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SOUTHERN COMPANY

MAY 0 7 2012

Docket Nos.: 52-025
52-026

ND-12-0990
10 CFR 50.90

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

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment:
Nuclear Island Basemat Thickness Tolerance (LAR-12-003R) Revised

Ladies and Gentlemen:

The U.S. Nuclear Regulatory Commission (NRC) issued the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 combined licenses (COLs) (License Nos. NPF-91 and NPF-92, respectively) to Southern Nuclear Operating Company (SNC) on February 10, 2012. In accordance with the provisions of 10 CFR 50.90, SNC hereby requests an amendment to the COLs for VEGP Units 3 and 4. The proposed amendment will revise the upper tolerance on the Nuclear Island (NI) critical sections basemat thickness as identified in the plant-specific Design Control Document (DCD).

During a public conference call hosted by the NRC staff on April 25, 2012 SNC notified the staff of the plans to submit a revised license amendment request (LAR) that would address NRC questions regarding the basis for statements in the technical evaluation section of the LAR. The revised LAR provided by this letter satisfies these plans, and supersedes in its entirety the April 6, 2012 LAR. In addition this revised LAR incorporates supplemental information provided in letter dated April 12, 2012.

The requested revisions are necessary to support changes identified during the surveying of the mudmat, which forms the foundation upon which the basemat is constructed. The description, technical evaluation, associated regulatory evaluations, and environmental consideration are contained in Enclosure 1 to this letter. To facilitate the staff's review of this activity, a proposed markup depicting the requested change to the licensing basis document is contained in Enclosure 2 to this letter. This letter contains no regulatory commitments.

SNC has also submitted a Preliminary Amendment Request (PAR) which requests a "no objections" finding by the NRC Staff prior to June 1, 2012, to allow construction to proceed. Following that finding on the PAR, this license amendment is requested to be issued by October 6, 2012. This license amendment will be implemented within 30 days of approval.

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NRO

In accordance with 10 CFR 50.91, SNC is notifying the State of Georgia of this LAR by transmitting a copy of this letter (including the enclosures) to the designated State Official.

Should you have any questions, please contact Mr. Wesley A. Sparkman at (205) 992-5061.

Mr. C. R. Pierce states that he is the Regulatory Affairs Director of Southern Nuclear Operating Company, 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.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

C. R. Pierce

CRP/EDG/dmw

Sworn to and subscribed before me this 7th *day of* May, *2012*

Notary Public: Dana Marie Williams

My commission expires: 12/01/2014

NOTARY PUBLIC STATE OF ALABAMA AT LARGE
MY COMMISSION EXPIRES: Dec 1, 2014
BONDED THRU NOTARY PUBLIC UNDERWRITERS

Enclosure 1: Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – License Amendment Request Regarding Nuclear Island Basemat Thickness Tolerance (Revised)
Enclosure 2: Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Licensing Basis Document Proposed Change

cc: Southern Nuclear Operating Company
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Southern Nuclear Operating Company

ND-12-0990

Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

License Amendment Request
Regarding
Nuclear Island Basemat Thickness Tolerance
(Revised)

Table of Contents

Pursuant to 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby proposes this License Amendment Request (LAR) to change Vogtle Electric Generating Plant (VEGP), Units 3 and 4, licensing basis documents associated with Combined License (COL) Nos. NPF-91 and NPF-92, respectively.

SNC requests staff approval of the license amendment as soon as practical to remove the risk of potential rework associated with continued installation of the nuclear island structure that would be impacted by this change. While an associated Preliminary Amendment Request (PAR) has been submitted to obtain the requisite "no objections" finding from the NRC Staff and allow construction to proceed, the risk of rework remains until the final action on this license amendment is completed.

1. Summary Description

The proposed change will change the upper tolerance on the Nuclear Island (NI) critical sections basemat thickness as identified in the VEGP Units 3 and 4 Final Safety Analysis Report (FSAR), which includes plant-specific Design Control Document (DCD), Subsection 3.8.5 and associated Table 3.8.5-3, Note 2, where this thickness tolerance value is identified. The note is designated as Tier 2* design information and identifies the NI critical sections basemat thickness upper tolerance as +1 inch. The proposed change is to increase this tolerance to +4 inches.

