ArevaEPRDCPEm Resource

From: BRYAN Martin (EXT) [Martin.Bryan.ext@areva.com]
Sent: Wednesday, June 23, 2010 6:05 PM
To: Tesfaye, Getachew
Cc: KOWALSKI David J (AREVA NP INC); ROMINE Judy (AREVA NP INC); PATTON Jeff (AREVA NP INC); COLEMAN Sue H (AREVA NP INC); TUTTLE Eileen B (AREVA NP INC); SANDERS Harris I (AREVA NP INC)
Subject: Draft Response to U.S. EPR Design Certification Application RAI No. 357, FSARCh. 5 OPEN ITEM, Supplement 5
Attachments: RAI 357 Supplement 6 Response - DRAFT.pdf

Getachew,

Attached is a draft response for RAI 357 Supplement 6. Earlier today, AREVA submitted Supplement 5 that provided a date for the final response as July 27, 2010. Let us know if you have any further questions or if we can submit this draft as final.

Sincerely,

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Response to

Request for Additional Information No. 357(4205), Supplement 6

1/12/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 05.03.01 - Reactor Vessel Materials
Application Section: 5.3.1.6 Material Surveillance

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DRAFT

Question 05.03.01-13:

OPEN ITEM

Section 5.3.1.6 (third paragraph) of the U.S. EPR FSAR states that the specimen capsules are confined in rigid-specimen guide baskets and that the specimen guide baskets are attached to the outside of the core barrel with austenitic stainless steel bolts. Because specimen guide baskets are typically welded to the core barrel in U.S. reactors, please discuss any operating experience you may have with the use of bolted connections in this application, and how you have ensured that the bolted connections will maintain their structural integrity for the life of the plant for anticipated degradation mechanisms.

Response to Question 05.03.01-13:

Some U.S. reactors have utilized bolted connections for attachment of the specimen guide baskets to the core barrel. The original B&W designs for U.S. reactors utilized Alloy 286 (SA-453 Grade 660 Condition B), which was susceptible to degradation such as stress corrosion cracking (SCC) and failed early in operation. Redesigned bolting was used in later designs (Alloy X-750 HTH) for Crystal River 3 and Davis Besse and has performed satisfactorily since startup.

As addressed in U.S. EPR FSAR Tier 2, Section 4.5.2.4 and identified in U.S. EPR FSAR Tier 2, Table 4.5-2—Reactor Vessel Internal Materials, cold worked Type 316 austenitic stainless steel bolting (refer to ASME Code Case N-60-5 in U.S. EPR FSAR Tier 2, Table 5.2-1—ASME Code Cases) is utilized for the U.S. EPR reactor pressure vessel (RPV) internals bolting. Cold worked Type 316 austenitic stainless steel bolting has been used for attaching the specimen baskets to the core barrel for AREVA (formerly FRAMATOME) units in France and for other European plants (Tihange 1 & 2, Doel 3, Koberg 1 & 2 and Ulchin 1 & 2 (KNU 9 & 10)). There have been no reported failures of these bolted connections.

The cold worked Type 316 austenitic stainless steel bolting is less sensitive to SCC, especially at the lower fluence levels anticipated at the location of specimen baskets (peak 60-EFPY neutron fluence of approximately 2×10^{19} n/cm^2) than the Alloy X-750 HTH. Based on the operating history of similar material in the European plants and the reduced sensitivity of the cold worked Type 316 austenitic stainless steel bolting compared to material that has performed satisfactorily for U.S. plants, the cold worked Type 316 austenitic stainless steel bolting is acceptable for its intended application in the U.S. EPR RPV internals.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

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