

**From:** Raj Anand  
**To:** internet:Joseph\_Hegner@dom.com  
**Date:** 8/04 4:29PM  
**Subject:** NORTH ANNA ESP EP RAI

Joe,

Please find attached a request for additional information regarding the North Anna early site permit (ESP) application that has arisen as a result of the NRC's review of the evacuation time estimate provided by Dominion in support of the ESP application.

Please look over the draft request for additional information (RAI) attached. Should you wish to discuss the RAI, please contact me at 301-415-1146. After such discussion (if requested), we will send you the RAI formally by letter. Your prompt response to this RAI is important in ensuring that the information you provide will be addressed by the staff in its draft safety evaluation report.

The staff notes that the scope of an ESP application review is different from the NRC's oversight of operating plant emergency planning. The North Anna ESP application includes a "major features emergency plan" pursuant to 10 CFR 52.17(b)(2)(i), which takes into account certain elements of the emergency plan in place at North Anna Units 1 and 2. For Dominion's submittal, the ESP review includes evaluation of information, including the evacuation time estimate, notwithstanding the fact that some of this information may also be part of an ongoing reactor oversight process with respect to Units 1 and 2.

Thanks,

Raj K. Anand  
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**CC:** Joseph Colaccino; Laura Dudes; Michael Scott; Nanette Gilles

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**Subject:** NORTH ANNA ESP EP RAI  
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**From:** Raj Anand

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**DRAFT**

#### **ADDITIONAL INFORMATION NEEDED TO SUPPORT NRC REVIEW OF NORTH ANNA EARLY SITE PERMIT APPLICATION**

##### SSAR Section 13.3, Emergency Planning

##### RAI 13.3-15

Please provide the following information regarding the North Anna Emergency Plan Evacuation Time Estimate (ETE):

- ETE Table 8 (Roadway Characteristics) identifies the road segments and characteristics within the plume exposure EPZ. Please provide the associated assumptions and data on road capacities and travel times.
- ETE Table 9 (Summary of Results of Evacuation Time Analysis) provides an overall summary of evacuation times. Please provide any traffic control measures necessary to direct

the public out of the EPZ. Also, please discuss whether the ETE depends on these measures being in place.

- c) The County radiological emergency response plans (RERPs) identify numerous locations for traffic control. Please discuss the resources and time necessary to implement these measures, if needed, in support of evacuation.
- d) ETE Section 3.1.2 (Key Evacuation Parameters) provides information on the assumptions of adverse weather conditions, including using snow and ice as the adverse weather conditions, and a reduced road capacity of 40%. Please provide additional information on the assumptions used, including consideration of (1) any additional time that may be needed for evacuation preparation (such as putting on tire chains), (2) any reduction in both road capacity and travel times, and (3) resources and time that may be necessary for clearing the driveways and major roadways of snow and ice to support the evacuation.
- e) ETE Section 3.1.1 (Loading of the Evacuation Network) identifies that evacuation network loading is derived from data presented in the 1990 ORNL study, "Evaluating Protective Actions for Chemical Agent Emergencies." ETE Section 3.1.2 provides distribution curves that are derived from the study, which reflect chemical releases that have an immediate threat to life. Please describe how the ETE uses this information to address the development of trip generation times for a radiological release that such evacuees would have sufficient time to mobilize.
- f) ETE Section 3.1.2 states that the assumption of "user equilibrium" is applied to account for local residents' knowledge and use of alternate paths to get to the same destination, as specified in the recommended evacuation routes, and that the evacuating population can and will adjust their routes in response to perceived (evacuation) impedance. County RERPs designate traffic control points that may limit user equilibrium. Please clarify how this user equilibrium assumption was modeled, and why it is needed.
- g) ETE Section 3.1.2 states that, because the non-vehicle owning population is a small fraction of the total population, and these individuals typically have neighbors with cars, there is no need for special treatment of them in an evacuation analysis. Please describe how the use of neighbors to provide transport to non-auto owning populations affects the traffic loading.
- h) ETE Section 4.3 (Estimates for Non-Auto-Owning Population) states that the non-auto owning population is approximately

seven to eight percent of the population in Louisa and Spotsylvania Counties, and that it is reasonable to expect that the majority of the population needing transportation will be able to evacuate with neighbors or relatives. Further, the ETE states that any remaining individuals stranded without transportation will be accounted for during the confirmation of evacuation and route alerting via signs to be placed in residents' windows, and that these signs are distributed in public outreach calendars. Please describe the bases for these assumptions, including assurances that this evacuation and confirmation will occur. In addition, for those who may be stranded, please clarify how their accounting is consistent with County RERPs, which identify bus routing for pickup of non-auto owning populations.

- i) Please describe how the analysis of the site-specific permanent population group was modeled in the Evacuation Simulation Model (ESIM), and provide an estimate of the time to evacuate the permanent population group, including car owners and non-car owners. In addition, please describe how projected demography has been taken into consideration in the ETE.
- j) ETE Section 4.4 (Estimates for Special Facilities) states that the schools within ten miles of North Anna Power Station (NAPS) have evacuation resources immediately available. In addition, school evacuations had been included with the general population during the evacuation analysis, and they share the time estimates for the general population. Please provide information on trip generation times from the schools to evacuation locations. Please address whether return trips are necessary, and whether they are included in the ETE analysis. In addition, the County RERPs indicate that the majority of school children do not have onsite bus transportation. Please describe the school bus mobilization time, and explain how this statement is consistent with the ETE statement that school evacuation resources would be immediately available.
- k) Please describe whether the ETE provides for working people to return home to evacuate as a family unit. Also, please describe whether the ETE accounts for packing, closing up the home for extended evacuation, pickup of neighbors, businesses securing assembly lines, and farmers feeding or watering livestock prior to leaving. In addition, describe whether trip generation times have been considered for the agricultural and ranching operations identified in the County RERPs.

- l) Please provide a figure (map) showing only those roads used as primary evacuation routes (e.g., Figure 3 of Appendix 4 to NUREG-0654/FEMA-REP-1), and also indicating the sector and quadrant boundaries.
- m) Please provide a figure (map) showing both the protective action zones (PAZs) and 10-mile emergency planning zone (EPZ) sector and quadrant boundaries.
- n) Please explain the basis for assuming that peak season night time evacuation represents the worst case scenario.
- o) Please provide a figure (map) showing evacuation areas, shelter areas, and relocation centers in host areas.
- p) ETE Section 3.1.2 states that a car occupancy factor of 2.5 is assumed. Please provide justification and site-specific data for this number, as it applies to residents, transients, tourists, industries, and working people.
- q) ETE Section 3.1.2 states that an evacuation is deemed complete when 90% of the affected population (all of those evacuating) have exited the 10-mile EPZ. Neither the COVRERP nor County RERPs indicate that the ETE is for 90% of the population instead of 100%. In addition, the ETE Executive Summary implies that the total 10-mile EPZ population of 20,292 is included in the time estimates, instead of the actual total of 18,782 shown in ETE Table 9 (Summary of Results of Evacuation Time Analysis). Please explain how these assumptions are consistent.
- r) ETE Section 4.5 (Confirmation of Evacuation) states that the most time-consuming method to confirm evacuation is to use ground vehicles, and that the time depends on the driving time for each route selected. Please provide the time needed for confirmation of evacuation, including the supporting assumptions and data.
- s) Please provide the separate distributions functions for the different categories of the population, and for each of the action stages after notification (e.g., see Section IV.B and Figure 4 of Appendix 4 of NUREG-0654/FEMA-REP-1).