

PMBelCOL PEmails

From: Joseph Sebrosky
Sent: Friday, December 12, 2008 10:02 AM
To: PMBelCOL PEmails
Subject: summary of 7/16/08 phone call with TVA to discuss Bellefonte meteorology question
Attachments: draft climatology rais second set.doc; draft climatology rais.doc; Changes To Meteorology RAIs as a result of 7-16-08 call.doc

MEMORANDUM TO: File (Docket Numbers 52-014, 52-015, Bellefonte Units 3 and 4 COLA)

FROM: Joe Sebrosky
Office of New Reactors, Division of New Reactor Licensing
Senior Project Manager, AP1000 Projects Branch 1

SUBJECT: Summary of 7/16/08 Conference Call with TVA to Discuss Bellefonte Meterology Questions

On July 16, 2008, NRC staff participated in a telephone conference call with TVA representatives (see list below) regarding the staff's proposed questions in the meterology area.

The attached draft RAIs were discussed during the call. As a result of the call some of these draft RAIs were revised. Also attached is a table summarizing the draft RAIs that were changed and the basis for the change.

The NRC attendees were:

Joe Sebrosky
Charlie Cox
Kevin Quinlin
Leta Brown
Brad Harvey
Joe Hoch

TVA (applicant) attendees were:

NuStart
Eddie Grant
Neil Haggerty
Peter Hastings
Shelly Kowkabani
Fred Redwanz
Francine Beck
Ron Davis
Chuck Palmer
JoAnn Morris
Marvin Morris
Jared Monroe
Al Schneider
Stan Lanham - Duke
John McConaghy – Duke

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Subject: summary of 7/16/08 phone call with TVA to discuss Bellefonte meteorology question

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From: Joseph Sebrosky

Created By: Joseph.Sebrosky@nrc.gov

Recipients:

"PMBeICOL PEmails" <PMBeICOL.PEmails@nrc.gov>

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Files	Size	Date & Time
MESSAGE	1312	12/12/2008 10:02:25 AM
draft climatology rais second set.doc		26178
draft climatology rais.doc	50754	
Changes To Meteorology RAIs as a result of 7-16-08 call.doc		47610

Options

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Draft Climatology RAIs – Sent to TVA 7/7/08

**Request for Additional Information
Bellefonte Units 3 and 4
Docket No. 52-014 and 52-015
SRP Section: 02.03.01 - Regional Climatology
Application Section: 2.3.1**

QUESTIONS from Siting and Accident Consequences Branch

ERAI 415, 02.03.01-***

10 CFR 52.79(a)(1)(iii) requires a COL applicant to identify the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated. SRP Section 2.3.1 also states the applicant should present data on severe weather phenomena which represent site conditions during the expected period of reactor operation.

Please provide an FSAR section that discusses the potential effects of climate change on regional climatology and resulting site characteristics

Draft Climatology RAIs – Sent to TVA 7/2/08

**Request for Additional Information
Bellefonte Units 3 and 4**

Docket No. 52-014 and 52-015

SRP Section: 02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases

Application Section: 02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases

QUESTIONS from Siting and Accident Consequences Branch

ERAI 461, 02.03.04-***

Regulatory Guide 1.206 states that the applicant should discuss the effects of topography on the short-term dispersion estimates. Please provide a revision to the Bellefonte FSAR that discusses the hill and valley topography near the Bellefonte site with respect to calculation of the short term atmospheric dispersion factors (χ/Q values). Were terrain recirculation factors or other adjustments used in the PAVAN calculations? What is the basis for the selected assumptions and inputs? The information provided should be sufficient to allow the NRC staff to perform its own confirmatory calculations.

ERAI 461, 02.03.04-***

Please provide a revision to the Bellefonte FSAR to justify use of the Bellefonte site center point as the point of reference when calculating the distance from the postulated release locations to the outer boundary of the LPZ, rather than use of the circumference of the 160-meter radius circle assumed in the EAB calculation.

ERAI 461, 02.03.04-***

Page 2.3-32 of the Bellefonte FSAR states that releases to the control room were assumed to be point ground level releases. However, footnote d on page 2.0-11 notes that the ground level containment release point χ/Q values shown on page 2.0-10 model the containment shell as a diffuse area source. Page 2.3-201 provides the distance and direction from each postulated release location to the control room HAVC. Please provide a revision to the Bellefonte FSAR listing all other inputs used in generating the control room χ/Q values to clarify how the χ/Q values for each source/receptor pair were calculated.

