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February 28, 2011
U7-C-NINA-NRC-110039

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
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Rockville MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Revised Responses to Requests for Additional Information

Attached are Nuclear Innovation North America LLC (NINA) revised responses to Requests for Additional Information (RAIs) related to Combined License Application (COLA) Part 2, Tier 2, Section 9.1, "Fuel Storage and Handling." As detailed in the attachments, the purpose of the revisions was to update the referenced technical reports supporting the following RAIs:

09.01.01-3 09.01.01-4

When a change to the COLA is required, it will be incorporated into the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions regarding these responses, please contact Scott Head at (361) 972-7136 or Bill Mookhoek at (361) 972-7274.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 2/28/2011

Mark McBurnett
Senior Vice President, Oversight & Regulatory Affairs
Nuclear Innovation North America LLC

jaa
Attachments: 1. RAI 09.01.01-3 Response, Revision 1
2. RAI 09.01.01-4 Response, Revision 1

STI 32831093

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NRO

cc: w/o attachment except*
(paper copy)

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RAI 09.01.01-3

QUESTION:

In response to RAI 2558 (Question 09.01.01-1), the applicant states that the confirmatory criticality analyses will be included in ITAAC 2.5.6.2 along with other items.

The staff does not agree that a future analysis in an ITAAC fulfill the requirements of ABWR COL License Information Items 9.1.6.1 and 9.1.6.3 as described in the response to 09.01.01-1. The staff has issued RAI 4032 (Question 09.01.01-2) requesting the applicant to meet COL Information Items 9.1.6.1 and 9.1.6.3. In addition, the staff is also requesting the applicant to provide the deliverables in COL Information Items 9.1.6.2 and 9.1.6.4 in order for the staff to perform it's safety review.

RESPONSE REVISION 1:

References:

1) Letter from Scott Head to NRC, "Responses to Requests for Additional Information," dated May 3, 2010, U7-C-STP-NRC-100101 (ML101260118)
2) Letter from Scott Head to NRC "Submittal of Technical Report," dated June 14, 2010, U7-C-STP-NRC-100136 (ML101670139)
   - WCAP-17246-P, "South Texas Project Units 3 & 4 Fuel Storage Racks Criticality Safety Methodology Report"
3) Letter from Scott Head to NRC "Response to Requests for Additional Information and Submittal of Revised Technical Report," dated October 11, 2010, U7-C-STP-NRC-100216 (ML102870265)
   - WCAP-17246-P, Revision 1, "South Texas Project Units 3 & 4 Fuel Storage Racks Criticality Safety Methodology Report"
4) Letter from Mark McBurnett to NRC, "Submittal of Technical Report," dated October 14, 2010, U7-C-STP-NRC-100230 (ML102910326)
   - WCAP-17311 Revision 0, "Stress Report for STP Units 3 & 4 New Fuel Storage Rack Baseline Design" (ML102910328).
5) Letter from Scott Head to NRC "Submittal of Technical Report," dated October 29, 2010, U7-C-STP-NRC-100245 (ML103060040)
   - WCAP-17331, Revision 0, "Stress Report for STP Units 3 & 4 Spent Fuel Storage Rack Baseline Design" (ML103060041)
6) Letter from Mark McBurnett to NRC, "Submittal of Revised Technical Reports" dated December 9, 2010, U7-C-STP-NRC-100260 (ML103490737)
   - WCAP-17311-P-Rev 1, Structural Analysis Report for STP Units 3 & 4 New Fuel
   - WCAP-17331-P-Rev 1, Structural Analysis Report for STP Units 3 & 4 Spent Fuel
7) Letter from Scott Head to NRC "Submittal of Technical Report," dated January 25, 2011, U7-C-NINA-NRC-110004 (ML110270170).
   - WCAP-17375-P, "South Texas Project Units 3 & 4 Fuel Storage Racks with DCD Fuel Design Criticality Safety Methodology Report"

The response to RAI 09.01.01-3 being revised herein was initially submitted by reference 1 and additionally addressed by references 2 through 7. This revision supersedes the original response to RAI 09.01.01-3 in its entirety to reflect changes to numbering and content of the referenced technical reports and to permit ease of review with a single consolidated response showing the proposed COLA revisions. Revisions are indicated by revision bars in the margin.

To address this request, a criticality analysis covering both the New Fuel Storage Racks (COL Item 9.1.6.1) and the Spent Fuel Storage Racks (COL Item 9.1.6.3) was performed based on a baseline rack design using a representative fuel type. A report, WCAP-17246-P, "South Texas Project Units 3 & 4 Fuel Storage Racks Criticality Safety Report," which detailed the methodology, described the analysis, and summarized calculation results, was provided in reference 2. Subsequently, responses to RAI 09.01.01-6 through RAI 09.01.01-15 and a related revision to the WCAP were provided by reference 3. Reference 3 and related WCAP report were reviewed by NRC staff in the Westinghouse offices in Cranberry Township, Pennsylvania on December 8 and 9, 2010. During this review, the staff requested additional information related to the DCD fuel of record and this was provided by reference 7.

