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Attachments: BLN Draft RAI - SRP Section 13.03.doc

Importance: High

Attached is a draft RAI related to SRP Section 13.03 for Bellefonte Units 3 and 4.

Please let me know which questions, if any, require a conference call to discuss in greater detail.

Thank you,
Brian

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DRAFT Request for Additional Information
Bellefonte Units 3 and 4
Tennessee Valley Authority
Docket No. 52-014 and 52-015
SRP Section: 13.03 - Emergency Planning
Application Section: COLA Part 5

QUESTIONS

13.03-***

ETE - 2: Site location and emergency planning zone
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

A number of maps are presented illustrating the EPZ, road networks, and water bodies. Communities and some political boundaries are shown along with major roads. However, as specified in Section I.A, "Site Location and Emergency Planning Zone," of Appendix 4 to NUREG-0654, provide a map that shows the county boundaries in relation to the plume exposure pathway EPZ, or a modified existing map.

13.03-***

ETE- 3: ETE general assumptions
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

Discuss who will staff the Traffic Control Points and Access Control Points. Discuss how long it will take the Traffic Control Guides, and necessary traffic barricades and cones, to arrive at the Traffic Control Points and Access Control Points after notification. Describe the impact of the arrival time estimate on the ETE analysis.

13.03-***

ETE - 4: ETE methodology
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

A description of the computer code used for traffic generation and routing is provided in Appendix B, "Traffic Assignment Model," and a description of the model used for generating traffic flow estimates is given in Appendix C, "Traffic Simulation Model; PCDYNEV" to the BLN ETE. However, the report only identifies PC-DYNEV (DYnamic Network EVacuation, a computerized macroscopic simulation model developed for the Federal Emergency Management Agency) as the tool used for the travel time computation, but none of the underlying algorithms, such as TRAD (TRaffic Assignment and Distribution) and UNITES (UNIted Transportation Engineering System) of the system have been included. PC-DYNEV is identified as the tool used for the travel time

computation, but only one underlying algorithm of the system has been included. Provide a general description of other important models of the IDYNEV System. Also, in BLN ETE Section 4,"Estimation of Highway Capacity," the algorithm for intersections is provided along with a description of the variables. Describe how the values for each variable, such as G_m (the mean duration of GREEN time servicing vehicles that are executing movement, m, for each signal cycle; seconds) were derived. Explain how the simplified equation on page 4-2 is affected by traffic control at intersections. Also related to the equation on page 4-2, various known factors such as F_1, F_2, etc. influence h_m (mean queue discharge headway of vehicles on this lane are executing movement, m; seconds per vehicle). Discuss the important F factors that influence h_m.

13.03-***

ETE - 5: Demand estimation
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) In the BLN ETE, Table 8-2 “School Population Demand Estimates” and Table 8-4, "Special Facility Transit Demand," there are “N/A” or not available entries for some cells, indicating that enrollment, staffing, or resident census values were not available for some schools and medical facilities and capacity was not available for 4 of 8 of the facilities identified. Also, the medical facility total population for the EPZ is not included in the table. Explain what values were used in the ETE calculations for the number of buses and ambulances. Explain how the number of ambulances and buses were derived. Clarify whether enough ambulances are available to support an evacuation in a single trip or if they will need to make additional trips. Explain any effect on the ETE. Either provide data for the "N/A" entries in Table 8-2, "School Population Demand Estimates," or provide and justify assumptions for the "N/A" table entries, or discuss why treating these values as zeros has no impact on ETE calculations. Explain how the demand was estimated for facilities where data was not available. If N/A entries in Section 8 and Appendix E are to be replaced with imputed numbers of students, staff, patients, etc., provide new calculations of numbers of bus runs after N/A entries in Section 8 and Appendix E. If values are imputes for N/A entries, clearly label imputed values and specify methods of imputation.

(b) Discuss why the Scottsboro Municipal Airport is not considered a special facility.

(c) Explain why there are no transient populations identified on Figure 3-4, "Transient Population by Sector," (e.g., shoppers) for the towns of Hollywood, Section and Dutton.

(d) Explain why there are no employee populations identified on Figure 3-6, "Employee Population by Sector," for the towns of Section and Dutton. Since the value of 806 on the figure is within the 10-mile radius and Emergency Response Planning Area (ERPA) 13, as indicated on Figure 3-1, "Bellefonte Nuclear Plant EPZ," is located outside of the 10-mile radius, clarify the 806 non-EPZ employees for ERPA 13 indicated on Figure 3-6.

