ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Wednesday, May 11, 2011 1:16 PM
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Subject: Draft - U.S. EPR Design Certification Application RAI No. 488 (5788), FSAR Ch. 6
Attachments: Draft RAI_488_SPCV_5788.doc

Attached please find draft RAI No. 488 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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Hearing Identifier: AREVA_EPR_DC_RAIs
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Request for Additional Information No. 488(5788), Revision 0

5/11/2011

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.02 - Containment Heat Removal Systems
Application Section: 6.3

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

06.02.02-91

Follow-up to RAI 434 Supplement 4, Question 06.02.02-71 and Revision 3 to ANP-10293 (March 2011).

Technical Report ANP-10293 R3 section 2.3.2 states: "There is a gap of approximately 1.6 ft between the top of each basket and the heavy floor to provide a flow path for return water in the event the basket becomes filled with debris." The report goes on to state "water overflow over the top of the retaining basket would occur after the debris have been captured." While the gap does exist for all 4 retaining baskets (RB), the flow path at the top of basket may essentially be rendered ineffective for two out of the four installed retaining baskets (referred to as the single compartment RB's). The two single compartment RB's are provided with an alternate flow path that is capable of delivering the return water to the annular region, via the gutter system. This flow path is situated well below (several feet) the top of the two single compartment RB's. The staff request that AREVA clarify FSAR/ANP-10293 technical report language about RB flow paths for return water.

06.02.02-92

Follow-up to RAI 434 Supplement 4, Question 06.02.02-71 and Revision 3 to ANP-10293 (March 2011).

ANP-10293 Technical Report section 2.3.2 states, "The minimum volume of the two other baskets [the single compartment baskets] is approximately 1589 ft^3 each with a minimum surface area of approximately 721 ft^2." The single compartment RB area and volume description provided in ANP-10293 section 2.3.2 are based on the full basket height. The listed area/volume includes area/volume that is bypassed by the installation of the "gutter" system. The un-bypassed area/volume is more representative of the single compartment RB area/volume available to collect/filter debris during an accident. Therefore, the staff request that AREVA include a description of the single compartment RB area/volume that is not bypassed by the gutter system.

06.02.02-93

Follow-up to RAI 434 Supplement 4, Question 06.02.02-71 and Revision 3 to ANP-10293 (March 2011)

ANP-10293 Section 3.2.5 describes how the "…lower annular area communicates with the IRWST through seven openings via gutters. These gutters seal off the two areas with a water seal in the IRWST to maintain a two-zone containment. The gutters are attached to the IRWST wall at the openings by anchoring bolts to the frame. The gutters protrude out from the wall approximately 12 inches, and then turn 90° down into the IRWST water to a level of -2.8 (-9.2 ft) meters. The minimum IRWST level during normal operating conditions is -2.59 (-8.5 ft) meters, keeping the annular space separated from the IRWST (see Figure 2-1). The gutters are stainless steel, including the anchoring material."

In addition to providing two-zone containment, these gutters also function to route water and debris to/from retaining baskets and the annular region and prevent adding debris directly to the IRWST water, bypassing the basket. The staff request that AREVA clearly state the design bases function of the gutter system as it appears to be credited to support strainer qualification efforts associated with long term core cooling. If these components serve an ECCS design bases function, these components should be described in the FSAR (Tier 1 and 2) with an appropriate equipment class, quality group, seismic category, design codes and standards designation, etc.

06.02.02-94

Follow-up to RAI 434 Supplement 4 and Revision 3 to ANP-10293 (March 2011):

ANP-10293 Section 3.2.5 describes how the "…lower annular area communicates with the IRWST through seven openings via gutters. These gutters seal off the two areas with a water seal in the IRWST to maintain a two-zone containment. The gutters are attached to the IRWST wall at the openings by anchoring bolts to the frame. The gutters protrude out from the wall approximately 12 inches, and then turn 90° down into the IRWST water to a level of -2.8 (-9.2 ft) meters. The minimum IRWST level during normal operating conditions is -2.59 (-8.5 ft) meters, keeping the annular space separated from the IRWST (see Figure 2-1). The gutters are stainless steel, including the anchoring material." The description provided above describes how the gutter is attached to the IRWST wall at the wall opening. The staff request that AREVA describe how the gutter system is attached to the single compartment basket and the double compartment basket. Describe any penetrations through the sides of baskets needed to ensure delivery of water and debris into the retaining basket interior.

