Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

June 4, 2010

10 CFR 52.79

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

In the Matter of)
Tennessee Valley Authority) Docket No. 52-014 and 52-015

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION – SHORT TERM DIFFUSION ESTIMATES

Reference:

1) Letter from Joseph M. Sebrosky (NRC) to Andrea L. Sterdis (TVA), Request for Additional Information Letter No. 94 Related to SRP Section 2.3.4 for the Bellefonte Units 3 and 4 Combined License Application, dated August 1, 2008
2) Letter from Jack Bailey (TVA) to Document Control Desk (NRC), Bellefonte Combined License Application – Response to Request for Additional Information – Short Term Diffusion Estimates, dated August 29, 2008
3) Letter from Andrea L. Sterdis (TVA) to Document Control Desk (NRC), Bellefonte Combined License Application – Response to Request for Additional Information – Short Term Diffusion Estimates, dated October 20, 2008
4) Letter from Andrea L. Sterdis (TVA) to Document Control Desk (NRC), Bellefonte Combined License Application – Response to Request for Additional Information – Short Term Diffusion Estimates, dated January 27, 2009

This letter provides Tennessee Valley Authority's (TVA) supplemental response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) item 02.03.04-01 included in Reference 1. RAI item 02.03.04-01 was initially responded to in Reference 2 and followed up by a supplement to it in References 3 and 4.

A response to RAI number 02.03.04-01 is addressed in the enclosure which also identifies associated changes to be made in a future revision of the BLN application.

If you should have any questions, please contact Tom Spink at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7062, or via email at tespink@tva.gov.

D085
NRO

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

Executed on this 4th day of June, 2010.

Thomas E. Spink
Manager, Bellefonte Nuclear Plant, AP1000 Licensing
Nuclear Generation Development & Construction

Enclosure
cc: See Page 3

Enclosure
TVA letter dated June 4, 2010
RAI Responses

Responses to NRC Request for Additional Information letter No. 94 dated August 1, 2008 (3 pages, including this list)

Subject: Short Term Diffusion Estimates in the Final Safety Analysis Report

RAI Number	Date of TVA Response
02.03.04-01	August 29, 2008; January 27, 2009, Supplemental information in this letter – see following pages
02.03.04-02	August 29, 2008
02.03.04-03	August 29, 2008; October 20, 2008; January 27, 2009
02.03.04-04	August 29, 2008

Associated Additional Attachments / Enclosures	Pages Included
02.03.04-01A	Provided October 20, 2008
02.03.04-01B	Provided January 27, 2009
02.03.04-03A	Provided October 20, 2008

NRC Letter Dated: August 5, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.03.04-01 (eRAI 461)

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.

BLN RAI/OI ID: 2792

BLN RESPONSE:

The following discussion supplements the response to RAI 2.3.4-1.

(1) The PAVAN short term (accident) atmospheric dispersion factor calculations were performed in accordance with the guidance provided in the PAVAN manual, NUREG/CR-2858. As stated in the PAVAN manual, terrain heights are used in determining the effective plume height for elevated releases. For more conservative ground level release evaluations, terrain data is not required or used by the PAVAN code. The Bellefonte Nuclear Units 3 and 4 plant vents are less than two and one-half times the containment building height; therefore, ground level releases were assumed. A ground level release assumption is conservative and consistent with RG 1.145, which states that for stack releases, the maximum ground-level concentration in a sector may occur beyond the exclusion area boundary distance or outer LPZ boundary distance.

Terrain recirculation factors were not applied in the PAVAN short term (accident) atmospheric dispersion factor calculations because, as described in RG 1.111, the effect of terrain recirculation is a prolonged or long term effect. Invoking standard recirculation correction factors using PAVAN affects only longer term dispersion factors, which were viewed to be sufficiently conservative based on the assumption of ground level releases.

In contrast, the Bellefonte Nuclear Units 3 and 4 atmospheric dispersion factor calculations for long term (normal) effluent releases were based on a mixed-mode release. The plant vent is the primary location for the majority of normal releases. Consistent with RG 1.111, a mixed-mode release assumption is reasonable because the release height of the plant vent is near the height of adjacent buildings, i.e., the containment building. Also, the height of the plant vent is 55.7 m, which is much higher than the 10 m height assumed for a ground release. The effective plume height was then adjusted by inputting distances and heights of site-specific terrain features, such as the river bluff and other significantly high terrain features in the area surrounding the site.

The bluff on the opposite side of the Tennessee River from Bellefonte Nuclear Plant is approximately 244 meters (800 feet) higher than the plant elevation. Adjustments to represent the long term effects of non-straight line trajectories associated with the bluff were accomplished by applying standard default correction factors for each directional sector. The standard default correction factors provided in the XOQDOQ code were conservatively assumed. Hills and mountains less than 300 meters above plant elevation typically change the concentrations at the ground by only a factor of two or three. The default correction method applies a correction factor of up to four in all directions depending on the distance from the release point. The only elevation

change of more than 300 meters near the site of the Bellefonte Nuclear Plant is 317 meters above plant elevation and occurs approximately 15.3 km (9.5 miles) north of the plant. This is far enough away from the plant that it will have minimal effect on the atmospheric dispersion factors for normal releases; however, the effect of this elevation change and other lesser topographical features are accounted for by adjusting the effective plume height.

(2) As described in FSAR Subsection 2.3.4.1, the Bellefonte meteorological data is representative of conditions at and near the site. There are no significant deviations from regional meteorological conditions caused by local site characteristics that would bias short term atmospheric dispersion factors. Likewise, nearby bodies of water such as Lake Guntersville were not found to have a significant impact on the short-term atmospheric dispersion factors. A statement to this effect will be added to the FSAR in a future revision.

This response is PLANT-SPECIFIC

ASSOCIATED BLN COL APPLICATION REVISIONS:

COLA Part 2, FSAR Chapter 2, Subsection 2.3.4.1 is revised from:

NUREG/CR-2858 refers to Regulatory Guide 1.111 for discussion of the effects of spatial and temporal variations in airflow in the region of a site. These effects are not described by the constant mean wind direction model. Consequently, the effects of hill and valley topography on airflow characteristics near the Bellefonte site were examined to identify any variation of atmospheric transport and diffusion conditions. The wind and stability characteristics of the site were compared with the same parameters at the Huntsville and Chattanooga airports. The representativeness of the observed meteorology in the region of interest (within 2 miles) was assessed. No long term trends were observed that would bias short term diffusion estimates. Therefore, no adjustments to represent non-straight line trajectories were applied.

To read:

NUREG/CR-2858 refers to Regulatory Guide 1.111 for discussion of the effects of spatial and temporal variations in airflow in the region of a site. These effects are not described by the constant mean wind direction model. Consequently, the effects of hill and valley topography and nearby Lake Guntersville on airflow characteristics near the Bellefonte site were examined to identify any variation of atmospheric transport and diffusion conditions. The wind and stability characteristics of the site were compared with the same parameters at the Huntsville and Chattanooga airports. The representativeness of the observed meteorology in the region of interest (within 2 miles) was assessed. No long term trends were observed that would bias short term diffusion estimates. Therefore, no adjustments to represent non-straight line trajectories were applied.

ASSOCIATED ATTACHMENTS/ENCLOSURES:

Attachment 02.03.04-01A – PAVAN Input File, previously provided

Attachment 02.03.04-01B – PAVAN Input Files for two years of met data, previously provided