

## **PMBelCOL PEmails**

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**From:** Spink, Thomas E [tespink@tva.gov]  
**Sent:** Tuesday, January 13, 2009 9:20 AM  
**To:** Joseph Sebrosky  
**Cc:** erg-xl@cox.net; Sterdis, Andrea Lynn; Ryan, William T III  
**Subject:** Courtesy email copy of TVA's Response to RAI Letter 140  
**Attachments:** BLN RAI Response to RAI Letter 140 Final 20090112.pdf

Joe,

I have enclosed a pdf copy of our response to RAI Letter 140 with this email as a courtesy. As always, the official submittal has been submitted to the Document Control Desk via paper copy using Federal Express services. The paper copy should arrive on January 13, 2009.

If you have any questions, please do not hesitate to call me.

*Thomas E. Spink*

**Licensing Project Manager**  
Nuclear Generation Development  
1101 Market Street, LP 5A  
Chattanooga, TN 37402  
423-751-7062; FAX (423) 751-6509

**Hearing Identifier:** Bellefonte\_COL\_Public\_EX  
**Email Number:** 1325

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**Subject:** Courtesy email copy of TVA's Response tp RAI Letter 140  
**Sent Date:** 1/13/2009 9:20:14 AM  
**Received Date:** 1/13/2009 9:20:38 AM  
**From:** Spink, Thomas E

**Created By:** tespink@tva.gov

**Recipients:**

"erg-xl@cox.net" <erg-xl@cox.net>  
Tracking Status: None  
"Sterdis, Andrea Lynn" <alsterdis@tva.gov>  
Tracking Status: None  
"Ryan, William T III" <wtryan@tva.gov>  
Tracking Status: None  
"Joseph Sebrosky" <Joseph.Sebrosky@nrc.gov>  
Tracking Status: None

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**Reply Requested:** No  
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**Recipients Received:**



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

January 12, 2009

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 – ATMOSPHERIC DISPERSION ESTIMATES FOR  
ROUTINE RELEASES

Reference: Letter from Joseph Sebrosky (NRC) to Andrea L Sterdis (TVA), Request for  
Additional Information Letter No. 140 Related to SRP Section 02.03.05 for the  
Bellefonte Units 3 and 4 Combined License Application, dated December 9, 2008

This letter provides the Tennessee Valley Authority’s (TVA) response to the Nuclear Regulatory  
Commission’s (NRC) request for additional information (RAI) items included in the reference  
letter.

A response to each NRC request in the subject letter is addressed in the enclosure which also  
identifies any associated changes that will be made in a future revision of the BLN application.

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

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

Executed on this 12<sup>th</sup> day of January, 2009.

Andrea L. Sterdis  
Manager, New Nuclear Licensing and Industry Affairs  
Nuclear Generation Development & Construction

Enclosure  
cc: See Page 2

Document Control Desk

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January 12, 2009

cc: (w/ Enclosures)

J. P. Berger, EDF  
J. M. Sebrosky, NRC/HQ  
E. Cummins, Westinghouse  
S. P. Frantz, Morgan Lewis  
M. W. Gettler, FP&L  
R. Grumbir, NuStart  
P. S. Hastings, NuStart  
P. Hinnenkamp, Entergy  
M. C. Kray, NuStart  
D. Lindgren, Westinghouse  
G. D. Miller, PG&N  
M. C. Nolan, Duke Energy  
N. T. Simms, Duke Energy  
K. N. Slays, NuStart  
G. A. Zinke, NuStart

cc: (w/o Enclosure)

B. C. Anderson, NRC/HQ  
M. M. Comar, NRC/HQ  
B. Hughes/NRC/HQ  
R. G. Joshi, NRC/HQ  
R. H. Kitchen, PGN  
M. C. Kray, NuStart  
A. M. Monroe, SCE&G  
C. R. Pierce, SNC  
R. Reister, DOE/PM  
L. Reyes, NRC/RII  
T. Simms, NRC/HQ

Enclosure  
TVA letter dated January 12, 2008  
RAI Responses

Responses to NRC Request for Additional Information letter No. 140 dated December 9, 2008  
(6 pages, including this list)

Subject: Atmospheric Dispersion Estimates for Routine Releases in the Final Safety Analysis  
Report

<u>RAI Number</u>	<u>Date of TVA Response</u>
02.03.05-006	This letter – see following pages
02.03.05-007	This letter – see following pages
02.03.05-008	This letter – see following pages

<u>Associated Additional Attachments / Enclosures</u>	<u>Pages Included</u>
Attachment 02.03.05-007A	3

Enclosure  
TVA letter dated January 12, 2009  
RAI Responses

**NRC Letter Dated: December 9, 2008**

**NRC Review of Final Safety Analysis Report**

**NRC RAI NUMBER: 02.03.05-006**

As a follow-on to NRC RAI Number 02.03.05-02, why is Table 2.3-324, which provides no decay, depleted X/Q values, included in the revised Bellefonte FSAR? How were these values used in the dose assessment?

