

Chapter 12 Discussion Topics List

Chapter 12 Radiation Protection, RAI 8339 Public Meeting with KHNP on APR1400 Design Certification Wednesday, June 15th, 2016, 8:00 a.m. – 11:00 a.m. (EST)

RAI 8339, Question 12.02-19, draft response and supplemental information provided in the Electronic Reading Room related to Decontamination Factors for CVCS Ion Exchangers

1. The applicant is assuming a DF of 100 on the pre-holdup ion exchange for Cs and Rb, while NUREG-0017 indicates that a DF of 2 should be used. Using a DF of 100 significantly lowers the source term of downstream components, compared to a DF of 2. While the applicant indicates that laboratory tests performed during the 1970s show that a 3:1 cation to anion ratio resin can have a DF of greater than 100, the application does not commit to using a 3:1 cation to anion ratio in the application. Furthermore, it is unclear that this high DF can be assumed for the lifetime of the resin and for plant life, as resin will degrade over time. Finally, the applicant indicates that some Combustion Engineering plants and System 80+ have assumed a DF of 100. However, in reviewing System 80+ it clearly indicates that the pre-holdup ion exchanger uses decontamination factors consistent with NUREG-0017. Also, while some Combustion Engineering plants may have used a DF of 100 this does not justify why the value is appropriate for the APR1400. Therefore, the applicant is requested to redo the calculations using a DF of 2 for the pre-holdup ion exchanger or provide a commitment in the application to ensure that the DF of 100 is maintained for the pre-holdup ion exchanger, for its lifetime of operation or provide justification, specifically related to the APR1400 design, for why the current source terms, shielding, and zoning are adequate for all downstream components.
2. The applicant indicates that the CVCS ion exchangers have a DF of 10 for crud, except for the purification ion exchanger which has a DF of 50. However, it is unclear if these are actually an additional removal fraction or if the values provided are simply repetitive of the other removal fractions. For example, for the pre-holdup ion exchanger, the applicant indicates that there is a DF of 10 for crud and a DF of 10 for cations. Co-60 could be both a cation and crud, so it is unclear if the applicant is assuming a DF of 10 once or twice for Co-60. In order to ensure that the staff has the proper understanding, please show how the values for Co-60 in DCD Table 12.2-11 were calculated for the pre-holdup and deborating ion exchangers, similar to what was done for the purification ion exchanger in RP-CQ-201506-Ch12_#2, response to question c.