

April 27, 2005

MEMORANDUM TO: John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Christopher Gratton, Sr. Project Manager, Section 1 /RA/
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: VOGTLE ELECTRIC GENERATING STATION, UNITS 1 AND 2 -
FACSIMILE TRANSMISSION OF DRAFT REQUEST FOR
ADDITIONAL INFORMATION (TAC NOS. MC4225 AND MC4226)

The Nuclear Regulatory Commission (NRC) staff transmitted the attached facsimiles containing questions to Mr. Jack Stringfellow of the Southern Nuclear Operating Company on November 30 2004 (Attachment 1), February 11, 2005 (Attachment 2), and March 24, 2005 (Attachment 3). The requests for additional information (RAIs) supported conference calls with the licensee regarding their application dated August 13, 2004. The February 17 call discussed the February 11, 2005, RAI, the February 22 call discussed the November 30, 2004, RAI, and the April 7, 2005, call was held to ensure the scope and breadth of the responses was clear. The licensee's application proposed to supplant the previous spent fuel pool rack criticality analysis with updated criticality calculations.

During the February 17, 2004, call, it was determined that the responses to questions 1 and 2 of the February 11, 2005, RAI resided in material already docketed, which was contained in the application, or was not needed to arrive at a safety conclusion. Therefore, the NRC staff determined that no response was necessary. The NRC staff clarified what information was needed for questions 3a, 3b, and 4. The NRC staff transmitted a revised RAI, enclosed in this noted-to-file as Attachment 3, on March 24, 2005. No other changes to any RAI was deemed necessary based on the conference calls. The NRC staff agreed that responses could be consolidated, as necessary. The licensee also agreed to provide a description of axial reactivity effects as part of their overall response.

This memorandum and the attached questions do not convey or represent an NRC staff position regarding the licensee's request.

Docket Nos. 50-424 and 50-425

Attachments: 1. Request for Additional Information sent 11/30/2004
2. Request for Additional Information sent 2/11/2005
3. Revised 11/30/2004 RAI sent 3/24/2005

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DRAFT
REQUEST FOR ADDITIONAL INFORMATION
LICENSE AMENDMENT REQUEST
SPENT FUEL RACK CRITICALITY ANALYSES
VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2
DOCKET NOS. 50-424 AND 50-425

1. On page 20 of attachment 5 to your submittal, you stated that the Boral® replacement Phase I racks were manufactured with “new” Boral® plates and the Phase II racks were manufactured with both “new” and “reclaimed” Boral® plates. The NRC staff requests the licensee to answer the following questions:
 - a. Explain the difference between what is consider a “new” and what is consider a “reclaimed” Boral® plate.
 - b. The licensee stated that the boral replacement racks were originally constructed for the Main Yankee spent fuel pool (SFP). Please clarify if these racks were ever used in the Maine Yankee SFP. If the racks were used, then clarify if the racks were checked to ascertain the physical state of the racks and tested for any degradation (e.g, blistering, etc.) prior to installation in the Vogtle SFP.
 - c. Was the B-10 content verified prior to installation? Is it the same amount for both the “new” and reclaimed” plates?
 - d. Are there any manufacturing or material differences between these types of plates? If there are differences, explain how these differences are accounted for in the expected performance of Boral®.
2. On page 8 of attachment 5 to your submittal, you stated that for conservatism, all of the Vogtle, Unit 1 storage cells were simulated with the dimensions associated with the thickest (0.2 inches) Boral® plates. The staff believes that instead of using the “reclaimed” plates, more conservatism would be introduce by using the “new” plates, which have a thickness of 0.081 inches. Please explain how would more conservatism be introduced in the computer model by using the thickest Boral® plates.
3. Recently, incidents of Boral® blistering have been reported and the impact on the expected performance of this material is not yet known. The NRC staff requests the licensee to explain if a Boral® coupon surveillance program is in place to monitor Boral® degradation. The licensee should include a complete description of its program (see below). If a program does not currently exists, the NRC staff requests the licensee to implement a coupon surveillance program to ensure consistent material performance. This program should monitor the physical and chemical properties of Boral® over time and should include the following:

- I. A description of the coupons used (e.g., from the same lot as the panels).
- II. The technique for measuring the initial Boron-10 (B-10) content of the coupons.
- III. Frequency of coupon removal and its justification.
- IV. Tests to be performed on the coupons (e.g., weight and dimension measurement (length, width and thickness), and B-10 content).

