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Energy to Serve Your World™

NL-05-1152

July 7, 2005

Docket Nos.: 50-424
50-425

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant
Request to Revise Technical Specifications to Reflect Updated Spent Fuel
Rack Criticality Analyses for Units 1 and 2
Response to Supplemental Request for Additional Information (RAI)

Ladies and Gentlemen:

On August 13, 2004, Southern Nuclear Operating Company (SNC) submitted a request to revise the Vogtle Electric Generating Plant (VEGP) Technical Specifications to reflect updated spent fuel rack criticality analyses for Units 1 and 2. On May 3, 2005, SNC responded to Requests for Additional Information (RAI) forwarded to SNC on February 11, 2005, and March 24, 2005.

On June 16, 2005, the Staff electronically forwarded a supplemental RAI to SNC.

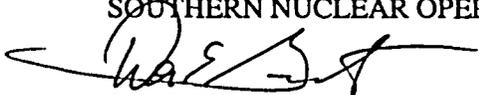
The enclosure of this letter contains the responses to the supplemental RAI of June 16, 2005.

Mr. D. E. Grissette states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company, and to the best of his knowledge and belief, the facts set forth in this letter are true.

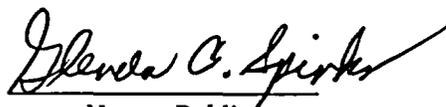
This letter contains no NRC commitments. If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY


Don E. Grissette

Sworn to and subscribed before me this 7th day of July, 2005.


Notary Public

My commission expires: 11/10/06



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DEG/RJF/daj

Enclosure: Response to Request for Additional Information Forwarded to SNC on
June 16, 2005

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. T. E. Tynan, General Manager – Plant Vogtle
RType: CVC7000

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. C. Gratton, NRR Project Manager – Vogtle
Mr. G. J. McCoy, Senior Resident Inspector – Vogtle

State of Georgia
Mr. L. C. Barrett, Commissioner – Department of Natural Resources

Enclosure

**Vogtle Electric Generating Plant
Response to Request for Additional Information
Forwarded to SNC on June 16, 2005**

Enclosure
Vogle Electric Generating Plant
Response to Request for Additional Information
Forwarded to SNC on June 16, 2005

Question 1

Regarding calculation X6CKA.01, dated 9/25/97, the results for both methods demonstrate that the criticality assumption is bounded by the manufacturing specifications of both types of panels, but it is not clear to the staff whether manufacturing tolerances were factored into the calculations. Please discuss whether manufacturing tolerances were factored into the B-10 areal density calculations.

Response to Question 1

The purpose of calculation X6CKA.01 was to demonstrate that the areal density of the "new" Boral bounded that of the "reclaimed" Boral. The areal density of the "new" Boral is less than that for the "reclaimed" Boral; therefore, it is conservative to assume the lower value in the analyses.

The calculation X6CKA.01 determined the areal density of the "reclaimed" Boral by two methods.

In the first method, the calculation of B-10 areal density is based on the conversion of the B₄C areal density to a B-10 areal density. The B₄C areal density is a minimum value, after accounting for manufacturing tolerances, thereby resulting in a minimum B-10 areal density.

In the second method, the calculation of B-10 areal density is based on the weight percent (w/o) of B₄C in the Boral core and the Boral core thickness. The values of these are minimum values, after accounting for manufacturing tolerances, thereby resulting in a minimum B-10 areal density.

The values for the B-10 areal density of the "reclaimed" Boral calculated by both methods are greater than the B-10 areal density of the "new" Boral. The B-10 areal density of 0.0238 gm/cm² for the "new" Boral is also a minimum value. It is the minimum requirement in the specification from the rack fabricator to the manufacturer of Boral. This is confirmed in the Boral manufacturer's certificate of compliance.

It is concluded that the B-10 areal density for the "new" Boral is bounding. In addition, the value used in the analyses is a minimum specified value. Therefore, further accounting for manufacturing tolerances is not required.

Question 2

In your response to RAI No. 1b (ML051260207), you stated that Maine Yankee (MY) had implemented a surveillance procedure once per cycle which involved drag testing and visual inspection of the cells to monitor for signs of bulging. Given that blistering is now known to occur in the Boral panels, does VEGP have any surveillance procedures in place, and if not, does it plan to implement any surveillance procedures similar to those at MY to monitor the potential for bulging and blistering (via drag testing, visual inspection or any other method)?

Response to Question 2

The issues of "bulging" and "blistering" are two separate and unrelated issues as discussed below.

Bulging

The Boral panels are enclosed in an annulus or enclosure between the storage cell wall and an outer stainless steel wrapper. In early vintage racks using Boral, the outer wrapper was welded all the way around to form a water-tight annulus. Not all of the welds were water-tight, thereby resulting in water intrusion into the annulus. Due to chemical reactions with the water, gas formation occurred which caused pressure buildup in the annulus. The pressures were apparently sufficient to cause deformation (bulging) of the cell wall. This resulted in interference between the cell wall and fuel assemblies during insertion and withdrawal. To address this issue, later vintages of racks were vented, i.e., vent holes were drilled to preclude pressure buildup in the annulus. Even though the Maine Yankee racks installed at VEGP were vented, Maine Yankee continued to perform drag testing due to a prior commitment.

This was previously discussed in response to questions from the Staff during the initial licensing of the Maine Yankee racks at VEGP (Enclosure 5 of letter LCV-0828-D, May 19, 1998, SNC to NRC). It was also discussed in the response to Staff Question 1b in Enclosure 2 of letter NL-05-0803, May 3, 2005.

