ArevaEPRDCPEm Resource

From: Getachew Tesfaye
Sent: Monday, March 23, 2009 7:04 PM
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Cc: Jeffrey Poehler; David Terao; Jason Carneal; Joseph Colaccino; ArevaEPRDCPEm Resource
Subject: Draft - U.S. EPR Design Certification Application RAI No. 206 (2455), FSAR Ch. 15
Attachments: Draft RAI_206_CIB1_2455.doc

Attached please find draft RAI No. 206 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. 206 (2455), Revision 0

3/23/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 15.00.03 - Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors
Application Section: 15.0.3

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

15.00.03-36

Background

(Reference RAI 137, Question 15.00.03-33) The concentrations of strong acids (HCl and HNO_3) in the containment sump that affect pH are listed in Table 15.0-55 of the FSAR. The response to the above referenced RAI question provided additional information regarding the pH of the sump over the course of thirty days with some details regarding decomposition of PVC insulation on cables that result from air dose to the cables. However, the assumed dose to the cables was not noted.

The amount of nitric acid identified in the tables appears to be calculated based only on the noble gas activity in the containment air (plus a small contribution from non-noble gas radionuclides). It does not appear that formation of nitric acid from radiolysis by radionuclides within the liquid phase of the containment spray is included in this calculation (in the licensee response Table 15.00.03-34-1 Sheet 2 of 3, Row 2).

NUREG/CR-5950 states that in the tests conducted for nitric acid formation following a LOCA, irradiated water-saturated air did not form measurable nitric acid, but irradiated, air-saturated water did form nitric acid. The formation of nitric acid is related to the overall sump pool dose rate, the time of exposure and the nitric acid formation constant (G-value of 0.007 molecules per 100 eV of deposited energy).

Following a LOCA the activity concentration in the RCS liquid phase will increase 1-2 orders of magnitude from its operating value. This needs to be accounted for in the total dose to the sump pool and the formation of nitric acid in this phase.

Requested Information

1. Based on the information provided in NUREG/CR-5950 and the increased activity of the RCS following a LOCA (from crud entrained in the liquid due to hydraulic and pH effects):

    a. What activity assumptions were made to calculate the dose to form nitric acid?

b. What G-value was used for nitric acid formation?
c. What was the dose rate as a function of time?
d. What was the average nitrogen concentration in the sump pool?
e. If a bounding assumption was made for the overall sump pool dose rate or total integrated dose, provide the basis and reference for the bounding assumption.

2. With regards to the cable jacketing decomposition to form HCl, what was the average noble gas and iodine air dose used as a function of time to determine the cable jacketing decomposition to form HCl?