November 6, 2001

Mr. John T. Herron
Vice President Operations
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO TECHNICAL SPECIFICATION CHANGE REGARDING APPENDIX K MARGIN RECOVERY - POWER UPRATE REQUEST (TAC NO. MA2971)

Dear Mr. Herron:

By letter dated September 21, 2001, Entergy Operations, Inc. proposed changes to the Waterford Steam Electric Station, Unit 3 (Waterford 3) Technical Specifications, which would allow an increase in the rated thermal power of Waterford 3 from 3,390 megawatts thermal (MWt) to 3,441 MWt.

After reviewing your request, the Nuclear Regulatory Commission staff has determined that additional information is required to complete the review. On October 26, 2001, we discussed this information with your staff by telephone and they agreed to provide the additional information requested in the enclosure within 30 days of receipt of this letter.

If you have any questions, please call me at (301) 415-1480.

Sincerely,

/RA/

N. Kalyanam, Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure: Request for Additional Information

cc: See next page

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REQUEST FOR ADDITIONAL INFORMATION

ENTERGY OPERATIONS, INC.

WATERFORD STEAM ELECTRIC STATION, UNIT 3

1. In Attachment 2, on page 3-2, the licensee states:

   "The power calorimetric uncertainty calculation described in Section 3.5.10 indicates that with the LEFM [Leading Edge Flow Meter] CheckPlus devices installed, the power measurement uncertainty (based on a 95 percent probability at a 95 percent confidence interval [95/95]) is less than 0.5 percent. Therefore, these analyses only need to reflect a 0.5 percent power measurement uncertainty...."

   Table 3.2-1 on page 3-5 provides secondary calorimetric power measurement uncertainty components with "1σ normal with mean=0" values. These 1σ-values are not 95/95 values because 95/95 requires a 2σ normal distribution about the mean, as opposed to a 1σ normal distribution about the mean. Provide a revised Table 3.2-1 listing the 2σ values and the supporting calculations of power measurement component uncertainties.

   Additionally, Section 3.5.10 does not describe the power calorimetric uncertainty calculation methodology or the method of determining the power measurement confidence interval, as introduced in the above quoted licensee statement. Provide a clarification of the introductory statement regarding Section 3.5.10.

2. In Attachment 2, on page 3-3, the licensee states:

   "Reactor power is calculated in the Core Operating Limits Supervisory System (COLSS), which resides in the plant monitoring computer (PMC). The inputs to the COLSS secondary calorimetric calculation include feedwater flow, feedwater temperature, steam flow, steam generator pressure, steam header pressure, and blowdown flow. The Caldon LEFM CheckPlus meters will provide the preferred feedwater flow and temperature input to COLSS. The venturi-based feedwater or main steam flow measurement and feedwater temperature element inputs will be available to COLSS for back up in the event the Caldon LEFM CheckPlus units become inoperable."

a) In calculating secondary calorimetric power (BSCAL), the typical COLSS derives steam flowrate by subtracting an operator-entered constant representing steam generator (SG) blowdown flowrate from measured feedwater flowrate, as opposed to using the inputs from the main steam flow sensors. Consequently, main steam flow measurement is not a back up input in a typical COLSS for secondary calorimetric calculations. Does the COLSS at Waterford Steam Electric Station, Unit 3 (Waterford 3) use the main steam flow sensor inputs to calculate BSCAL?

b) Will the existing feedwater temperature resistance thermal detectors and venturi flow meters be periodically calibrated and tested to ensure operability in the event an LEFM CheckPlus becomes inoperable?

3. In Attachment 2, on page 3-3, the licensee states:

> "The LEFM CheckPlus feedwater mass flow and temperature input will also be used in COLSS to adjust or “calibrate” the feedwater and main steam venturi-based flow meters calculated mass flows. The LEFM CheckPlus temperature input will be used in COLSS to adjust or “calibrate” the feedwater temperature input. The adjustments are made continuously in COLSS by comparing the Caldon LEFM CheckPlus output to the venturi and temperature element outputs. The venturi and temperature element outputs are compensated by comparison-based multipliers to match the Caldon LEFM CheckPlus output. The comparison-based multipliers are stored in memory within the COLSS program.
>
> In the event the Caldon LEFM CheckPlus units become inoperable, the control room operators are promptly alerted by the control room annunciator and computer alarms. COLSS will automatically use the venturi and temperature element outputs, adjusted by the comparison based multipliers retrieved from memory, to continue calculating reactor power based on the secondary calorimetric...."

a) Since the COLSS secondary calorimetric calculation uses a steam flow value that is derived from the feedwater flow and an operator-entered constant representing SG blowdown flow, why does the COLSS “calibrate” the main steam flow meters?

b) Will the feedwater control system use the LEFM CheckPlus “calibrated” feedwater flow, steam flow, and feedwater temperature signals to control feedwater flow?

