

## ClinchRiverESPHNPEm Resource

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**From:** Schiele, Raymond Joseph <rjschiele@tva.gov>  
**Sent:** Thursday, July 27, 2017 2:59 PM  
**To:** Sutton, Mallecia  
**Cc:** Manoharan, Archana  
**Subject:** [External\_Sender] RE: Draft RAI pertaining to Part 6 of TVA application, Exemptions and Departures, EP exemptions  
**Attachments:** CRNS ESP Draft RAI RC-01 8885 Mark Up.pdf

Mallecia,

TVA has reviewed the draft RAI and has verified that the draft RAI does not contain any proprietary information or security related information. Based on the information discussed on the clarification call held today, 7/27/2017, TVA would like the NRC to consider making clarifications to the RAI, as discussed on the call, prior to issuance as final(see attached). TVA is able to respond to the RAI within 30 days of issuance.

Thanks,

Ray Schiele  
Tennessee Valley Authority  
Clinch River Nuclear  
Small Modular Reactor Project  
Office-423-751-8628  
Cell-410-610-2320  
[rjschiel@tva.gov](mailto:rjschiel@tva.gov)

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**From:** Sutton, Mallecia [mailto:Mallecia.Sutton@nrc.gov]  
**Sent:** Friday, July 21, 2017 1:46 PM  
**To:** Schiele, Raymond Joseph  
**Cc:** Hastings, Peter S; ClinchRiverESPSafRAINPEm Resource; Colaccino, Joseph; Fetter, Allen; Burkhart, Lawrence; Hart, Michelle  
**Subject:** Draft RAI pertaining to Part 6 of TVA application, Exemptions and Departures, EP exemptions

**TVA External Message. Please use caution when opening.**

Good Afternoon,

Attached is the draft RAI pertaining to Part 6 of your application, Exemptions and Departures, EP exemptions (RAI Number-01, eRAI-8885) for the Clinch River Nuclear Site ESP application review.

TVA has five working days to review the draft RAI and respond to the following:

1. A clarification call is needed to clarify any of portion of the RAIs;
2. TVA identifies any proprietary information or security-related information (SRI) located in the question(s);
3. TVA is able to respond to the RAI within 30 days.

After the call, or after five days, NRC will finish processing the RAI through the eRAI system and issue the RAI as final to TVA. Subsequent to receipt of the final RAI, TVA will have 30 calendar days to respond to the RAIs unless additional time is specifically requested.

Please let me know if you have any questions.

Thanks  
Mallecia

Mallecia Sutton  
Project Manager  
NRO/DNRL/LB3  
U.S. Nuclear Regulatory Commission  
301-415-0673

**Hearing Identifier:** ClinchRiver\_ESP\_HF\_NonPublic  
**Email Number:** 71

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**Subject:** [External\_Sender] RE: Draft RAI pertaining to Part 6 of TVA application, Exemptions and Departures, EP exemptions  
**Sent Date:** 7/27/2017 2:58:35 PM  
**Received Date:** 7/27/2017 2:58:48 PM  
**From:** Schiele, Raymond Joseph

**Created By:** rjschiele@tva.gov

**Recipients:**  
"Manoharan, Archana" <Amanoharan@tva.gov>  
Tracking Status: None  
"Sutton, Mallecia" <Mallecia.Sutton@nrc.gov>  
Tracking Status: None

**Post Office:** TVACHAXCH8.main.tva.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	2069	7/27/2017 2:58:48 PM
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**Options**  
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**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

## **Draft Request for Additional Information, eRAI 8885**

Issue Date: 7/21/17

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 and bounds~~ Representative Plant)

- 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
- ~~Comparison of~~ DBA and less severe accident consequences at Site Boundary EPZ boundary to EPA PAG (1 rem total effective dose equivalent (TEDE))

- ~~Comparison~~ Discussion of more severe accident consequences to substantial reduction in early health effects criterion (probability of exceeding 200 rem whole body is less than  $1 \times 10^{-3}$  per Rx-yr and decreasing rapidly at Site Boundary 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.