(e) Under “Total Demand in Addition to Permanent Population” in Section 3, it states that 300 vehicles are assumed per lane. Clarify whether this is per lane or per hour or per lane-hour for multi-lane roads. Provide a basis for the estimated 300 vehicles per lane.

Explain why vehicles traveling through the EPZ (external-external trips) are not included on any road other than US 72.

13.03-***

ETE - 6: Estimation of permanent residents
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) The total number of permanent residents within 10 miles of BLN is 25,522 in Figure 3-2, "Permanent residents by Sector," in the BLN ETE, and the total number of permanent residents within 10 miles of BLN is 25,483 as identified in Table 2.1-203 in the FSAR. Reconcile the population projections provided within the BLN ETE analysis and with those provided in the FSAR by 10-year interval and 2 km radii for all population groups (i.e., permanent residents, employees, other transients, and special facility populations).

(b) The routes for individuals requiring public transit are identified, but there is no mention of how transit dependent individuals get from their residence to these bus routes. Provide information on the means by which these individuals are assumed to get to the transit routes and clarify that the time required for this action is included in the BLN ETE.

(c) Explain why the term (0.64x0.31) is squared in the equation in Section 8.1, "Transit-dependent People - Demand Estimate," when calculating the number of persons requiring public transit.

13.03-***

ETE - 7: Transient Populations

SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Provide information on whether the Scottsboro Landfill and the Widows Creek Fossil Plant are within the EPZ. If yes, explain why the landfil, plant and associated employees were not included in Appendix E, "Special Facility Data."

(b) Provide the following information related to boating and boaters. (1) Discuss the number of boats and persons in boats within the EPZ on Guntersville Lake as a function of scenario (time of day, season, weather, special events such as fishing tournaments, etc.). (2) Discuss the numbers of boats that are typically launched and retrieved as opposed to those that are left in the water. (3) Discuss the transit times for boaters to docks, moorings, or boat launch areas. (4) Discuss boat launch throughput (i.e., boats retrieved per hour per boat launch ramp). (5) Discuss the numbers of boat launch/retrieval facilities in the EPZ and the number of boats they may need to retrieve under normal and fishing tournament conditions. (6) Discuss the impact of boating

scenarios on ETE for recreational areas under normal and fishing tournament conditions.

(c) There appears to be no discussion regarding peak tourist volumes. However, there are many tourist activities in the area including the Jackson County Fair, the annual Junior National College Golf Tournament, as well as other special events that were not included in the analysis. Discuss why peak tourist estimates were not included in the ETE analysis.

(d) It appears there may be some motels that were not included in Table 3-3, "Summary of Transients," including the Days Inn, Econo Lodge, Scottish Inn and Best Western Scottsboro Inn and Suites. Clarify how information was obtained on local hotels to ensure completeness.

(e) Discuss why the Scottsboro Golf and Country Club is not included in Table 3-3, "Summary of Transients," in the golf courses category.

(f) In Figure 5.1, "Events and Activities Preceding the Evacuation Trip," explain the reasoning behind transients not returning to their “residences” prior to evacuation. For those in hotels, they may need to return to gather their belongings prior to evacuation.

13.03-***

ETE - 8: Special facility population
SRP Chapter 13.3 Acceptance Criterion 17

Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Discuss why bed-ridden and wheel chair-bound (i.e., non-ambulatory) residents in special facilities were not included in the BLN ETE analysis. Discuss the impact of this omission on the evacuation time for such residents.

(b) The Highway Capacity Manual (HCM) (2000) specifies 2-5 seconds per person for commuters to board buses that are part of public transit systems. The HCM 2000 does not address persons with pets and/or significant luggage, nor does it explicitly address school children. Clarify why the basis for loading school children in 5 minutes is the same as loading of public transportation buses as described in Section 8.4, "Evacuation Time Estimates for Transit-dependent People," which references the Highway Capacity Manual (HCM) 2000.

(c) The section titled "Evacuation of Transit-dependent Population," in Chapter 8, "Transit-dependent and Special Facility Evacuation Time Estimates," states that based upon experience at other rural plants, it is estimated that bus mobilization time will average approximately 90 minutes extending from the advisory to evacuate to the time when buses are dispatched from their respective depots. Discuss the number and types of rural plants used to establish the mobilization time for the buses.

13.03-***

ETE - 9: Emergency planning zone
SRP Acceptance Criterion 17

Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Provide the basis for the population used to calculate the shadow evacuation vehicles identified in Table 6-4, "Vehicle Estimates by Scenario." Explain how the shadow population percentages included in Table 6-4 were developed.