ERAI 461, 02.03.04-***

Regulatory Guide 1.206 states that, for the purposes of control room radiological habitability analyses, the applicant should provide a site plan showing true north and indicating locations of all potential accident release pathways and control room intake and unfiltered in-leakage pathways. Bellefonte FSAR Figure 2.1-201 provides a site plot plan but does not highlight the location of each of the postulated source and receptor locations. Therefore, please update the Bellefonte FSAR to provide a more detailed figure drawn to scale showing true north and the source and receptor locations.

ERAI 461, 02.03.04-***

Please revise the Bellefonte FSAR to list which χ/Q values were used in the dose assessments for unfiltered in-leakage to the control room.

ERA1 461, 02.03.04-***

Please confirm that all postulated airborne release and receptor locations for Bellefonte have been captured by the AP1000, Rev. 16, list for all design basis accident release scenarios, including those resulting from loss of offsite power or other single failure.

Request for Additional Information
Bellefonte Units 3 and 4
Docket No. 52-014 and 52-015
SRP Section: 02.03.03 - Onsite Meteorological Measurements Programs
Application Section: 2.3.3

QUESTIONS from Siting and Accident Consequences Branch

ERA1 450, 02.03.03-***

The BLN FSAR references a historic meteorological data set (1979-1982) from the BLN site. The historic data are used to show validity and representativeness of the new 2006-2007 data set. Please formally submit an electronic copy of this hourly data set in the format specified in Appendix A to Revision 1 to Regulatory Guide 1.23.

Request for Additional Information
Bellefonte Units 3 and 4
Docket No. 52-014 and 52-015
SRP Section: 02.03.05 - Long-Term Atmospheric Dispersion Estimates for Routine Releases

Application Section: 02.03.05 - Long-Term Atmospheric Dispersion Estimates for Routine Releases

QUESTIONS from Siting and Accident Consequences Branch

ERA1 467, 02.03.05-***

Please provide a list of all inputs and assumptions used as inputs to estimate the χ/Q and D/Q values resulting from routine airborne releases. What is the basis for the selected assumptions and inputs? The information provided should be sufficient to allow the NRC staff to perform its own confirmatory calculations.

ERA1 467, 02.03.05-***

Airborne routine releases were assumed to occur from the center of the Bellefonte site. Please identify the actual planned routine release points and discuss these locations with respect to the center of the site, other structures, and the characteristics of each release mode.

ERA1 467, 02.03.05-***

With regard to calculation of the atmospheric dispersion factors (χ/Q values) for routine airborne releases, page 2.3-34 of the FSAR states that terrain recirculation was considered consistent with Regulatory Guide 1.111. Please revise the FSAR to provide a more detailed discussion of the basis for and how terrain was factored into the calculation of the χ/Q and D/Q values.

**Request for Additional Information
Bellefonte Units 3 and 4
Docket No. 52-014 and 52-015
SRP Section: 02.03.03 - Onsite Meteorological Measurements Programs
Application Section: 2.3.3**

QUESTIONS from Siting and Accident Consequences Branch

ERAI 414, 02.03.03-***

Regulatory Guide 1.206 states that the Onsite Meteorological Measurements Program description should include a site map showing tower location with respect to manmade structures, topographic features, and other site features that may influence site meteorological measurements and should indicate distances to nearby obstructions to flow in each downwind sector. Please provide such a map.

ERAI 414, 02.03.03-***

Regulatory Guide 1.23 specifies a sampling rate of 5 seconds for digital meteorological data. Please justify the 60-second sampling rate used for temperature and dew point measurements as indicated in the BLN FSAR.

ERAI 414, 02.03.03-***

Regulatory Guide 1.206 states that RG 1.23 contains guidance on acceptable onsite meteorological programs and any deviations from the guidance provided in RG 1.23 should be identified and justified. BLN FSAR 2.3.3 stated that most equipment is calibrated or replaced at least every six months of service. Please identify and justify any deviations.

ERAI 414, 02.03.03-***

Regulatory Guide 1.206 states that the applicant should provide an electronic copy of (1) the joint frequency distributions (JFD) of wind speed and direction by atmospheric stability class based on appropriate meteorological measurement heights and data reporting periods, in the format described in RG 1.23, and (2) an hour-by-hour listing of the hourly averaged onsite meteorological database in the format shown in RG 1.23. Only one set of the above JFDs was submitted. Please submit joint frequency distributions for all measurement heights. FSAR Table 2.3-309 should identify the measurement height of the data used (Reference RG 1.23).

