ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Wednesday, August 31, 2011 12:56 PM
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Subject: Draft - U.S. EPR Design Certification Application RAI No. 510 (6026,6016), FSAR Ch. 3
Attachments: Draft RAI_510_EMB2_6026_EMB1_6016.doc

Attached please find draft RAI No. 510 regarding your application for standard design certification of the U.S. EPR. If you have any question or need clarifications regarding this RAI, please let me know as soon as possible, I will have our technical Staff available to discuss them with you.

Please also review the RAI to ensure that we have not inadvertently included proprietary information. If there are any proprietary information, please let me know within the next ten days. If I do not hear from you within the next ten days, I will assume there are none and will make the draft RAI publicly available.

Thanks,
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Request for Additional Information No. 510(6026, 6016), Revision 0

8/31/2011

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.02.01 - Seismic Classification
SRP Section: 03.09.05 - Reactor Pressure Vessel Internals

Application Section: 3.2.1

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)
QUESTIONS for Engineering Mechanics Branch 1 (AP1000/EPR Projects) (EMB1)

03.02.01-19

FSAR Rev.2 Section 3.2.1 states that to meet the requirements of both GDC 2 and 10 CFR 50, Appendix S with regard to the design for earthquakes, U.S. EPR SSC are seismically classified in accordance with RG 1.29. Also, Table 1.9-2 of the FSAR Tier 2 states that that the U.S. EPR complies with RG 1.29, Revision 4. RG 1.29 regulatory position C.1.c. identifies that the systems that are required for post accident containment atmosphere cleanup (e.g., hydrogen removal system) are designated as Seismic Category I and must be designed to withstand the effects of the SSE and remain functional. However, FSAR Table 3.2.2-1 identifies that the Passive Autocatalytic Recombiners in the Combustible Gas Control System are classified as Seismic Category II rather than Seismic Category I. Therefore, in RAI 481 Question 03.02.01-18, the applicant was requested to describe the basis for the seismic classification of the Passive Autocatalytic Recombiners as Seismic Category II and clarify why this classification is consistent with RG 1.29 or revise the FSAR to show this as an exception to RG 1.29 and justify the acceptability of this exception.

The Response to Question 03.02.01-18 references FSAR Tier 2, Section 6.2.5 that states the hydrogen concentration during design basis accidents remains below the threshold passive autocatalytic recombiners (PARs) are required and credited for accident mitigation. For that reason, the PARs are not safety-related components and are only required for severe accident mitigation. During a safe shutdown earthquake, it is only necessary for the PARs to maintain integrity, and their function is not required during a seismic event. They are therefore classified as Seismic Category II. The response does not address if this is an exception to RG 1.29 or revise the FSAR.

On the basis that the PARs are not relied upon for design basis events they are not considered safety-related or seismic Category I. However, the response does not address the exception to RG 1.29 or revise the FSAR, and the response is incomplete. NRC staff is concerned that this seismic classification represents an exception to RG 1.29 and the FSAR should be revised to identify this as an exception with an appropriate justification. This also appears to represent an exception to RG 1.7, normally addressed in FSAR Section 6.2.5, that should also be included in the FSAR. The applicant is requested the to evaluate the seismic classification of the PARs and associated equipment used to remove hydrogen to determine if this classification represents an

exception to RG 1.7 and 1.29 and revise the FSAR to identify this as an exception with an appropriate justification. The applicant should specifically explain in the FSAR if the combustible gas control system is important to safety and if the system is needed to be functional after an earthquake in order to satisfy GDC 2. If FSAR Chapter 19 explains the basis for designation of important to safety SSCs relied upon for mitigating severe accidents and assigning their appropriate seismic requirements, the response should so clarify.

03.09.05-28

Follow-up to RAI 184, Question 03.09.05-12

In RAI 184, Question 03.09.05-12, the staff requested the applicant to provide more details of the instrumentation supporting structures [e.g. thermocouple, water level sensor, in-core nuclear instrumentation system (ICIS), control and drive rod assembly] as well as the relevant flow-induced vibration analysis for these structures. Additionally, the staff requested that Section 3.9.5 of the FSAR be revised to include sufficient information about the instrumentation supporting structures and their flow-induced vibration analyses.

In response, the applicant did not provide detail information about the instrumentation supporting structures and did not revise Section 3.9.5 of the FSAR. Please revise the FSAR with this requested information and include relevant FIV analyses in the revision. The staff needs this information to assure conformance with GDC-1 and 4. Revise Section 3.9.5 of the FSAR to include sufficient information about the instrumentation supporting structures and the relevant flow-induced vibration analyses.

03.09.05-29

Follow-up to RAI 184, Question 03.09.05-14

In RAI 184, Question 03.09.05-14, the staff requested the applicant to provide sufficient details about the design of the upper core plate and its interface with the fuel assemblies, core barrel, upper support columns, and lower guide tubes. Also, explain how these component assemblies are evaluated against possible excitation mechanisms of flow-induced vibration and revise Section 3.9.5 of the FSAR to include sufficient information about the design arrangement of the upper core plate and associated internals components including a discussion of the evaluation of the potential adverse effects of flow induced vibration and vortex shedding.

In response, the applicant provided a description of several potential sources of UCP flow excitation and made available for NRC inspection, AREVA NP drawings of the UCP design details and interfaces. The staff accepts this response. However, the applicant did not revise Section 3.9.5 of the FSAR to include sufficient information about the design arrangement of the UCP and associated internal components including a discussion of potential adverse effects of FIV and vortex shedding. Please revise the FSAR with this requested information. The staff needs this information to assure conformance with GDC-1 and 4.

03.09.05-30

Follow-up to RAI 184, Question 03.09.05-15

In RAI 184, Question 03.09.05-15, the staff requested the applicant to provide design details together with relevant flow-induced vibration analysis for the horizontal support plates and tie

rods inside the control rod guide assemblies (CRGAs.) In particular, the applicant is requested to provide drawing/sketches of the control rod guide and to clarify any differences of this design from that of other currently operating PWR reactors and their impact on potential flow excitation mechanisms. Also, revise Section 3.9.5 of the FSAR to provide the requested information.

In response, the applicant made available for NRC inspection, the CRGA design details which are shown in AREVA NP upper internals drawings. The applicant also referred to several RAI responses from Section 3.9.2. The staff finds this acceptable; however, the applicant did not revise Section 3.9.5 of the FSAR. Please revise Section 3.9.5 of the FSAR with the requested information. The staff needs this information to assure conformance with GDC-1 and 4.