Continued drag testing would not provide any new information. In addition, since the bulging issue was resolved by venting the annulus, VEGP will not perform drag testing, or other testing, to monitor for bulging.

Blistering

The main concern with blistering is the reduction of the flux trap size and the potential impact on the criticality analyses. As previously described in the response to Staff Question 3 in Enclosure 2 of letter NL-05-0803, May 3, 2005, VEGP does not have a Boral coupon surveillance program. VEGP does not have any Boral surveillance coupons. Drag testing would not provide any insights into the blistering issue. Further, because the Boral is enclosed in a stainless steel wrapper (discussed above), visual inspection of the Boral panels is not possible.

SNC will continue to monitor the blistering issue as discussed in the response to Staff Question 4 below.

Question 3

In your response to RAI No. (ML051260207), you named some of the conservatisms that would offset the effects of blistering on reactivity. Two of the conservatisms were that the B-10 content is uniformly reduced by 10 percent and that the limiting flux trap size is modeled. Regarding the B-10 content conservatism, the staff is not clear whether this 10

percent reduction is taken from the value of 0.0238 g/cm² or if it is already included in this value. With respect to the modeling of the flux trap size, it is not clear to the staff what this entails. Is this assumption meant to take into account the effects of blistering on reactivity?

Response to Question 3

B-10 Content

Some of the new fuel rods are coated with zirconium diboride (ZrB₂). This is known as an Integral Fuel Burnable Absorber (IFBA). The IFBA are credited in the criticality analyses. It is the B-10 content of the IFBA that was uniformly reduced by 10%. This is described in Sections 1.5, 3.1.2, and 3.5.1 for Unit 1 in Enclosure 5 of the amendment request, and in Sections 1.5 and 3.5.4.2 for Unit 2 in Enclosure 6 of the amendment request (letter NL-04-0973, August 13, 2004, SNC to NRC).

Flux Trap

The modeling of the flux trap is described in Sections 1.3, 1.5, 2.3, 3.1.1, and 3.1.2 for Unit 1 in Enclosure 5 of the amendment request. It is also described in the response to Staff Questions 1a and 2 in Enclosure 2 of letter NL-05-0803, May 3, 2005. The "reclaimed" Boral panels are thicker than the "new" Boral panels. By modeling each storage location as having the thicker Boral panels, the amount of water between adjacent cells (the flux trap region) is minimized which acts to increase reactivity. This assumption was made to bound both types of Boral panels.

Question 4

In your response to RAI No. 3 (ML051260207), you stated that SNC continues to monitor issues regarding the application of Boral in spent fuel racks through its Operating Experience and Corrective Actions Program and through the internal operating experience at one of its other plants that has a Boral surveillance program. The staff would like more information regarding the use of Boral in the other SNC plant; for example:

- a. How long has the Boral been in use there?*
- b. What kind of tests are performed and how often have the coupons been tested?*
- c. Is the coupon environment (fuel exposure) similar to that of VEGP?*

Response to Question 4

As discussed previously in the response to Staff Question 3 in Enclosure 2 of letter NL-05-0803, May 3, 2005, VEGP does not have a Boral coupon surveillance program. Also, in the same response, SNC stated that the racks were licensed for use at VEGP in 1998 (Amendment 102 to FOL NFP-68 and Amendment 80 to FOL NFP-81 dated June 29, 1998) with no requirement for a Boral surveillance program. This is the current licensing basis for the Unit 1 spent fuel storage racks.

Bulging is discussed in response to Staff Question 2 above. Depletion of B-10 was previously addressed in the response to Staff Question 3 in Enclosure 2 of letter NL-05-0803, May 3, 2005. In addition, as discussed in the same response, VEGP does not have any Boral surveillance coupons. Creating Boral coupons from the VEGP racks would require destruction of storage cells.

Blistering, as discussed in the response to Staff Question 2 above, is a recently identified phenomenon. It is still an emerging issue. As previously discussed in the response to Staff Question 3 in Enclosure 2 of letter NL-05-0803, May 3, 2005, SNC continues to monitor issues regarding the application of Boral in spent fuel racks through its Operating Experience and Corrective Action programs. In addition, SNC continues to monitor the internal operating experience at one of its other plants that has a Boral surveillance program. Such information is considered part of the database of operating experience. SNC also is a participant in the Electric Power Research Institute (EPRI) Users' Group that follows industry issues with regards to Boral. This provides SNC access to research data and industry operating experience information.

Additional Question

In addition, the staff would like to confirm that VEGP has the proper material certification documentation from MY for any testing and a discussion of the results performed to the Boral prior to their installation in VEGP.

Response to Additional Question

For the "reclaimed" Boral, SNC has the Boral manufacturer's report of quantitative testing of Boral samples that provided the necessary data for the Boral thickness and B-10 areal density. In addition, SNC has the specification developed by the rack fabricator for the "new" Boral B-10 areal density requirements as well as the Boral manufacturer's certificate of conformance. Data from these documents were used for determining the B-10 areal density as discussed in the response to Staff Question 1 above.

As discussed in the response to Staff Questions 3 in Enclosure 2 of letter NL-05-0803, May 3, 2005, Maine Yankee did not have a Boral coupon surveillance program. Also, as discussed in the response to Staff Question 1b of the same letter, no testing was performed on the Boral prior to installation at VEGP.