ClinchRiverESPHFNPEm Resource

From:	Sutton, Mallecia
Sent:	Monday, August 21, 2017 3:58 PM
To:	Schiele, Raymond Joseph
Cc:	Colaccino, Joseph; Fetter, Allen; Anderson, Joseph; Musico, Bruce; ClinchRiverESPSafRAIPEm Resource; Fetter, Allen; pshastings (pshastings@tva.gov); Barss, Dan
Subject:	Issuance of RAI Pertaining to Evacuation Time Estimates in Section 13.03 of TVA Application
Attachments:	CRNS ESP Final RAI EP-08 9029.pdf

Good Afternoon,

This email is a formal issuance of an RAI pertaining to evacuation time estimates of your application, (RAI Number-08, eRAI-9029), for the Clinch River Nuclear Site ESP application review. The draft version of the RAI was provided to TVA on 8/04/2017, and a clarification call on the draft RAI was not requested by TVA.

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.
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Request for Additional Information, Number 08, eRAI 9029
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Operating Company: Tennessee Valley Authority
Docket No. 52-047
Review Section: 13.03 - Emergency Planning
Application Section: 13.3.4 – Evacuation Time Estimates

QUESTIONS

13.03

Regulatory Basis: 10 CFR 52.17(b)(1), 10 CFR 52.17(b)(2)(i), 10 CFR 50.47(b)(10), Section IV of Appendix E to 10 CFR Part 50, NUREG-0654 Evaluation Criteria J.8 and J.10, NUREG/CR-7002

In Part 2 (Site Safety Analysis Report (SSAR)) of the Early Site Permit Application (ESPA), Section 13.3.4, "Evacuation Time Estimates," states that the Evacuation Time Estimate (ETE) for evacuation of an approximately two-mile plume exposure pathway emergency planning zone (EPZ) is detailed in the ETE report provided in Part 5B. The staff evaluated the ETE report against the applicable regulations and guidance, and identified the requests for additional information (RAIs) listed below. Consistent with the regulations and guidance identified above, please provide the following information, or explain why it is not required.

1. Section 2.1, "Permanent Residents and Transient Population," states in part that "[t]he permanent resident population has been estimated using Census block data obtained from the U.S. Census 2010 and is projected to 2015 for this analysis." In addition, Section 2.5.2, "Shadow Evacuation," states in part that "[s]hadow evacuation was determined based on U.S. Census 2010 data, projected to 2015. . . . According to the Census data, projected to 2015, there are 186,500 permanent residents living within 15 miles of the CRN Site."

   The use of the U.S. Census 2010 data is consistent with Section IV.2 of Appendix E to 10 CFR Part 50, which states in part that the (ESP) application shall provide evacuation time estimates for the plume exposure pathway EPZ for transient and permanent populations, using the most recent U.S. Census Bureau data as of the date the applicant submits its application to the NRC (which was on May 12, 2016 (ADAMS Accession No. ML16139A752)). However, the ETE report does not describe the method used for projecting the U.S. Census 2010 data to 2015.

   Provide additional information to describe the methodology used to project population growth from 2010 to 2015 (for transient, permanent, and shadow evacuation populations), including the basis for justifying why the 2015 data is reasonable and accurately reflects the area surrounding the Clinch River Nuclear (CRN) Site. In

addition, update the ETE analysis in the ESPA to reflect this methodology description, if appropriate, or explain why this is not required.

2. Section 2.5, "Other Demand Estimate Considerations," states that "the presence of major employers in the vicinity of the CRN Site (50 or more employees) was researched during development of the ESPA ER [Environmental Report] and was evaluated for use in development of the ETE report." While Table 2.7, "Major Employers in the EPZ," only lists Kingston Academy and Duratek as major employers, the staff's online (Google) search of the proposed 2-mile EPZ revealed that there may be additional major employers in this area. These include Energy Solutions, located northwest of the CRN Site, and VW Group of America and HT Hackney Company located southeast of the CRN Site.

   Explain how the ETE analysis determined that only two major employers are located within the 2-mile EPZ; including how Energy Solutions, VW Group of America, and HT Hackney Company were excluded from consideration.

3. Table 2.1, "Permanent Resident Population By Sector," and Figure 2.1. "Permanent Resident Population by Sector," show that a significant portion of the population resides in the southeastern quadrant of the 2-mile EPZ. However, based on the data in Tables 2.8, "Total Population Considered for Each Scenario," Table 2.9, "Total Vehicles Considered for Each Scenario," and Table C.2, "Data Input by Zone," it appears that all vehicles from this area are generated and loaded onto the network at node 59. (Node 59 is shown in Figure 3.1, "Evacuation Network Map." Figure 3.3, "Evacuation Network Map – Grid II," and Figure 3.4, "Evacuation Network Map – Grid III.")

   Explain why the population in the area spanning the East-Northeast to South sectors are loaded onto the network at only one location (i.e., node 59). In addition, describe how the locations for the input nodes were determined?

