BellBendCOLPEm Resource

From: Temple, Jeffrey
Sent: Thursday, October 08, 2009 9:18 AM
To: Jones, Joe A
Cc: BellBendCOL Resource
Subject: FW: RAI 47
Attachments: Response Enclosure Pgs 1-27.pdf; BNP-2009-292 (RAI 47).pdf

Joe…first part of Bell Bends response to our ETE RAIs. I will be reviewing today and tomorrow. Working at home tomorrow, so if you need me, call me on my cell phone at 207-441-2727. thanks…Jeff Temple

---

From: Canova, Michael
Sent: Monday, October 05, 2009 11:19 AM
To: Temple, Jeffrey
Cc: Chowdhury, Prosanta; Williams, Kevin
Subject: FW: RAI 47

Jeff:

Therre are two more parts to this "advance" copy. They total another 12 MB. I'll try to minimize that before I send them to you, but no promises. If you'd prefer I can dump them to a CD. Of course they will eventually show up in ADAMS.

Mike

From: Sgarro, Rocco R [mailto:rrsgarro@pplweb.com]
Sent: Thursday, October 01, 2009 2:39 PM
To: Canova, Michael
Cc: Woodring, Kathryn L; 'j freels'; 'Kirkwood, Jon K'; michael.yox@constellation.com
Subject: RAI 47

Mike,

As you can see from the email string, we're breaking this one into three parts in order to get it to you electronically. The other two parts will be forthcoming; please advise if you have any questions.

Thanks!

Rocky

R. R. Sgarro
Manager - Nuclear Regulatory Affairs
PPL Bell Bend, LLC
W: 570.802.8102 (Bell Bend)
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From: Woodring, Kathryn L
Sent: Thursday, October 01, 2009 2:31 PM
To: Sgarro, Rocco R
Subject:

Rocky,

See attached cover letter as well as pgs 1-27 of enclosure. Two more sections to come.

Katie Fitzpatrick (Woodring)
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Hearing Identifier: BellBend_COL_Public
Email Number: 366

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Subject: FW: RAI 47
Sent Date: 10/8/2009 9:18:15 AM
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From: Temple, Jeffrey

Created By: Jeffrey.Temple@nrc.gov

Recipients:
"BellBendCOL Resource" <BellBendCOL.Resource@nrc.gov>
Tracking Status: None
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Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

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Sensitivity: Normal
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Recipients Received:

RAI No.: 47

Question No.: 13.03-2 (ETE-1)

ETE-1: Estimated Population Growth

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Population estimates in the ETE were based on data from the 2000 U.S. Census and projected to the year 2009 using Year 2000 Census block point data. In Table 3-2, "[emergency planning zone] EPZ Permanent Resident Population," the 2000 Population is 69,718, from which the 2009 population is projected. The year 2000 population in Table 3-2 differs from the "UniStar Nuclear Services Bell Bend Nuclear Power Plant Environmental Report" (ER) Table 2.5-6, "Resident and Transient Populations by Sector and Distance from BBNPP Site, 2000," and the Final Safety Analysis Report (FSAR) Table 2.1-3, "{SECPOP Population for Counties within 10 mi (16 km) Radius of BBNPP (2000-2006)}," which provides a 2000 population of 49,596 people. Describe the reason the ETE year 2000 census block data is greater than resident populations described in the EP and in the FSAR. Make appropriate revisions to the ETE report, if necessary.

B. Table 3-1, "Population Estimates by County," provides annual growth rates for counties within or surrounding the EPZ. The ETE states that these growth rates were used in 2009 permanent resident projections provided in Table 3-2, "EPZ Permanent Resident Population." However, 2009 population projections in Table 3-2 do not correlate with the annual growth rate projections identified in Table 3-1. For example in Table 3-2, emergency response planning area (ERPA) 21 in Luzerne County has a 2000 and 2009 population of 10,930 people (indicating a zero percent growth over a nine year period); while Table 3-1, shows an annual growth rate in Luzerne County of 0.21 percent. Explain how growth rates provided in Table 3-1 are utilized to develop the population values for Table 3-2. Make appropriate revisions to the ETE report, if necessary.

Response

A. The Environmental Report (ER) Table 2.5-6, "Resident and Transient Populations by Sector and Distance from BBNPP Site, 2000," and the Final Safety Analysis Report (FSAR) Table 2.1-3, "{SECPOP Population for Counties within 10 mi (16 km) Radius of BBNPP (2000-2006)}," uses a 10 mile radius centered at the midpoint of the proposed new unit at the Bell Bend site. The ETE report, however, uses a 10 mile radius centered at the existing units at the Susquehanna Steam Electric Station site. The ETE reports the population within the Municipalities which in aggregate comprise the EPZ. The existing EPZ was defined using the centerpoint of the existing plant. Considering the ETE focuses on the EPZ population as opposed to the 10-mile population, the use of SSES as the centerpoint was deemed appropriate. As shown in Figure 3-1 of the ETE

report, there are several areas within 10 miles that are not within the EPZ (i.e. to the north of Union Township). There are also several areas outside of 10 miles which are within the EPZ (i.e. Mifflin Township). Table 1 summarizes the permanent resident population for year 2000:

Table 1. Permanent Resident Population (Year 2000)				
County	**Within 10 Mile Ring of SSES**	**Within EPZ**	**Within EPZ & outside 10 mile ring**	**Within 10 mile ring & outside EPZ**
Luzerne	35,338	49,285	14,469	522
Columbia	17,918	20,433	2,515	0
Total:	**53,256**	**69,718**	**16,984**	**522**

As shown in Table 1, there are 16,984 people living within the EPZ who are more than 10 miles from the proposed unit, while there are 522 people who live within 10 miles of the proposed unit, but are not within the EPZ. Thus, 69,718 – 53,236 = 16,984 – 522.

In summary, the difference in population within 10 miles (53,256 vs. 49,596) between the ER and the ETE is explained by the following factors:

- The use of different centerpoints for the analyses.
- The use of a 10-mile radius to define the area for the ER versus the use of the EPZ boundary to define the area for the ETE.

B. Table 3-1, "Population Estimates by County" indicates an annual growth rate of -0.32% for Luzerne County, not 0.21%. As stated in the footnote at the bottom of the table, 2000 populations were conservatively maintained for year 2009 for those counties that have negative annual growth rates. Since Luzerne County's growth rate was -0.32%, its 2009 population estimate will be the same as the population reported in 2000.

