KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Wednesday, July 22, 2015 2:41 PM
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Cc: Stutzcage, Edward; McCoppin, Michael; Olson, Bruce; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 103-7998 (12.02 - Radiation Sources)
Attachments: APR1400 DC RAI 103 RPAC 7998.pdf; image001.jpg

KHNP,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. However, KHNP requests, and we grant, 60 days to respond to the RAI question. We may adjust the schedule accordingly.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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MESSAGE	648	7/22/2015 2:41:13 PM
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Options
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Return Notification: No
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REQUEST FOR ADDITIONAL INFORMATION 103-7998

Issue Date: 07/22/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 12.02 - Radiation Sources
Application Section: 12.2

QUESTIONS

12.02-10

Requirement:

10 CFR 52.47(a)(5) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR 20.

Issue:

FSAR Table 15A-1 provides the core fission product inventories for 60 essential isotopes. This list includes the isotopes Y-90, Rb-86, Sr-92, Y-92, Zr-97, Ru-105, Sb-127, Sb-129, Te-127, Te-127m, Ba-139, La-141, La-142, Rh-105, Pr-143, Nd-147, Pu-238, Pu-289, Pu-240, Pu-241, Am-241, Cm-242, Cm-244. In addition, source terms for the liquid waste management system (LWMS) and solid waste management system (SWMS) include some of these isotopes. However, the RCS design basis source terms provided in FSAR Tables 11.1-2 and 12.2-5 and other relevant source terms in Chapter 11 and Chapter 12 do not include these isotopes.

In addition, other isotopes such as Rh-103m and Rh-106 appear in the waste management system source terms but do not appear in the source term for other components.

Finally, APR1400 component source terms contain fewer isotopes than other new reactor applications and many of these isotopes are included in other new reactor application source terms., APR1400 component source terms contain fewer isotopes than other new reactor applications and many of these isotopes are included in other new reactor application source terms.

Information Needed:

It is unclear why the afore mentioned isotopes would not be included in the design basis RCS source terms and all other relevant source terms in Chapter 11 and 12, when they are essential isotopes relevant to core inventory and some of them appear relevant and are included in the LWMS and SWMS source terms.

Please update the FSAR to include the calculated activities of these isotopes within the source terms or provide justification for why these isotopes are not needed in FSAR Tables 11.1-2 and 12.2-5, as well as in all other sources listed within Chapters 11 and 12.

12.02-11

Requirement:

10 CFR 52.47(a)(5) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR 20.

Issue:

A review of the gaseous radwaste system (GRS) in Chapters 11 and 12 reveals apparent missing information and anomalies in the FSAR. Staff needs this information to conduct source term and shielding design reviews as well as to conduct the SRP Chapter 11 review. Therefore, the staff has the following questions.

Information Needed:

1. A review of FSAR Chapters 11 and 12 reveals that for some noble gas isotopes, the 1% failed fuel source term is lower than both the expected and 0.25% failed fuel source term in both the RCS and the GRS. The 1% RCS source term assumes continuous gas stripping while the expected and 0.25% source term assumes no gas stripping. However, based on the system information provided in Chapter 11, it would appear that stripped gas would accumulate in the GRS. Therefore, it is unclear how gas stripping would result in both a decrease in RCS and GRS source terms.

a. Please revise the source terms for the RCS and/or GRS, as appropriate, to ensure that noble gases are accounted for in the 1% source term, or explain how gas stripping is reducing the inventory in both the RCS and GRS.

b. Discuss howthe response to this question, and any changes made to the FSAR as a result of this response, effect the information regarding BTP 11-5 and the BTP 11-5 analysis, and update the FSAR, as appropriate.

2. Please explain how the values for “At Inlet” in Tables 11.3-11 and 12.2-19 were determined and update the FSAR as appropriate with this information.

3. Please include the 0.25% header drain tank, guard bed, and waste gas dryer source terms in Chapter 12 or justify not including them.

4. Please include the dimensions and parameters for the delay beds, guard beds, waste gas dryer, and header drain tank in FSAR Table 12.2-25 or justify not including them in the table.

5. FSAR Table 11.3-4 indicates that there is a HEPA filter as part of the GRS package. Please include the 0.25% failed fuel source term for this filter in Chapter 12 and associated dimensions and parameters in Table 12.2-25 or justify not including it.

12.02-12

Requirement:

10 CFR 52.47(a)(5) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR 20.

Issue:

In addition to the information requested in previous requests for additional information, staff identified various other missing pieces of information in the Chapter 12 source term information. This question is not intended to include information requested in previous requests for additional information.

Information Needed:

1. Staff identified several components source dimensions and parameters in FSAR Table 12.2-25 for which no source term is included in FSAR Chapter 12. These sources are as follows:

    a. Spent fuel pool cleanup demineralizer
    b. Steam generator blowdown flash tank
    c. Waste storage drum area

    Please include the source terms for these sources in the FSAR or justify an alternative.

2. The staff identified various source terms in Chapter 12 which do not have source dimensions and parameters provided in FSAR Table 12.2-25. These sources are as follows:

    a. Seal injection filter (Table 12.2-12)
    b. Reactor drain filter (Table 12.2-12)
    c. Boric acid filter (Table 12.2-12)
    d. Purification filter (Table 12.2-12)
    e. Reactor makeup water filter (Table 12.2-12)
    f. Concentrate heater (Table 12.2-14)
    g. Concentrate cooler (Table 12.2-14)
    h. Flash tank (Table 12.2-14)
    i. Vapor separator (Table 12.2-14)
    j. Concentrate pump (Table 12.2-14)

k. Concentrate transfer pump (Table 12.2-14)
l. Steam generator blowdown mixed-bed (Table 12.2-18)
m. Blowdown pre-filter (Table 12.2-18)
n. Blowdown post-filter (Table 12.2-18)
o. CPS cation bed (Table 12.2-18)
p. CPS mixed bed (Table 12.2-18)
q. Equipment waste tank (Table 12.2-20)
r. Monitor tank (Table 12.2-20)
s. Reverse osmosis (Table 12.2-21)

Please include the dimensions and parameters for these sources in FSAR Table 12.2-25 or justify an alternative.

3. Table 12.2-25 lists the liquid radwaste system (LRS) ion exchanger (IX). It is unclear which ion exchanger in Table 12.2-21 this represents (cation bed, mixed bed 1, mixed bed 2). Please update FSAR Table 12.2-25 to clearly identify which component LRS IX represents and include the information for the missing IXs.


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