Entergy

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April 6, 2007
JAFP-07-0047

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

REFERENCES:
1. Letter, Entergy to USNRC, "James A. FitzPatrick Nuclear Power Plant, Docket No. 50-333, License No. DPR-59, License Renewal Application," JAFP-06-0109, dated July 31, 2006
2. Letter, USNRC to JAFNPP, "Requests for Additional Information Regarding the Review of the License Renewal Application for James A. FitzPatrick Nuclear Power Plant (TAC No. MD2666)," dated February 23, 2007

SUBJECT: **Entergy Nuclear Operations, Inc.**
**James A. FitzPatrick Nuclear Power Plant**
**Docket No. 50-333, License No. DPR-59**
**License Renewal Application, Amendment 8**

Dear Sir or Madam:

On July 31, 2006, Entergy Nuclear Operations, Inc. submitted the License Renewal Application (LRA) for the James A. FitzPatrick Nuclear Power Plant (JAFNPP) as indicated by Reference 1. Attachment 1 provides responses to the requests for additional information as detailed by the NRC in Reference 2. The response to questions concerning section 4.3.1, Class 1 Fatigue will be provided at a later date. To support the response to section 4.3.1 questions, JAF is currently performing a detailed review of the original design basis cycle analysis and subsequent analyses. The result of this review will be a report providing the technical details of what methods were used, why the current design basis allowable cycles are appropriate and how JAF intends to address differences between the current allowable number of cycles and the projected number of cycles. A formal response to the section 4.3.1 questions will be provided no later than June 30, 2007, as discussed with the NRC staff on a March 26, 2007 telecon. This schedule was acceptable to the NRC staff.

Should you have any questions concerning this submittal, please contact Mr. Jim Costedio at (315) 349-6358.

A124

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I declare under penalty of perjury that the foregoing is true and correct. Executed on the 6th day of April, 2007.

Sincerely,

PETE DIETRICH
SITE VICE PRESIDENT

PD/cf

Attachment 1

cc:

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Section 4.7.1 - Recirculation Isolation Valves

Background

In qualifying the Recirculation Isolation Valves for TLAA, the Licensee in LRA Section 4.7.1, Recirculation Isolation Valves, partially quotes the method of analysis and qualification requirements stated in Table 16.2-7 of the Updated Final Safety Analysis Report (UFSAR) in reference to the 28" Suction and Discharge Recirculation Valves. It also states that fatigue evaluation was not required for these valves.

The UFSAR indicates that these valves are designed to withstand the effects of cyclic loads and provides the criteria, method and requirements for the fatigue evaluations in Table 16.2-7. Table 16.2-7 provides specific criteria with experimental and analytical methods for evaluating and qualifying the 28" Suction and Discharge Recirculation Valves. For the analytical method it specifies the ASME Boiler and Pressure Vessel Code, Nuclear Vessels Section III Article 4. In Art 4, Design, fatigue evaluation is part of the required design criteria and the UFSAR in Table 16.2-7 provides cycles with defined service of operation for fatigue evaluations. It also indicates that the results from the fatigue evaluations were plotted and showed that the flange region of the valve is adequate for the defined service. Table 16.2-7 also provides requirements with calculated values and allowables for the primary and the primary plus secondary stresses for the valve body, bonnet and bonnet joint bolts.

Referencing the recirculation isolation valves, the UFSAR states, "For fatigue evaluations consider 30 cycles of normal pressurization followed by blowdown and 270 cycles of normal pressurization followed by normal depressurization."

As these valves are not ASME class valves, no specific fatigue analysis was required; however, the number of cycles suggested by the UFSAR is greater than the number of cycles allowed as part of the Fatigue Monitoring Program, so the transients suggested will not be exceeded. Thus this TLAA will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(I).

RAI 4.7.1-1

Provide the basis for the referenced cycles in LRA Section 4.7.1 and elaborate on your rational for concluding that the LRA cycles are less than those referenced in the UFSAR Table 16.2-7.

**Response to RAI 4.7.1-1:**

The number of cycles referenced in LRA Section 4.7.1 is quoted from UFSAR Table 16.2-7. A fatigue analysis using these numbers was not identified during review of the current licensing basis. The cycles in Table 16.2-7 are normal pressurization cycles followed by depressurization. Depressurization by blowdown is specified for 30 cycles. Of the transient cycles in LRA Table 4.3-2, the relief valve blowdown transient has an allowable number of cycles of two, which is much less than the value of 30 in Table 16.2-7. The normal pressurization followed by normal depressurization of the recirculation valves accompanies normal startup followed by normal cooldown of the RCS. The allowable number of heatup and cooldown cycles of the RCS as stated in LRA Table 4.3-2 is 233. This value is less than the value of 270 specified in Table 16.2-7 for normal pressurization followed by normal depressurization. As discussed in the

response to RAI 4.7.1-2 below, these cycles were not used for the evaluation of fatigue for the recirculation valves; however, JAFNPP conservatively addressed the cycle assumptions listed in UFSAR Table 16.2-7 as a potential TLAA.

RAI 4.7.1-2

As stated in UFSAR table 16.2-7, fatigue evaluation and interpretation of results was required to qualify the 28" Suction and Discharge Recirculation Valves for 40 year life. Discuss how this UFSAR requirement will be maintained for a 20 year life extension.

