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W3F1-2005-0084

December 19, 2005

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

Subject: Additional Response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors"
Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

Dear Sir or Madam:

By letter dated September 16, 2005 (W3F1-2005-0063), Entergy provided a response to Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors". Entergy committed to provide additional information related to the Generic Letter by December 15, 2005. On December 15, 2005 Entergy requested and was granted by Waterford 3's NRC Project Manager, Mel Fields, an extension to provide the additional information by December 21, 2005. The extension was requested because of shifting site resources used to address the recently issued B.5.b Demand for Information letter.

Attachment 1 of this letter provides the additional information.

There are no new commitments contained in this submittal.

If you have any questions or require additional information, please contact Greg Scott at 504-739-6703.

Sincerely,

A handwritten signature in black ink, appearing to read "Jason M. Laque".

JML/GCS/cbh

Attachment

ALL

cc: Dr. Bruce S. Mallett
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Waterford Steam Electric Station Unit 3
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U. S. Nuclear Regulatory Commission
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Attachment 1
To
W3F1-2005-0084

**Additional Response to Generic letter 2004-02, "Potential Impact of
Debris Blockage On Emergency Recirculation During Design Basis
Accidents at Pressurized Water Reactors"**

Waterford 3 committed action

Notification to you should a Technical Specification change be required as a result of analysis or plant modifications made to address this generic letter

Response

Waterford 3 will not require a Technical Specification Change as a result of analysis or plant modifications made to address this generic letter.

Waterford 3 committed action

Provide the results of the downstream effects evaluation for long-term wear

Provide the resolution and corrective actions for the downstream components that will be performed with the long-term evaluations

Response

The critical components in the flow paths downstream of the sump have been evaluated for the effects of internal wear and blockage considering a replacement sump screen. The impact of debris is determined for the entire duration of a loss-of-coolant accident (LOCA) for 30 days as specified in the Final Safety Analysis Report, Chapter 15, using the methodologies; WCAP 16406-P Rev. 0, "Evaluation of Downstream Sump Debris Effects in Support of GSI-191" and letters LTR-SEE-05-160, "Depletion Coefficients for Fibrous and Non-Fibrous Debris," LTR-SEE-05-172, "Mass Distribution of Failed Coatings," and LTR-SEE-05-174, "Addenda to Appendix F and Section 7 of WCAP-16406-P". The following provides a summary of the downstream effects evaluation.

- The calculated wear on the high-pressure safety injection (HPSI) pumps' wear ring gap exceeds the acceptance criterion of 0.034" for wear ring clearances.
- The calculated wear on the containment spray (CS) pumps' wear ring gap exceeds the acceptance criterion of 0.058" for wear ring clearances.
- The calculated wear on the heat exchanger tubes is less than the acceptance criteria of 0.031" minimum wall thickness and therefore is acceptable for the impact of the debris.
- The calculated wear on the HPSI pump mechanical seal cooling heat exchangers tubes is negligible and therefore the impact of debris is acceptable.
- The calculated wear on the CS pump mechanical seal cooling heat exchangers tubes is less than the acceptance criteria of 0.042" minimum wall thickness and therefore is acceptable for the impact of the debris.
- The calculated increase in the system flow for the flow restriction orifices is less than the acceptance criterion of an increase in system flow less than or equal

to 3% and therefore is acceptable. The exceptions are the 3" orifices with 1.116" bore which have unacceptable increase in system flow.

- The calculated change in flow rate in the containment spray nozzles exceeds the acceptance criterion of 10% increase in the flow rate through the nozzles.
- The calculated stress in the throttle valves for the HPSI injection header valves and reactor coolant loop hot leg valve is less than the minimum allowable stress of 14,700 psi. Therefore, these valves are acceptable for the impact of the debris.
- There is no impact on control instrumentation and associated root isolation valves due to debris. The fluid velocities in the HPSI and CS piping lines are sufficient to keep debris in suspension, and the sensing lines are located either at the top or at the side of the main pipe which eliminate the possibility of debris settling into the sensing lines.
- The nuclear fuel will not be impacted as adequate reactor coolant system flow will be maintained with the use of a strainer with a high fibrous debris capture efficiency.
- In addition to aforementioned components, several relief valves are addressed for potential leakage. It is determined the relief valves are not exposed to pressure exceeding their set points when there is debris in the fluid and therefore are acceptable for the impact of debris.

In conclusion, the HPSI and CS pumps, size 3-inch orifices with 1.116-inch bore, and containment spray nozzles would have unacceptable wear. Entergy is further evaluating the components which do not meet the acceptance criteria to reduce the wear or blockage in order to arrive at an acceptable resolution.