COLA Impact:

The BBNPP COLA will not be revised due to this RAI response.

RAI No.: 47

Question No.: 13.03-3 (ETE-2)

ETE-2: ETE Methodology

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Section 2, "Study Estimates and Assumptions," states that in Figure 2-1, "Assumed Evacuation Response," the area which is within the EPZ but outside the evacuation region (Regions R08-R22), will have a voluntary evacuation of 50 percent. Figure 2-1 (Regions R08-R22) shows a 35 percent voluntary evacuation rate for this area. Clarify whether the blue area depicting Regions R08-R22 in Figure 2-1 will have a 35 percent or 50 percent voluntary evacuation rate.

Response

A. The text in assumption 4 of Section 2.2, "Study Methodological Assumptions" is correct, stating that 50 percent of the population within the EPZ but outside the evacuation region will elect to voluntarily evacuate. For consistency with the other figures, the text will be modified to indicate that this area is red, and Figure 2-1 will be modified so that the area in question will be shaded red instead of blue.

COLA Impact:

1. The second paragraph of assumption 4 in Section 2.2, "Study Methodological Assumptions" will be modified as follows in a future revision of the ETE Report:

> Voluntary evacuation is ~~considered~~ anticipated for all types of regions as indicated in Figure 2-1. For the ~~radial~~ circular regions (R01 ~~through~~ and ~~R03~~R02), it is assumed that in the area that is within the EPZ but outside the evacuation region (shown in blue), 35 percent of the population will elect to voluntarily evacuate. For the keyhole configuration regions R04 through R07 (evacuate 2-Mile ring and sector downwind to 5-Miles), shown in the bottom left of Figure 2-1, the area shown in red is external to the evacuation region but within 5 miles of the power station. It is assumed that 50 percent of the population within this area will elect to voluntarily evacuate. In the ~~remaining~~ surrounding blue area (which extends from 5 miles to the EPZ boundary) ~~which is outside the evacuation region, but~~ within the EPZ, it is assumed that 35 percent of that population will elect to voluntarily evacuate. For the other keyhole

configurations, regions R08 through R22 (evacuate 5-Mile ring and sector downwind to EPZ boundary) shown in the bottom right of Figure 2-1, it is assumed that 50 percent of the population within the ~~blue~~ red area which is within the EPZ, but outside the evacuation region, will elect to voluntarily evacuate.

2. Figure 2-1 will be replaced with the attached figure in a future revision of the ETE Report.

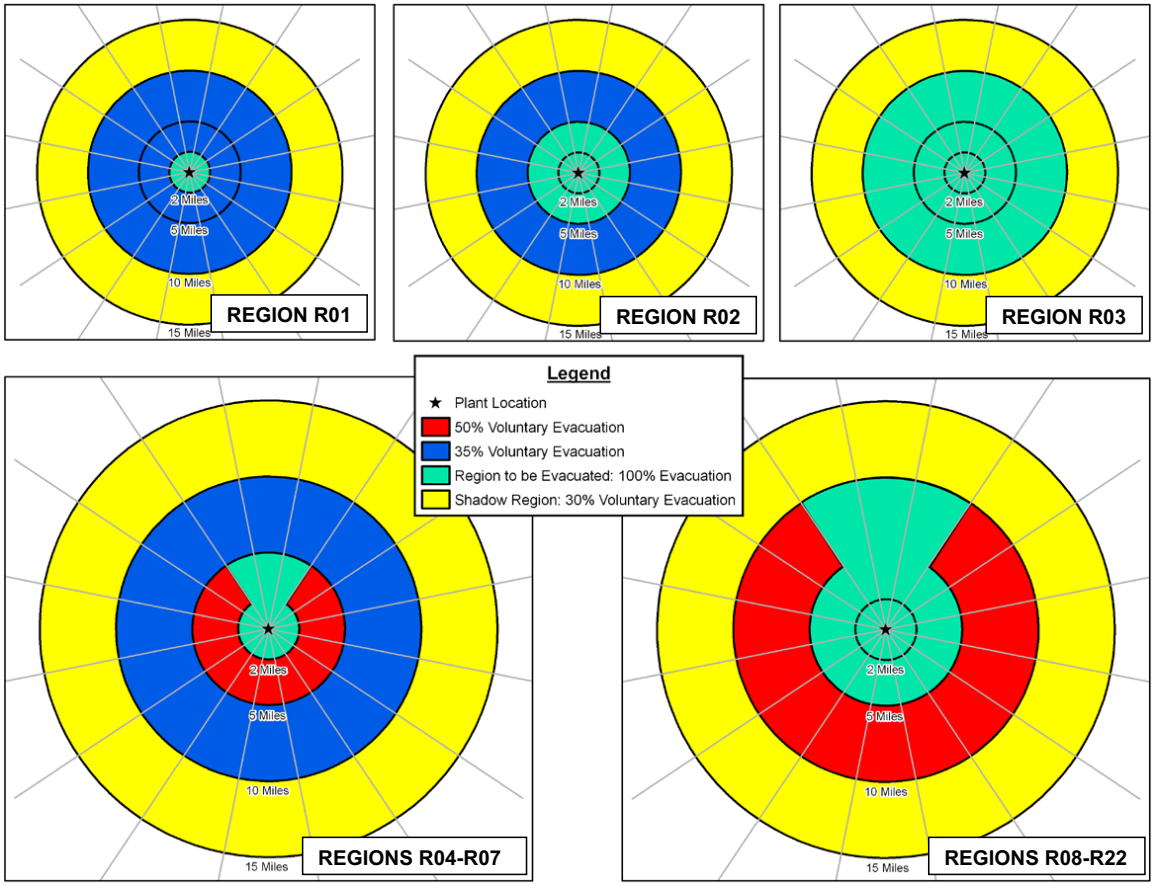

Figure 2-1. Assumed Evacuation Response

RAI No.: 47

Question No.: 13.03-4 (ETE-3)

ETE-3: ETE Methodology

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Section 4, "Estimation of Highway Capacity," describes the approach for estimating highway capacity and provides the algorithm and equation used for the approach to a signalized intersection. Explain how the variables are derived, specifically for the Mean Duration of Green Time and Mean Queue Discharge, for the capacity of an approach to a signalized intersection.