ERAI 414, 02.03.03-***

Regulatory Guide 1.206 states that the applicant should provide meteorological data from at least two consecutive annual cycles (and preferably 3 or more entire years), including the most recent 1-year period, at the time of application submittal. RG1.206 further states that if only one year of data is available at the time of application that the applicant should continue to monitor the data and submit the complete 2-year data set when it has been collected. Regulatory Guide 1.23 states that the 24-month period of data should be defensible, representative and complete.

1. Please provide the complete 2-year data set. Update text references, statistical values, and tables that reference the 1-year BLN data set in sections 2.3.1 and 2.3.2.
2. Please provide reanalysis of the Section 2.3.4 and 2.3.5 atmospheric dispersion estimates.

Request for Additional Information
Bellefonte Units 3 and 4
Docket No. 52-014 and 52-015
SRP Section: 02.03.05 - Long-Term Atmospheric Dispersion Estimates for Routine Releases
Application Section: 02.03.05 - Long-Term Atmospheric Dispersion Estimates for Routine Releases

QUESTIONS from Siting and Accident Consequences Branch

ERAI 535, 02.03.05-***

Please discuss how each of the four types of χ/Q values provided in BLN FSAR Tables 2.3-323 through 2.3-329 (i.e., no decay, undepleted; no decay, depleted; 2.26 day decay, undepleted; 8.00 day decay, depleted) are used to calculate the dose rates to individuals and the population as presented in FSAR Section 11.3.3.

ERAI 535, 02.03.05-***

BLN FSAR Section 11.3.3.4 states that, based on site meteorological conditions, the highest rate of plume exposure and ground deposition occurs at the EAB 0.77 miles NNE of the plant. BLN FSAR Table 2.3-325 lists the no decay undepleted χ/Q value at this location as $1.40 \text{ E-}06 \text{ m/sec}^3$. However, Table 2.3-323 lists higher no decay, undepleted χ/Q values at 1.5 mi. SSE and 2 mi. S of the plant as $2.11 \text{ E-}06 \text{ m/sec}^3$ and $2.06 \text{ E-}06 \text{ m/sec}^3$, respectively. The no decay, depleted χ/Q values at these two locations shown in Table 2.3-325 are also higher than the no decay, depleted χ/Q value listed for the EAB in the NNE sector at 0.77 miles. Therefore, please justify use of the 0.77 mile NNE EAB χ/Q values to determine the highest rate of plume exposure.

Request for Additional Information
Bellefonte Units 3 and 4
Docket No. 52-014 and 52-015
SRP Section: 02.03.02 - Local Meteorology
Application Section: 2.3.2

QUESTIONS from Siting and Accident Consequences Branch

ERAI 518, 02.03.02-***

FSAR Tables 2.3-263 thru 2.3-265 are titled Temperature Means and Extremes for the individual data sets. Please clarify that all the data statistics presented in the tables are identified correctly as being monthly mean or extreme. For example, Table 2.3-264 (BLN 1979-1982) has a record minimum of -3.9°F . Table 2.3-263 (Scottsboro, AL) has 28.3°F as the lowest temperature in the table. Please review these tables for consistency and add the second year (2007-2008) of BLN data where appropriate. Also add a statement/justify why Scottsboro was chosen for the temperature analysis when Huntsville data is used for other parameters.

ERAI 518, 02.03.02-***

FSAR section 2.3.2.1.3.2 states that Huntsville averaged 37 hours/year of fog from 2001 through 2005. The staff was unable to confirm the value from the reference (#227)/ website provided in section 2.3.7 of the FSAR. Additionally the 37 hours/year value seems low when compared to the NCDC LCD (SRP 2.3.1 reference #6) statistic of 19.9 days/year with "Heavy" fog. Please provide further clarification on where these data were obtained and how the annual estimate was calculated.

ERAI 518, 02.03.02-***

Please verify that the monthly and average mixing heights and ventilation rates presented in FSAR Table 2.3-303 and Table 2.3-211 are correct. The staff was unable to reproduce the values presented in the tables. The staff values were higher. It appears that the missing/blank values in the mixing height data base were averaged into the calculation as zeros.

ERAI 518, 02.03.02-***

Please revise FSAR Section 2.3.2.2.1 to discuss the effects of salt and moisture deposition due to cooling tower operation on electrical transmission lines and other electrical equipment, including transformers and the switchyard.