Similarly, an analysis covering the New Fuel Rack Dynamic and Impact Analyses (COL Item 9.1.6.2) was performed on the baseline rack design and results provided in references 4 and 6 (WCAP-17311). A separate analysis covering the Spent Fuel Rack Load Drop Analysis (COL Item 9.1.6.4) was also performed and results submitted by references 5 and 6 (WCAP-17331).

As a result of this RAI response, COLA Part 2, Tier 2, Subsections 9.1.6.1, 9.1.6.2, 9.1.6.3, and 9.1.6.4 will be revised. A new Subsection 9.1.7S, "References," will be added. Changes from COLA Rev. 5 are indicated with grey shading as follows (the mark-up for Subsection 9.1.7S supersedes the mark-up provided in response to RAI 09.01.01-6):

9.1.6.1 New Fuel Storage Racks Criticality Analysis

The following standard supplement addresses COL License Information Item 9.1.

The COL applicant shall provide the NRC a confirmatory criticality analysis for the inadvertent placement of a fuel assembly in other that prescribed locations as required by Subsection 9.1.1.1.1. ~~A confirmatory~~ The criticality analysis for new fuel storage, which addresses the inadvertent placement of a fuel assembly in other than prescribed locations is provided in WCAP-17246-P and WCAP-17375-P. ~~will be prepared and verified in accordance with ITAAC 2.5.6.1, 2.5.6.2 and 2.5.6.3.~~

~~The analysis will document:~~

~~(1) Assumptions and input parameters (i.e. number of racks, fuel capacity, rack material, neutron poison content, fuel center to center distances). Assumptions include highest reactivity fuel and optimum moderators under normal and accident conditions.~~

~~(2) The highest reactivity fuel storage array is maintained subcritical (k_{eff} ≤ 0.95) when fully loaded under varying moderator conditions up to optimum (dry to flooded with fire extinguishing aerosols or non-borated water).~~

~~(3) Rack design precludes inadvertent placement of fuel in other than design locations.~~

~~(4) Failure of non-safety related structures in vicinity of new fuel storage or fuel load drop will not increase k_{eff} > 0.95.~~

~~(5) Maximum uplift forces from fuel handling equipment will not increase k_{eff} > 0.95 for fuel array.~~

9.1.6.2 Dynamic and Impact Analyses of New Fuel Storage Racks

The following standard supplement addresses COL License Information Item 9.2.

The COL applicant shall provide the NRC confirmatory dynamic and impact analyses of the new fuel storage racks, as requested by Subsection 9.1.1.1.6. ~~These analyses are dependent on a vendor specific design and the as-built configuration of new fuel storage racks. A description of~~ tThe structural analysis, including dynamic and ~~I~~impact (load drop) analyses, for the new fuel storage racks ~~confirmatory analyses will be~~ is provided in WCAP-17311-P. ~~an FSAR amendment in accordance with 10 CFR 50.71(e) prior to receipt of fuel. (COM 9.1-1)~~

~~Structural integrity of the racks will be demonstrated for the load combinations described in SRP 3.8.4 appendix D.~~

~~The dynamic analysis will utilize the input excitation provided in Section 3A.10.2 for a SSE. The fuel storage vault and racks meet Seismic Category 1 requirements.~~

~~The impact analysis will confirm that keff≤ 0.95 for a load drop of one fuel assembly and its associated handling tool from a height of 1.8 m above the new fuel racks.~~

9.1.6.3 Spent Fuel Storage Racks Criticality Analysis

The following standard supplement addresses COL License Information Item 9.3.

The COL applicant shall provide the NRC a confirmatory critically analysis for the inadvertent placement of a fuel assembly in other than prescribed locations, as required by Subsection 9.1.2.3.1. ~~A confirmatory~~ The criticality analysis for spent fuel storage which addresses the inadvertent placement of a fuel assembly in other than prescribed locations is provided in WCAP-17246-P and WCAP-17375-P. ~~will be prepared and verified in accordance with ITAAC 2.5.6.1, 2.5.6.2 and 2.5.6.3.~~

~~The analysis will document:~~

~~(1) Assumptions and input parameters (i.e. number of racks, fuel capacity, rack material, neutron poison content, fuel center to center distances). Assumptions include highest reactivity fuel assembly (based on minimum burnup) and optimum moderator under normal and accident conditions.~~

~~(2) The highest reactivity fuel storage array is maintained subcritical ($k_{eff} \leq 0.95$) when fully loaded under optimum moderator condition (non-borated water).~~

~~(3) Maximum uplift forces from fuel handling equipment will not increase $k_{eff} \geq 0.95$ for fuel array.~~

~~(4) Failure of non-safety related structures in vicinity of spent fuel storage, fuel load drop or missiles generated by surrounding equipment will not increase $k_{eff} \geq 0.95$~~

~~(5) Rack design precludes inadvertent placement of fuel in other than design locations.~~

9.1.6.4 Spent Fuel Racks Load Drop Analysis

The following standard supplement addresses COL License Information Item 9.4.

