ClinchRiverESPHFNPEm Resource

From: Sutton, Mallecia
Sent: Friday, July 28, 2017 11:44 AM
To: Schiele, Raymond Joseph; Manoharan, Archana
Cc: ClinchRiverESPSafRAIPEm Resource; Fetter, Allen; pshastings (pshastings@tva.gov); Colaccino, Joseph; Fetter, Allen; Burkhart, Lawrence; Hart, Michelle
Subject: Issuance of RAI pertaining to Part 6 of TVA application, Exemptions and Departures, EP exemptions
Attachments: CRNS ESP Final RAI RPAC-07 8885.pdf

Good Morning,

This email is a formal issuance of an RAI pertaining to Part 6 of your application, Exemptions and Departures, EP exemptions (RAI Number-07, eRAI-8885), for the Clinch River Nuclear Site ESP application review. The draft version of the RAI was provided to TVA on 7/21/2017, and a clarification call on the draft RAI was requested by TVA. The clarification call took place on 7/27/2017, and TVA gained a better understanding of the level of detail needed by NRC staff in order to help ensure that an effective RAI response is provided.

The schedule we have established for the review of the application assumes technically correct and complete responses within 30 calendar days of receipt of RAIs. For any RAIs that cannot be responded to within 30 calendar days, it is expected that a date for receipt of this information will be provided to the staff within the 30-day period so that the staff can assess how this information might impact the published schedule.

Please contact me if you have any questions.

Thanks,

Mallecia Sutton
U.S. Nuclear Regulatory Commission
Office of New Reactors
Division of New Reactor Licensing
Licensing Branch 3
Washington, D.C.
301-415-0673

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Recipients:
"ClinchRiverESPSafRAIPEm Resource" <ClinchRiverESPSafRAIPEm.Resource@nrc.gov>
Tracking Status: None
"Fetter, Allen" <Allen.Fetter@nrc.gov>
Tracking Status: None
"pshastings (pshastings@tva.gov)" <pshastings@tva.gov>
Tracking Status: None
"Colaccino, Joseph" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
"Fetter, Allen" <Allen.Fetter@nrc.gov>
Tracking Status: None
"Burkhart, Lawrence" <Lawrence.Burkhart@nrc.gov>
Tracking Status: None
"Hart, Michelle" <Michelle.Hart@nrc.gov>
Tracking Status: None
"Schiele, Raymond Joseph" <rjschiele@tva.gov>
Tracking Status: None
"Manoharan, Archana" <Amanoharan@tva.gov>
Tracking Status: None

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Request for Additional Information, Number 7, eRAI-8885

Issue Date: 07/28/2017
Application Title: Clinch River Nuclear Site, ESP
Operating Company: Tennessee Valley Authority
Docket No. 52-047
Review Section: NONE - NO SRP SECTION
Application Section: Part 6 - Exemptions and Departures, EP exemptions

QUESTIONS

The staff requires additional information about the discussion that supports the emergency planning exemption requests in Part 6 of the early site permit application (ESPA). Under 10 CFR 50.12(a)(1), specific exemptions may be granted if they are "authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security." In addition, "special circumstances" as defined in 10 CFR 50.12(a)(2) must be present. The applicant needs to provide sufficient information to show that application of certain regulations in 10 CFR 50.33(g), 10 CFR 50.47(b) and (c)(2), and 10 CFR Part 50, Appendix E in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule, as required by 10 CFR 50.12(a)(2)(ii), or that special circumstances exist under other provisions of the regulation. Additionally, the applicant must show that the exemption otherwise meets the requirements of 10 CFR 50.12(a)(1).

