



*Entergy*

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W3F1-2009-0010

March 18, 2009

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

Subject: RAI #2 Response to Amendment Request NPF-38-276,  
Core Protection Calculator Power Calibration Adjustment Limit  
Waterford Steam Electric Station, Unit 3  
Docket No. 50-382  
License No. NPF-38

- REFERENCES:
1. Entergy letter dated September 17, 2008, "License Amendment Request NPF-38-276, Core Protection Calculator Power Calibration Adjustment Limit" (W3F1-2008-0050)
  2. NRC Request for Additional Information Regarding "License Amendment Request NPF-38-276 to Modify Core Protection Calculator Power Calibration Adjustment Limit," dated December 2, 2008 (TAC NO. MD9657)
  3. RAI Response to Amendment Request NPF-38-276, "Core Protection Calculator Power Calibration Adjustment Limit," dated January 8, 2009 (W3F1-2009-0001)
  4. NRC Request #2 for Additional Information Regarding "License Amendment Request NPF-38-276, to Modify Core Power Calculator Power Calibration Adjustment Limit," dated February 6, 2009 (TAC NO. MD9657)

Dear Sir or Madam:

By letter (Reference 1), Entergy Operations, Inc. (Entergy) proposed a change to the Waterford Steam Electric Station, Unit 3 (Waterford 3) Technical Specification (TS) 3/4.3.1 to revise Note 2 of Technical Specification Table 4.3-1.

By letter (Reference 2), the NRC issued five RAI questions. Entergy responded by letter (Reference 3) to the five RAI questions.

AODI  
LRR

By letter (Reference 4), the NRC issued four RAI questions. Entergy's responses to the four RAI questions are included in Attachment 1.

There are no technical changes proposed. The conclusions of the original no significant hazards consideration included in Reference 1 are not affected by any information contained in this RAI response letter.

There are no new regulatory commitments contained in this submittal. If you have any questions or require additional information, please contact Robert J. Murillo Manager, Licensing at (504) 739-6715.

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 18, 2009.

Sincerely,



KJC/MEM/ssf

Attachment: RAI #2 Response to Amendment Request NPF-38-276, Core Protection Calculator Power Calibration Adjustment Limit

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**Attachment 1**

**W3F1-2009-0010**

**RAI #2 Response to Amendment Request NPF-38-276, Core Protection Calculator  
Power Calibration Adjustment Limit**

**RAI 1 - Explain how paragraph 50.36(c)(3) of Title 10 of the Code of Federal Regulations (10 CFR) is met, even when not performing a heat balance calibration Surveillance Requirement (SR) during the initial power ascension following refueling.**

*Background:*

*Note 2 of Table 4.3-1 currently states, in part, "Between 15% [percent] and 80% of RATED THERMAL POWER, compare the Linear Power Level, the CPC at  $\Delta T$  power, and CPC nuclear flux power signals to the calorimetric power. If any signal is greater than the calorimetric calculation by more than 10%, then adjust the affected signal(s) to within 0.0% to 10% of the calorimetric."*

*The LAR proposes to modify Note 2 to state, in part, "Between 15% and 80% of RATED THERMAL POWER, compare the RPS Linear Power, CPC  $\Delta T$  power, and CPC neutron flux power indications to calorimetric power and take the following actions as applicable: IF either the CPC  $\Delta T$  power or the CPC neutron flux power indication is greater than calorimetric power by more than 10% of RATED THERMAL POWER; THEN calibrate the affected CPC power indication such that it is 8% to 10% of RATED THERMAL POWER greater than calorimetric power. This requirement does not apply during the initial power ascension following refueling but becomes applicable after the first calibration of the CPC power indications at or above 80% of RATED THERMAL POWER in the power ascension."*

*Regarding why the requirement does not apply during the initial power ascension following refueling, the LAR states, "This is because it is recognized that all power indications are closely monitored during startup testing and significant deviations of CPC power from calorimetric power would be promptly corrected. Therefore, this situation is not explicitly addressed in the setpoint and safety analyses because the likelihood that a power increasing event would occur and result in conditions inconsistent with analysis assumptions is acceptably low."*

*10 CFR 50.36(c)(3) states "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."*

*It is unclear how the justification in the LAR is sufficient enough to support the assertion that a SR, as required by 10 CFR 50.36(c)(3), does not need to apply during the initial power ascension following refueling. The licensee's justification that indications are closely monitored and significant deviations would be promptly corrected appears insufficient. The ability to closely monitor and promptly correct deviations does not negate the regulatory requirement for inclusion in TS .*

**Entergy Response:**

The W3 LAR is not changing this statement of Note 2 in a substantive manner. The passage ["If any signal is within -0.5% to +10% of the calorimetric calculation, then do not calibrate except as required during initial power ascension following refueling."] is being changed to [IF RPS Linear Power or either CPC power indication is within -0.5% to +10% of RATED THERMAL POWER of calorimetric power, THEN do not calibrate the

affected indication except as required during the initial power ascension following refueling."]. The change is merely breaking out the term "any signal" to the pertinent signals which constitute the term "any signal," which are RPS Linear Power or either CPC power indication.

