

J. Barnie Beasley, Jr., P.E.  
Vice President  
Vogtle Project

Southern Nuclear  
Operating Company, Inc.  
40 Inverness Center Parkway  
P.O. Box 1295  
Birmingham, Alabama 35201

Tel 205.992.7110  
Fax 205.992.0403



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November 6, 1998

LCV-1268

Docket Nos.: 50-424,  
50-425

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

Ladies and Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT  
RESPONSE TO NRC GENERIC LETTER 98-04

On July 14, 1998, the NRC issued Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment". The subject generic letter addresses the NRC staff's concerns regarding the impact of potential coating debris on the operation of safety-related systems, structures, and components (SSCs) during a postulated design basis loss-of-coolant accident (LOCA). Protective coatings are necessary inside containment to control radioactive contamination and to protect surfaces from erosion and corrosion. The NRC staff is concerned that significant detachment of coatings from the substrate may prevent the emergency core cooling systems (ECCS) from satisfying the requirements of 10 CFR 50.46(b)(5) for providing long-term cooling. In addition, they are concerned that any such detachment of coatings from their substrate may prevent the safety-related containment spray system (CSS) from satisfying the plant-specific licensing basis of controlling containment pressure and radioactivity releases following a LOCA. Generic Letter 98-04 requests information under 10 CFR 50.54(f) to evaluate the licensees' programs for ensuring that Service Level 1 (as defined in Attachment 3 to the generic letter) protective coatings inside containment do not detach from their substrate during a design basis LOCA and interfere with the operation of the ECCS and the safety-related CSS.

The generic letter requires that, within 120 days of the date of the generic letter, licensees provide information in response to generic letter item 1, and item 2(i) or item 2(ii), as appropriate.

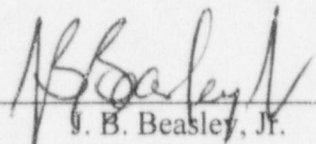
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The enclosure provides the required 120-day response for Vogtle Electric Generating Plant (VEGP), Units 1 and 2.

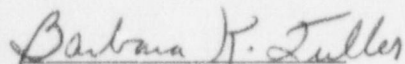
Please contact this office should there be any questions in this regard.

Mr. J. B. Beasley, Jr. states that he is Vice President of Southern Nuclear Operating Company and is authorized to execute this oath on its behalf, and to the best of his knowledge and belief, the facts set forth in this letter and the enclosure thereto are true.

SOUTHERN NUCLEAR OPERATING COMPANY

By:   
J. B. Beasley, Jr.

Sworn to and subscribed before me this 5th day of November, 1998.



Notary Public

My Commission Expires: 12/12/01

JBB/JAE/jae

Enclosure: Response to NRC Generic Letter 98-04

xc: Southern Nuclear Operating Company

Mr. W. L. Burmeister (w/o enclosure)

Mr. J. T. Gasser (w/o enclosure)

Mr. M. Sheibani (w/enclosure)

SNC Document Management (w/enclosure)

U. S. Nuclear Regulatory Commission

Mr. D. H. Jaffe, Senior Project Manager, NRR (w/enclosure)

Mr. L. A. Reyes, Regional Administrator (w/enclosure)

Mr. J. Zeiler, Senior Resident Inspector, Vogtle (w/enclosure)

ENCLOSURE  
TO  
SOUTHERN NUCLEAR OPERATING COMPANY  
LETTER LCV-1268

VOGTLE ELECTRIC GENERATING PLANT  
RESPONSE TO NRC GENERIC LETTER 98-04

Licenseses were required to submit a written response to NRC Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment", that includes the information outlined below in Items 1, and 2(i) or 2(ii). Each item is addressed below.