Please describe any quantitative analysis performed to evaluate these effects, including providing a copy of the SACTI input files (*e.g.*, *PREP.USR*, *MULT.USR*, *TABLES.USR*, *PAGE.USR*) and assumptions so the staff may conduct a confirmatory analysis.

ERAI 518, 02.03.02-***

FSAR section 2.3.2.1.3.1.2 states that the maximum snowfall at Scottsboro was 10.0 inches on February 15, 1958. FSAR section 2.3.1.2.2 states that the greatest snowfall in Scottsboro was 12 inches on March 13, 1993. The staff was able to verify the 12 inch value from the Southeast Regional Climate Center data for Scottsboro. Please review this apparent discrepancy for FSAR consistency.

Please also review for a typo the period of record and number of years reported (i.e., 1959-2005 not equal to 36 years).

Changes To Meteorology RAIs as a result of July 16, 2008, Phone Call with TVA

RAI number	Issued Version of RAI	Draft Version of RAI	Discussion of Changes
ERAI 415 2.3.1-9	Standard Review Plan 2.3.1 states that the applicability of data on severe weather phenomena used to represent site conditions during the expected period of reactor operation should be substantiated. Current literature on possible changes in the weather in the site region should also be reviewed to be confident that the methods used to predict weather extremes are reasonable. Include a discussion in FSAR Section 2.3.1 on the possible changes in the weather in the site region and any potential impact on the proposed site characteristics.	10 CFR 52.79(a)(1)(iii) requires a COL applicant to identify the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated. SRP Section 2.3.1 also states the applicant should present data on severe weather phenomena which represent site conditions during the expected period of reactor operation. Please provide an FSAR section that discusses the potential effects of climate change on regional climatology and resulting site characteristics	Changes made to RAI to clarify and focus the information the staff was requesting
ERAI 461 2.3.4-1 through 2.3.4 -4	02.03.04-1 Regulatory Guide 1.206 states that the applicant should discuss the effects of topography on the short-term dispersion estimates. Please provide a revision to the Bellefonte FSAR that discusses the hill and valley topography near the Bellefonte site with respect to calculation of the short term atmospheric dispersion factors (χ/Q values). Were terrain recirculation factors or other adjustments used in the PAVAN calculations? What is the basis for the selected assumptions and inputs? The information provided should be sufficient to allow the NRC staff to perform its own confirmatory calculations. Consider providing the computer input files as part of the response.	ERAI 461, 02.03.04-*** Regulatory Guide 1.206 states that the applicant should discuss the effects of topography on the short-term dispersion estimates. Please provide a revision to the Bellefonte FSAR that discusses the hill and valley topography near the Bellefonte site with respect to calculation of the short term atmospheric dispersion factors (χ/Q values). Were terrain recirculation factors or other adjustments used in the PAVAN calculations? What is the basis for the selected assumptions and inputs? The information provided should be sufficient to allow the NRC staff to perform its own confirmatory calculations. ERAI 461, 02.03.04-*** Page 2.3-32 of the Bellefonte FSAR states that releases to the control room were assumed to be	2.3.4-1 and 2.3.4-3 had "Consider providing the computer input files as part of the response," added the RAI. The 5 th and 6 th questions of ERAI 461 that was sent in draft form were not issued because they are not within the scope of the COL.

	<p>02.03.04-3 Page 2.3-32 of the Bellefonte FSAR states that releases to the control room were assumed to be point ground level releases. However, footnote d on page 2.0-11 notes that the ground level containment release point χ/Q values shown on page 2.0-10 model the containment shell as a diffuse area source. Page 2.3-201 provides the distance and direction from each postulated release location to the control room HAVC. Please provide a revision to the Bellefonte FSAR listing all other inputs used in generating the control room χ/Q values to clarify how the χ/Q values for each source/receptor pair were calculated. Consider providing the computer input files as part of the response.</p>	<p>point ground level releases. However, footnote d on page 2.0-11 notes that the ground level containment release point χ/Q values shown on page 2.0-10 model the containment shell as a diffuse area source. Page 2.3-201 provides the distance and direction from each postulated release location to the control room HAVC. Please provide a revision to the Bellefonte FSAR listing all other inputs used in generating the control room χ/Q values to clarify how the χ/Q values for each source/receptor pair were calculated.</p> <p>ERAI 461, 02.03.04-*** Please revise the Bellefonte FSAR to list which χ/Q values were used in the dose assessments for unfiltered in-leakage to the control room.</p> <p>ERAI 461, 02.03.04-*** Please confirm that all postulated airborne release and receptor locations for Bellefonte have been captured by the AP1000, Rev. 16, list for all design basis accident release scenarios, including those resulting from loss of offsite power or other single failure.</p>	
<p>ERAI 467 2.3.5-3</p>	<p>2.3.5-3 Please provide a list of all inputs and assumptions used as inputs to estimate the χ/Q and D/Q values resulting from routine airborne releases. What is the basis for the selected assumptions and inputs? The information provided should be sufficient to allow the NRC staff to perform its own confirmatory calculations. Consider providing the computer input files as part of the response</p>	<p>Please provide a list of all inputs and assumptions used as inputs to estimate the χ/Q and D/Q values resulting from routine airborne releases. What is the basis for the selected assumptions and inputs? The information provided should be sufficient to allow the NRC staff to perform its own confirmatory calculations</p>	<p>“Consider providing the computer input files as part of the response,” added to the final version of the question</p>