B. Using the equation presented on page 4-2, discuss how traffic control is included in the intersection analysis.

C. Appendix D, "Detailed Description of Study Procedure," identifies the steps to perform the ETE calculations. Step 10 in Appendix D discusses that changing control treatment at critical intersections can improve service and expedite movement of traffic. Discuss any model treatments that were used to expedite movement of traffic through intersections, and revise the ETE report as needed.

D. Discuss the effect on the ETE if the county specific traffic management plans were used in the analysis. Revise the ETE report as needed.

Response

A. Appendix K presents the saturation flow rate estimates for every link in the analysis network. These values are based upon observations made during the field survey and on the principles embedded within the 2000 Highway Capacity Manual (HCM). The HCM, as discussed in Section 4 of the ETE report, presents procedures for estimating capacity based upon the type of facility and the facility characteristics. The queue discharge headway per lane for through vehicles is computed as h = 3600 sec. per hour ÷ saturation flow rate; saturation flow rate in Appendix K is expressed in terms of vehicles per hour per lane.

The mean durations of all signal intervals at each signalized intersection are input to the DYNEV simulation model. This is accomplished by estimating the ratio, (G - L) / C, which is the fraction of a cycle length which provides service to each approach (L is the "lost time" per phase; g is the effective green time, G – L; G = green phase duration). The model is then executed and the volumes serviced by the competing approaches to each intersection are computed. The green time allocated to each direction of traffic is then recomputed in proportion to the dominant competing traffic volumes at that

intersection. By way of illustration, consider a signalized intersection where the total number of vehicles serviced over the course of the evacuation is found to be as follows:

N_E = 2500 *vehicles*; N_W = 1200 *vehicles;* N_N = 4000 *vehicles;* N_S = 1000 *vehicles*

The subscripts represent the direction of travel along each approach. If the number of lanes are the same for all approaches, we then identify the higher value of vehicles serviced in each direction of travel; in this example the eastbound and northbound demands exceed the values for the westbound and southbound approaches, respectively. The ratio of green time to cycle length (g / C) is then computed as follows:

$$\left(\frac{g}{C}\right)_{E,W} = \frac{2500}{(4000+2500)} = 0.38$$

Therefore, for a two-phase signal,

$$\left(\frac{g}{C}\right)_{N,S} = (1-0.38) = 0.62$$

This calculation is done at every intersection and then the model is executed again with these revised inputs to compute new ETE and traffic routing. The number of iterations that need to be performed are generally not more than 2 or 3. Note that such auxiliary considerations as “start-up lost time” are specified by the analyst; also the “lost time” associated with the signal switching from one phase to the next (i.e. losses, L, in service time due to the yellow and all red intervals) are computed internally by the simulation model. Also, any losses due to queue spillback and other operational difficulties encountered by the traffic are likewise represented by the model.

This approach is justified by the following considerations:

1. Most signal controllers these days, particularly in urban and suburban environs, are traffic actuated and adjust their timing in a manner that is responsive to the competing demands.
2. Any existing inefficiencies in the timing plans of signals along the analysis network will be compensated by driver behavior. During an evacuation, evacuees will generally respect the signal timing indications in the presence of competing flows in the interest of their personal safety; however, in the absence of any competing traffic movements, it is reasonable to expect that evacuees will pass through the intersection even if the signal indication is red.
3. No attempt is made to “optimize” signal timing to respond to cycle-by-cycle fluctuations in demand volume.

When there are competing traffic movements at an intersection or juncture, the real-estate within the intersection must be timeshared by these competing movements in order to afford safe passage. This is implemented in the simulation model by the analyst determining the allocation of effective green time as described above. Thus, depending upon circumstances, one or more of the competing traffic flows may be delayed at the intersection.

KLD applies the DYNEV model as an analysis tool rather than as a "single pass through" calculation of ETE. In particular, this tool is used to identify points of congestion and locations where Traffic Control Points (TCPs) could be helpful to the evacuating public. In addition, the detailed results of the simulation are analyzed to identify any locations where the specified control policy at at-grade intersections is not commensurate with the attendant evacuation traffic volumes. At these locations, the engineers at KLD adjust the allocation of green time so that it services the competing traffic volumes and the movement of traffic under evacuation conditions. In this manner, the model is executed in an iterative procedure so as to provide assurance that the allocations of "effective green time" at intersections appropriately represent the operating conditions during an evacuation.

This iterative procedure does not attempt to "optimize" traffic operations at an intersection but rather to represent a reasonably efficient operation under evacuation conditions. The establishment of a TCP at an intersection could well provide greater operational performance than is represented by the model. Thus, if all TCPs are manned in a timely manner by experienced personal, it is *possible* that the ETEs predicted by the model might be slightly longer than achievable in actual conditions under these circumstances. It is our belief that ETEs should represent reasonable expectations, but not optimal expectations.

The traffic management plan defined in Appendix G prioritizes intersections and provides for traffic guides to be assigned at those intersections where traffic volumes are heaviest as the top priority. These traffic guides will actually provide service as needed, even overriding the signal indications if there is an imbalance in demand relative to the signal timings in the controller. It is therefore reasonable to expect that the service provided to competing traffic flows will be reasonably efficient along the lines described above during an emergency evacuation.

Conservatively, the ETE calculations do not rely upon any of the traffic control measures in Appendix G. The estimates of capacity, which are used by the DYNEV model and are documented in Appendix K, are based upon the factors described in Section 4 and upon the observations made during the road survey. It is assumed that these capacity estimates are not enhanced nor compromised by the establishment of a TCP at an intersection. As detailed in Section 9, the functions to be performed in the field at TCPs are to (1) facilitate evacuating traffic movements; and (2) discourage those movements that would move travelers closer to the Power Station. The personnel manning these TCPs will also serve a surveillance function to inform the EOC of any problems that occur in the vicinity or are reported to them by evacuees. The calculated ETE does not rely upon implementation of the Traffic Control Points outlined in ETE Appendix G.

B. The DYNEV simulation model represents the actual implementation of traffic signal displays (i.e. green, yellow and red) in accord with the timing specified by the analyst, as described above. The model simulates the movement of traffic along the approaches; if a red signal indication is exhibited then the approaching vehicles will stop as they do in the real world; when the signal indication changes to green then the queue developed during the red will discharge at the saturation flow rate given in Appendix K. The simulation output records the number of stops and the delays experienced as well as the queue lengths on all approaches during the course of the evacuation. The animation "snapshots" shown in Figure 7-3 through 7-6 are taken directly from the model output.