**Response to RAI 4.7.1-2:**
UFSAR section 4.3.5 states that the recirculation piping and related equipment was evaluated in accordance with ANSI B31.1; and this code does not require a fatigue analysis. The UFSAR does not state that a fatigue analysis was done and does not reference a fatigue analysis for the recirculation valves. JAFNPP has not identified a fatigue analysis for the recirculation isolation valves, merely the guidance in Table 16.2-7 for what cycles to include if the analysis is done. To be conservative, JAFNPP evaluated the numbers of cycles listed in Table 16.2-7 as if those numbers had been used in a fatigue TLAA. If a fatigue analysis was done for the JAFNPP recirculation valves, it will remain valid for the period of extended operation because the cycles specified in Table 16.2-7 will not be exceeded during 60 years of plant operation as discussed in the response to RAI 4.7.1-1.

RAI 4.7.1-3

UFSAR Table 16.2-7 also provides requirements with calculated values and allowables for the primary and the primary plus secondary stresses for the valve body, bonnet and bonnet joint bolts. In LRA space, determine the suitability of joint bolts for UFSAR defined service cycles projected to end of life extension. If not required provide justification.

**Response to RAI 4.7.1-3:**

The calculation for primary plus secondary stresses does not change based on the number of cycles or number of years of operation. Rather the primary plus secondary stresses represent the greatest stresses seen during any of the transients. Since the calculated values do not change, the bonnet joint bolts remain suitable for the period of extended operation.

RAI 4.7.1-4

LRA Section 4.7.1 states that, "the number of cycles suggested by the UFSAR is greater than the number of cycles allowed as part of the Fatigue Monitoring Program, so the transients suggested will not be exceeded." Provide a reference that contains the number of cycles allowed in the Fatigue Monitoring Program for the UFSAR defined services for fatigue evaluations stated in UFSAR Table 16.2-7 for the 28" Suction and Discharge Recirculation Valves. In LRA Section 4.7.1, show that these cycles projected to end of life extension are less than the UFSAR cycles.

**Response to RAI 4.7.1-4:**

The Fatigue Monitoring Program monitors and limits the number of transient cycles of the reactor coolant system to the values specified in UFSAR Table 4.2-3. These values are provided in LRA Table 4.3-2, in the column "Current Design Basis Cycles, Allowable." Of the

design transients defined, the most numerous, transients 5 and 6, represent only a small fraction of a full temperature cycle. The total number of full temperature cycles represented by these cycle limits is well below the 7000 cycles allowed by ANSI B31.1.0.

For the monitored cycles, actual historical cycles were projected to the end of the period of extended operation in LRA Table 4.3-2. As stated in Table 4.3-2 the shutdown cycles are projected to reach 244 cycles. This is less than the value of 270 cycles specified in Table 16.2-7 for normal pressurization followed by normal depressurization of the recirculation isolation valves. All other cycles pertinent to the recirculation isolation valves project well below their allowed numbers. The JAFNPP Fatigue Monitoring Program is discussed in LRA Appendix B, Section B.1.12 and will ensure the allowed cycles are not exceeded.

Section 4.7.2 Leak Before Break

Background

The staff reviewed LRA Section 4.7.2 and per our discussions with the applicant during the staff's and applicant's conference call on 2/12/07, the staff requests that the applicant revise and resubmit Section 4.7.2 after addressing the following points:

1. Remove all references to the terms "Leak Before Break," as the TLAA being discussed clearly predates the formal concept of Leak Before Break documented in Standard Review Plan Section 3.6.3.

2. Rename section 4.7.2 with a title that describes the primary purpose of the analysis in UFSAR Section 16.3.2 and the staff's original Safety Evaluation Report for licensing of the facility, Section 5.2.2.

3. Discuss the specific "time limited" part of the original analysis and provide a description of the "plant modifications" (or non-installations) which were permitted based on the original analysis including locations, or systems in the plant to which the modifications were permitted.

4. Conclude with an explanation of how the TLAA will be addressed in the context of the ongoing LRA review OR include a commitment to be submitted with the completed TLAA for review at least 2 years prior to entering the period of extended operation.

**Response to Section 4.7.2:**

UFSAR Section 16.3.2.2 discusses an evaluation of the necessity of pipe whip restraints whose installation could have an adverse effect on plant safety such as hindering inservice inspections (ISI). As part of the evaluation, the growth of a crack prior to sudden rupture is calculated using a fatigue analysis to predict the propagation of cracks that originate at defects permitted by the ANSI B31.7 Code. UFSAR Section 16.3.2.2 concludes that for cyclic stress equal to the design yield strength with defect sizes permitted by the Code, the fatigue life of each pipe line is greater than 100,000 transient cycles. While the 100,000 transient cycles is not a time-limited assumption defined by the current operating term, the analysis is conservatively evaluated as a TLAA. As shown in LRA Table 4.3-2, no transients are projected to exceed 100,000 cycles during 60 years of operation. Since transient cycles will not exceed 100,000 in 60 years of operation, the existing fatigue crack growth analysis presented in UFSAR Section 16.3.2.2 remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

The LRA is revised to change the title of LRA Section 4.7.2 to "Fatigue Crack Growth Analysis for UFSAR Section 16.3.2.2". The text of Section 4.7.2 is replaced with the previous paragraph. LRA Table 4.1-1 is revised to replace "Leak before break" with "Fatigue Crack Growth Analysis" and "Analysis will be projected" with "Analysis remains valid 10 CFR 54.21(c)(1)(i)". Appendix A is revised to change the title of Section A.2.2.6 to "Fatigue Crack Growth Analysis for UFSAR Section 16.3.2.2". The text for Section A.2.2.6 is revised to state the following.

> "UFSAR Section 16.3.2.2 concludes that for cyclic stress equal to the design yield strength with defect sizes permitted by the Code, the fatigue life of each pipe line is greater than 100,000 transient cycles. Since transient cycles will not exceed 100,000 in 60 years of operation, the existing fatigue crack growth analysis presented in UFSAR Section 16.3.2.2 remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i)."