

PMBelCOL PEmails

From: Joseph Sebrosky
Sent: Friday, March 06, 2009 4:29 PM
To: PMBelCOL PEmails
Cc: 'Spink, Thomas E'; Ravindra Joshi; Malcolm Patterson; 'Bob Hirmanpour'
Subject: Summary of 3/6/09 phone call with TVA to discuss Bellefonte PRA questions
Attachments: chapter 19 draft followon questions.doc

On March 6, 2009, NRC staff (Joe Sebrosky and Malcolm Patterson) participated in a telephone conference call with TVA representatives and observers (see below) regarding the staff's detailed review of the Bellefonte Units 3 and 4 COL application. The purpose of the call was to discuss the attached draft chapter 19 RAls. The staff agreed to make the following corrections before issuing the RAls in final form:

- 1) correct the reference to table 2.3-801 in the fourth question
- 2) correct that the last question is a followon to question 19-03 and not 19-05.

The staff also indicated that it would review the responses to similar questions on Vogtle docket and share with industry the staff's observations regarding the adequacy of the Vogtle responses. The staff agreed to do this because of the similarity between the Vogtle questions and the Bellefonte questions.

Industry Participants

Bob Hirmanpour- NuStart/BLN
Eddie Grant - NuStart
Thomas Spink – TVA
Amy Aughtman - Southern
Julie Giles – SCEG
Ken Karcher – PGN
Amy Aughtman – Southern
Raymond Burski – FP&L
Roman Losev – Enercon
Fred Redwanz - Enercon

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From: Joseph Sebrosky

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Bellefonte Units 3 and 4
Tennessee Valley Authority
Docket No. 52-014 and 52-015
SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: 19

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

Erai 1985, 19-***

[Follow-up to Question 19-02]

In your RAI response dated 9/4/08, there is a table of external events. One column of this table is labeled "Applicable to Site? (Y/N)." The staff considers all events that are physically possible to be "applicable" and expects that they will be discussed. For example, if there is no dam a higher elevation in the same watershed as the site, flooding due to dam failure would not apply. Some of the assessments documented in the response are not consistent with this understanding. Please clarify what is meant by "applicable" in your response and ensure that the response is consistent with this meaning.

19-***

[Follow-up to Question 19-02]

The staff agrees that many of the events applicable to a site may be screened from further evaluation because they are so infrequent that their contribution to risk is too small to affect the plant CDF or LRF, even if core damage is assumed to result. Other events that are less frequent than $1E-06$ may also be screened if the conditional core damage probability is so low that the risk from all such sequences taken together is too small to affect CDF or LRF. The basis for screening and assessment of risk from events (including a description of the logic used to screen the event and reference for numerical values) that cannot be screened must be reported in the BLN Final Safety Analysis Report (FSAR) along with other PRA results and assumptions. Please document these PRA results in the FSAR. (Format and content expectations are documented in Appendix A to Section C.I.19 of RG 1.206, "Combined License Applications for Nuclear Power Plants.")

19-***

[Follow-up to Question 19-02]

Section 19.58 of the AP1000 Design Control Document (DCD) classifies tornadoes according to the enhanced Fujita scale. To allow direct comparison between the FSAR and the referenced DCD, please re-classify tornadoes reported in the FSAR using the enhanced Fujita scale.

19-***

[Follow-up to Question 19-02]

The BLN tornado analysis uses only data from Jackson County (21 tornadoes); this

data set does not provide an adequate sample size. (NUREG/CR-4461, "Tornado Climatology of the Contiguous United States," recommends using data from a box two degrees (latitude and longitude) to four degrees on a side to obtain a representative sample; and states that 1-degree boxes should only be used if the number of events is large enough to ensure reliable statistics. The information in FSAR Table 2.3-801 indicates that the seven-county region around the BLN site has an area of 4460 square miles, slightly larger than the area of a 1-degree box.) Please revise the site-specific tornado frequency calculations using data from an area larger than Jackson County and justify the adequacy of the sample size.

19-***

[Follow-up to Question 19-02]

For tornado classes EF0 to EF3, the BLN frequency estimates are based on a point-structure strike probability. Use of a point-structure strike probability alone may be optimistic. (NUREG/CR-4461, Section 4.2, indicates that for large structures, the probability of a tornado strike should consider characteristic dimensions of the structure and the expected length of the tornado's path.) Please justify the use of a point-structure strike probability or revise the site-specific tornado frequencies to account for the dimensions of the plant structures and tornado path length.