The COL applicant shall provide the NRC a confirmatory load drop analysis, as required by Subsection 9.1.4.3. ~~This analysis is dependent on a vendor specific design and the as-built configuration of spent fuel storage racks. A description of t~~The ~~confirmatory~~ structural analysis, including load drop analysis, for the spent fuel storage racks ~~will be~~ is provided in WCAP-17331-P. ~~an FSAR amendment in accordance with 10 CFR 50.71(e) prior to receipt of fuel. (COM 9.1-2)~~

~~The load drop analysis will confirm that $k_{eff} \leq 0.95$ for a drop of one fuel assembly and its associated handling tool from a height of 1.8 m above the spent fuel racks.~~

9.1.7S References

9.1-1 WCAP-17246-P, "South Texas Project Units 3 & 4 Fuel Storage Racks Criticality Safety Methodology Report," Westinghouse Electric Company, LLC.

9.1-2 WCAP-17375-P, "South Texas Project Units 3 & 4 Fuel Storage Racks with DCD Fuel Design Criticality Safety Methodology Report," Westinghouse Electric Company, LLC.

9.1-3 WCAP-17311-P, "Structural Analysis Report for STP Units 3 & 4 New Fuel Storage Rack Baseline Design," Westinghouse Electric Company, LLC.

9.1-4 WCAP-17331-P, "Structural Analysis Report for STP Units 3 & 4 Spent Fuel Storage Rack Baseline Design," Westinghouse Electric Company, LLC.

RAI 09.01.01-4

QUESTION:

Spent Fuel Racks Structural Evaluation

To address COL License Information Item 9.7, the applicant stated in FSAR Section 9.1.6.7 that a confirmatory structural evaluation of the racks will be provided in an FSAR amendment in accordance with 10 CFR 50.71(e) prior to receipt of fuel. Since structural integrity of the racks must be demonstrated under all postulated loading conditions for providing protection to the spent fuel from mechanical damage, the applicant is requested to provide details of analysis and design of the spent fuel racks using the guidance in SRP 3.8.4, Appendix D, in order for the staff to assess structural adequacy of the spent fuel racks.

RESPONSE REVISION 1:

Response to RAI 09.01.01-4 was submitted in letter U7-C-STP-NRC-100101, dated May 3, 2010 (ML101260118). This RAI Response is revised to reflect changes to numbering and content of the referenced WCAP report.

The technical report (WCAP-17331-P, "Structural Analysis Report for STP Units 3 & 4 Spent Fuel Storage Rack Baseline Design"), referenced in RAI 09.01.01-3, which covers the COL Item 9.1.6.4, Spent Fuel Racks Load Drop Analysis, also covers the Spent Fuel Racks Structural Evaluation (COL Item 9.1.6.7). It describes details of the analysis and design of the spent fuel racks using the guidance in SRP 3.8.4, Appendix D. This analysis is based on a baseline rack design using a representative fuel type. The report, which was provided in letter U7-C-STP-NRC-100245 dated October 29, 2010 (ML103060040), was revised and provided in letter U7-C-STP-NRC-100260, dated December 9, 2010 (ML 103490737).

As a result of this RAI response, COLA Part 2, Tier 2, Subsection 9.1.6.7 will be revised. Changes from COLA Rev. 5 are indicated with grey shading as follows:

9.1.6.7 Spent Fuel Racks Structural Evaluation

The following standard supplement addresses COL License Information Item 9.7.

The COL applicant shall provide the NRC a confirmatory structural evaluation of the spent fuel racks, as outlined in Subsection 9.1.2.1.3. ~~This evaluation is dependent on a vendor specific design and the as-built configuration of spent fuel storage racks. A description of t~~The ~~confirmatory~~ structural evaluation of the spent fuel racks ~~will be~~ is described ~~provided~~ in WCAP-17331-P. ~~an FSAR amendment in accordance with 10 CFR 50.71(e) prior to receipt of fuel. (COM 9.1-4)~~

~~Structural integrity of the racks will be demonstrated for the load combinations described in SRP 3.8.4 appendix D. The fuel storage racks meet Seismic Category 1 requirements.~~