**BLN RAI ID: 2646**

**BLN RESPONSE:**

FSAR Table 2.3-325, "Annual average  $\chi/Q$  values for no decay, depleted," was provided for information only. Note that the RAI incorrectly identified the subject Table as 2.3-234. These values are not used in the dose analysis [refer to the response to RAI 02.03.05-001 (BLN-RAI-LTR-076), for further explanation of how the various  $\chi/Q$  values were used]. Because the  $\chi/Q$  values for no decay, depleted are not used in the normal effluent release dose analyses, Table 2.3-325 will be deleted from the FSAR in a future revision of the COLA.

This response is PLANT-SPECIFIC.

**ASSOCIATED BLN COL APPLICATION REVISION:**

COLA Part 2, FSAR. Chapter 2, will be revised to delete FSAR Table 2.3-325, "ANNUAL AVERAGE  $\chi/Q$  VALUES FOR NO DECAY, DEPLETED."

**ASSOCIATED ATTACHMENTS/ENCLOSURES:**

None

Enclosure  
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**NRC Letter Dated: December 9, 2008**

**NRC Review of Final Safety Analysis Report**

**NRC RAI NUMBER: 02.03.05-007**

Were the XOQDOQ computer code input terrain distances and heights, card types 10 and 11, derived from either Bellefonte FSAR Figure 2.3-286 or 287? Why were the first set of heights for all 16 sectors input as zeroes? Please provide a figure or figures marked to show several examples of how the distance and height inputs were derived.

**BLN RAI ID: 2647**

**BLN RESPONSE:**

The terrain distances and heights (XOQDOQ Card Types 10 and 11) were developed using topographical maps of the area. The points of significant elevation increases for each directional sector were identified on the maps and the distances were approximated using the drawing scales. The minimum distances to a significant elevation change within a 45° sector centered on each of the 16 directions were used. The first set of heights is all zeroes because the first set identifies the starting point for the elevation changes. The terrain is relatively flat from the site to the distances identified as the starting points for the significant elevation changes. There are elevation increases of up to approximately 150 ft on the east side of the plant before crossing the Tennessee River. However, these elevation changes are insignificant compared to the increases of approximately 800 ft. on the opposite side of the Tennessee River. An example is provided in Attachment 02.03.05-007A. Refer to response to RAI 02.03.05-003 (BLN-RAI-LTR-095) for further details.

This response is PLANT-SPECIFIC.

**ASSOCIATED BLN COL APPLICATION REVISIONS:**

No COLA revisions have been identified associated with this response.

**ASSOCIATED ATTACHMENTS/ENCLOSURES:**

Attachment 02.03.05-007A: Example for Calculating Distances

**NRC Letter Dated: December 9, 2008**

**NRC Review of Final Safety Analysis Report**

**NRC RAI NUMBER: 02.03.05-008**

With regard to the XOQDOQ computer code card type 16 inputs, where are the AP1000-specific values documented?

**BLN RAI ID: 2648**

**BLN RESPONSE:**

The card type 16 parameters and the respective values used for the Bellefonte Nuclear Plant analysis are provided in Table 1 below. The references for each value are also identified in the table.

**Table 1: XOQDOQ Card Type 16 Input Parameters**

Parameter	BLN Value	Reference
Vent Average Velocity (m/s)	5.27	See response to RAI 02.03.05-003 (BLN-RAI-LTR-095)
Vent Inside Diameter (m)	2.74	See response to RAI 02.03.05-003 (BLN-RAI-LTR-095)
Height of Vent Release Point (m above plant grade)	56	Table 15A-7 of AP1000 DCD, Rev. 15
Height of Vent's Building (m above plant grade)	71	Table 3.3-5 of AP1000 DCD, Rev. 15, Tier 1 Material See explanation below
Minimum Cross-Sectional Area of Vent's Building (m <sup>2</sup> )	2909	Calculated using dimensions from Table 3.3-1 of AP1000 DCD, Rev. 15, Tier 1 Material, and Westinghouse drawings See explanation below
Wind Height used for Vent's Release (m above plant grade)	10	BLN Lower-level measurement (FSAR Subsection 2.3.3.2)
Vent Heat Emission Rate (cal/sec)	0	Default value <sup>1</sup>

<sup>1</sup> According to the XOQDOQ User's Guide (NUREG/CR-2919), nuclear power stations generally have ambient temperature plumes, so the heat emission rate is read in as zero. For routine releases, it is reasonable to assume that the plume is near ambient temperature.

