Gallardy, Vivian

From: TUPPER Larry (AREVA) <Larry.Tupper@areva.com>
Sent: Friday, June 23, 2017 11:15 AM
To: Garcia Santos, Norma
Cc: GUZZARDO Michelle (AREVA); MIGLIORE Rick (AREVA); EDWARDS Scott (AREVA)
Subject: [External_Sender] RE: RAI 6-4

Dear Norma,

Thank you for the response. We will review the staffs comments and provide you an input as what we would propose as the next steps sometime next week.

Sincerely

Larry

Larry Tupper
Manager Special Projects
Larry.tupper@areva.com
509-375-8926 (Office)
509-378-8687 (Mobile)

From: Garcia Santos, Norma [mailto:Norma.GarciaSantos@nrc.gov]
Sent: Friday, June 23, 2017 6:39 AM
To: TUPPER Larry (FL)
Cc: GUZZARDO Michelle (FL); MIGLIORE Rick (LO)
Subject: RE: RAI 6-4

Good morning,

This e-mail includes the input provided by the staff related to your proposed response to RAI 6-4.

The staff reviewed the proposed response to RAI 6-4 and thinks that you (the applicant) are on the right track. However, the applicant needs to perform a systematic evaluation for all potential fuel configurations and identify the one that is the most reactive as required by the regulations 10 CFR 71.55(b). Analyzing a few samples is not an acceptable way to demonstrate compliance with the regulation of 10 CFR 71.55(b). (The staff

can add a condition on the allowable fuel configuration as evaluated in the application, if an acceptable response is not provided.)

The concern is that the applicant has to identify the most reactive fuel configuration because BWR fuel assemblies typically include variations of fuel enrichment in both radial and axial directions. Also, the amount of burnable poison load is typically dependent of the fuel enrichment. Given the combined variations of enrichment and poison load, a fuel assembly with higher enrichment may not necessarily be more reactive than the ones with lower enrichment and lower poison loading.

As information and references, the staff wants to mention that NUREG/CR-7224 provides some information on some typical fuel and poison loadings configurations. Also, NUREG/CR-7158 provides more information on the assessment of the parameters that may impact the k_{eff} of a fuel assembly. However, these NUREGs are NOT directly applicable to the TN-B1 design and the applicant needs to determine the applicability of the information in these documents to your application. These documents were mentioned as references only that may provide some information that may help in the process to respond to the RAI. Also, the staff mentioned these NUREGs to "highlight" that a fuel assembly with higher enrichment may not necessarily be more reactive than the ones with lower enrichment and lower poison loading, as previously mentioned in this email.

Therefore, the applicant needs to provide to the staff an analysis that:

- includes all potential fuel configurations for the ATRIUM-11 fuel with consideration of various combinations of enrichment and poison load as well as partial length rod loading, and
- identifies the most reactive configuration including the bounding (maximum) k_{eff} for the package.

With regard to the various fuel configurations, the applicant stated on page 421 of the application that for enrichment of 5%, 13 poisoned fuel rods are required for each assembly. The applicant also needs to provide as part of the RAI response the number of poisoned rods needed for an assembly containing fuel rods with different enrichments (e.g., some rods are at 3%, some are at 4%, and some are at 4.8% (these numbers are fictitious and are provided for example purposes only)).

I can schedule a phone call if you need clarification on this email.

Thanks,
Norma

From: TUPPER Larry (AREVA) [mailto:Larry.Tupper@areva.com]
Sent: Tuesday, June 20, 2017 11:48 AM
To: Garcia Santos, Norma <Norma.GarciaSantos@nrc.gov>
Cc: GUZZARDO Michelle (AREVA) <Michelle.Guzzardo@areva.com>; MIGLIORE Rick (AREVA) <rick.migliore@areva.com>
Subject: [External_Sender] RAI 6-4

Dear Norma,

I have been talking to our criticality engineers regarding RAI 6-4. While they still had problems determining exactly how to apply NUREG/CR-7224, they have developed an updated response to RAI 6-4, which they believe may address the reviewers questions. They suggested that we

hold off on any phone calls with the reviewer until such time as the reviewer has had a chance to review the updated response, which is attached.

Bottom line here is that we want to cancel the Thursday phone call and ask that the reviewer look at the attached document. Based upon his review we can then determine what additional actions need to be taken.

A couple of quick notes about the attached document.

- It is non-proprietary in nature.
- The additional calculations discussed in the document have not been fully QA'd. We could possibly do that based upon the reviewers feedback on regarding usefulness in resolving this RAI.

Sincerely

Larry

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