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July 31, 2008

Docket Nos.: 50-424
50-425

NL-08-1155

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

Vogtle Electric Generating Plant
Supplemental Response to NRC Generic Letter 2004-02

Ladies and Gentlemen:

By letter dated May 22, 2008 (NL-08-0818), Southern Nuclear Operating Company (SNC) requested an extension for the final response to Generic Letter 2004-02 for the completion of:

- Downstream effects evaluations in accordance with WCAP-16406-P Rev. 1, "Evaluation of Downstream Sump Debris Effects in Support of GSI-191" and WCAP-16793-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid."
- Completion of chemical effects testing and evaluation of test results.

An extension was granted by the NRC to July 31, 2008, in a letter dated May 29, 2008.

The Enclosure contains the responses for the downstream effects questions for components and in-vessel. All responses related to the chemical effects questions will be issued by August 29, 2008 as discussed in SNC extension request letter NL-08-1195, dated July 31, 2008, and with members of NRC staff on July 28 and 31, 2008.

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

Mr. M. J. Ajluni states he is Nuclear Licensing Manager for Southern Nuclear Operating Company and 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.

(Affirmation and signature are provided on the following page)

Sincerely,

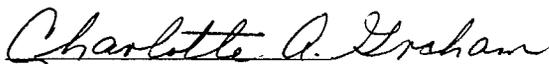


Mark J. Ajluni
Manager – Nuclear Licensing

MJA/DWM/cag

Enclosure: 1. Vogtle Electric Generating Plant Supplemental Response to
NRC GL 2004-02

Sworn to and subscribed before me this 31 day of July, 2008.


Notary Public

My commission expires: 6/9/12

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. T. E. Tynan, Vice President – Vogtle
Mr. D. H. Jones, Vice President - Engineering
RType: CVC7000

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. R. A. Jervey, NRR Project Manager – Vogtle
Mr. G. J. McCoy, Senior Resident Inspector – Vogtle

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3.m Downstream Effects - Components and Systems

- 1) **If NRC-approved methods were used (e.g., WCAP-16406-P with accompanying NRC SE), briefly summarize the application of the methods. Indicate where the approved methods were not used or exceptions were taken, and summarize the evaluation of those areas.**

SNC Response to 3.m.1:

The VEGP downstream effects evaluation uses the methodology presented in WCAP-16406-P Revision 1 to evaluate the ECCS and CSS components.

In response to GSI-191 and NRC GL 2004-02, Westinghouse has evaluated the downstream impact of sump debris on the performance of the ECCS and CSS following a LOCA at VEGP Units 1 and 2. The effects of debris ingested through the containment sump strainer during the recirculation mode of the ECCS and CSS include erosive wear, abrasion, and potential blockage of flow paths. The smallest clearance found for the VEGP Units 1 and 2 heat exchangers, orifices, and spray nozzles in the recirculation flow path is 0.375 inches (3/8") for the containment spray nozzles. No blockage of the ECCS flow paths is expected with a sump strainer hole size of 0.09375 inch (3/32").

The instrumentation tubing is also evaluated for potential blockage of the sensing lines. The transverse velocity past this tubing is determined to be sufficient to prevent debris settlement into these lines, so no blockage will occur.

The VEGP heat exchangers, orifices, and spray nozzles were evaluated for the effects of erosive wear for a limiting debris concentration over the mission time of 30 days. The erosive wear on these components is determined to be insufficient to affect the system performance.

For pumps, the effect of debris ingestion through the sump strainer on three aspects of operability, including hydraulic performance, mechanical shaft seal assembly performance, and mechanical performance (vibration) of the pump, were evaluated. The hydraulic and mechanical performances of the pump were determined to not be affected by the recirculating sump debris. The mechanical shaft seal assembly performance evaluation resulted in the one action item with the suggested replacement of the RHR pumps' carbon/graphite backup seal bushings with a more wear resistant material, such as bronze. However, VEGP has an Engineered Safety Feature (ESF) atmospheric filtration system in its auxiliary building and this action is not required.

Evaluations of the system valves showed that the minimum recirculation flow rates are adequate to preclude debris sedimentation in all cases. All of the valves that are subject to being blocked pass the plugging criteria at their current positions, since the strainer mesh size is smaller than the minimum valve clearance. All of the valves that are subject to erosion pass the acceptable criteria for the mission time of 30 days. In order to evaluate the

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plugging on the equipment within the ECCS and CSS recirculation flow paths, the clearances within the components are compared to the maximum debris size expected to be ingested through the sump strainer. The wear evaluation on this equipment is performed using the wear models developed in WCAP-16406-P, Revision 1.