In addition, the licensee should discuss the impact it would have on the analyses should the coupons reveal a change in material performance from that assumed in the analyses.

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1. The vendor for the rack analysis stated that the methodology proposed in the application dated August 13, 2004, would not be used again. Please explain the basis for basing your application on this methodology.
2. The shortcomings of the Westinghouse methodology are alluded to on page E1-1 of Enclosure 1, namely, the axial shape bias and the reactivity equivalencing techniques. The first of these is dealt with on page 29 of Enclosure 5. Section 3.3 discusses the modeling utilized to simulate the axial depletion. However, upon reading this section, it is apparent that axial depletion is not being performed, rather, the method appears to assume a uniform axial distribution. Does the methodology use a uniform axial distribution, and if so, why, when the majority of the industry depletes the assemblies using a number of axial zones?
3.
 - a. In the second paragraph of Section 3.3 of attachment 5, reference is made to average moderator and temperature profiles utilized to perform spectral calculations. However, no basis was provided for these choices. Please provide the basis for these selections.
 - b. In the third paragraph of Section 3.3, reference is made to the use of boron in all the DIT (Discrete Integral Transport) calculations. Were these calculations performed in compliance with NUREG-6683, A Critical Review of the Practice of Equating the Reactivity of Spent Fuel to Fresh Fuel in Burnup Credit Criticality Safety Analyses for PWR Spent Fuel Pool Storage," September 2000.
4. It is not clear to the NRC staff where the subject of reactivity equivalencing is discussed and employed. If so, why is this practice being used when practically every other licensee and vendor has stopped using it. Please provide chapter and section pointing to this subject matter.

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1. On page 20 of attachment 5 to your submittal, you stated that the Boral[®] replacement Phase I racks were manufactured with “new” Boral[®] plates and the Phase II racks were manufactured with both “new” and “reclaimed” Boral[®] plates. The staff requests the licensee to answer the following questions:
 - a. Explain the difference between what is consider a “new” and what is consider a “reclaimed” Boral[®] plate.
 - b. The licensee stated that the Boral[®] replacement racks were originally constructed for the Maine Yankee spent fuel pool (SFP). Please clarify if these racks were ever used in the Maine Yankee SFP. If the racks were used, then clarify if the racks were checked to ascertain the physical state of the racks and tested for any degradation (e.g., blistering, etc.) prior to installation in the Vogtle SFP.
 - c. Was the B-10 content verified prior to installation? Is it the same amount for both the “new” and “reclaimed” plates?
 - d. Are there any manufacturing or material differences between these types of plates? If there are differences, the licensee should explain how these differences are accounted for in the expected performance of Boral[®].
2. On page 8 of attachment 5 to your submittal, you stated that for conservatism, all of the Vogtle, Unit 1 storage cells were simulated with the dimensions associated with the thickest (0.2 inches) Boral[®] plates. The staff believes that instead of using the “reclaimed” plates, more conservatism would be introduce by using the “new” plates, which have a thickness of 0.081 inches. Please explain how would more conservatism would be introduced in the computer model by using the thickest Boral[®] plates.
3. Recently, incidents of Boral[®] blistering have been reported and the impact on the expected performance of this material is not yet known. The NRC staff requests the licensee to explain if a Boral[®] coupon surveillance program is in place to monitor Boral[®] degradation. The licensee should include a complete description of its program (see below). Discuss your plans to implement a coupon surveillance program to ensure consistent material performance. A coupon surveillance program should monitor the physical and chemical properties of Boral[®] over time and should include the following:
 - I. A description of the coupons used (e.g., from the same lot as the panels).
 - II. The technique for measuring the initial Boron-10 (B-10) content of the coupons.
 - III. Frequency of coupon removal and its justification.
 - IV. Tests to be performed on the coupons (e.g., weight and dimension measurement: length, width and thickness), and B-10 content.

In addition, the licensee should discuss the impact it would have on the analyses should the coupons reveal a change in material performance from that assumed in the analyses.

4. In your submittal dated November 20, 1997, an areal density of 0.0238 g/cm^2 was assumed for the criticality analysis. In your submittal dated August 13, 2004, this same value is also assumed. Given that the racks have been exposed to radiation for many years at Maine Yankee and approximately 7 years at Vogtle; and tests have not been performed to verify the areal density of the panels prior to installation, provide the technical basis for the assumed areal density value and its continued use in the current criticality analysis. This justification should address Reference 4 of your November 20, 1997 submittal and industry experience.