



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

May 31, 2018

MEMORANDUM TO: Jennifer L. Dixon-Herrity, Chief  
Licensing Branch 4  
Division of Licensing, Siting, and Environmental Analysis  
Office of New Reactors

FROM: William (Billy) Gleaves, Senior Project Manager */RA/*  
Licensing Branch 4  
Division of Licensing, Siting, and Environmental Analysis  
Office of New Reactors

SUBJECT: US NRC AUDIT REPORT RELATED TO LICENSE AMENDMENT  
REQUEST (LAR) 17-039 – UNQUALIFIED SERVICE LEVEL 1  
COATINGS PROGRAM

The U.S. Nuclear Regulatory Commission staff conducted an audit of documents related to the Vogtle Electric Generating Plant Units 3 and 4 proposed license amendment request (LAR) 17-039. The audit was conducted at various dates and times, as planned, between April 4, 2018 and May 11, 2018 at the virtual Southern Nuclear/Westinghouse Electronic Reading Room.

The audit plan can be found in the Agencywide Documents Access and Management System (ADAMS) under Accession number ML18094B064 dated April 4, 2018. A summary report of the audit is enclosed.

Docket Nos.: 52-025 and 52-026

Enclosure:  
As stated above

cc:  
Greg Makar  
Leslie Terry

SUBJECT: US NRC AUDIT REPORT RELATED TO LICENSE AMENDMENT REQUEST  
(LAR) 17-039 – UNQUALIFIED SERVICE LEVEL 1 COATINGS PROGRAM  
DATED: MAY 31, 2018

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**ADAMS ACCESSION: ML18142B482                      \*via email                      NRO-008**

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<b>DATE</b>	5/31/18	5/30/18	5/22/18	5/31/18

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**AUDIT REPORT IN SUPPORT OF LAR-17-039 REGARDING THE UNQUALIFIED  
SERVICE LEVEL I COATINGS PROGRAM**

**SOUTHERN NUCLEAR OPERATING COMPANY  
VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4  
Docket Nos. 52-025 and 026**

**NRC Audit Team**

William Gleaves, Senior Project Manager  
Greg Makar, Materials Engineer  
Leslie Terry, Materials Engineer  
Matthew Mitchell, Branch Chief

**I. Applicant and Industry Staff Participants**

Adam Quarles (SNC)  
Wes Sparkman (SNC)  
Neil Haggarty (SNC)  
Christina Rocco (Westinghouse)  
Sylena Smith (Westinghouse)

**NRC Audit Dates**

Various dates and times between October 30, 2017, and December 14, 2017.

Status teleconferences with SNC were held on April 19, 2018, and May 4, 2018.

**NRC Audit Location**

Audit of Calculation files located in the Southern Nuclear/Westinghouse Electronic Reading Room (eRR).

**Documents Audited**

- SV3-AX01-GEC-000001, Revision B, "Unqualified Coatings Log for Vogtle Unit 3"
- W2-9.14-102, Field Deviation Report, "Westinghouse Level 2 Procedure"
- APP-GW-GAP-428, Revision 14, "Nonconformance and Disposition Report (N&D)"
- APP-GW-GAP-420, Revision 14, "Engineering and Design Coordination Reports"
- APP-GW-Z0-604, Revision 9, "Application of Protective Coatings to Systems, Structures and Components"
- APP-GW-HT-002, Revision 4, "Containment Coating Functional Requirements"

Enclosure

- APP-G1-X0-001, Revision 8, “Protective Coatings Design Requirements (Safety Class C & Seismic Category N/A)”
- APP-PXS-M3C-013, Revision 4, “Post LOCA Coating Debris from Zone of Influence”
- APP-AX01-GEF-013, “Engineering and Design Coordination Report Document”
- SV3-Q240-GNR-000004, “Nonconformance Report”

## **1.0 Audit Purpose**

The purpose of the audit is to review the regulatory basis supporting license amendment request (LAR) 17-039 (reports and calculations) to verify the information and evaluations in the “Unqualified Service Level I Coatings Program (LAR 17-039)” submitted by Southern Nuclear Operating Company (SNC) for the Vogtle Electric Generating Plant (VEGP), Units 3 and 4, on November 3, 2017, and supplemented March 28, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17307A201 and ML18087A147, respectively).

## **2.0 Audit Background**

By letter dated November 3, 2017, and supplemented March 28, 2018 (ADAMS Accession Nos. ML17307A201 and ML18087A147, respectively), SNC requested NRC approval of amendments to Combined License (COL) Numbers NPF-91 and NPF-92 for VEGP, Units 3 and 4, and exemptions from certain elements of the generic Advanced Passive 1000 (AP1000) Design Control Document (DCD). This LAR was designated by SNC as LAR 17-039. Specifically, the amendment and exemption are related to a proposed administrative program to manage a limited quantity of unqualified coatings in Service Level I (SL I) areas inside containment. In this context, “unqualified” refers to an applied coating for which design basis accident qualification is specified but cannot be verified.