4. In Attachment 2, on page 3-4, the licensee states:

> "In the event the Caldon LEFM CheckPlus units become inoperable, the control room operators are promptly alerted by the control room annunciator and computer alarms. COLSS will automatically use the venturi and temperature element outputs, adjusted by the comparison based multipliers retrieved from memory, to continue calculating reactor power based on the secondary calorimetric. Without the Caldon LEFM CheckPlus units in operation, the comparison based multipliers are no longer continuously updated. The uncertainties of the venturi and temperature element based inputs are expected to increase over time due to drift and ambient temperature uncertainty effects. These effects will be addressed through administrative controls."

In Attachment 2, on pages 3-6 to 3-7, the licensee states:

> "The LEFM CheckPlus operability requirements will be contained in the Waterford 3 Technical Requirements Manuals (TRM). A Limiting Condition for Operation (LCO) has been drafted for inclusion in the TRM stating that an operable Leading Edge Flow Meter (LEFM CheckPlus) shall be used in the performance of the calorimetric heat balance measurements whenever power is greater than the pre-uprate level of 3,390 MWt. If the LEFM CheckPlus is not operable, plant operation will be administratively controlled at a power level consistent with the accuracy of the available instrumentation. With these controls, the effect on plant operations is that power will be reduced and maintained to a level that accounts for the appropriate

instrumentation uncertainties thereby preserving ECCS [Emergency Core Cooling System] limits."

a) The use of comparison-based multipliers to allow continued operation at the uprated power level assumes that the Caldon LEFM CheckPlus units become inoperable before updating the values of the comparison-based multipliers with potentially incorrect “calibration” data. If this last set of comparison-based multipliers could not be validated, the accuracy of the venturi and temperature elements should not be assumed. Consequently, the reactor power level could not be determined from a secondary calorimetric based on these uncertainties, and the reactor power should be reduced to a power level commensurate with the current accuracy of the instrumentation, which is 3,390 MWt. Provide a justification for operating at power levels greater than the current 3,390 MWt power level when an LEFM CheckPlus instrument is not operable.

b) During plant power level transitions, which can occur at rates up to 5 percent rated thermal power per minute, or as a result of a 10 percent step change in power, changes in turbine power cause the steam flow to change before the feedwater flow changes. Since the LEFM CheckPlus feedwater mass flow and temperature input are used in COLSS to adjust or “calibrate” the feedwater and main steam venturi-based flow meter mass flows, and if the LEFM CheckPlus becomes inoperable during or immediately following a power transition, the continuously updated comparison-based multipliers obtained just prior to the LEFM CheckPlus becoming inoperable may not reflect the correct steam flow rate. Describe the effect this condition would have on safe plant operations.

5. In Attachment 2, page 3-19, Section 3.5.10 states:

> "If the ultrasonic feedwater flow measurement equipment is out of service for more than the allowed outage time (AOT), it will be necessary to reduce the LPL [licensed power level] in COLSS (see Section 3.2)."

This paragraph should state that the LPL in COLSS should be reduced to 3,390 MWt.

6. In Attachment 2, on page 3-55, Section 3.10.3.1, the licensee states:

> "The CPCS [Core Protection Calculator System] SPVMIN [Setpoint Variable Minimum Value], the floor for the VOPT [Variable Overpower Trip], is used as mitigating action against transients starting from a low power state (e.g., CEAW [Control Element Assembly Withdrawal] from Hot Zero Power (HZP)) (Table 4-2, UFSAR [Updated Final Safety Analysis Report] Section 15.4.1.2). Currently the floor of the VOPT, SPVMIN, is set at 30% of 3,990 MWt. To maintain the credited reactor trip at the same absolute power level, SPVMIN will be reduced by the ratio of the new and old Rated Thermal Power definitions. Thus, for operation at a Rated Thermal Power of 3,441 MWt, SPVMIN will have a setpoint of 29.6% of 3,441 MWt."

a) The text should be corrected to state the current floor of the VOPT, SPVMIN, Rated Thermal Power as 30 percent of 3,390 MWt instead of 3,990 MWt.

b) In the cited statement, the absolute power of the old SPVMIN is 1,017 MWt, and the absolute power of the proposed SPVMIN (using 29.6 percent of 3,441 MWt) would be approximately 1,018.5 MWt, or 1.5 MWt higher. To maintain a conservative value for SPVMIN, the absolute power of 1,017 MWt should be retained for the proposed SPVMIN. Provide a justification for using an absolute power greater than 1,017 MWt (e.g., 29.6 percent of 3,441 MWt) instead of the existing SPVMIN value.

Waterford Generating Station 3

cc:

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