2. Detailed Description

SNC requests that the licenses be amended as described below. Construction activities associated with the nuclear island basemat structure affected by the proposed license amendment are near-term in the schedule. To allow construction activities to proceed in accordance with the current integrated schedule, SNC has also submitted an associated Preliminary Amendment Request (PAR)-12-003. The technical scope of the associated PAR is consistent with the technical scope of this LAR.

The FSAR / plant-specific DCD, Subsection 3.8.5, describes the "foundation" for the nuclear island, and Subsection 3.8.5.8 for "construction inspections" specifically indicates that Table 3.8.5-3 identifies the minimum required reinforcement and concrete thickness. Table 3.8.5-3, Note 2, is identified as Tier 2* material and reads as follows:

[*2. The thickness of these sections is 6' 0" with a construction tolerance of +1 inch, -3/4 inch.*]*

It is requested that this Note be revised to replace the +1 inch tolerance with +4 inches, to read:

[*2. The thickness of these sections is 6' 0" with a construction tolerance of +4 inches, -3/4 inch.*]*

Subsection 3.8.5.8 also states "The minimum required reinforcement and concrete thickness represent the required minimum values to meet the design basis loads."

The existing construction tolerance included in the note is appropriate for a section using forms to determine the concrete thickness. The basemat concrete is placed without forms on top of the mudmat with the mudmat at its as-built location. The construction tolerance for this method of construction needs to be increased to account for the variability of the mudmat surface and relative settlement at the time of concrete placement. These combined impacts have resulted in an uneven surface upon which to place the nuclear island basemat.

During recent surveying of the mudmat (which forms the foundation upon which the basemat is constructed) it was determined that the upper surface of the mudmat is not as level as would be desired for placing a near-constant thickness basemat. Specifically, it is possible that if the basemat is placed at the intended thickness of six feet and within the thickness tolerances identified for the basemat in Note 2 of Table 3.8.5-3, the settled basemat upper surface may not be as level as would be desired. It is expected that the upper tolerance will need to exceed the current allowable upper tolerance in order to provide a level top surface of the Unit 3 basemat upon which the remaining nuclear structures would then be built. In order to improve the probability of a level surface on which to continue construction of the Nuclear Island (NI) structures, a change is requested such that the upper tolerance may be as great as four inches.

Based upon current conditions and the similar backfill and planned similar construction sequence for the Unit 4 mudmat placement, a four inch upper tolerance is also expected to be sufficient to provide a level top surface of the Unit 4 basemat.

3. Technical Evaluation

System Description

The AP1000 nuclear island consists of three seismic Category I structures founded on a common basemat. The three structures that make up the nuclear island are the coupled auxiliary and shield buildings, the steel containment vessel, and the containment internal structures. The nuclear island is shown in Final Safety Analysis Report or FSAR (which includes the plant-specific Design Control Document or DCD) Figure 3.7.1-14. For ease of construction, the foundation is built on a mudmat. The mudmat is lean, nonstructural concrete and rests upon the load-bearing soil.

Applicable Text, Table and Figure Changes

Tier 2* Departure:

The DCD identifies the information in Note 2 of Table 3.8.5-3 as Tier 2* information. As such, any change requires prior NRC approval to implement.

Supporting Technical Details

The proposed tolerance for the basemat is in conformance with standard concrete tolerances in ACI-117. ACI-117 provides an applicable tolerance of -1 inch and does not specify a limit for an upper tolerance for foundations such as those discussed in ACI-117 Section 3.4.1.3 and shown in the figure for Section 3.4 of the Commentary for ACI-117 that shows the cross-sectional dimensions for footings. The change of the tolerance for the basemat thickness identified in the DCD to +4 inches was chosen as a standard value to be sufficient for Vogtle Units 3 and 4, and future AP1000 applications. Limiting the upper tolerance to +4 inches limits the evaluation required to show that ACI-349 criteria and requirements are satisfied. The tolerance of +1 inch in the DCD Revision 19 was determined to be a misapplication of the standard tolerance for cast in place floors during the review of the as-built mudmat elevation.

The increase in the basemat thickness construction tolerance may result in slightly more concrete than the nominal basemat design. An assessment of the effect of the increase in thickness on the basemat design has been completed. The assessment is documented in a calculation completed under the applicable Appendix B quality assurance program. This assessment is the basis for the statements in the following paragraphs. This additional concrete will not have an adverse impact on the strength of the basemat or the response of

the basemat to loads, including seismic loads, from the nuclear island structures supported by the basemat. The additional concrete does not increase the amount of reinforcement required to resist shear or flexure loads in the basemat. The most significant parameter in the assessment of the impact of the increase in the tolerance on the design of the basemat is the amount of concrete cover over the topside longitudinal reinforcement in the basemat. The moment capacity with a potential increase or decrease in cover does not vary significantly from the minimal value. The calculation of shear capacity is not affected by the increase or decrease in cover.