06.02.02-95

Follow-up to RAI 434 Supplement 4, Question 06.02.02-71 and Revision 3 to ANP-10293 (March 2011).

RAI 434 response to Question 06.02.02-71 states that all four retaining baskets collect and filter flow from the annular space and commits to change FSAR section 6.3 which

currently indicates that only two of the four baskets [the double compartment baskets] filter flow from the annular space.

ANP-10293 R3 Section 3.2.5 describes how the "…lower annular area communicates with the IRWST through seven openings via gutters."

Appendix E to ANP-10293 R3, indicates that the screened area of the large compartment (front basket) of the double compartment RB design (at full height) contains less screened area than the single basket design (at full height). Therefore, it is conservative to model the front portion of the double basket design in the test apparatus.

Given that the single compartment RB now connects to the annular region (via the gutter system), and this connection is several feet below the baskets full height, essentially reducing the baskets effective area to the region at or below the gutter, the staff request that AREVA explain how comparing the full height of the single compartment basket area to the full height of the double compartment front/large basket area is a conservative approach for designing the test apparatus?

06.02.02-96

ANP-10293 R3 section 3.1.4 provides the ECCS strainer head loss test result and indicates that the testing details are contained in Appendix E in the same report. Appendix E lists two phases of testing. Based on the description of tests provided in Appendix E, it is not clear to the staff which test(s) in each phase AREVA has selected to serve as the design basis qualification test(s) for the retaining basket and strainer. Therefore, the staff request that AREVA clearly state which tests are credited with establishing the US EPR qualification basis and why.

06.02.02-97

As a follow-up question to RAI 434 question 06.02.02-74 and in accordance with RG 1.206 section C.I.6.2.2 Containment Heat Removal Systems, the staff request that AREVA describe the following design features in the FSAR for the US EPR:

- Discuss the types of insulation used inside the containment and identify where and in what quantities each type is used.
- List the materials used in fabricating the identified insulation, and describe the behavior of the insulation during and after a LOCA.
- Describe the methods used to attach the insulation to piping and components.

In addition, as part of the US EPR GSI-191 evaluation, the staff request to know if the US EPR uses a method to attach NUKON fiber insulation to piping and components that increases the destruction pressure and reduces the ZOI Radius in comparison to the unjacketed NUKON destruction pressure and ZOI Radius (6 psi and 17D respectively, per Table 3-2 of staff SE on NEI 04-07). If attachment methods are credited to increase the destruction pressure in comparison to unjacketed NUKON, the staff requests that AREVA develop inspection, test, analysis, and acceptance criteria (ITAAC) and/or additional methods to ensure that the US EPR as-built NUKON insulation application is as robust as the experiments that justify the increased NUKON destruction pressure.

06.02.02-98

Follow-up to RAI 434 Question 06.02.02-77

In the response to RAI 434 question 06.02.02-77 the applicant did not include any updates to the FSAR or ANP-10293. The information contained in the response related to basket performance is needed to support the staffs safety review of testing and should be included in the appropriate sections of the FSAR and/or technical report. Therefore, request AREVA update the FSAR or technical report with the information related to basket performance.

06.02.02-99

According to Figure 2-1 in ANP-10293 Rev. 3, it appears that return water falling from the heavy floor may directly impinge upon a portion of the Retaining Basket screened surface area. During testing of the retaining basket screen, water falling from a simulated heavy floor did not impinge upon basket screened surfaces. The staff request that AREVA clarify if the actual basket design screened surface will have water and debris directly impinging upon screen surfaces. If water does directly impinge upon a portion of the basket screened surface, explain the effects this would have on overall basket performance and strainer head loss.