The proposed administrative program would be consistent with ASTM International (ASTM) Standard D 7491-08, “Standard Guide for Management of Non-Conforming Coatings in Coating Service Level I Areas of Nuclear Power Plants.” As stated in Regulatory Guide (RG) 1.54, Revision 3, “Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants,” the NRC staff finds the program described in ASTM Standard D 7491-08 acceptable for managing non-conforming coatings in SL I areas. ASTM Standard D 7491-08 identifies unqualified SL 1 coatings as a type of non-conforming coatings. Managing coating debris is one aspect of addressing Generic Safety Issue 191 (GSI-191), “Assessment of Debris Accumulation on PWR Sumps Performance,” and long-term core cooling.

The purpose of the audit was to gain a better understanding of information underlying and supporting the VEGP, Units 3 and 4 protective coatings program and to identify information that fundamentally supports the basis of the regulatory decision which may require docketing. Specifically, the Audit Team reviewed information supporting the LAR, such as tracking documents being used to ensure the potential coating debris is maintained within the licensing basis limits (i.e., non-conforming coatings and other coating types), the technical evaluation and tracking process for nonconformances and managing unqualified coatings (i.e., periodic reassessment and tracking document updates), the process for assessing the effect of

nonconformances on other design and licensing limits, and the consistency with ASTM D 7491-08. The “Plan for the Regulatory Audit of Southern Nuclear Operating Company, Inc., VEGP, Units 3 and 4, Protective Coatings Program,” is available in ADAMS under Accession No. ML18094B064.

The Office of New Reactors (NRO) Licensing Projects staff determined that an audit of the reports and calculations supporting this LAR is the appropriate method to verify this proposed change by reviewing licensing basis documents rather than by issuing multiple rounds of requests for additional information (RAIs) for information that is not required to be on the docket.

### **3.0 Regulatory Basis**

Title 10 of the *Code of Federal Regulations* (10 CFR) 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. This activity involves a departure from COL Appendix C information and corresponding plant-specific Tier 1 information; therefore, this activity requires an amendment to the COL. Accordingly, NRC approval is required prior to making the plant-specific changes in this LAR.

10 CFR 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2\* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. The proposed change to UFSAR (Tier 2) design information involves changes to plant-specific Tier 1 (and corresponding changes to COL Appendix C) information, and thus requires NRC approval for the Tier 2 and involved Tier 1 departures.

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. 10 CFR 52, Appendix D, VIII.A.4 requires a Tier 1 change shall not result in a significant decrease in the level of safety otherwise provided by the design.

10 CFR 50.46a provides requirements and criteria for high point vents for the reactor vessel head.

10 CFR Part 50, Appendix A, GDC General Design Criteria (GDC) 1, “Quality standards and records,” of Appendix A to 10 CFR Part 50 , “Domestic Licensing of Production and Utilization Facilities”

10 CFR Part 50, Appendix A, GDC 4, “Environmental and dynamic effects design bases,” of Appendix A to 10 CFR Part 50

10 CFR Part 50, Appendix A, GDC 35, “Emergency core cooling,” of Appendix A to 10 CFR Part 50

10 CFR Part 50, Appendix A, GDC 38, “Containment heat removal,” of Appendix A to 10 CFR Part 50

10 CFR 50.46(b)(5), “Long-term cooling”

10 CFR Part 52, “Design Certification Rule for the AP1000 Design,” Appendix D.

RG 1.54, "Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants"

RG 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident"

Enclosure 2, "Coatings Evaluation Guidance for NRC Review of Generic Letter 2004-02 Supplemental Responses Prepared by the Office of Nuclear Reactor Regulation, Division of Component Integrity," of "Revised Guidance for Review of Final Licensee Responses to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," dated March 28, 2008.

The NRC staff followed NRO Office Instruction NRO-REG-108 (Revision 0), "Regulatory Audits," (ADAMS Accession No. ML081910260) in performing the audit of the reports and calculations cited below.

#### **4.0 Summary of Observations**

Managing non-conforming coatings according to ASTM Standard D 7491-08 requires the following: identifying the design limit of non-conforming coatings, determining the amount of non-conforming coatings, managing the non-conforming coatings, and documentation. The audit documents and discussions provided the Audit Team with an understanding of how SNC's program addresses these issues.