(b) Provide map(s) that show the locations of all the special facilities identified in Appendix E, "Special Facility Data," with respect to ERPA boundaries. Also, discuss the inclusion of Bridgeport, AL, as an assumed reception center in Figure 10-1, "Assumed General Population Reception Centers," compared to the assumed reception centers in Table 8-3, "Assumed School Reception Centers." Discuss the impact on the BLN ETE of the reception centers being other than the assumed ones. Are these the same facilities as referred to as relocation centers in section J.8., "Evacuation Time Estimates," in the BLN Emergency Plan?

13.03-***

ETE - 10: Traffic capacity
SRP Chapter 13.3 Acceptance Criterion 17

Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Clarify whether the traffic control measures in Appendix G, "Traffic Management," were or were not used in the ETE calculations.

(b) Explain how the traffic management plan identified in Section 9, "Traffic Management Strategy," and Appendix G was integrated into the ETE calculation. Does the time estimate depend upon these controls being in place?

(c) Since it would be expected that vehicles generally would not travel at posted speeds through traffic control points, explain how the ETE modeling addresses the movement of vehicles through traffic control intersections. Also, is there a factor that slows vehicles as they pass through intersections?

13.03-***

ETE - 11: Evacuation roadway network
SRP Chapter 13.3 Acceptance Criterion 17

Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Provide a map or maps that include the nodes and numbering identified in Appendix

K, "Evacuation Roadway Network Characteristics." The ERPA boundaries should also be indicated on the map(s). The existing node network on Figure 1.2, "Bellefonte Link-node Analysis Network," appears to have considerably fewer segments and nodes in the north and northwest region as compared to the rest of the EPZ. The populations in this area are comparable to those in the south and southeast regions. Discuss how the number of nodes in the north and northwest region adequately represent the roadway network.

What width was used for a "Full Lane" in Appendix K? Discuss whether lane widths were measured during the field survey, and if they were one consistent width.

13.03-***

ETE - 12: Roadway segment characteristics
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Subsection "Field Surveys of the Highway Network," of Section 1.3, "Preliminary Activities," states that unusual roadway characteristics were identified in the field survey including: narrow bridges, sharp curves, poor pavement, flood warning signs, inadequate delineations, etc. Identify where these locations occur. Explain how this information was used in the ETE calculations.

(b) Section 4,"Estimation of Highway Capacity," states that the two lane roadway capacity is 1700 passenger cars per hour (pc/hr) as identified in Chapter 20 of the HCM. Chapter 20 of the HCM does identify 1700 pc/hr as the capacity of a two lane roadway, but only if the roadway meets the base conditions of Chapter 12. Clarify whether the field survey confirmed that lane widths are greater than or equal to 12 feet, shoulder widths are wider than or equal to 6 feet, and there are no other impediments to through traffic as described in Chapter 12 of the HCM.

(c) Clarify what value was used for lane width in Appendix K. Identify where the narrowest roadway sections exist within the roadway network and explain how this was factored into the ETE calculation.

13.03-***

ETE - 13: Reporting format
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) Provide separate ETE results for permanent residents, transients, and special populations as described in Appendix 4 to NUREG-0654. Discuss the very modest reduction in highway capacity and free flow speed during rain and ice.

(b) Explain why there is no increase in ETE time in Table 7-1D, "Time to Clear the Indicated Area of 100 Percent of the Affected Population," due to adverse weather for

Evacuation Region 03 Summer Weekend, when there is an increase in time for the same Evacuation Region 03 in Table 7-1C "Time to Clear the Indicated Area of 95 Percent of the Affected Population."

(c) Section 7.3, "Evacuation Rates," states that the ETE should not be distorted to account for “laggards”. Clarify whether the ETE results presented in Table 7-1D actually includes 100% of the population or whether the evacuation tail was truncated and “laggards” were not included. Also, in Appendix F, "Telephone Survey," Figure F-11, "Time to Prepare Home for Evacuation," indicates that 6 hours are required as the maximum time needed for the last individuals to prepare to evacuate. They must then travel out of the EPZ. Table 7-1D indicates the longest evacuation time is 4.5 hours. Explain how the data in Figure F-11 were used in the development of the ETE, that is, how it can take up to 6 hours to prepare for evacuation but that all evacuations are complete after 4.5 hours.

(d) Regarding Table 6-3, "Percent of Population Groups for Various Scenarios," explain the need for school buses in scenarios 3, 4, 9 and 10, which are weekend scenarios.

