

## **PMSummerColpEM Resource**

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**From:** Gleaves, Bill  
**Sent:** Wednesday, June 28, 2017 10:25 AM  
**To:** PMSummerColpEM Resource  
**Subject:** FW: FW: ACTION: Draft RAI for VC Summer LAR 16-03 R1  
**Attachments:** 6-27-2017 Draft Questions rev 1 .docx

Attached is the approved draft RAI for V.C. Summer 2 & 3 for LAR 16-03, Rev 1, on "Auxiliary Bldg. Roof Rebar Configuration Design."

Billy  
William (Billy) Gleaves  
Lead Project Manager for  
V.C. Summer Units 2 and 3  
Licensing Branch 4  
US NRC, Office of New Reactors

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**From:** Chakravorty, Manas  
**Sent:** Wednesday, June 28, 2017 7:00 AM  
**To:** Gleaves, Bill <Bill.Gleaves@nrc.gov>  
**Cc:** Samaddar, Sujit <Sujit.Samaddar@nrc.gov>; Jain, Bhagwat <Bhagwat.Jain@nrc.gov>; Patel, Pravin <Pravin.Patel@nrc.gov>  
**Subject:** FW: FW: ACTION: Draft RAI for VC Summer LAR 16-03 R1

Bill,

Enclosed is the attached revised RAI that I concur with.

Thanks,

Manas

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**Sent Date:** 6/28/2017 10:24:55 AM  
**Received Date:** 6/28/2017 10:24:56 AM  
**From:** Gleaves, Bill

**Created By:** Bill.Gleaves@nrc.gov

**Recipients:**  
"PMSummerColpEM Resource" <PMSummerColpEM.Resource@nrc.gov>  
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Request for Additional Information

V.C. Summer Nuclear Station Units 2 and 3

License Amendment Request, LAR 16-03 R1

“Auxiliary Building Roof Rebar Configuration Design”

The NRC staff considered the following regulatory requirements in reviewing the license amendment request (LAR) that included the UFSAR changes.

10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” Appendix A, “General Design Criteria for Nuclear Power Plants,” General Design Criterion (GDC) 1, “Quality Standards and Records,” requires that structures, systems, and components (SSCs) important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed

10 CFR Part 50, Appendix A, GDC 2, “Design Bases for Protection against Natural Phenomena,” requires that structures, systems, and components (SSCs) important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

10 CFR Part 50, Appendix A, GDC 4, “Environmental and Dynamic Effects Design Bases,” requires that 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-cooling accidents.

10 CFR Part 50, Appendix S, “Earthquake Engineering Criteria for Nuclear Power Plants,” requires that nuclear power plants shall be designed so that, if safe-shutdown earthquake (SSE) ground motion occurs, certain structures, systems and components (SSCs) will remain functional and within applicable stress, strain, and deformation limits. The required safety functions of structures, systems, and components must be assured during and after the vibratory ground motion associated with the SSE ground motion through design, testing, or qualification methods.

In performing its technical review, the NRC staff evaluated the LAR for compliance with regulations, applicable regulatory codes, guides, and standards, and approved precedents. In addition, the NRC staff reviewed the licensee’s current licensing and design basis, as described in its UFSAR. The staff finds that the licensee in Enclosure 5 of its May 3, 2017 submittal identified several changes to the current licensing and design basis in UFSAR Table 3H.5-10. The licensee made significant changes to the information pertaining to licensing basis thermal load, governing load combinations, design forces in the roof girder and the reinforcement requirement in the concrete slabs. The licensee in Enclosure 4 attributed these changes to “more refined analysis and combined seismic and thermal loads” but did not describe in detail the refinement made to the analysis. The licensee did not describe how the combined “seismic and thermal loads”

result in such a significant change in design forces since this combination was originally considered in the licensing basis per UFSAR Table 3.8.4-2 for Seismic Category I structures. In order to perform its safety evaluation, the staff require the following additional information with regards to changes requested by the licensee in UFSAR Table 3H.5-10 in the LAR 16-03R1.

1. From the markup of UFSAR Table 3H.5-10 in the LAR 16-03R1, the staff notes a significant increase in roof girder forces (24%) and in the required slab reinforcement (46%). Generally this is indicative of an increase in applied loads. The licensee attributes the increase in demand to "more refined analysis and the combined seismic and thermal loads". The licensee did not identify any changes to the design load combinations in UFSAR Table UFSAR Table 3.8.4-2 for seismic category I structures. The licensee is requested to describe the specific refinements (changes) that have been made to the structural analysis and provide the basis that these refinements lead to higher demands in roof girder forces and in the required reinforcement in concrete slab.
2. In UFSAR Table 3H.5-10, the licensee proposed to delete "Note 1". The "Note 1" explained how the thermal loads are considered in the design basis load combinations in UFSAR Table 3.8.4-2 for seismic category I structures. The licensee is requested to describe in detail the basis for deleting this note from the Table 3H.5-10. The licensee is also requested to provide the magnitude of any revised thermal load conditions considered and how the normal and accidental thermal loads are considered in load combinations LC3 and LC7 and if this methodology has previously been evaluated by the staff. The licensee is also requested to describe any changes made in the structural analysis model or methodology for normal and accidental thermal load analysis.
3. The licensee in UFSAR Table 3H.5-10 proposed to change the governing load combination from LC3 to LC 7 except for the slab reinforcement perpendicular to roof girders. The load combination LC3 includes normal thermal and seismic loads and LC7 includes accident thermal and seismic loads. The licensee is requested to provide the technical basis and justification for change in the governing load combination from LC3 to LC7. The licensee is also requested to provide the rationale why the LC7 governs the required concrete slab reinforcement parallel to the roof girders but not in the direction perpendicular to the girders that is governed by LC3. The licensee is requested to provide a comparative value for each load in LC3 and LC7 calculated in the directions parallel and perpendicular to the roof girder to support its conclusion.
4. In UFSAR Table 3H.5-10, the required concrete slab reinforcement parallel to the girders (2.54 in2/ft.) is changed (increased by 46%) and is exactly equal to the provided reinforcement. Please discuss the sensitivity of any unverified parameter, assumptions, or any load in the load combination considered in the calculations that may potentially change and the required reinforcement may exceed the value of 2.54 in2/ft.
5. The licensee in UFSAR Table 3H.5-10 proposed to change the allowable shear and bending stresses for the roof girder. The licensee is requested to describe in detail the technical basis for arriving at the higher allowable stresses.