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SOUTHERN NUCLEAR
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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Vogtle Electric Generating Plant Unit 4
ITAAC Closure Notification on Completion on
Completion of ITAAC 2.1.01.07.iv [Index Number 11]

Ladies and Gentlemen:

In accordance with 10 CFR 52.99(c)(1), the purpose of this letter is to notify the Nuclear Regulatory Commission (NRC) of the completion of Vogtle Electric Generating Plant (VEGP) Unit 4 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Item 2.1.01.07.iv [Index Number 11] for verifying that a report exists and concludes that the spent fuel racks can withstand design basis dropped spent fuel assembly loads and maintain the calculated effective neutron multiplication factor required by 10 CFR 50.68 limits. The closure process for this ITAAC is based on the guidance described in NEI 08-01, Industry Guideline for the ITAAC Closure Process under 10 CFR Part 52, which was endorsed by the NRC in Regulatory Guide 1.215.

This letter contains no new NRC regulatory commitments. Southern Nuclear Operating Company (SNC) requests NRC staff confirmation of this determination and publication of the required notice in the Federal Register per 10 CFR 52.99.

If there are any questions, please contact David Woods at 706-848-6903.Respectfully submitted,

Michael J. Yox
Regulatory Affairs Director Vogtle 3&4

Enclosure: Vogtle Electric Generating Plant (VEGP) Unit 4
Completion of ITAAC 2.1.01.07.iv [Index Number 11]

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Southern Nuclear Operating Company
ND-16-0953
Enclosure

Vogtle Electric Generating Plant (VEGP) Unit 4
Completion of ITAAC 2.1.01.07.iv [Index Number 11]

ITAAC Statement

Design Commitment:

7. The new and spent fuel storage racks maintain the effective neutron multiplication factor required by 10 CFR 50.68 limits during normal operation, design basis seismic events, and design basis dropped spent fuel assembly accidents over the spent fuel storage racks.

Inspections, Tests, Analyses:

iv) Analysis of the spent fuel storage racks under design basis dropped spent fuel assembly loads will be performed.

Acceptance Criteria:

iv) A report exists and concludes that the spent fuel racks can withstand design basis dropped spent fuel assembly loads and maintain the calculated effective neutron multiplication factor required by 10 CFR 50.68[(1)] limits.

Note:

1. The requirements of 10 CFR 50.68 are summarized as follows:
   - For new fuel storage racks:
     - The affective neutron multiplication factor (K-effective) must not exceed 0.95 when flooded with unborated water and
     - K-effective must not exceed 0.98 with optimum moderator conditions.
   - For spent fuel storage racks:
     - If methodology does not take credit for soluble boron:
   - K-effective must not exceed 0.95 when flooded with unborated water.
     - Or if methodology takes credit for soluble boron:
   - K-effective must not exceed 0.95 when flooded with borated water and K-effective must remain below 1.0 when flooded with unborated water.

ITAAC Determination Basis

Multiple Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) are used to verify the new and spent fuel storage racks maintain the effective neutron multiplication factor required by 10 CFR 50.68 limits during normal operation, design basis seismic events, and design basis dropped spent fuel assembly accidents over the spent fuel storage racks. This ITAAC requires that analyses be performed to ensure the calculated effective neutron multiplication factor for the spent fuel storage racks meets the requirements of 10 CFR 50.68 limits under design basis dropped spent fuel assembly accidents over the spent fuel storage racks.

The requirements of 10 CFR 50.68 are summarized as follows:

The requirements of 10 CFR 50.68 are summarized as follows:
- For new fuel storage racks:
  - The affective neutron multiplication factor (K-effective) must not exceed 0.95 when flooded with unborated water and
  - K-effective must not exceed 0.98 with optimum moderator conditions.

- For spent fuel storage racks:
  - If methodology does not take credit for soluble boron:
- K-effective must not exceed 0.95 when flooded with unborated water.
  - Or if methodology takes credit for soluble boron:
- K-effective must not exceed 0.95 when flooded with borated water and K-effective must remain below 1.0 when flooded with unborated water.

Structural and criticality analyses have been performed to evaluate configurations resulting from a dropped spent fuel assembly. Multiple drop accidents were evaluated including a drop on top of the racks and a drop through an empty cell. The structural analysis used a finite element model from a dynamic simulation code, LS-DYNA v970, to determine the impact loads and to assess the extent of permanent damage to the storage racks for impact to the active fuel region.

The criticality analyses for the AP1000 spent fuel storage racks have been conducted to comply with the requirements of 10 CFR 50.68. The analysis employs the Monte Carlo N-Particle Transport Code (MCNP) version 4A, (Reference 2) and a three dimensional model of the fuel storage racks filled with a maximum 5.0 weight-percent U-235 Westinghouse AP1000 17x17 fuel assemblies. The spent fuel storage racks are modeled inside a pool fully flooded with borated and unborated water. The fuel assembly drop configurations included a horizontal drop on top of the rack and a vertical drop on an occupied or empty cell in the criticality model.

The results as documented in the structural analyses (Reference 1) determined that the damage from a drop event on top of the racks does not impact the active fuel region, and the damage from a drop event through an empty cell does impact the active fuel region, but had been previously evaluated in the criticality analysis. This impact is further evaluated in the criticality analysis.

The results as documented in the spent fuel storage racks criticality analysis (Reference 2) demonstrate the maximum K-effective value for the bounding fuel drop case is 0.9207 (with borated water) and 0.9950 (with unborated water) which meet the ITAAC acceptance criteria.

ITAAC Finding Review

In accordance with plant procedures for ITAAC completion, Southern Nuclear Operating Company (SNC) performed a review of all ITAAC findings pertaining to the subject ITAAC and associated corrective actions. This review found that there are no relevant ITAAC findings associated with this ITAAC. The ITAAC completion review document number is included in the Vogtle Unit 4 ITAAC Completion Package for ITAAC 2.1.01.07.iv (Reference 3) and available for NRC inspection.

ITAAC Completion Statement

Based on the above information, SNC hereby notifies the NRC that ITAAC 2.1.01.07.iv was performed for VEGP Unit 4 and that the prescribed acceptance criteria are met. Systems, structures, and components verified as part of this ITAAC are being maintained in their as-designed, ITAAC compliant condition in accordance with approved plant programs and procedures.

References (available for NRC inspection)

1. APP-GW-GLR-033, Rev. 5, Spent Fuel Storage Racks Structural/Seismic Analysis
2. APP-GW-GLR-029, Rev. 4, AP1000 Spent Fuel Storage Racks Criticality Analysis
3. SVP_SV0_3956, Attachment 1, Submittal of Inspections, Test, Analyses and Acceptance Criteria (ITAAC) Completion Package for Unit 4 ITAAC 2.1.01.07.iv (11) (Verification of spent fuel storage racks under design basis dropped spent fuel assembly loads)