The Audit Team reviewed the tracking process, including tracking documents, for unqualified coatings in SL I areas of containment. Once a nonconformance is identified (e.g., coating is not accessible for a required measurement), a Nonconformance and Disposition (N&D) Report is originated. The N&D Report is reviewed for impact to GSI-191. A technical evaluation of the nonconformance is issued through an Engineering and Design Coordination Report (E&DCR). The technical evaluation will include a description of the nonconformance, a technical justification for the disposition (approve or reject), and identification of any other unit-specific analyses impacted by the nonconformance. A rejected nonconformance will require a corrective action to qualify the coating. An accepted non-conforming coating will be managed to ensure the licensing basis debris total is not exceeded.

For GSI-191 evaluations, the Zone of Influence (ZOI) for debris generation is defined according to the number of diameters of the broken pipe. In general, qualified coatings outside the ZOI are assumed not to be a debris source unless they are degraded. The AP1000 design basis includes a ZOI of 4D for epoxy coatings and 10D for inorganic zinc (IOZ) coatings. Unqualified coatings located outside the ZOI for the coating type will need to be incorporated into the unit-specific tracking log and the "Post LOCA Coating Debris from Zone of Influence" document where all coating debris sources are identified, explained, and quantified. Unqualified coatings located inside the ZOI for the coating type will need to be incorporated into the unit-specific tracking log. Unqualified coatings inside the ZOI will not need to be incorporated into the "Post LOCA Coating Debris from Zone of Influence" document because calculating the amount of all coatings within the ZOI is already a requirement for that document. Unqualified coating N&D Reports and E&DCRs are attached to the unit-specific tracking log and the "Post LOCA Coating Debris from Zone of Influence" document.

The unit-specific tracking log records the type of coating, color, description of where the coating is applied, total surface area, dry film density, dry film thickness, total mass, location within

containment (e.g., room, elevation), whether the coating falls inside the ZOI, basis for acceptance, and applicable N&D Report and E&DCR. During the April 19, 2018, audit status meeting, SNC clarified that potential effects on the design basis other than coatings debris, such as the effect on heat sink calculations, are identified in the E&DCR.

During the May 4, 2018, audit status meeting, SNC confirmed that unit-specific tracking logs will be updated during each refueling outage. SNC also noted that the "Post LOCA Coating Debris from Zone of Influence" will be updated in accordance with applicable procedures but could be updated more frequently depending on the effect the changes in unqualified coatings has on the coatings debris total. During the May 4, 2018, audit status meeting, SNC noted their fleet wide work control program that ensures coatings work is scheduled and completed. This program will be used to document planned work to resolve coating nonconformances. SNC clarified during the May 4, 2018, audit status meeting that IOZ debris, whether it originates inside or outside of the ZOI, is assumed to fail as particulates that transport to the emergency core cooling system (ECCS) strainers. SNC further clarified that epoxy inside the ZOI is assumed to fail as particulates and transport, while epoxy outside the ZOI is assumed to fail as chips that will not transport to the ECCS strainers.

## **5.0 Status Briefings**

The NRC Audit Team conducted an audit status meeting on April 19, 2018, to discuss questions arising from the audit related to the process for managing unqualified coatings in SL I areas of containment and to request additional documents be added to the eRR to improve their understanding of the information tracked for each unqualified coating in SL I areas of containment. On May 4, 2018, the Audit Team conducted an audit status briefing to discuss additional questions arising from the audit related to the unit-specific tracking log, resolving nonconformances, and what gets logged as transportable debris.

## **6.0 Exit Briefing**

The Audit Team conducted an audit closeout meeting on May 14, 2018. At the exit briefing the NRC Audit Team reiterated the purpose of the audit and discussed their activities. The Audit Team stated that the audit assisted them in understanding SNC's overall coatings program for VEGP, Units 3 and 4 and how unqualified coatings in Service Level 1 areas of containment will be identified, evaluated, and tracked at VEGP, Units 3 and 4.

## **7.0 Requests for Additional Information Resulting from Audit**

No requests for additional information resulted from the audit.

## **8.0 Open Items and Proposed Closure Paths**

There are no open items as a result of the audit.

## **9.0 Deviations from the Audit Plan**

During the audit period SNC added additional documents to the eRR upon request from the NRC Audit Team.

## 10.0 References

1. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment and Exemption, "Unqualified Service Level 1 Coatings Program (LAR-17-039)," dated November 3, 2017 (ADAMS Accession Number ML17307A201).
2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment and Exemption, "Unqualified Service Level 1 Coatings Program (LAR-17-039S1)" dated March 28, 2018 (ADAMS Accession Number ML18087A147).
3. NRO-REG-108, "Regulatory Audits," dated April 2, 2009 (ADAMS Accession Number ML081910260)
4. Vogtle Units 3 and 4 Updated Final Safety Analysis Report, Revision 6 and Tier 1, Revision 5, dated March 12, 2017 (ADAMS Accession No. ML17172A218).
5. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).
6. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).