ArevaEPRDCPEm Resource

From: Clark, Phyllis
Sent: Monday, February 10, 2014 4:39 PM
To: usepr@areva.com
Cc: ArevaEPRDCPEm Resource
Subject: U.S. EPR Final RAI 627 RPAC (eRAI 7408)
Attachments: US EPR DC RAI Letter 627 eRAI 7408.docx

Attached please find the final subject requests for additional information (RAI) 627 (eRAI 7408) regarding your application for standard design certification of the U.S. EPR. A draft of the RAI was provided to you on February 5, 2014. Your email dated February 7, 2014 stated that no clarification phone call was required on this RAI and that the RAI could be issued as "final". Therefore, the questions in this RAI remain unchanged from their draft version.

The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. Additionally, please make sure to include in your response letter a statement certifying whether or not your response contains any sensitive or proprietary information that needs to be withheld from public disclosure.

Sincerely,

Phyllis Clark
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Request for Additional Information 627

Issue Date: 02/10/2014
Application Title: U. S. EPR Standard Design Certification - Docket Number 52-020
Operating Company: AREVA NP Inc.
Docket No. 52-020
Review Section: 12.02 - Radiation Sources
Application Section: FSAR Sections 3D, Chapter 11, and Chapter 12

QUESTIONS

12.02-7

In the response to RAI 17, Supplement 2, Question 15.00.03-1, the applicant determined that the reactor coolant system (RCS) concentrations of N-16 would be 2.59 times higher than what was originally provided. In reviewing this supplemental response staff noted several apparent errors and inconsistencies between the response and information provided in the FSAR and information previously provided to staff. In addition, it is unclear if the applicant fully evaluated the N-16 concentration changes with regard to Chapter 3 equipment qualification information and radiological information provided within Chapters 11 and 12. Therefore, in order to ensure that the DCD provides up to date, accurate, and consistent information and to ensure that staff fully understands the changes made in the response, staff has the following questions. In responding to these questions, please update the FSAR, as appropriate, to ensure that it is consistent, accurate, and up to date.

1. In the response to RAI 17, Supplement 2, Question 15.00.03-1, the applicant updated dose rates in FSAR Table 3D-8, based on a calculated increase in the N-16 source term by 2.59 times. In order to ensure compliance with 10 CFR 50.49, staff has the following comments regarding this table.
    a. Please explain why the dose rate above the reactor pressure vessel and IRWST does not increase.
    b. FSAR Section 3D.5.1.1 indicates that the cumulative dose column in Table 3D-8 is based on the dose to the equipment over 60 years of operation. However, in reviewing the changed values in Table 3D-8, the dose rates in the dose rate column, multiplied over 60 years does not equate to the values presented in the cumulative dose rate column, please explain or correct these apparent inconsistencies.
    c. For the Reactor Building, in row "Equipment Area-All Equipment," it currently indicates that the dose rate is 1.20E+25 Rad/hour. Please correct this error.
    d. Staff noted that dose rates in some areas of the Reactor Building and Annulus Buildings increased more than others. In order to ensure compliance with 10 CFR 50.49, please provide the methods, models, and assumptions used to revise the dose rates in FSAR Table 3D-8.

2. On page 3 of 3 of the response, under "Nitrogen-16 Determination," in the first sentence, the applicant states that the N-16 concentration increased by 2.59 times. In the following sentence it states that the increase is primarily due to the ORIGEN-S improvement in energy resolution for N-16 above 10 MeV leading to increased accuracy. Therefore, it is unclear if the concentration of N-16 is actually increasing or if the source term for N-16 is simply increasing due to improved source term modeling. The applicant should better explain what is causing the source term to increase and ensure all information provided in the response and proposed FSAR markups is consistent. Moreover, the staff interpretation of the improvement in energy resolution is that it should be qualified in the response and FSAR mark-up as being for activation by neutrons above 10 MeV.

3. SRP Section 12.2 states that the applicant should provide the basis for the source terms provided in FSAR Section 12.2. Various statements in FSAR Section 12.2 indicate that N-16 is not significant for systems outside containment because of the short half life of N-16 and the time it takes for reactor coolant water to exit containment. Please ensure that these statements are still valid for the increased N-16 source term. To support this information, please provide the expected transport time for RCS water to exit containment, as well as the basis for those values.

4. SRP Section 12.3-12.4 states that the areas inside the plant structures, as well as in the general plant yard, should be subdivided into radiation zones, with maximum design dose rate zones and the criteria used in selecting maximum dose rates identified. Therefore, please ensure that the increased N-16 source term does not result in any radiation zoning changes to any of the Chapter 12 radiation zone maps (both inside and outside containment).

5. In Table 12.2-4 the applicant changed the time it takes for coolant to cycle through the reactor coolant loop from 9.93 seconds to 9.92 seconds. However, the applicant did not make this change in Table 11.1-1 which still states that the transit time through the reactor coolant loop is 9.93 seconds. Please ensure that the information provided in these the tables is accurate and consistent.

6. In the proposed mark-up of FSAR Tier 2, Section 11.5.4.1, on expected N-16 concentrations and main-steam line radiation fields, the staff notes that the increase in steam concentration is greater than a factor of 2.59 (see p.3 of 3), but rather nearly 4.5 times higher. The applicant is requested to address the difference between the stated factor of 2.59 and the staff's observation of nearly 4.5.

7. In reviewing the proposed mark-up of FSAR Tier 2, Section 11.5.4.1 on expected N-16 concentrations and main-steam line radiation fields, it is not clear if the proposed revision considered the basis of the values, given the staff review of the calculation package and

discussion with Areva staff during the audits conducted in April and May 2010. Specifically, the expected RCS N-16 concentrations were presumed to be 40 uCi/cc and other data were then dependent on that assumption. The expected correlation factor among N-16 concentration, SG tube leakage rate, dose rate at the location of the monitor, inherent self-shielding properties of MS piping, and radiation monitor reading formed the basis of that instrument response rate. Based on the information presented in the response of this RAI, it is not clear if the applicant has reviewed the assumptions and results of the calculation package and confirmed that the revisions presented in response to this RAI does not adversely impact the basis of the information and assumptions presented in FSAR Tier 2, Rev. 4, Section 11.5.4.1. It should be noted that the expected N-16 concentrations and radiation fields given in FSAR Rev. 4, Section 11.5.4.1 support compliance with TS 16.3.4.12 and commitment to use industry guidance under NEI 97-06. The applicant is requested to confirm that the proposed changes and revisions will not negate the technical basis in complying with the TS and industry guidance.

8. While the response proposes the deletion of the cited N-16 concentration (40 uCi/cc) in FSAR Tier 2, Table 11.1-7, the applicant should be aware that this concentration forms the basis of demonstrating compliance with TS 16.3.4.12 and NEI 97-06 – see Areva's calculation package. The applicant should retain some of this information in the FSAR since a COL applicant will use it to develop the associated tests as part of the ITP (under test abstract #143) and confirm compliance with the TS. It is suggested that the key technical details be retained in the FSAR (e.g., added to Footnote 15 in FSAR Tier 2, Table 11.5-1) in order to facilitate a COL applicant's effort in developing the ITP test, assigning acceptance criteria for the tests, and confirming the operability of the radiation monitors for that TS.