From: Green, Kimberly
Sent: Monday, April 27, 2020 11:37 AM
To: Wells, Russell Douglas
Cc: Shoop, Undine
Subject: Audit Plan Related to Review of the Watts Bar Nuclear Plant, Units 1 and 2, License Amendment Request Implement the FULL SPECTRUM™ LOCA (FSLOCA™) Methodology for Loss-of-Coolant Accident (LOCA) Analysis (EPID L-2020-LLA-0005)
Attachments: Audit Plan.docx

Dear Mr. Wells,

By application dated January 17, 2020 (**A**gencywide **D**ocuments **A**ccess and **M**anagement **S**ystem (ADAMS) Accession No. ML20017A338), pursuant to Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), Tennessee Valley Authority (TVA) submitted a License Amendment Request (LAR) for the Watts Bar Nuclear Plant (WBN), Units 1 and 2. The proposed changes would: revise WBN Units 1 and 2 Technical Specification (TS) 5.9.5, "Core Operating Limits Report," to replace the loss-of-coolant accident (LOCA) analysis evaluation model references with reference to the FULL SPECTRUM™ Loss-of-Coolant Accident (FSLOCA™) Evaluation Model analysis applicable to WBN Units 1 and 2, with replacement steam generators; revise the WBN Unit 2 Operating License condition 2.C(4) to reflect the implementation of the FSLOCA™ Evaluation Model methodology; and, revise WBN Unit 1 TS 4.2.1, "Fuel Assemblies," to delete discussion of Zircalloy fuel rods. TVA is also requesting approval of the new LOCA-specific Tritium Producing Burnable Absorber Rod (TPBAR) stress analysis methodology to evaluate the integrity of the TPBARs for conditions expected during a LBLOCA..

The US Nuclear Regulatory Commission staff is reviewing the proposed change and has determined that a regulatory audit is necessary to complete its review.

Attached, please find an audit plan containing the basis, scope, audit staff, and deliverable for this audit. For this audit, as previously discussed with you, access to the requested documents may be made through the use of an electronic reading room or portal.

If you have any questions, please let me know.

Regards,
Kim Green

Hearing Identifier: NRR_DRMA
Email Number: 550

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AUDIT PLAN

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-390 AND 50-391

IMPLEMENTATION OF FULL SPECTRUM™ LOCA METHODOLOGY FOR

LOSS-OF-COOLANT ANALYSIS

EPID L-2019-LLA-0005

I. Background

By application dated January 17, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20017A338), pursuant to Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), Tennessee Valley Authority (TVA) submitted a License Amendment Request (LAR) for the Watts Bar Nuclear Plant, Units 1 and 2 (WBN). The proposed changes would: revise WBN Units 1 and 2 Technical Specification (TS) 5.9.5, "Core Operating Limits Report," to replace the loss-of-coolant accident (LOCA) analysis evaluation model references with reference to the FULL SPECTRUM™ Loss-of-Coolant Accident (FSLOCA™) Evaluation Model analysis applicable to WBN Units 1 and 2, with replacement steam generators; revise the WBN Unit 2 Operating License condition 2.C(4) to reflect the implementation of the FSLOCA Evaluation Model methodology; and, revise WBN Unit 1 TS 4.2.1, "Fuel Assemblies," to delete discussion of Zircalloy fuel rods. TVA is also requesting approval of the new LOCA specific Tritium Producing Burnable Absorber Rod (TPBAR) stress analysis methodology to evaluate the integrity of the TPBARs for conditions expected during a LBLOCA.

The application references several analyses or documents that are not provided as part of the application or are not provided in the reference section. In order to confirm that the analyses and references support the requested licensing action, the staff of the U.S. Nuclear Regulatory Commission (NRC) plan to perform an audit of the listed documents in the Information Request section below.

II. Regulatory Audit Bases

The regulatory audit is based on the LAR from TVA for approval of the application of FSLOCA and TPBAR stress analysis methodology. The format of the regulatory audit is based on the Nuclear Reactor Regulation Office Instruction, LIC-111, "Regulatory Audits."

The NRC staff considered the following regulatory requirement during its review of the LAR:

Criterion 11, "Reactor inherent protection," of Appendix A to Part 50 – General Design Criteria (GDC) for Nuclear Power Plants, requires that, "The reactor core and associated coolant systems shall be designed so that in the power operating range the net effect of the prompt inherent nuclear feedback characteristics tends to compensate for a rapid increase in reactivity."

The TPBAR stress analysis methodology provides a recovery margin in the post-LOCA criticality evaluation in the presence of assumed TPBAR failures. TPBAR rupture results in a positive reactivity addition and is a penalty in the post-LOCA criticality evaluation.

III. Regulatory Audit Scope

The regulatory audit will focus on the following:

- The new LOCA-specific TPBAR stress analysis methodology in Section 4.2.2 of the LAR
- Documents or analyses that identify or predict the TPBAR cladding temperature (Section 4.2.2)
- The Monte Carlo style uncertainty analysis related to the figures of merit (Section 4.2.2)
- Tolerance limits for the figures of merit related to the TPBAR structural integrity: 1) rupture due to primary membrane and bending stresses, and 2) rupture due to creep damage (Section 4.2.2)
- Open literature used to develop allowable stress limits (Section 4.2.2)
- The new post-LOCA criticality methodology (Section 4.2.3)

IV. Information Request

Please provide the following documents for the staff to audit:

- LOCA-specific TPBAR stress analysis methodology developed by Pacific Northwest National Laboratory (PNNL)
- Document(s) that includes the TPBAR cladding temperature used to determine whether TPBAR would be expected to rupture following LOCA
- Document(s) that describe how the two acceptance criteria (Page E1-11 of CNL-19-051) are developed.
- A list of the references to open literature from where the allowable stress limits were developed (Page E1-11 of CNL-19-051)
- Uncertainty analyses performed to determine figures of merit related to the TPBAR structural integrity, and rupture due to primary membrane and bending stress and rupture due to creep damage
- Document that details the post-LOCA criticality analysis (Section 4.2.3 of CNL-19-051)

V. Team Assignments

The review team will consistent of:

Mathew Panicker, NRC technical reviewer
Diana Woodyatt, NRC technical reviewer
Kimberly Green, NRC Project Manager.

VI. Logistics

The audit will be conducted via electronic reading room, which is requested to be open from April 27 through May 15, 2020.

An entrance call will be conducted as soon as practicable toward the beginning of the audit.

The electronic reading room or portal should employ measures to prevent the downloading, copying, or otherwise storing of any online portal documents by the NRC staff accessing the portal.

As necessary, clarification calls will be requested regarding the documents under audit.

VII. Special Requests

None

VIII. Deliverables

A regulatory audit summary will be completed within 90 days after the closure of the audit.