- (1) A summary description of the plant-specific program or programs implemented to ensure that Service Level 1 protective coatings used inside the containment are procured, applied, and maintained in compliance with applicable regulatory requirements and the plant-specific licensing basis for the facility. Include a discussion of how the plant-specific program meets the applicable criteria of 10 CFR Part 50, Appendix B, as well as information regarding any applicable standards, plant-specific procedures, or other guidance used for: (a) controlling the procurement of coatings and paints used at the facility, (b) the qualification testing of protective coatings, and (c) surface preparation, application, surveillance, and maintenance activities for protective coatings. Maintenance activities involve reworking degraded coatings, removing degraded coatings to sound coatings, correctly preparing the surfaces, applying new coatings, and verifying the quality of the coatings.**

**Response to Item 1:**

Controls were implemented for the procurement, application, and maintenance of Service Level 1<sup>1</sup> protective coatings used inside containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to Vogtle Electric Generating Plant, Units 1 and 2 (VEGP-1 and 2). The requirements of 10 CFR 50, Appendix B, are implemented through specification of appropriate technical and quality requirements for the Service Level 1 coatings program which includes ongoing maintenance activities.

For VEGP-1 and 2, Service Level 1 coatings are subject to the requirements of NRC Regulatory Guide 1.54; American National Standards Institute (ANSI) N101.2, N101.4, N5.12, and N45.2; VEGP Final Safety Analysis Report (FSAR) section 6.1.2; VEGP Specification X1AJ14; and

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<sup>1</sup>Our response applies to Service Level 1 coatings used in primary containment that are procured, applied, and maintained by VEGP or its contractor(s).

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RESPONSE TO NRC GENERIC LETTER 98-04

(continued)

**Response to Item 1 (continued):**

VEGP plant procedures 25018-C, "Qualification for Painting/Coatings Applications", and 25019-C, "Qualified (N) Coatings". As stated in FSAR section 1.9.54, VEGP-1 and 2 conformance to Regulatory Guide 1.54 is discussed in FSAR table 6.1.2-1. Adequate assurance that the applicable requirements for the procurement, application, inspection, and maintenance are implemented is provided by procedures and programmatic controls, approved under the VEGP Quality Assurance Program.

- (a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR Part 50, Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2 requirements (e.g., receipt inspection, source surveillance, etc.). This specification of required technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable requirements contained in the standards and regulatory commitments referenced herein. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory requirements previously referenced.
- (c) The surface preparation, application and surveillance during installation of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable portions of the standards and regulatory commitments referenced herein. Documentation of completion of these activities is performed consistent with the applicable requirements. Where the requirements of the standards and regulatory commitments did not address or were not applicable to repair/replacement activities, these activities were performed in a manner consistent with the generally accepted practices for coatings repair/replacement. These practices are described in various American Society for Testing and Materials (ASTM) standards and coating practice guidelines by industry organizations issued subsequent to those which VEGP has a regulatory commitment. VEGP recognizes that the NRC has not formally endorsed many of the more recent ASTM standards or industry guidelines, but nonetheless, they provide useful information which can be appropriately applied to provide assurance that repair/replacement activities on Service Level

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(continued)

**Response to Item 1 (continued):**

1 coatings are effective in maintaining the acceptability of the coatings.

Condition assessments of Service Level 1 coatings are conducted periodically inside containment at VEGP-1 and 2. Coating condition assessments are conducted as part of an informal, routine coating maintenance program. Presently, coating inspections/evaluations are conducted during outages. In addition, a plan is presently being implemented to replace the old concrete floor coating system with a new system. This will be accomplished by replacing a designated floor area each outage until all applicable floor areas have been re-coated with the new system. As localized areas of degraded coatings are identified, those areas are evaluated and scheduled for repair or replacement, as necessary. The periodic condition assessments, and the resulting repair/replacement activities, assure that the amount of Service Level 1 coatings that may be susceptible to detachment from the substrate during a Loss-of-Coolant Accident (LOCA) event is minimized.