2) Provide a summary and conclusions of downstream evaluations.

SNC Response 3.m.2: See response to 3.m.1.

3) Provide a summary of design or operational changes made as a result of downstream evaluations

SNC Response to 3.m.3:

Orifices were installed in the Unit 1 and Unit 2 Intermediate and High Head ECCS lines. The associated throttle valves were adjusted to ensure that no blockage will occur.

3.n Downstream Effects - Fuel and Vessel

1) Show that the in-vessel effects evaluation is consistent with, or bounded by, the industry generic guidance (WCAP-16793), as modified by NRC staff comments on that document. Briefly summarize the application of the methods. Indicate where the WCAP methods were not used or exceptions were taken, and summarize the evaluation of those areas.

SNC Response to 3.n.1:

SNC is participating in the PWR Owners Group (PWROG) program to evaluate downstream effects related to in-vessel long-term cooling. The results of the PWROG program are documented in WCAP-16793-NP (WCAP-16793-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in Recirculating Fluid," Rev. 0, May, 2007), which was provided to the NRC staff for review in June 2007. The program was performed such that the results apply to the entire fleet of PWRs, regardless of the design (e.g., Westinghouse, CE, or B&W). The PWROG program demonstrated that the effects of fibrous debris, particulate debris, and chemical precipitation would not prevent adequate long-term core cooling flow from being established. In the cases that were evaluated, the fuel clad temperature remained below 750 degrees F in the recirculation mode. This is well below the acceptance criterion of 2200 degrees F in 10 CFR 50.46 acceptance criteria for emergency core cooling systems for light-water nuclear power reactors. The specific conclusions reached by the PWROG are noted below.

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- Adequate flow to remove decay heat will continue to reach the core even with debris from the sump reaching the RCS and core. Test data has demonstrated that any debris that bypasses the screen is not likely to build up an impenetrable blockage at the core inlet. While any debris that collects at the core inlet will provide some resistance to flow, in the extreme case that a large blockage does occur, numerical analyses have demonstrated that core decay heat removal will continue. Per WCAP 16793-NP, Revision 0, no plant specific evaluation is recommended. This conclusion thus applies to VEGP.
- Decay heat will continue to be removed even with debris collection at the fuel assembly spacer grids. Test data has demonstrated that any debris that bypasses the screen is small and consequently is not likely to collect at the grid locations. Further, any blockage that may form will be limited in length and not be impenetrable to flow. In the extreme case that a large blockage does occur, numerical and first principle analyses have demonstrated that core decay heat removal will continue. Per WCAP 16793-NP, Revision 0, no plant specific evaluation is recommended. This conclusion thus applies to VEGP.
- Fibrous debris, should it enter the core region, will not tightly adhere to the surface of fuel cladding. Thus, fibrous debris will not form a "blanket" on clad surfaces to restrict heat transfer and cause an increase in clad temperature. Therefore, adherence of fibrous debris to the cladding is not plausible and will not adversely affect core cooling. Per WCAP 16793-NP, Revision 0, no plant specific evaluation is recommended. This conclusion thus applies to VEGP.
- Using an extension of the chemical effects method developed in WCAP-16530-NP to predict chemical deposition of fuel cladding, two sample calculations using large debris loadings of fiberglass and calcium silicate, respectively, were performed. The cases demonstrated that decay heat would be removed and acceptable fuel clad temperatures would be maintained. WCAP-16530-NP, Revision 0 evaluated the potential for chemical precipitation to form on the cladding surface as summarized in the preceding bullet, which is demonstrated in WCAP-16793, Revision 0, to produce acceptable fuel clad temperature results for two sample cases. As recommended in the WCAP-16793-NP, Revision 0, VEGP has performed a plant-specific calculation using plant-specific parameters and the recommended WCAP methodology. The results of this calculation confirm that chemical plate-out on the fuel does not result in the prediction of fuel cladding temperatures above the 750 degrees F acceptance criterion.

3.0 Chemical Effects

All responses related to the chemical effects questions will be issued by August 29, 2008 as discussed in SNC extension request letter NL-08-1195 dated July 31, 2008 and with members of your staff on July 28 and 31, 2008.