13.03-***

ETE - 14: Methodology
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

(a) The unnumbered table with column headings "Event Number" and "Event Description" on page 5-4 of the BLN ETE differs from the legend in Figure 5-1, "Events and Activities Preceding the Evacuation Trip." The legend in Figure 5-1 appears to agree with the text that follows. Event numbers (page 5-4) evidently lead to Event Sequences in Table 5-1, "Event Sequence for Evacuation Activities," associated with Activities, each of which is associated with a numbered time distribution. The numbers 1-5 in the legend of Figure 5-1 do not correspond to the numbers 1-5 in the unnumbered table on page 5-4, but rather to the activities in Table 5-1, even though there are only 4 activities in that table and there are 5 numbers in Figure 5-1. In the four headings beginning “Time Distribution…”, Activities seem to be associated with a numerical sequence such as 1 → 2, whereas in Table 5-1 activities are associated with distribution numbers and event sequences, neither of which match the numerical sequences in the “Time Distribution…” headers. Some items associated with numbers are events, others are either mislabeled or are intervals between events (sometimes called “evacuation activities” or “activities” in the BLN ETE). The word “activity” has a different meaning in the legend of Figure 5-1 than it has in the caption of Figure 5-1. Explain why the methodology as presented leads to valid evacuation time estimates, or clarify and eliminate ambiguities in the text, tables, and figures of Section 5, "Estimation of Trip Generation Time."

(b) The example in Section 7, "General Population Evacuation Time estimates (ETE)," states that the distance to be evacuated is judged to be 10 miles. Step number 2 of the example then states to enter Table 7-2 and locate the group entitled “evacuate 5-mile ring and downwind to EPZ boundary.” There is no Table 7-2. Clarify whether Table 7-1 on page 7-13 should read Table “7-2.”

(c) Discuss the assumptions used in developing the ETEs for the non car-owning public with respect to any special services that may be needed to serve the non-ambulatory population subgroup.

(d) Section 8.4, "Evacuation Time Estimates for Transport-dependent People," states that buses should be dispatched for transit-dependent people after those people have mobilized and are in a position to board the buses. Explain how the time estimate for mobilizing these buses was derived. Explain how the time needed for local authorities to inform the transit dependent public of the time at which buses should be expected to arrive was incorporated into the ETE analysis.

(e) Are there plans for vans to wait until residents are mobilized and ready for transport, or are second trips required for stragglers?

(f) Identify the time required to notify and mobilize drivers. Identify the time required to evacuate these special needs individuals, including travel times, loading/unloading, and return trips if needed.

(g) Explain how the inbound travel speed and time is calculated considering that buses must traverse traffic control points.

(h) Provide a basis for the assumption that the speed for buses is 30 mph as indicated in Section 8.4. According to the HCM 2000, when stopping and loading twice per mile are included, speeds of 15 mph would be more realistic. Clarify how these speeds can be achieved when buses are mixed with evacuating traffic and traveling through multiple traffic control points. Clarify how many stops the buses are expected to make along each route identified in Figure 8-2, "Proposed Transit-dependent Bus Routes." Clarify how long a bus is expected to wait for individuals at the bus stops.

(i) Provide the basis for unloading a bus in 5 minutes as shown in Table 8.7A, "Transit-dependent Evacuation Time Estimates - Good Weather."

(j) Explain why it takes 172 minutes for the bus to arrive at the reception center in Table 8.7A but it only takes 36 minutes to return to the EPZ to start the new route. Explain why an aggregate total ETE value is not provided for the two waves. Also, clarify these same issues for Table 8.7B.

(k) Tables 8-5A, "School Evacuation Time Estimates - Good Weather," and 8-5B, "School Evacuation Time Estimates - Rain," indicate school bus speeds of 40 to 45 miles per hour. Inbound buses would have to slow down to traverse the traffic control at intersections. Explain how speeds were established for buses going against traffic until they reach their destination. Discuss how this range of speeds takes into account interactions with evacuation traffic and travel through multiple traffic control points.

(l) Discuss the numbers of individuals and time needed to shut down industrial equipment for major employers such as those listed in table titled, "Bellefonte EPZ: Major Employers (As of April , 2007)," on page E-6. Explain how these individuals and the time needed to shut down equipment are considered in the BLN ETE

analysis.

(m) Table 8-8A., "Evacuation Time Estimates for Ambulatory Evacuees from Special Facilities - Good Weather," and Table 8-8B. "Evacuation Time Estimates for Ambulatory Evacuees from Special Facilities - Rain," provides time estimates for ambulatory evacuees. However, there is no discussion or quantification of the number of non-ambulatory evacuees. Non-ambulatory evacuees would include individuals that must be transported by ambulance with medical assistance. Discuss whether there are any non-ambulatory individuals at the special facilities identified in the above tables, and if there are, explain how their transport is considered in the ETE analysis.