**(2) Information demonstrating compliance with item (i) or item (ii):**

- (i) For plants with licensing-basis requirements for tracking the amount of unqualified coatings inside the containment and for assessing the impact of potential coating debris on the operation of safety-related SSCs during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:**
  - (a) The date and findings of the last assessment of coatings, and the planned date of the next assessment of coatings.**
  - (b) The limit for the amount of unqualified protective coatings allowed in the containment and how this limit is determined. Discuss any conservatism in the method used to determine this limit.**

**Response to Item 2(i)(a) and (b):**

Section 6.1.2.1.B.9 of the VEGP FSAR requires that an inventory of unqualified coatings be maintained to ensure appropriate control of coatings inside containment thereby complying with NRC Regulatory Guide (RG) 1.54. However, there is no licensing-basis requirement that VEGP

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(continued)

**Response to Item 2(i)(a) and (b) (continued):**

assess the impact of potential coating debris on the operation of safety-related systems, structures, and components (SSCs) during a postulated design basis LOCA. As a result of only one of the licensing-basis requirements cited in Item 2(i) being applicable to VEGP and not both, a response is being provided for Item 2(ii) in lieu of item 2(i)(a) and (b). Information is provided in the response to Item 2(ii) that demonstrates compliance with 10 CFR 50.46(b)(5), "Long-term cooling" and the functional capability of the safety-related CSS as set forth in the licensing basis. As specifically noted in the generic letter, if a licensee can demonstrate this compliance *without* quantifying the amount of unqualified coatings, this is acceptable.

- (c) **If a commercial-grade dedication program is being used at your facility for dedicating commercial-grade coatings for Service Level 1 applications inside the containment, discuss how the program adequately qualifies such a coating for Service Level 1 service. Identify which standards or other guidance are currently being used to dedicate containment coatings at your facility; or,**

**Response to Item 2(i)(c):**

Item 2(i)(c) is not applicable to VEGP-1 and 2 since commercial grade dedication for Service Level 1 coatings used inside containment is not currently used.

- (ii) **For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10CFR50.46b(5), "Long-term cooling" and the functional capability of the safety-related CSS as set forth in your licensing basis. If a licensee can demonstrate this compliance without quantifying the amount of unqualified coatings, this is acceptable.**

**The following information shall be provided:**

- (a) **If commercial-grade coatings are being used at your facility for Service Level 1 applications, and such coatings are not dedicated or controlled under your Appendix B Quality Assurance Program, provide the regulatory and safety basis for not controlling these coatings in accordance with such a program. Additionally, explain why the facility's licensing basis does not require such a program.**

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(continued)

**Response to Item 2(ii):**

The following description and referenced materials describe the licensing basis for VEGP-1 and 2 relative to conformance with 10 CFR 50.46(b)(5), "Long-term cooling," specifically with regard to VEGP's ability to provide extended decay heat removal including related assumptions for debris that could block containment emergency sump screens:

- Section 6.2.2 of the VEGP FSAR describes the design and licensing bases of the Containment Heat Removal Systems for VEGP-1 and 2. Per section 6.2.2 of NRC NUREG-1137, "Safety Evaluation Report related to the operation of Vogtle Electric Generating Plant, Units 1 and 2 (SER)," the function of the Containment Heat Removal Systems is to remove heat from the containment atmosphere to limit, reduce, and maintain the containment pressure and temperature at acceptably low levels following a LOCA or secondary system pipe rupture. Two containment spray recirculation intake pipes take suction from two separated containment emergency sumps. The sump intakes are protected (by trash guards and fine mesh screens) from debris that could clog the spray nozzles. Net positive suction head (NPSH) calculations show that the NPSH available in the recirculation spray is adequate.

Section 6.3 of the VEGP FSAR describes the design and licensing bases of the ECCS for VEGP-1 and 2. SER section 6.3, "Emergency Core Cooling System", states that this system is designed to provide core cooling as well as additional shutdown capability for accidents that result in significant depressurization of the reactor coolant system. The available NPSH for all pumps in the ECCS (centrifugal charging, safety injection, and Residual Heat Removal system) has been shown by analysis to provide adequate margin. In the sump screen blockage analysis, insulation was considered as the potential blockage source material for LOCA-generated debris. As stated in section 6.1.2.1.D of the FSAR, a majority of the coatings specified for use inside the containment are of the inorganic type. The failure mode of inorganic zinc is powdering rather than blistering and delamination and was not considered as a blockage source material for LOCA-generated debris in the sump screen blockage analysis.