19-***

[Follow-up to Question 19-02]

The response to Question 19-02 indicates that no hurricanes have been recorded within 25 miles of Jackson County since 1851. The staff expects applicants to evaluate a larger area (within 100 miles), since paths that hurricanes take have a significant degree of randomness within a cone of expected travel. However, if a site is clearly outside a "hurricane-prone" region (as defined in ASCE-705, "Minimum Design Loads for Buildings and Other Structures"), the staff considers it reasonable to assume that the frequencies of the higher hurricane classes (i.e., Categories 3, 4, and 5) are negligible unless it is known that hurricane-strength winds from at least one hurricane (of that magnitude or larger) have passed within 100 miles of the site. Please provide hurricane frequencies based on an increased search radius or provide the basis for concluding that BLN is not in a hurricane-prone region.

19-***

[Follow-up to Question 19-02]

The response to Question 19-02 states that the Category 5 hurricane frequency is determined by dividing the measured duration by the number of occurrences of tropical weather. It is more likely that the number of occurrences was divided by the interval over which observations were recorded. Please clarify the definition of event frequency in the FSAR.

19-***

[Follow-up to Question 19-02]

The AP1000 DCD includes consideration of tropical storms in its evaluation of the risk from high winds. Please revise the FSAR to include an estimate of extratropical cyclone frequency. Include hurricanes downgraded to tropical storms (or less) by the time they approach the BLN site. Demonstrate that this frequency is bounded by the corresponding value in the AP1000 DCD.

19-***

[Follow-up to Question 19-02]

For risk from external flooding, expand the discussion to address all potential causes of elevated water levels (e.g., precipitation, dam failure), including credible combinations of sources. Provide a justification for screening external floods as a significant risk contributor, or include them in the site-specific PRA. Given that no basis has been provided for concluding that CCDP is less than unity when water levels exceed plant grade elevation, external flooding can only be screened if a conservative analysis demonstrates that the frequency is negligible.

19-***

[Follow-up to Question 19-02]

The applicant's response to risk from manmade hazards does not address those associated with toxic materials. Please discuss the level of risk related to potential hazards associated with toxic materials and the systematic method used to assess or screen the hazard including the basis for numerical values used. Deterministic evaluations documented in other parts of the FSAR need not be repeated but should be cited if they are used to help support the assessment of risk.

19-***

[Follow-up to Question 19-02]

The DCD lists "nearby facility accidents" among the manmade external hazards but describes no approach to addressing these potential hazards. It is clear that such hazards can exist, and it is expected that COL applicants will address them by screening them out of the PRA or subjecting them to additional analysis by methods similar to those used for transportation hazards and pipelines. Both physical and chemical hazards should be assessed. Please discuss the level of risk related to potential hazards associated with nearby facilities and the systematic method used to assess or screen the hazard including the basis for numerical values used. Deterministic evaluations documented in other parts of the FSAR need not be repeated but should be cited if they are used to help support the assessment of risk.

19-***

[Follow-up to Question 19-02]

The DCD calls for the applicant to “reevaluate the qualitative screening of external fires” and perform a risk assessment if it cannot be demonstrated that the frequency of hazard is $<1\text{E-}07$ per year. Please document this reevaluation or assessment in the FSAR.

19-***

[Follow-up to Question 19-05]

In response to NRC RAI 19-05, a change to COL Information Item 19.59.10-2 was proposed to account for plant-specific design, design changes, or departures from the design certification that affect the PRA. A similar issue appears in COL Information Item 19.59.10 3 (dealing with internal fire and internal flood analyses). It should be addressed in a similar manner. Both COL Information Item Nos. 19.59.10 2 and 19.59.10 3 appear again in License Condition No. 2, “Summary of COL Information Holder Items,” of Part 10 of the BLN COLA, which should also be updated. Please propose an appropriate revision to the application.

19-***

[Follow-up to Question 19-05]

In response to NRC RAI 19-03, three changes to STD COL Information Item 19.59.10-4 were proposed: (1) implementing SAMG on a site-specific basis, interfacing with the emergency operating procedures and the emergency plan, as well as providing training for the emergency response organization; (2) providing a schedule for this implementation; and (3) shifting responsibility from the COL applicant to the COL holder. The staff understands that development of SAMG has been completed. Revise the proposed COL information item and associated license conditions (2 and 6) to address a schedule for the future implementation, rather than for the development, of site-specific SAMG.