002, Appendix K Measurement Uncertainty Recovery – Power Uprate Request (LAR 2002-15) (RBG-45951)
2. Entergy letter dated August 2, 2002, Response to Requests for Additional Information Appendix K Measurement Uncertainty Recovery – Power Uprate Request (RBG-45984)

Dear Sir or Madam:

Entergy Operations, Inc. (Entergy) requested approval of changes to the River Bend Station (RBS) Operating License and Technical Specifications associated with an increase in the licensed power level in Reference 1. The changes involve a proposed increase in the power level from 3,039 MWt to 3,091 MWt. Based on that submittal, NRC reviewers in the Mechanical and Civil Engineering Branch (MCEB) have asked some questions.

Responses to the questions from the I&C and the electrical reviewers were provided in Reference 2. Responses to questions from the MCEB reviewers are provided in the Attachment. The original no significant hazards considerations included in Reference 1 is not affected by any information contained in this supplemental letter.

There are no new commitments made in this submittal. Should you have any questions or comments concerning this request, please contact Jerry Burford at (601) 368-5755.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on September 16, 2002.

Sincerely,

Rick J. King
Director, Nuclear Safety Assurance

RJK/FGB

Attachments:
Response to Mechanical RAI

cc: U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

NRC Senior Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

U.S. Nuclear Regulatory Commission
Attn: Mr. Michael K. Webb MS O-7D1
Washington, DC 20555-0001

Mr. Prosanta Chowdhury
Program Manager – Surveillance Division
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Attachment

RBG-46011

Response to MCEB questions

Attachment
Response to NRC MCEB questions for RBS Power Uprate

1. In reference to Section 2.5 of Attachment 2 to the amendment request, provide a summary of evaluation for the effect of the proposed power uprate on the structural integrity of the control rod drive mechanism (CRDMs). Confirm whether and how the existing design basis stress and fatigue analysis of the CRDMs remains unchanged for the proposed 1.7% power uprate.

Response:

The components of the CRD mechanism, which form part of the primary pressure boundary, have been designed in accordance with the applicable ASME B&PV Code, Section III. The CRD mechanism structural and functional integrity is acceptable for a bottom head pressure of at least the reactor vessel design pressure.

The CRD mechanism has been evaluated for the proposed 1.7 percent power uprate operating conditions and found to be acceptable. The CRD mechanism is not affected by the different Thermal Power Optimization (TPO) conditions reflected in Table 1-1 of the Thermal Power Optimization Safety Analysis Report (TSAR). Therefore, the existing design basis analysis for stress and fatigue cumulative usage of the CRD mechanisms remains unchanged for the proposed 1.7 percent power uprate.

2. In reference to Section 3.2.2, confirm that the current design basis for the RBS power operation at 3039 MWt bounds the proposed power uprate at 3091 MWt. Provide a summary of the evaluation performed including maximum CUFs, calculated stresses, and code-allowable limits to show that sufficient margin exists in the current design basis for critical reactor vessel components to accommodate the increase steam flow, feedwater flow and temperature due to the proposed power uprate. These components include main closure flange and studs, reactor vessel support skirt, refueling bellows, stabilizer brackets, recirculation and feedwater nozzles.

Response:

The existing licensing basis for the reactor vessel structural evaluation is based on an analysis at 102% of the current licensed thermal power (CLTP) or 3100 MWt, which bounds the proposed TPO uprate at 101.7% or 3091 MWt. The reactor vessel structural evaluation confirmed that the existing licensing basis bounds the conditions proposed by the TPO uprate, as presented in TSAR Sections 3.2.2.1, 3.2.2.2, and 3.2.2.3. No additional evaluations were required to be performed.

3. In reference to Section 3.3.3, you indicated that the generic evaluation in the TLTR (TPO Licensing Topical Report) is applicable to the proposed power uprate condition, and that no further evaluation is needed. However, the TLTR (see Reference 2) has not been approved by the staff. Provide a summary of the evaluation of the steam dryers and separators and discuss how these components are affected by the proposed power uprate. Confirm whether and how the current design basis analysis of the separators and dryers remain valid for the proposed 1.7% power uprate condition.

Response:

TPO increases the saturated steam generated in the reactor core. At constant core flow, this results in an increase in the separator inlet quality and the dryer face velocity and a decrease in the water level inside the dryer skirt. These factors, in addition to the core radial power distribution, affect the steam separator-dryer performance.

The change in the moisture content of the main steam line flow resulting from the change in the above conditions, associated with TPO, is concluded to be negligible based on the acceptable evaluations that have been performed on the larger power uprate evaluations. Also, the effect of the higher TPO steam flow on the steam dryer pressure drop is concluded to be negligible based on the small increase evaluated on all of the larger power uprate evaluations (TLTR, Appendix I, Table I-1). The available margins support acceptable performance with TPO for 1.7% power uprate.

4. In reference to Section 3.4, provide a summary describing the effect of the proposed power uprate on the safety-related thermowells and sample probes in the MS, FW, and recirculation piping systems. Confirm whether and how the existing flow induced vibration (FIV) analysis of the thermowells and sample probes remains valid for the proposed 1.7 percent power uprate.

Response:

FIV analyses have been performed for the safety-related thermowells and sample probes in the MS, FW, and recirculation piping systems at the proposed 1.7 percent power uprate condition. The analytically predicted maximum bounding FIV stress at the proposed 1.7 percent power uprate condition is 4,600 psi, which is below the allowable stress of 7,000 psi at 10^{11} cycles for carbon steel material. Thus, the safety-related thermowells and sample probes in the Main Steam (MS), Feedwater (FW), and recirculation piping systems are structurally adequate for the FIV at the proposed 1.7 percent power uprate condition.

5. In reference to Section 3.5.1, identify the piping systems attached to the FW lines that are affected by the proposed power uprate and provide a summary of the TPO evaluation for these piping systems.

Response:

There are no piping systems attached to FW lines that are affected by TPO.

The table in Section 3.5.1 discusses that the current licensing basis bounds TPO conditions for the FW piping. Since the FW piping system itself is unaffected by TPO, the piping systems attached to FW are acceptable, and no further evaluation of such piping systems was performed.

6. In reference to Section 3.5.2, list the most critical balance of plant (BOP) piping systems that were evaluated for the power uprate. Provide a summary of evaluations performed for BOP piping, components, and pipe supports, nozzles, penetrations, guides, valves, pumps, heat exchangers, and anchorage for pipe supports.

Response:
The evaluations of the balance of plant piping for the recent 5% uprate were performed at a reactor dome pressure of 1074 psia and a core power level of 3100 MWt (which included a 2 percent power uncertainty). Details of these evaluations were provided in Entergy letter RBG-45293, dated April 3, 2000, in response to NRC questions on that application (see responses to questions 5 and 6). Note that some of the information for the Main Steam System provided in that letter was later revised in Entergy letter RBG-45428, dated July 18, 2000 (see response to question 10). In addition, any effects of the increase in flow on flow accelerated corrosion (FAC) are covered by the existing program for monitoring pipe wall thinning. These evaluations considered the bounding temperature, pressure, and flow changes in the impacted systems. The plant conditions considered bound those for the TPO uprate conditions. Therefore, there is no change in BOP piping or component stresses or pipe support loads.