As discussed in the response to part A, the ETEs represent reasonable, but not optimal expectations. Therefore, no allowance is made for TCP operations. The access control points (ACPs) are assumed to restrict and divert travelers who wish to travel through the EPZ, after 90 minutes following the Advisory to Evacuate.

The equation on page 4-2 relates approach capacity to discharge headway and to the control at a signalized intersection. The response to Part A describes how the control is specified.

C. For other, more congested EPZs, KLD has explored "special treatments" which require the presence of traffic guides. These treatments may involve contra flow ("reverse laning") procedures or special turn control treatments to expedite the movement of people particularly those who are resident in high density population areas close to the nuclear power plant. These locations are identified by the model in the form of extensive queuing and delays. It is our judgment that the Bell Bend EPZ need not resort to such special treatments given the fairly expeditious ETE of about 5 hours, which primarily reflects mobilization time rather than the effects of excessive congestion.

D. As discussed above, if all the traffic control points identified in the county plans were manned, the ETE may be less than that predicted in this study. This assumes, however, that sufficient manpower and equipment resources are available and that all traffic control points can be manned in sufficient time to support the evacuation process. As mentioned above, no "credit" is taken for the expected improvement in traffic operations at those sites where traffic personal are located. Consequently the conservative approach adopted is to avoid the assumption of expedited treatment at these locations. Therefore, any departure from the traffic management plan in Appendix G would not influence the computed ETE.

COLA Impact:

1. The following text will be added to the bottom of page 1-6 to a future revision of the ETE Report:

   For the reader interested in more details of the model than are provided in Appendices B, C and D, and in Highway Research Record No. 772 (discussed in Section 4 of this report), the following references are suggested:

   - NUREG/CR-4873 – Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code
   - NUREG/CR-4874 – The Sensitivity of Evacuation Time Estimates to Changes in Input Parameters for the I-DYNEV Computer Code

2. Replace item 6 in Section 2.3 with the following text in a future revision of the ETE Report:

   6. Traffic Control Points (TCP) within the EPZ will be staffed over time, beginning at the Advisory to Evacuate. Their number and location will depend on the Region to be evacuated and resources available. It is assumed that drivers will act rationally, travel in the directions identified in the plan, and obey

all control devices and traffic guides. The objectives of these TCP are:

a. Facilitate the movements of all (mostly evacuating) vehicles at the location.
b. Discourage inadvertent vehicle movements towards the power station.
c. Provide assurance and guidance to all travelers. This guidance is provided by the deployment of traffic cones and by the user of hand signals by the traffic guides.
d. Act as local surveillance and communications center.
e. Provide information to the emergency operations center (EOC) as needed, based on direct observation or on information provided by travelers.

In calculating ETE, it is assumed that drivers will act rationally, travel in directions identified in the plan, and obey all control devices and traffic guides. These TCP serve many useful functions, but are not considered in specifying the inputs to the DYNEV model used to calculate ETE. Consequently, the results presented in Section 7 and in Appendix J are conservative in that they do not reflect an incremental enhancement in traffic performance due to the presence of these TCP. The time needed to mobilize personnel or equipment to staff the TCP will not influence ETE results.

~~6. Traffic Control Points (TCP) within the EPZ will be staffed over time, beginning at the advisory to evacuate. Their number and location will depend on the region to be evacuated and personnel resources available. The objectives of these TCP are:~~

~~Facilitate the movements of all (mostly evacuating) vehicles at the location.~~

~~Discourage inadvertent vehicle movements toward the power station.~~

~~Provide assurance and guidance to any traveler who is unsure of the appropriate actions or routing.~~

~~Act as a local surveillance and communications center. Provide information to the Emergency Operations Center (EOC) as needed, based on direct observation or on information provided by travelers.~~

~~Consistent with these objectives, there is no expectation that the operation of TCPs will materially shorten evacuation times. In calculating ETE, it is assumed that drivers will act rationally, travel in the directions identified in the plan (as documented in the public information material), and obey all control devices and traffic guides. Therefore, the TCP are not expected to enhance or impede the flow of traffic. Consequently, any shortfall of personnel or equipment will not influence the ETE results. Also, the time needed to mobilize personnel or equipment to man these TCP will not influence the ETE results.~~

3. Add the following text to the end of Section 9 of a future revision of the ETE Report:

> As discussed in Section 2.3, these TCP are not credited in calculating the ETE results. Access control points (ACP) are deployed near the periphery of the EPZ to divert "through" trips. The ETE calculations reflect the assumptions that all "external-external" trips are interdicted after 90 minutes have elapsed after the advisory to evacuate (ATE).
>
> All transit trips and other responders entering the EPZ to support the evacuation are assumed to be unhindered by personnel manning TCP.
>
> Study Assumptions 5 and 6 in Section 2.3 discuss ACP and TCP staffing schedules and operations.

RAI No.: 47

Question No.: 13.03-5 (ETE-4)

ETE-4: Demand Estimation, Permanent Residents

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Table 8-1, "Transit Dependent Population Estimates," identifies 2,036 residents requiring transportation. Discuss whether any of these residents may have special needs and require specialized transportation. Revise the ETE report as needed.

B. Section 8.1, "Transit-Dependent People – Demand Estimate," states that county emergency plans estimates 8,174 people as transit dependent. Provide a more detailed explanation to support use of 2,036, rather than 8,174 residents, for the transit dependent population, including confirmation from county authorities that the lower estimate is appropriate for use in evacuation planning. Revise the ETE report as needed.

Response

A. The estimate of transit-dependent estimates in Table 8-1, "Transit Dependent Population Estimates," considered residents who would not likely have access to a vehicle at the time of an evacuation. The methodology used the following responses from the telephone survey:

- Household size
- Vehicles available for an evacuation
- Percent households with commuters
- Percent households with non-returning commuters

It is likely that some of the transit-dependent population might also have special transportation requirements; these persons are accounted for in Table 8-4A. The ETE report estimates that the 2,036 identified transit dependent population are able to evacuate by bus.

B. The census tract data provides estimates of number of households with 0, 1 and 2 vehicles per households within each tract. Using this information and the average household size per tract, an estimate of the number of people requiring transportation within the EPZ was calculated. This estimate was 8,421 transit

dependent people. This estimate is close to the county plan estimates of 8,174 suggesting that a similar method was applied.