- VEGP-1 and 2 are committed to conform with RG 1.82, June 1974 (Revision 0), "Sumps for Emergency Core Cooling and Containment Spray Systems," as described in FSAR section 1.9.82 but with exception for Regulatory Position C7 (regarding sump coolant velocity). Also, in lieu of the 50% blockage assumption, tests were conducted for VEGP-1 and 2 using plant models to determine unique flow and blockage parameters. VEGP has assumed that the systems that draw from the sumps for emergency core cooling and containment spray systems may experience sump blockage as documented in these tests due to debris generated

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(continued)

Response to Item 2(ii) (continued):

as a result of a LOCA. These systems were intended to function, even with debris partially obstructing the sumps. The analyses submitted as part of the licensing basis for VEGP demonstrate, however, that, even with this blockage, the emergency core cooling and containment spray systems will continue to provide sufficient cooling flow as to fulfill the long-term cooling functions required to conform with 10 CFR 50.46(b)(5). In addition, an "Unqualified Coatings" log book is maintained for VEGP-1 and 2 as required by FSAR section 6.1.2.1 to ensure appropriate control of coatings inside containment. Protective coatings on replacement equipment for installation inside containment is either (1) provided by a qualified vendor to Service Level 1 requirements; (2) coated to Service Level 1 requirements at the site; (3) excluded from RG 1.54 by FSAR section 6.1.2.1.C; or (4) documented in the "Unqualified Coatings" log book as an unqualified coating.

- The NRC accepted these analyses and these systems as meeting the requirements of 10 CFR 50.46(b)(5) in SER sections 6.2.2, 6.3, and 6.3.6 (including applicable supplements (SSERs)) as noted in the following:

6.2.2 (excerpt)

SER ... "The staff concludes that the containment heat removal systems satisfy the requirements of GDC 38, 39, and 40 and the provisions of RGs 1.1 and 1.82 and are, therefore, acceptable with the exception of the adequacy of the sump design discussed above. ..."

SSER 1... "The staff concludes that the Vogtle containment sump capability is acceptable. ..."

6.3 (excerpt)

SER... "Conformance with the applicable acceptance criteria formed the basis for concluding that the design of the facility for emergency core cooling is acceptable. ..."

6.3.6 (excerpt)

SER... "(8) The applicant has provided an analysis of the ECCS performance using an approved analysis model that satisfies the criteria of Appendix K of 10 CFR 50 and has shown that the system



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(continued)

Response to Item 2(ii) (continued):

performance satisfies the acceptance criteria of 10 CFR 50.46. The applicant must provide confirmation that the operator can take appropriate action within the stated time in the event of a very small LOCA during startup and shutdown.”

6.3.5 (excerpt)

SSER 4 (6.3.5)...“The staff concludes that the Vogtle ECCS design is adequate for LOCA in Mode 3. For breaks of 7-in. diameter and smaller, adequate time would be available for the operator to manually initiate SI. ...”

“... Because the occurrence of a LOCA at Vogtle while the plant is in Mode 4 is very unlikely before the interim fixes are implemented, and because of the measures already taken at plant Vogtle to instruct operators to trip and realign the RHR pumps, the staff concludes that the Vogtle ECCS design is acceptable.”

- The licensing basis for VEGP-1 and 2, as accepted by the NRC’s SER, provides both the regulatory and safety basis for safety system performance. As the NRC noted in NRC Generic Letter 85-22, “Potential for Loss of Post-LOCA Recirculation Capability due to Insulation Debris Blockage,” a change in regulatory guidance for the basis for sump screen blockage would constitute a generic backfit.

Moreover, the industry analysis for coating failure alone during a LOCA, and industry testing of coating failure conducted to date, does not contradict VEGP’s determination that emergency core cooling system flow following a LOCA will be adequate to maintain the core temperature at an acceptably low value and to remove decay heat for the extended period of time required by the long-lived radioactivity remaining in the core following a design-basis accident. Accordingly, a separate demonstration of the regulatory and safety basis for safety system performance is not required.

Finally, Item 2(ii)(a) is not applicable to VEGP-1 and 2 since commercial grade dedication for Service Level 1 coatings used inside containment are not currently used.