Regarding system design, the W3 heat balance (calorimetric power) is calculated continuously and automatically and updates every 30 seconds (COLSS). The calorimetric power is an automatically calculated function performed by COLSS. Additionally, during the initial power ascension following refueling, a key aspect is that not adjusting CPC power indications downward is conservative; for example, if CPC power indications are adjusted downward by 5% at 20% power and this results in the CPC power indications being lower by 5% when 80% power is reached, then the plant power indication is non-conservative (i.e. CPC power indication is less than actual plant power). Regarding RPS Linear Power indication, during initial power ascension following refueling, the power indication is checked per procedure, but is not credited in the Safety Analysis.

***RAI 2 - In order to ensure that the CPC trip signal calibration is captured in TS, state if the CPC indications and trip signals can be calibrated independently.***

*Background:*

*Section 7.2.1.1.2.5 of the FSAR states:*

*Outputs of each CPC are:*

- a. DNBR [departure from nucleate boiling ratio] trip and pretrip
- b. DNBR margin (to control board indication)
- c. Local power density trip and pretrip
- d. Local power density margin (to control board indication)
- e. Calibrated neutron flux power (to control board indication)
- f. CEA [control element assembly] withdrawal prohibit on DNBR or local power density pretrip or CEA misoperation
- g. Hot pin axial shape index (to control board indication)

*The outputs of the CPC contain both indications and trip signals. Note 2 of Table 4.3-1 currently compares the Linear Power Level, the CPC at  $\Delta T$  power, and CPC nuclear power signals to the calorimetric calculation above 15% RATED THERMAL POWER. Note 2 contains actions to adjust the signals for various deviations from the calorimetric calculation. The LAR proposes to modify Note 2 to compare the Linear Power Level, the CPC at  $\Delta T$  power, and CPC nuclear power indications to the calorimetric calculation above 15% RATED THERMAL POWER and to adjust the indications for various deviations from the calorimetric calculation.*

*10 CFR 50.36(c)(3) states "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."*

*It is unclear if the CPC indications and trip signals can be calibrated independently such that, as a result of the proposed change, the trip signal calibration may not be captured in TS as required by 10 CFR 50.36(c)(3).*

**Entergy Response:**

The "indications" that are discussed in the proposed revision to Note (2) are calculated values within the CPC software. These values are used in the CPC trip decision logic as well as being available for display and adjustment/calibration. Therefore, calibrating these indications results in appropriate adjustments to the trip decision process within the CPC software.

**RAI 3 - State if the discussion in the Bases on PCALIB (the CPC addressable constant)** provides information that is an exception to the Note 2 TS SR, provides amplifying information on how to achieve the Note 2 TS SR, or provides information in order to ensure that parameters other than those listed in the Note 2 TS SR are maintained.

*Background:*

*The Bases submitted with the proposed LAR state:*

*CPCs use the addressable constant PCALIB to determine power dependent biases for use in its calculations. Thus, when calibrations of CPC power indications are performed, it may be necessary to adjust the CPC constant PCALIB as described below:*

- *While operating below 80% RATED THERMAL POWER (plus uncertainty), whenever the calibration of either CPC neutron flux power or CPC  $\Delta T$  power is adjusted, PCALIB must be set equal to the lower of the power level (in % RATED THERMAL POWER) of that adjustment and the power level (in % RATED THERMAL POWER) of the most recent calibration adjustment (or verification) of the other power indication (the one not being calibrated).*
- *PCALIB can be set to the current power level (in % RATED THERMAL POWER) whenever both CPC neutron flux power and CPC  $\Delta T$  power are adjusted or verified to be within the Technical Specification requirements at that power level.*
- *PCALIB can be set to 100.0 whenever both CPC neutron flux power and CPC  $\Delta T$  power have been adjusted or verified to be within the Technical Specification requirements at or above 80% RATED THERMAL POWER (plus uncertainty).*
- *PCALIB must be set to 20.0 prior to initial power ascension following refueling.*

*10 CFR 50.36(c)(3) states "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."*

*It is unclear if the discussion in the Bases on PCALIB provides information that is an exception to the Note 2 TS SR, provides amplifying information on how to achieve the*

*Note 2 TS SR, or provides information in order to ensure that parameters other than those listed in the Note 2 TS SR are maintained. This clarification is needed in order to ensure that the SR contained in the TS continue to satisfy 10 CFR 50.36(c)(3).*

**Entergy Response:**

The discussion in the Bases on PCALIB is not related to the change to Note (2) of the TS Table 4.3-1. It describes and clarifies requirements for adjustment of the CPC addressable constant PCALIB such that the CPCs use appropriate power dependent biases in all of their calculations.

PCALIB is set to the power level of the most recent adjustment or verification of the CPC power indications. CPC uses either the power dependent bias for the current power level or the one for PCALIB, whichever is larger.

The discussion of PCALIB in the Technical Specification 3/4.3.1 Bases provides amplifying information to support that the Quarterly Functional Testing Surveillance Requirement for Functional Unit 14 continues to be met.

***RAI 4 - Paragraph 3 on page 5 of Attachment 1 to the licensee's letter dated September 17, 2008 states that "...Specifying that adjustment limits are percentages of RATED THERMAL POWER instead of percentages of current power is essentially Editorial..."***

*Please clarify why changes to the units (rated thermal power vs. current power) in adjustment limits do not change the current TS requirements and are editorial in nature. (Are the changes consistent with the CPC power calculation algorithm?)*

**Entergy Response:**

This change is intended to clarify that the adjustment limits were and are in units of Rated Thermal Power. The language in "Paragraph 3 on page 5 of Attachment 1" is imprecise and shouldn't have implied that the adjustment limits were percentages of current power. The plant has not used the adjustment limits in percentages of current power.