

NRC staff comments on Holtec's responses to request for additional information (RAI):

Note: Highlighted text below indicates that NRC staff considers the RAI response to be unresolved or incomplete.

1. Applicant updated Table 2.2 in "Non-Fuel-Hardware for PWR Assemblies" and on Page 15 in discussion on Co-59 impurity. This RAI was more focused on hardware within the activated fuel region (guide tubes, water rods, etc.) and NRC staff doesn't see that update in the topical.
2. Axial blankets are stated as allowable contents in Table 2.2. Discussion added at the bottom of page 14. The description on page 14 states that either the enrichment and burnup of the blanketed regions will be incorporated into the burnup and enrichment used for the source term analysis, or they will be neglected. Presumably this was done for maximum flexibility as all vendors may not treat blanketed assemblies the same. Source term from blanketed fuel assemblies will need some additional considerations (e.g., higher peaked axial burnup profile or justification that using the lower enrichment balances the higher burnup from the averaged assembly values), staff could add a condition to the topical that this will need to be addressed when the dose rate calculation method is approved for the intended application.
3. Holtec will review the range and propose a method for site specific outliers that are outside the area of applicability but can be changed in the source term generation methodology.
 - a. For 3a, Table 2.2 was modified to include a range of applicability for boron concentration, in-core exposure to inserts and control rods, moderator density, fuel density, specific power, fuel arrays, fuel mass. This is the type of information the staff was seeking to address RAI 3a and it will review whether the range selected for each parameter can be justified with the rest of the information added to the topical justifies the range in Table 2.2.
 - b. For 3b, an applicable range of moderator density was added to Table 2.2. with justification and discussion added to page 8 and 9. This is the type of information the staff as seeking to addresses its concern for RAI 3b and it will review the information to make a finding that the allowable range and assumed ORIGAMI input values are justified.
4. The applicant added information to page 6 of the topical to address this RAI. This is the type of information the staff was seeking to address this concern. The staff will review the additional information to determine if it is acceptable.
5. Information added to page 15 to address this RAI. Although this states that assemblies may include irradiated steel replacement rods and that the activity must be included in the source term evaluation, there is no information on how this is to be included.
6. Not addressed yet.
7. Information added to page 15 to state that group structure from Table 3.5 will be used and will match the radiation transport method or a different group structure will need to be proposed when approving the radiation transport method. This addresses the staff's concern.
8. For fuel hardware, Discussion added to page 15 to state that 1.0 g/cc for Co-59 impurity for stainless steel and Inconel components will be used for fuel assemblies manufactured after 1990 and 2.2 and 4.7 g/kg for assemblies manufactured after 1990. Staff will review this information to determine if it is acceptable. One thing to note was

that in a previous clarification call on January 11, 2022, staff and Holtec had discussed allowing site specific Co-59 impurity if it can be justified by the site. This option does not appear to be mentioned here.

For non-fuel hardware, page 17 was modified to state 0.8 g/kg for steel and 4.7 g/kg for Inconel will be used. This is inconsistent with page 15. Will there be different values used for components manufactured prior to 1990?

9. See below

- a. Mass limit not added to Table 2.2 also considerations for varying thimble plug devices (TPD) configuration not added to Table 2.2. Discussion added to page 17. Extra explanation needed here, "... If there are any indications that the amounts of components to be qualified are significantly higher from those" how is this evaluated? Information on how source terms need to be adjusted should be provided. Did not address if lower masses can be used how this is done and what constitutes appropriate reference and documentation. Staff would expect that this is something that should be stated needs to be documented in the qualification report.
- b. Discussion added to page 16. This was the type of information the staff was seeking and it will evaluate the information provided.
- c. Table 2.2 was not updated. Discussion added to page 19 saying that if control rods are inserted more than 10% on average than the mass of the irradiated material will be increased and the irradiation length will be increased. Similar comment to 3a, more details are needed (i.e., if more than 10%, this is what you need to do). Presumably the statement on changing mass has something to do with Table 3.7? Is irradiation performed with a unit mass like the method for activating Co-59 in Section 3.5?

10. See below

- a. Discussion added on page 20. Addresses staff concern.
- b. Discussion added to page 20. Clarification requested on "...the portion of the neutron source assembly (NSA) in the active region shall be considered to be similar to a burnable poison rod assembly (BPRA) NSA, but with appropriately reduced number of full-length rods." What is an appropriately reduced number of full-length rods, how is this implemented? Presumably through the mass calculation? What is "the top of the NSA is to be considered identical to a TPD" mean? What is considered the "top"? Staff will evaluate the information provided further.
- c. Information added to page 20 address staff concern.

11. See below

- a. Addressed on page 28
- b. Text referencing Section 2.8 and Table 2.2 not added but bullet does state that parameters need to be within area of applicability.
- c. Added, however there is a typo because it now says 3.2, 3.5 and 3.5 (3.4 was omitted). Staff will need to look at Sections 3.2, 3.4 and 3.5 to ensure changes made provide explicit enough direction in modeling and calculating activation sources.
- d. Addressed on page 28
- e. addressed on Page 28
- f. Addressed on Page 28

g. Not addressed yet.

h. Not addressed yet.

i. Not addressed yet, i.e., staff is not looking for complicated Qual Reports that would need to be reviewed like an FSAR.

12. Not addressed yet.

13. Applicant deleted statements mentioning averaging dose rate / acceptance criteria limits.

14. See below

a. Addressed

b. addressed

c. addressed

d. addressed

e. addressed

f. addressed

g. addressed

h. Not yet addressed

i. addressed

j. not addressed