4. From Figures 3.1 and 3.4, it appears that the Interstate 40 interchange at Exit 360 is modeled, but not the interchange at Exit 362, which is located (but not shown) east of Exit 360 and within the 2-mile EPZ. Explain the modeling decision to exclude Exit 362 from the network.

5. Assumption 4 in Table 1.2, "General Assumptions," states that "[b]ackground traffic is on the roadway when initial notification occurs and stops entering the EPZ upon establishment of Access Control Points at 90 minutes following the advisory to evacuate." Section 5.1, "Development of Traffic Controls Plans," describes an assumed traffic control plan, in which the background and pass-through traffic stops entering the EPZ 90 minutes after the evacuation order is issued. Section 4.3, "Evacuation Time Estimates for the General Public," describes the timing of background and pass-through traffic, and states that a 45 minute background traffic simulation is assumed to ensure equilibration prior to initiating the ETE simulation.

   Step 4 of Section 4.3, which states that "[a]t 90 minutes the background traffic will stop entering the network," is unclear as to whether the background and pass-through traffic

stops 90 minutes after the evacuation begins, or if it stops 90 minutes from the beginning of the simulation (including the equilibration time). Clarify when the evacuation starts, with regard to the timing and simulation of background and pass-through traffic.

6. The trip generation distributions in Table 4.8, "Trip Generation Distributions (Daytime)," Table 4.9, "Trip Generation Distribution (Nighttime)," and Table 4.10, "Trip Generation Distributions (Weekend)," contain almost identical data, with the longest trip generation time of 300 minutes reflected in trip generation Distribution C in each table. While the network-wide travel times in Table C.6, "Network-Wide Travel Time (Minutes)," are all close to 3 minutes (excluding Scenario 10), the ETEs provided in Table 4.13, "ETEs for Evacuation of the General Public (90% of the Affected Population)," and Table 4.14, "ETEs for the General Public (100% of the Affected Population)," show differences between daytime, evening, and weekend ETEs on the order of 30 to 40 minutes. These differences appear to reflect the loading curves in Table C.1, "Loading Curves," since the network-wide travel times in Table C.6 are all close to 3 minutes (excluding Scenario 10). Describe the relationships between the trip generation distributions and the loading curves in Table C.1.

   In addition, clarify why the evacuation times in Table 4.14 for 100 percent of the general public are less than the maximum times specified by the trip generation distribution curves in Figure 4.2, "Trip Generation Distributions Comparison (Daytime)," Figure 4.3, "Trip Generation Distributions Comparison (Nighttime)," and Figure 4.4, "Trip Generation Distributions Comparison (Weekend)."

7. Tables C.4, "Existing Number of Vehicles by Hour by Exiting Node," and Table C.5, "Existing Percentage of Vehicles by Hour by Exiting Node," show that vehicles exiting the network are counted on exit links 2495, 504, and 1811 (nodes 913, 892, and 1801, respectively). These links do not appear to cover all possible EPZ exit routes. Describe how the evacuation routes were determined (i.e., development of the origin-destination matrix for evacuees), including why exiting vehicles are only counted on the specified links.

8. Section 2.1.1, "Permanent Residents with Vehicles," estimates that 506 evacuating vehicles are needed for the estimated 856 permanent EPZ residents. This same number is summarized in Table 2.2, "Permanent Resident Population and Evacuating Vehicles," However, Table 2.9 lists the permanent resident vehicles at 658 (excluding Scenario 10), which appears to be the number used in the model described in Appendix C, "Traffic Simulation Model Inputs and Outputs." Explain the difference between the number of estimated permanent resident vehicles, and the numbers used for the Appendix C model input.

9. Table A.2, "Link Input File," includes the identification of node 113 and link 757. Figure 3.2, "Evacuation Network Map – Grid I," shows node 113 outside of the 2-mile EPZ, and link 757 leading to that node from within the 2-mile EPZ. However, node 113 is not identified as a destination node in Table C.3 "Destination Nodes and Capacities, or listed

in Table C.2. Identify whether there are any vehicles on this link; and if so, explain how they are accounted for in the ETE?

10. Table 2.9 lists the total vehicles considered for each scenario, including the number of permanent resident vehicles, transient vehicles, transit dependent permanent resident vehicles, and major employers' vehicles. Table C.2 appears to be the model input for the same groups of vehicles that are generated at specific zones within the network. However, in each scenario there are minor differences between these two tables in the range of 1 to 6 vehicles (e.g., for Scenario 1, Table 2.9 totals 880 vehicles, while Table C.2 totals 882 vehicles). Explain this discrepancy.

11. Table C.2 appears to provide the number of vehicles loaded onto the network, and Table C.4 and Table C.7, "Total Vehicles Exiting the Network," provide the total number of vehicles exiting the network. In each scenario, the number of exiting vehicles in Tables C.4 and C.7 is less than the number of input vehicles in Table C.2 by as much as 9 vehicles (e.g., for Scenario 1, Table C.2 totals 882 vehicles, while Tables C.4 and C.7 total 874 vehicles). Explain what is happening to the missing vehicles.