<p>ERAI 414 2.3.3-5</p>	<p>02.03.03-5 Submit an electronic copy of the complete 2-year BNL hourly meteorological database. Also submit an appendix to the FSAR containing the following derived from the second year of BNL hourly meteorological data:</p> <ul style="list-style-type: none"> (1) joint frequency distributions of wind speed, wind direction, and atmospheric stability for both the lower and upper levels (2) atmospheric dispersion and deposition factors presented in FSAR Sections 2.3.4 and 2.3.5. <p>This appendix should also demonstrate how representative the first year of data is of long-term conditions at the site. If the appendix cannot show that the two years of meteorological data are compatible (e.g., there are substantial differences in atmospheric dispersion and deposition factors between the two years of data) and the first year of data is shown to be non-conservative, revise the atmospheric dispersion and deposition factors presented in FSAR Sections 2.3.4 and 2.3.5 using the second year of meteorological data.</p> <p><i>SRP 2.3.3 states COL applicants should provide at least two consecutive annual cycles (and</i></p>	<p>ERAI 414, 02.03.03-*** Regulatory Guide 1.206 states that the applicant should provide an electronic copy of (1) the joint frequency distributions (JFD) of wind speed and direction by atmospheric stability class based on appropriate meteorological measurement heights and data reporting periods, in the format described in RG 1.23, and (2) an hour-by-hour listing of the hourly averaged onsite meteorological database in the format shown in RG 1.23. Only one set of the above JFDs was submitted. Please submit joint frequency distributions for all measurement heights. FSAR Table 2.3-309 should identify the measurement height of the data used (Reference RG 1.23).</p> <p>ERAI 414, 02.03.03-*** Regulatory Guide 1.206 states that the applicant should provide meteorological data from at least two consecutive annual cycles (and preferably 3 or more entire years), including the most recent 1-year period, at the time of application submittal. RG1.206 further states that if only one year of data is available at the time of application that the applicant should continue to monitor the data and submit the complete 2-year data set when it has been collected. Regulatory Guide 1.23 states that the 24-month period of data should be defensible, representative and complete.</p> <ul style="list-style-type: none"> 1. Please provide the complete 2-year data set. Update text references, statistical values, and tables that reference the 1-year BLN data set in sections 2.3.1 and 2.3.2. 2. Please provide reanalysis of the Section 2.3.4 and 2.3.5 atmospheric dispersion estimates. 	<p>Draft rai regarding joint frequency distribution dropped. Staff determined information is not needed for its safety finding.</p> <p>RAI 2.3.3-5 revised to more clearly define the staff's information needs.</p>
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<p><i>preferably 3 or more whole years) of onsite meteorological data with the COL application, including the most recent 1-year period. If two years of onsite meteorological data are not available at the time the application is filed, the staff expects that the COL applicant will provide at least one annual cycle of meteorological data collected onsite with the application. These data should be used by the applicant to calculate (1) the short-term atmospheric dispersion estimates for accident releases discussed in SRP Section 2.3.4 and (2) the long-term atmospheric dispersion estimates for routine releases discussed in SRP Section 2.3.5. The applicant should continue to monitor the data and submit the complete 2-year data set when it has collected all the data. This supplemental submittal should also include a reanalysis of the Section 2.3.4 and 2.3.5 atmospheric dispersion estimates based on the complete 2-year data set.</i></p>		
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