



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 1, 2009

Vice President, Operations
Entergy Operations, Inc.
Waterford Steam Electric Station, Unit 3
17265 River Road
Killona, LA 70057-3093

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - REQUEST FOR
ADDITIONAL INFORMATION RE: LICENSE AMENDMENT REQUEST TO
MODIFY TECHNICAL SPECIFICATION SECTION 5.6, "FUEL STORAGE,"
AND ADD NEW TECHNICAL SPECIFICATION 3/4 9.12, "SPENT FUEL POOL
(SFP) BORON CONCENTRATION" (TAC NO. MD9685)

Dear Sir/Madam:

By letter dated September 17, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082660649), Entergy Operations, Inc. (the licensee), submitted an application for a license amendment request to the U.S. Nuclear Regulatory Commission (NRC) requesting an amendment to the license in the form of changes to the Technical Specification to take credit for soluble boron in Region 1 (cask storage pit) and Region 2 (spent fuel pool and refueling canal) fuel storage racks for the storage of both Standard and Next Generation Fuel assemblies.

The NRC staff has reviewed the application and has determined that additional information contained in the enclosure is needed to complete the review.

NRC discussed the need for additional information on November 17, 2008, with Mr. G. Scott of your staff. Mr. Scott agreed to provide a response within 30 days of the receipt of this letter.

If you have any questions, please contact me at (301) 415-1480 or by electronic mail at kaly.kalyanam@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "N. Kalyanam", with a horizontal line underneath.

N. Kalyanam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure: As stated

cc w/encl.: Distribution via ListServ

OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR ADDITIONAL INFORMATION
WATERFORD STEAM ELECTRIC STATION, UNIT 3
LICENSE AMENDMENT REQUEST REGARDING
FUEL STORAGE, SPENT FUEL BORON CONCENTRATION

By letter dated September 17, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082660649), Entergy Operations, Inc. (the licensee), submitted an application for a license amendment request to the U.S. Nuclear Regulatory Commission (NRC) requesting an amendment to modify Technical Specification (TS) 5.6, "Fuel Storage," and add new TS 3/4 9.12, "Spent Fuel Pool (SFP) Boron Concentration" to take credit for soluble boron in Region 1 (cask storage pit) and Region 2 (spent fuel pool and refueling canal) fuel storage racks for the storage of both Standard and Next Generation Fuel (NGF) assemblies.

Entergy submitted the application to revise the Waterford Steam Electric Station Unit 3 (Waterford 3) licensing basis to reflect the new spent fuel pool (SFP) criticality analysis. The licensee performed the new analysis to credit soluble boron in the fuel storage racks for both Standard and NGF.

Currently, there is not a generically approved methodology for performing SFP criticality analysis. Therefore, each plant-specific submittal must provide reasonable assurance that the applied methodology provides conservative results. The NRC staff has reviewed the application and determined that the following information is needed for the NRC staff to complete its review.

1) Burnup profile:

In the letter dated September 17, 2008, the licensee states that, "Calculations are conservatively performed with the axial burnup distribution shown in Table 5.3 (see Section 5.3) and with an axially constant burnup, and the higher reactivity is used in the analyses."

- (a) The application, however, appears to lack information demonstrating that these distributed and axially constant profiles are bounding for the fuel assemblies at Waterford 3. Please describe the methodology used for the profile selection.
- (b) Please describe how the effects of using blanketed fuel and/or operating with control rods/axial power shaping rods were considered?

- (c) The application identifies two distributed profiles for two burnup intervals: one for ≤ 25 gigawatt-days/ton (GWD/T) and another for ≥ 25 GWD/T. How was the transition point determined?

2) Burnup uncertainty:

In the letter dated September 17, 2008, the licensee states that burnup uncertainty was applied in accordance with the staff guidance (Reference 1). However, it does not indicate how the reactivity decrement was calculated. Please provide the enrichment and burnup combinations used to determine the decrement.

3) Depletion parameters:

NUREG/CR-6665, "Review and Prioritization of Technical Issues Related to Burnup Credit for LWR Fuel" (Reference 2), recommends using the maximum fuel and core outlet temperature. Table 5.2 of HI-2084014 identifies the average temperatures for the fuel and moderator.

- (a) Please state if the assumed temperatures for the fuel and moderator bound all projected operating conditions at Waterford (if that is the case). If not, provide justification for using less than the maximum temperature.
- (b) The application identifies 1000 parts per million (ppm) as the bounding soluble boron concentration. Please provide the cycle-average soluble boron concentration at Waterford.

In addition to moderator/fuel temperature and soluble boron concentration, please address the other core depletion parameters indicated in NUREG/CR-6665 as well.

4) Fuel rod and assembly parameters:

In the letter dated September 17, 2008, the application states that, "Tolerance calculations were performed for pure water only since the presence of soluble boron in the pool lowers reactivity and reactivity effects of tolerances, and therefore the pure water case bounds the soluble boron case." Please provide quantitative support for this assertion.

5) CASMO-4

In support of the amendment request, CASMO-4 is used to determine the reactivity effects due to rack tolerances, assembly design, and pool temperature. The application does not provide any validation of the code for these uses. Please justify the use of CASMO-4 for these purposes.

6) Soluble Boron Requirements:

The application provides no discussion on the soluble boron methodology. Please explain how the soluble boron requirements were determined.

References:

1. NRC Memorandum from L. Kopp to T. Collins, Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light-Water Reactor Power Plants," August 19, 1998 (ADAMS Accession ML003728001).
2. NUREG/CR-6665, "Review and Prioritization of Technical Issues Related to Burnup Credit for LWR Fuel"

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Sincerely,
/RA/

N. Kalyanam, Project Manager
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*Minor editorial changes only from staff RAI

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|--------|-------------|-------------|--------------|-------------|-------------|
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| DATE | 1-2-09 | 1/2/09 | 11/05/08 | 1/2/09 | 1-2-09 |

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Grids Completed 1/2/09 - SML