The design calculations were reviewed to determine the equations which would be impacted by an increase or decrease in cover. The affected equations were calculated for the minimum and maximum cover. The basemat design with the increase in the basemat thickness construction tolerance remains in compliance with ACI-349. Based on the minimal change in the results of the equations with minimum and maximum cover, no increase in structural reinforcement is required to compensate for the additional concrete.

The additional concrete mass does not have an adverse impact on the seismic design spectra or the structural analysis of the basemat or other nuclear island structures since the additional concrete does not significantly add to the mass of the basemat and the nuclear Island structures. Even with a constant increase of +4 inches over the entire basemat, the total weight of the NI would change by less than 0.6%. This small change in mass and center of gravity would have negligible impact to the dynamic analysis. The small variation in basemat thickness has a minimal effect on the seismic analysis and the analysis includes elements such as peak broadening to provide margin for variations in concrete properties and as-built variations.

The small change in mass also does not have an impact on the final expected settlement predictions provided in FSAR Subsection 2.5.4.10.2. As indicated therein "Differential settlement of a few inches across the width of the nuclear island would not have an adverse effect on the safety-related functions of structures, systems, and components." The settlement seen to-date is within the previously projected settlement values.

The increase in basemat thickness construction tolerance has no impact on the finite element analysis methods used to analyze the nuclear island structures since, as noted above, the seismic spectra used for design is not changed.

The modeling of the structures is not impacted since the size, type, and configuration of the elements used in the finite element analysis are not changed. The analysis of the response of the reactor coolant system and core to normal operation and postulated accident conditions does not depend on the dynamic response of the nuclear island structure and, therefore, is not impacted by the increase in basemat thickness construction tolerance.

The increase in the basemat thickness construction tolerance does not significantly change the center of gravity and does not change soil properties and, therefore, it has no impact of the analysis of the nuclear island for sliding or overturning.

No testing of plant systems or experiments has been identified associated with this change. No changes to procedures or controls for plant systems and components have been identified associated with the change in the basemat thickness tolerance.

The activity has no adverse effect on the ex-vessel severe accident analysis. The capabilities of the structures, systems and components to respond to an ex-vessel severe accident are not altered. The response of the containment to a postulated reactor vessel failure, including direct containment heating, ex-vessel steam explosions, and core concrete

interactions is not altered by a minor potential increase in the thickness of the concrete in the basemat. The design of the reactor vessel and the response of the reactor vessel to a postulated severe accident are not altered by the change to the basemat thickness tolerances.

The activity has no impact on the Aircraft Impact Assessment. The changes described are to the tolerances for the thickness of the basemat upon which the nuclear island is constructed. There is no change to protection of plant structures, systems, and components provided by the design of the shield building and the auxiliary building. The activity described does not change the design or construction of the shield building or the auxiliary building.

The activity has no impact on emergency plans or physical security plans. There is no change to systems or the response of systems to postulated accident conditions. There is no change to perimeter walls or other aspects of the structures that could impact physical security.

Only the tolerance on the thickness of the basemat is changed; therefore, there is no change to the shielding provided by the structural modules. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to the predicted radioactive releases due to normal operation or postulated accident conditions.

Summary

This activity does not adversely affect any AP1000 design function. The plant-specific departure does not involve an adverse change to the method of evaluation for establishing adequate design bases or safety analyses. It does not adversely affect a design feature credited in the ex-vessel severe accident assessment. Tests, experiments, and procedures described in the licensing basis are unchanged by this activity.