ESPA Part 2, Site Safety Evaluation Report (SSAR), Section 13.3, states that the Clinch River ESP application is based on a surrogate design defined as part of a Plant Parameter Envelope (PPE). ESPA Part 6, Section 1.3.4, states that special circumstances "exist at the CRN [Clinch River Nuclear] Site due to the anticipated enhanced safety features of the SMR [small modular reactor] designs under consideration," and provides some additional discussion about the expected features in general terms. ESPA Part 6, Section 1.3.2, states that the proposed exemptions will not present undue risk to public health and safety because the SSAR "sets forth criteria that the SMR design will be required to meet in order for an exemption to apply" based on the calculated consequences of radiological events for the design to be sited at the CRN site. SSAR Section 13.3 states that the criteria are based on a dose-at-distance approach and a demonstration that any accident consequences are less than the Environmental Protection Agency (EPA) Protective Action Guide (PAG) criteria related to early phase protective actions (see EPA-400/R-16/001, "PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents") and meet a proposed risk reduction criteria for potential very severe accidents. The SSAR goes on to state that the combined license application (COLA) must demonstrate that the specific SMR design chosen will justify the size of the selected emergency planning zones (EPZ) that would be consistent with one of the two Emergency Plans evaluated during the ESPA review.

Based on the staff review of the ESPA Part 6 and subsequent NRC audit at the TVA Clinch River site, the staff determined additional information is necessary to support review of the proposed exemption request. In order to complete its review of the ESPA request for exemptions related to emergency planning, the staff requires additional information on the anticipated enhanced safety features of SMRs and the related minimization of accident consequences for the surrogate design and PPE that support the discussion of how the CRN ESPA demonstrates that there is no undue risk to public health and safety, as required by 10 CFR 50.12(a)(1), and demonstrates special circumstances under 10 CFR 50.12(a)(2)(ii) with respect to relevant sections of the regulations in 10 CFR 50.33(g), 10 CFR 50.47(b) and (c)(2), and 10 CFR Part 50, Appendix E and 10 CFR 52.7. The following three questions are based on the methodology in NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plans" (December 1978), which provides the technical justification for existing regulations related to EPZ size and contains the methodology that staff is using to evaluate the exemption request. Specifically, the staff requires the following information pursuant to the above regulations and NUREG-0396:

1.
Additional information that provides technical support and justification for statements made in the discussion of special circumstances in ESPA Part 6 (page 5), that SMRs under consideration are anticipated to have the following enhanced safety features that result in the following characteristics:

- Smaller radionuclide inventory and source terms
- Projected rate of progression of postulated accidents is slower
- Design features that eliminate several historically considered design basis events (DBEs)
- Occurrence of severe accidents that is significantly less likely
- Advanced design features that minimize accident consequences

This additional information should also make clear how the designs under consideration relate to the surrogate design and PPE in the ESPA and how the listed SMR accident characteristics compare to those for operating reactors and large light water reactor designs.

2.
Additional information that demonstrates that the proposed accident consequence criteria (EPA PAG and substantial reduction in early health effects) are met at a given EPZ boundary distance for potential reactor facilities that would be encompassed within the surrogate design and PPE, as supporting a combined nuclear generating capacity not to exceed 800 MWe (2420 MWt) for the site as requested in the ESPA:

a. Overview of design-related information used in demonstration analyses and how related to ESPA design considerations (representativeness)

b. Accidents included in analyses as credible, including description of:

- Scenarios and progression
- Accident probability
- Categorization of accidents (design basis accidents (DBAs), less severe accidents, more severe accidents)
- Accident release source terms

c. Consequence assessments, including:

- Dose analysis assumptions and inputs
- Evaluation against EPA PAG criterion for DBA and less severe accidents to result in EPZ at distant consitant with exemption request.

- For more severe accident consequences evaluation against substantial reduction in early health effects criterion (probability of exceeding 200 rem whole body is less than $1x10^{-3}$ per Rx-yr and decreasing rapidly at EPZ boundary)

3.
The listed bases for exemption related to EPZ size in ESPA Part 6, Tables 1-1 and 1-2, only refer to the EPA PAG criterion. Please clarify why the substantial reduction in early health effects criterion is not included.