Using the telephone survey data, Table 8-1 estimates the number of transit dependent people as 2,036 after accounting for ride-sharing of 50%, or 4,072 transit dependent before ride sharing. This estimate of transit dependent population is based on the recognition that average household size is related to number of vehicles/household (i.e., the ETE study estimates are based on an average household size of 1.68, 1.75 and 2.54 for households with 0, 1 and 2 vehicles per household, respectively). However the estimate using the census tract data is based on an average household size of 2.43 for households with 0, 1, and 2 vehicles per household. Clearly, the number of people in a household with 0 vehicles is lower than households with 1 or 2 vehicles. Hence, using the same household size for households with 0, 1 and 2 vehicles will result in the county's higher estimate for the transit dependent population. Finally, the estimate in the county plan likely included those in special facilities (updated Table 8-4 as provided in response to RAI 13-03.12 (ETE-11)), who are treated separately in the ETE report.

The telephone survey that was conducted expressly for EPZ residents disaggregated the estimate of household size by vehicle ownership to provide an accurate estimate for transit dependents in the EPZ, used in the ETE report.

Consider the following: (8174 – 1081) / (1.68/2.43) *0.5 = 2452.

Here, the county plan estimate of 8174 is reduced by 1081 in special facilities. The ratio of no-car household size to average household size is then applied. The 0.5 factor represents car-sharing. The resulting 2452 compares with the ETE study estimates of 2036.

The ETE report has been reviewed by the counties and their comments incorporated into the report. They did not express any comments regarding these transit dependent estimates in Section 8.

COLA Impact:

The BBNPP COLA will not be revised due to this RAI response.

RAI No.: 47

Question No: 13.03-6 (ETE-5)

ETE-5: Demand Estimation, Transient Populations

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Section 3, “Demand Estimation,” “State Parks,” states that based on aerial imagery, an estimate of 30 percent non-EPZ residents was developed. Discuss how aerial imagery of parking lots supports determination of the number of non-EPZ residents, and revise the ETE report as needed.

B. Section 3, “Demand Estimation,” identifies 475 resident students at the Penn State Hazelton campus. Discuss whether transit dependent needs were considered for this population group, and revise the ETE report as needed.

C. The number of commuting employees is presented in Figure 3-7, “Employee Population by Sector,” and shows 360 employees within 3 miles of the plant as those working at SSES. Explain why Bell Bend employees who will commute to work are not included in Figure 3-7. Revise the ETE report as needed.

D. Transient estimations in the FSAR Section 2.1.3.3.1, “Transient Population Within 10 mi (16 km),” and ER Table 2.5-6, “Resident and Transient Population by Sector and Distance from BBNPP Site, 2000,” differ from those in the ETE. The FSAR states there are seven camping facilities located within 10 miles of Bell Bend Nuclear Power Plant, and the ETE states there are five camping facilities within the EPZ. Major employers and number of employees also differ between the FSAR and ETE. Table 2.1-6, “{Transient Population Facilities-Major Employers Within 10 mi (16 km) Radius of BBNPP},” of the FSAR and Appendix E, “Special Facility Data,” of the ETE differ in both major employers and the number of employees at facilities. Discuss the difference in transient estimations provided. Revise the ETE report as needed.

E. Table 6-3, “Percent of Population Groups Evacuating for Various Scenarios,” indicates that the largest percent of transients occurs during winter scenarios. However, Section 3, “Demand Estimation,” identifies golf courses, state parks,

campgrounds, etc., as locations that attract transients. Discuss the basis for your conclusion that the winter scenarios have the larger transient populations.

F. Table 6-3, "Percent of Population Groups Evacuating for Various Scenarios," shows that 52 percent of residents with commuters in household will await the return of the commuter before evacuating. Appendix F, "Telephone Survey," (page F-7) states 60 percent of respondents would await the return of a commuter before evacuating. Discuss whether 52 percent or 60 percent of residents with commuters in their household was used, and what the effect on the ETE is if the 60 percent factor is used. In addition, provide justification for your conclusion that 52 percent is the appropriate factor to use for this calculation. Revise the ETE report as needed.

Response

A. The Aerial imagery was used to determine the capacity of the parking lot (250 spaces), not to derive the percentage of non EPZ residents. Applying a peak occupancy of 65%, and an estimate of 30% for non-EPZ resident population yields a peak load of 49 vehicles, or 98 transients assuming average vehicle occupancy of 2.0. The discussion in page 3-8 for state parks will be updated to read as:

Using aerial imagery of the parking lot, 250 vehicles spaces were estimated at the Nescopeck State Park. With 65% peak occupancy, and an estimate of 30% non EPZ residents yields an estimated 49 vehicles belonging to transient (non-EPZ residents) at this facility.

The Nescopeck State park is within the EPZ, and includes activities such as fishing, hunting, hiking, cross country skiing, and environmental education programs. Given its location and activities, an assumption that 30% of the visitors would be non-EPZ residents is reasonable for the ETE Study.

B. The 475 resident students at the Penn State Hazelton campus were included as part of the resident population within the EPZ and the transit dependent needs of this population group were included as part of the estimates provided in Section 8.

C. Employees at Bell Bend are not included in Figure 3-7 because it only considered employees in scenarios 1-12. Employees at the future Bell Bend site are considered in Scenario 13, and are quantified in the section titled "Special Events" at the end of Section 3 of the ETE report.

D. The table below presents the comparison of the recreational facilities including campgrounds as listed in the FSAR and the ETE Study

Facility	FSAR Population (people)	ETE Study Non-EPZ Resident Population (people) for Campgrounds	Comment
Acorn Acres	April-October 346		This site is located outside the EPZ
Camp Louise Girl Scouts in the Heart of Pennsylvania	June-August 250-350 Weekends - 300	26 people	
Camp Setebaid	July-August 170		Same location as Camp Louise
Council Cup Campground	Year Round: 250-300 April - October: 295	325 people	
Good's Campground	April - October 100 - 300 Weekend 10 Weekly		This site is located outside the EPZ
Hidden New Lake Campground	April - October 200-300	33 people	
Whispering Pines Camping Estates	April - October 250	78 people	
Susquehanna Riverlands	100,000 people per year	See Note1 below	
Moyers Grove Campground	Not listed in FSAR	170 campsites	

Of the seven campgrounds listed in the FSAR only five are within the EPZ and are included in the ETE Study. As outlined in the ETE Study, the population estimates at these sites used for the ETE calculations are the number of people that do not reside within the EPZ. The FSAR presents the total population estimates, both the residents of the EPZ and non-residents. Hence, the population estimates are different.