4. Regulatory Evaluations

4.1 Significant Hazards Consideration

The proposed changes would amend Combined License Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively, in regard to increasing the upper tolerance on the thickness of the nuclear island (NI) basemat critical sections as identified in Final Safety Analysis Report (and plant-specific Design Control Document or DCD) Table 3.8.5-3, Note 2, which is Tier 2* information. An increase in the upper tolerance is requested in order to directly provide a level upper surface of the basemat upon which the rest of the NI is to rest.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

4.1.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

As indicated in FSAR (plant-specific DCD) Subsection 3.8.5.5, the design function of the basemat is to provide the interface between the nuclear island structures and the supporting soil or rock. The basemat transfers the load of nuclear island structures to the supporting soil or rock. The basemat transmits

seismic motions from the supporting soil or rock to the nuclear island. The revision of the basemat construction tolerance does not have an adverse impact on the response of the basemat and nuclear island structures to safe shutdown earthquake ground motions or loads due to anticipated transients or postulated accident conditions. The revision of the basemat construction tolerance does not impact the support, design, or operation of mechanical and fluid systems. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to the predicted radioactive releases due to normal operation or postulated accident conditions. The plant response to previously evaluated accidents or external events is not adversely affected, nor does the change described create any new accident precursors. Therefore, there is no significant increase in the probability or consequences of an accident previously evaluated.

4.1.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed change is to increase the construction tolerance for the basemat thickness. The revision of the basemat construction tolerance does not change the design of the basemat or nuclear island structures. The revision of the basemat construction tolerance does not change the design function, support, design, or operation of mechanical and fluid systems. The revision of the basemat construction tolerance does not result in a new failure mechanism for the basemat or new accident precursors. As a result, the design function of the basemat is not adversely affected by the proposed change. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.1.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The revision in the basemat thickness construction tolerance does not have an adverse impact on the strength of the basemat. The increase in the basemat thickness construction tolerance does not have an adverse impact on the seismic design spectra or the structural analysis of the basemat or other nuclear island structures. The revision in the basemat thickness construction tolerance has no impact on the analysis of the nuclear island for sliding or overturning. As a result, the design function of the basemat is not adversely affected by the proposed change. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, the proposed changes present no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.2 Applicable Regulatory Requirements/Criteria

The basemat and nuclear island structures are required to comply with requirements in ACI-349 and supplementary requirements included in plant-specific DCD Section 3.7

and 3.8. The increase in the basemat thickness construction tolerance does not impact the compliance with ACI-349 and the plant-specific DCD.

10 CFR 50, Appendix A, General Design Criterion (GDC) 1, *Quality standards and records*, requires structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The revision in the basemat thickness construction tolerance does not affect compliance with GDC 1.

10 CFR 50, Appendix A, General Design Criterion (GDC) 2, *Design bases for protection against natural phenomena,* requires structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. The revision in the basemat thickness construction tolerance does not affect compliance with GDC 2.

10 CFR 50, Appendix A, General Design Criterion (GDC) 4, *Environmental and dynamic effects design bases*, requires structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. The revision in the basemat thickness construction tolerance does not affect compliance with GDC 4.

10 CFR 52, Appendix D, Section VIII requires NRC approval for Tier 2* information departures. Although this departure does not adversely affect safety, it does involve changes to Tier 2* information. Therefore, NRC approval is required prior to making the Tier 2* changes addressed in this departure.

4.3 Precedent

No precedent is identified.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5. Environmental Consideration

The proposed amendment would revise the construction tolerance for the basemat concrete thickness. The increase in the basemat thickness construction tolerance will not change the materials used in the basemat or the construction methods. The nature of this change is such that it will not produce conditions which could result in adverse environmental impact either during construction or subsequently during plant operation. This change would only affect the construction tolerance for the basemat thickness and would have no effect on any plant effluents that may be released offsite, or on any aspects of plant design or operation that would affect individual or cumulative occupational radiation exposure. Furthermore, as discussed in Section 4.1, the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c).

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, facility construction and operation following implementation of the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6. References

1) AP1000 Design Control Document (DCD), Rev 19, Section 3.8, "Design of Category I Structures," including Table 3.8.5-3 (as incorporated by reference into the Vogtle Combined License (COL) Final Safety Analysis Report (FSAR)).

2) American Concrete Institute (ACI), ACI 349 - Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary

3) American Concrete Institute (ACI) ACI-117 "Specifications for Tolerances for Concrete Construction and Materials and Commentary"

Southern Nuclear Operating Company

ND-12-0990

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Licensing Basis Document
Proposed Change

This enclosure includes this cover page and 1 page showing proposed licensing basis document change.

Marked-up FSAR (DCD) Table 3.8.5-3 (Note 2)

*[2. The thickness of these sections is 6'0" with a construction tolerance of ~~+1~~+4 inches, -3/4 inch.]**