(n) The table of day care centers in Appendix E, "Special Facility Data," of the BLN ETE analysis lists five day care centers. A brief review of the local telephone book identified at least six other day care centers within the plume exposure pathway EPZ. Discuss how the day care centers were identified and whether the number of day care centers identified in the BLN ETE analysis should be revised and the analysis revised accordingly.

(o) Table 8-2, "School Population Demand Estimates," appears to be missing some local schools such as the Skyline High School, Cumberland Presbyterian preschool, Macedonia school and possibly others. Explain the method used to identify all of the schools within the plume exposure pathway EPZ. Clarify whether additional schools need to be considered in the BLN ETE analysis. Also, in Table 8-2, there is an estimate of two buses needed for the Epruett Center of Technology and Jackson County Alternative School. However, there is no estimate of enrollment for these schools. Explain why two buses are adequate when most of the schools in the list require four or more buses.

(p) Section 8, "Transit-dependent and Special Facility Evacuation Time Estimates," indicates bus speeds of 30 miles per hour (mph) for buses. Explain how these buses can travel 30 mph when Figure 7-5, "Congestion Patterns at 2 Hours After the Advisory to Evacuate," shows congestion on these roadways during this timeframe. Clarify how the congestion indicated on Figures 7-4 thru 7-6 affects the speed of the buses.

(q) Table 8-7A, "Transit-dependent Evacuation Time Estimates - Good Weather," indicates a pick up time of 15 minutes for transit-dependent bus runs. Section 8.4, "Evacuation Time Estimates for Transit-dependent People," states that 15 minutes are needed when multiple stops are made. Clarify whether 15 minutes should be used as an average for each stop or whether 15 minutes is the total amount of time that the buses are stopped. Considering that Routes 1 and 4 are both longer than 24 miles, identify the estimated number of stops on each route.

13.03-***

ETE - 15: Evacuation confirmation
SRP Chapter 13.3 Acceptance Criterion 17

Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4

to NUREG-0654

The BLN ETE analysis suggests a method of confirmation using a statistical sampling via a stratified random sample of the population and a telephone survey. In Section 12, "Confirmation Time," it states that this survey could be completed within four hours of the initial announcement to evacuate. It appears that the proposed telephone method may have ignored recent developments in telephone technology that result in fewer people having conventional “land lines” for telephone service: the advent of cellular (mobile) phone technology, the growing use of internet telephones, and the increasing use of unlisted phone numbers. The cell-phone system may be overloaded and dysfunctional during an evacuation; cell phones may be off, discharged, or misplaced; and the internet may not be functioning in some or many areas (e.g., during a storm). Accordingly, the reliance on non-answering of telephones under such circumstances may be questionable. Discuss the rationale for using a telephone survey to confirm evacuation as opposed to visual confirmation by aircraft or ground vehicles. Clarify what action is necessary if the telephone survey response is less than 20%, but still significant (i.e., greater than 5%).

The ETE states that the confirmation time is suggested and that the county may have its own approach. Clarify whether the time for confirming the evacuation has been agreed upon by the responsible county officials. Provide information to support that the time required to obtain the personnel needed to confirm the evacuation has been included in the time estimate. Provide information on the time and resources needed to obtain necessary telephone numbers for the EPZ prior to beginning the telephone survey.

13.03-***

ETE - 16: Actions to improve evacuation time
SRP Chapter 13.3 Acceptance Criterion 17
Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

The only reference to actions that could be taken to improve evacuation time is the traffic management strategy in Section 9, "Traffic Management Strategy." Such actions as public education, making telephone contact prior to bus pick-up, a public outreach/information program, intelligent transportation systems, dynamic message signs, or highway advisory radio, are not mentioned. Provide specific recommendations in addition to a traffic management strategy.

The "Analytical Tools" portion of Section 1.3, " Preliminary Activities," states that the analyst can identify bottlenecks and develop countermeasures that are designed to expedite the movement of vehicles. Identify any adjustments that were made to improve evacuation times.

13.03-***

ETE - 17: Review of the ETE
SRP Chapter 13.3 Acceptance Criterion 17

Regulatory Basis: 10 CFR Part 50, Appendix E.IV., introductory paragraph; Appendix 4 to NUREG-0654

Provide additional information on the involvement of state and county emergency planners and local and state police. (a) Clarify whether state and local organizations involved in emergency response reviewed the entire ETE plan or just the traffic control plan. (b) Clarify whether state and local organizations provided any comments. Include any comments and resolution of such comments in the ETE document. (c) Clarify whether State and Local emergency response agencies concurred with the Traffic Control Point and Access Control Point selection and arrangements in the ETE.