Note1: The Susquehanna Riverlands is a 400 acre recreational area that includes picnicking, hiking, ball fields, playgrounds, fishing along the north branch of the Susquehanna River, and hunting. The estimate of 100,000 in the FSAR includes all of these activities. Assuming that this area is used only 125 days each year results in an average occupancy of 800 people per day. If half of these people live outside the EPZ it would result in an estimate of 400 transients (non-residents) visiting this area, not

necessarily at the same time. The ETE Study estimates a total of 1357 transients (895 at lodging, 98 state parks, 80 in golf courses, 200 for hunting, 84 for fishing) excluding the camp grounds. This estimate of 1357 transients implies that 400 of them visit the Riverlands at the same time during the day.

The table below presents the comparison of the number of employees and the major employers as listed in the FSAR and the ETE Study.

Facility	Employees		Comment
	ETE Study	FSAR	
Berwick Hospital Center	-	600	
Berwick Offray	1100	600-700	
Berwick Retirement Village	-	131	
DeLuxe Building Systems	105	300	
PPL Susquehanna	1247	1460	ETE Study estimates did not include the contractors on site
Wise Foods	450	700	
Penn State Hazelton	210	-	These facilities are within the EPZ but outside the 10-mile region of the Bell Bend Site
Luzerne Community College	375	-	

As outlined in the ETE Study, only those employees who reside outside the EPZ are used in the ETE computations. These estimates are derived from conversations with personnel at the facilities and accessing the journey to work census data.

The ETE study will be updated to reconcile with the employment numbers presented in the FSAR in a future revision of the ETE Report.

E. College students attending Penn State Hazleton Campus and Luzerne Community College who are not residents of the EPZ are considered transients. Since this group of students constitutes the majority of the transients identified in the report, and most students attend school during winter weekday scenarios, the transient percentages are higher during winter (Scenarios 6, 7 and 8) compared to summer. The table below presents the estimated number of transients for the summer and winter scenarios.

Transient Type	Summer Midweek Midday	Summer Weekend Evening	Winter Midweek Midday	Winter Midweek Evening
College Students	230	0	2034	226
Camps	45	174	0	0
Hotels	200	451	100	451
Fishing	10	42	10	0
Hunting	20	50	50	0
Golf	30	60	0	0
Parks	20	49	0	0
Total	555	826	2194	677

F. As implied in Figure F-6, about 52 percent of households within the EPZ have commuters. Of these households, 60 percent would await the return of their commuters before evacuating (see Page F-7). Thus 31.2 percent of all households (60 percent of 52 percent) would await the return of commuters. However, the computations of the ETE assumed that all households with commuters (52 percent of total households) would await their return, as a conservative approach.

A sensitivity study was performed to study the effects, if the factor of 60 percent was applied to the percent of household with commuters. Table below compares the changes to the ETE for Scenario 6, Region 3 (Winter, Full EPZ) which has the highest population estimate, with this factor.

	% of HH that wait for the return of the commuter	50th Percentile	90th Percentile	95th Percentile	100th Percentile
ETE Report	52.0	1:30	3:00	3:25	5:30
Sensitivity Study	31.2	1:25	3:00	3:20	5:30

As shown in the table, applying the 60 percent factor, resulted in a small immaterial change in some ETE.

Section 2.3 will be updated in a future revision of the ETE Report to clarify this assumption.

COLA Impact:

1. Item 4) in Page 3-8 will be updated in a future revision of the ETE Report as follows:

The Nescopeck State Park is located along the eastern boundary of the EPZ; hiking and fishing are prevalent in the park. Using aerial imagery of the parking lot, 250 vehicles spaces were estimated at the Nescopeck State Park. With 65% peak occupancy, and an estimate of 30% non EPZ residents yields an estimated 49 vehicles belonging to transient (non-EPZ residents) at this facility.

~~Based on aerial imagery of the parking lots, an estimate of 30% non EPZ residents using the facility and an assumed 65% peak occupancy yields an estimated 49 vehicles at this facility. It is assumed that there are 2 people in each vehicle; thus~~Thus, there are 98 transients visiting the park.

2. After reconciling the estimates of major employers between the FSAR and the ETE Study, the following items will be updated in a future revision of the ETE Report:

- No. of employees commuting into the EPZ in the last paragraph of Page 3-13
- Tables 3-7, 6-4, and 7-1
- Figures 3-7, and 3-8
- Table listing Major Employers in Appendix E

3. Section 2.3 item 3) will be updated in a future revision of the ETE Report as follows:

    3. It is further assumed that:

        a. Buses will evacuate the schools first (if in session at the time of the accident) before those who are transit-dependent.

        b. 52 percent of households in the EPZ have at least one commuter;

        ~~b.~~c. The telephone survey results suggest that 60 percent of those households will await the return of a commuter before beginning their evacuation trip~~, based on the telephone survey results~~. However, the ETE was computed based on the conservative assumption that all (100 percent) of the households with commuters will await the return of the commuter before beginning their evacuation trip.

RAI No.: 47

Question No.: 13.03-7 (ETE-6)

ETE-6: Demand Estimation, Special Facility Population

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Several special facilities listed in Table 8-4, “Special Facility Transit Demand,” are missing census information and capacity values. This includes the Bonham Nursing Center, which identifies a capacity of 67 but does not include transportation resources, and the Birchwood Nursing Home, which identifies a census of 76 persons but only identifies one bus to serve the facility.

    1. Discuss why capacity values are not included in Table 8-4 and are not used to develop transportation requirements. Revise the ETE report as needed.

    2. Explain why some special facilities in Table 8-4 do not require transportation resources to support an evacuation. Revise the ETE report as needed.

B. Table 8-4 identifies the need for 49 ambulances, and Table 8-4A, “Risk Municipality Medical Transportation Requirements,” identifies a need for 57 ambulances.

    1. Clarify if the 57 ambulances identified in Table 8-4A are for transit dependent residents or special facility residents. Revise the ETE report as needed.

    2. Discuss the total number of ambulances needed to support an evacuation. Revise the ETE report as needed.

C. Table 8-2A, “Luzerne County Schools,” and Table 8-2B, “Columbia County Schools,” identify the need for 185 buses to evacuate school facilities within the EPZ. Supplemental local emergency plans identify 177 buses between Luzerne and Columbia Counties. Discuss whether 177 or 185 buses are needed to respond. Revise the ETE report as needed.

D. Section 2.5.1.1.3.2, “Transient Population Levels,” in the Environmental Report states that the State Correctional Institutions (SCI) Retreat is located 8 miles north of Bell Bend Nuclear Power Plant. However this facility is not identified in Table 8-4, "Special Facility Transit Demand" in the ETE study.

    1. Discuss the transportation resources and logistics for evacuation of this facility. Revise the ETE report as needed.

Response

A.

1. We have acquired additional facility data and have updated table 8-4. See response to RAI 13-03.12 (ETE-11)

2. Some of the facilities identified are day-care facilities such as Northeast Counseling and hence do not require transportation. Patients either drive or are driven to these facilities.

An updated Table 8-4 will be included in a future revision of the ETE study with the missing information at these facilities.

B.

1. The 57 ambulances identified in Table 8-4A are required for homebound special needs population, and not special facilities. The ETE report will be modified accordingly.

2. The total number of ambulance runs needed for the evacuation is 131 (74 from updated Table 8-4 and 57 from Table 8-4A). Under county and state concept of operations, unmet needs are passed to the state which coordinates needed support resources. In this case, the State Department of Health would obtain needed ambulance resources from surrounding jurisdictions. In addition, local ambulances used in the first wave could also be re-assigned to a second transport mission, if necessary.

C. Tables 8-2A and 8-2B identify that 185 buses will be needed to evacuate the school facilities. This is comparable to the estimate of 184 buses, as provided in the Luzerne County and Columbia County emergency plans, Attachment A, Page A14-7. Since these are higher than the 177 in the supplemental emergency plans, the higher estimate of 185 buses was used in the ETE Study, as a conservative approach.

Also, Attachment A, Page A14-7 of the county emergency plans identified that there were no unmet needs in terms of the bus requirements for the school evacuations.

D. Figure E-8 presented the location of the SCI Retreat facility, however the table with the population estimates was not included in Appendix E. The following table will be added to Appendix E in a future revision of the ETE Study:

SESS EPZ: Correctional Facilities						
Distance (miles)	Direction	Name of Facility	Address	Town	Phone	Inmates
LUZERNE COUNTY						
7.4	NE	SCI Retreat	660 State Route 11	Hunlock Creek	(570) 735-8754	980

We had encountered resistance from correctional facility personnel in revealing their evacuation procedures because of security concerns. Their preference is to lock down the facility and shelter the inhabitants particularly if they are far from the nuclear power plant (NPP) and the plume is traveling in another direction. This facility is approximately 8 miles from the NPP.

Based on confidential information received recently some reasonable estimates and assumptions can be applied:

1. Estimate 40 buses are deployed in 2 convoys
2. Assume the following mobilization times to assemble the buses and drivers, travel to the facility and to board the buses while maintaining security:
    a. First convoy: 2 hours from Advisory to Evacuate
    b. Second convoy: 3 hours
3. The evacuation route is confidential. For the ETE purposes, it is assumed that the convoy will exit the EPZ along US-11 northbound
4. In a future revision of the ETE study, a sensitivity study will be conducted to quantify the impacts on ETE of adding the two convoys to the evacuation traffic stream

COLA Impact:

1. The following section will be added at the end of page 8-9 to a future revision of the ETE Study:

ETE for Homebound Special Needs Population

Ambulances

As shown in Table 8-4A, it is estimated that 57 ambulance runs will be needed to evacuate the homebound bed-ridden population within the EPZ. The table also indicates that there are only 32 ambulances available.

The total number of ambulance runs needed for the evacuation is 131 (74 from Table 8-4 and 57 from Table 8-4A). Under county and state concept of operations, unmet needs are passed to the state which coordinates needed support resources. In this case, the State Department of Health would obtain needed ambulance resources from surrounding jurisdictions. In addition, local ambulances used in the first wave could also be re-assigned to a second transport mission, if necessary.

As stated on page 8-9, mobilization time and loading time are assumed to be 60 minutes each per ambulance. Each ambulance servicing the homebound bed-ridden population will make 2 stops with an estimated distance of 2 miles between stops and an estimated distance of 5 miles to the EPZ boundary after the final stop. It is conservatively assumed that ambulances will travel at 30 mph within the EPZ. Mobilization time is 5 minutes longer and travel speed is 10% less in rain – 27 mph. All ETE are rounded to nearest 5 minutes.

The first wave ETE are computed as follows:

a. Ambulance arrives at first household: 60 minutes
b. Loading time at first household: 20 minutes
c. Ambulance travels to second household: 2 miles @ 30 mph = 5 minutes
d. Loading time at second household: 20 minutes
e. Travel time to EPZ boundary: 5 miles @ 30 mph = 10 minutes

ETE: 60 + 20 + 5 + 20 + 10 = 1:55

Rain ETE: 70 + 25 + 5 + 25 + 11 = 2:15 (rounded to nearest 5 minutes)

The second wave ETE, if needed, are computed as follows:

a. Ambulance departs EPZ at 1:55
b. Travel time from EPZ boundary to host facility: 5 miles @ 30 mph = 10 minutes
c. Ambulance unloads (20 minutes) and driver takes a 10-minute rest: 30 minutes
d. Ambulance returns to EPZ and arrives at first house: 10 miles @ 30 mph = 20 minutes
e. Loading time at first household: 20 minutes
f. Ambulance travels to second household: 2 miles @ 30 mph = 5 minutes
g. Loading time at second household: 20 minutes
h. Travel time to EPZ boundary: 5 miles @ 30 mph = 10 minutes

ETE: 115 + 10 + 30 + 20 + 20 + 5 + 20 + 10 = 3:50

Rain ETE: 135 + 11 + 35 + 22 + 25 + 5 + 25 + 11 = 4:30

2. Add the following table to Appendix E in a future revision of the ETE Study.

SESS EPZ: Correctional Facilities						
Distance (miles)	Direction	Name of Facility	Address	Town	Phone	Inmates
LUZERNE COUNTY						
7.4	NE	SCI Retreat	660 State Route 11	Hunlock Creek	(570) 735-8754	980

3. Add a sensitivity study to Section I, related to the evacuation of SCI Retreat as discussed in response item D, in a future revision of the ETE Study.

RAI No.: 47

Question No.: 13.03-8 (ETE-7)

ETE-7: Demand Estimation, Emergency Planning Zone (EPZ)

Acceptance Criteria: SRP Requirements A and H; Acceptance Criterion 11

Regulatory Basis: 10 CFR 52.79 (a) (21), Section IV of Appendix E to 10 CFR 50

A. Table 8-5A, "School Evacuation Time Estimates – Good Weather," indicates that the distances from Garrison Memorial Elementary School, Huntington Mills Elementary School and Northwest Area High School to the EPZ boundary is 11 miles. Discuss how traveling these distances through the EPZ reflects a generally radial evacuation, as recommended in NUREG 0654. Revise the ETE report as needed.

Response

The first sentence under "School Evacuation" on page 8-6 of the ETE report reads: "The distance from a school to the EPZ boundary is measured using Geographical Information Systems (GIS) software along the most likely route from the school to the EPZ boundary in the direction of the designated host school."

The attached Figure 1 shows the likely evacuation routes between the three cited schools and the host, Dallas Middle School. As presented in Figure 1, the lengths of the routes between these schools and the EPZ boundary are 7.2 mi, 8.4 mi and 5.2 mi. These routes which are generally outbound relative to the location of the nuclear power plant will be updated in a future revision of the ETE study, along with the ETE in Tables 8-5A and 8-5B.

COLA Impact:

1. Tables 8-5A and 8-5B will be updated in a future revision of the ETE Report with the updated evacuation route distances.

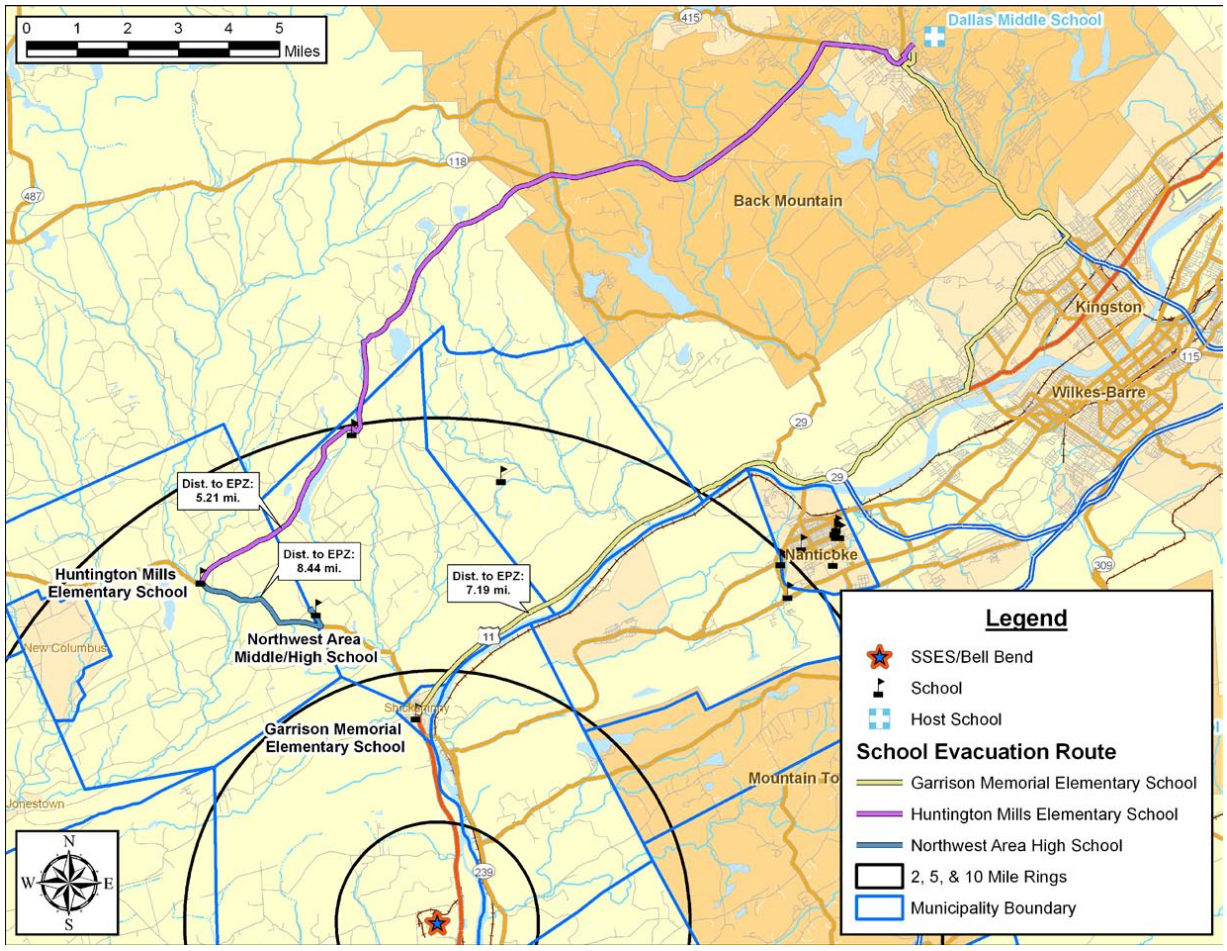

Figure 1 – School Bus Evacuation Route

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October 1, 2009

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BELL BEND NUCLEAR POWER PLANT
RESPONSE TO RAI No. 47
BNP-2009-292 Docket No. 52-039

References: 1) M. Canova (NRC) to R. Sgarro (PPL Bell Bend, LLC), Bell Bend COLA – Request for Information No. 47 (RAI No. 47) – RAI-3300, email dated September 4, 2009

The purpose of this letter is to respond to the request for additional information (RAI) identified in the referenced NRC correspondence to PPL Bell Bend, LLC. This RAI addresses Emergency Planning, as discussed and submitted in Part 5 of the Bell Bend Nuclear Power Plant Combined License Application (COLA).

The enclosure provides our response to RAI No. 47, Questions 13.03-2 through 13.03-14, which includes revised Evacuation Time Estimate (ETE) Report (COLA Part 5) content. These changes will be incorporated in a future revision of, or supplement to, the COLA upon revision of the ETE Report. This future revision of, or supplement to, the COLA is the only new regulatory commitment.

Should you have questions or need additional information, please contact the undersigned at 570.802.8102.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 1, 2009

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosure: As stated

cc: (w/o Enclosures)

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Enclosure

Response to NRC Request for Additional Information No. 47
Bell Bend Nuclear Power Plant