A sensitivity study was performed to quantify the effects of changes in some shield building dimensions from Revision 15 of the AP1000 DCD to Revision 16. This sensitivity study documented that the changes in the shield building dimensions had a negligible impact on the  $\chi/Q$  and D/Q values. Therefore, the inputs from Revision 15 of the AP1000 DCD were maintained.



The dimensions from Table 3.3-1 of the AP1000 DCD, Rev. 15, Tier 1 Material and a Westinghouse drawing, which were used in the analysis are:

Design Plant Grade – El. 100'-0"

Distance from Design Plant Grade to Top Surface of Shield Building Roof – 234'-0"

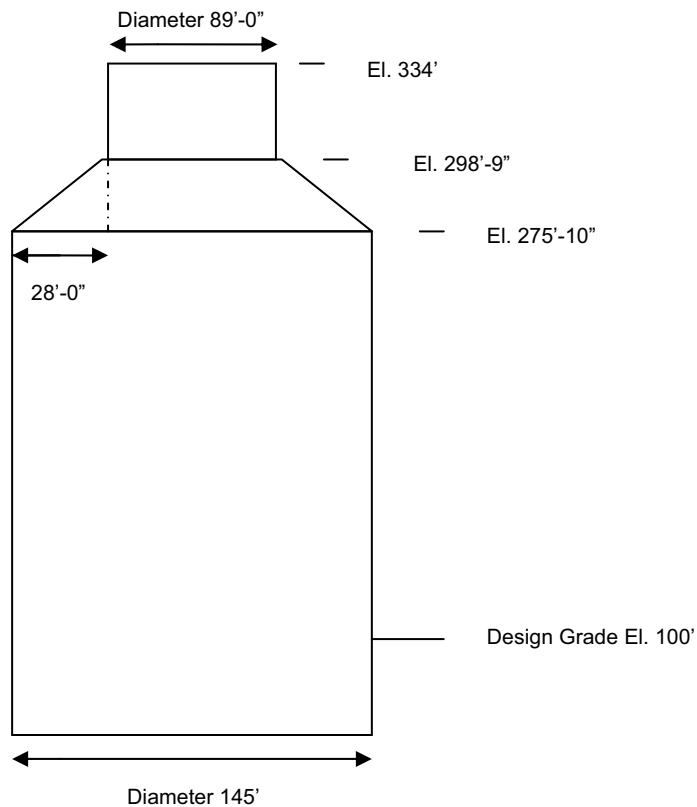
Outside Surface of Shield Building Wall to Shield Building Centerline – 72'-6"

Elevation Range of Shield Building Conical Roof – 275'-10" to 298'-9"

PCS Tank Roof – El. 334'

PCS Water Storage Tank Outside Diameter – 89'-0"

These elevations and dimensions are used to create the diagram of the shield building cross-section below.



Above Grade Cylindrical Section:

$$\text{Width} = 2 \times (72' - 6") = 145' - 0" = 145.0 \text{ ft}$$

$$\text{Height} = (275' - 10") - (100' - 0") = 175' - 10" = 175.83 \text{ ft}$$

$$\text{Area} = 145.0 \times 175.83 = 25495.4 \text{ ft}^2 = 2369 \text{ m}^2$$

Enclosure  
TVA letter dated January 12, 2009  
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Conical Roof:

$$\begin{aligned} \text{Area} &= [(298'-9'') - (275'-10'')] \times [(89'-0'') + (28'-0'')] \\ &= 2681 \text{ ft}^2 = 249 \text{ m}^2 \end{aligned}$$

PCCS Tank:

$$\begin{aligned} \text{Area} &= [(334'-0'') - (298'-9'')] \times (89'-0'') \\ &= 3137 \text{ ft}^2 = 291 \text{ m}^2 \end{aligned}$$

**Total Area = 2909 m<sup>2</sup>**

This response is PLANT-SPECIFIC.

**ASSOCIATED BLN COL APPLICATION REVISIONS:**

No COLA revisions have been identified associated with this response.

**ASSOCIATED ATTACHMENTS/ENCLOSURES:**

None

Attachment 02.03.05-007A  
TVA letter dated January 12, 2009  
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Attachment 02.03.05-007A

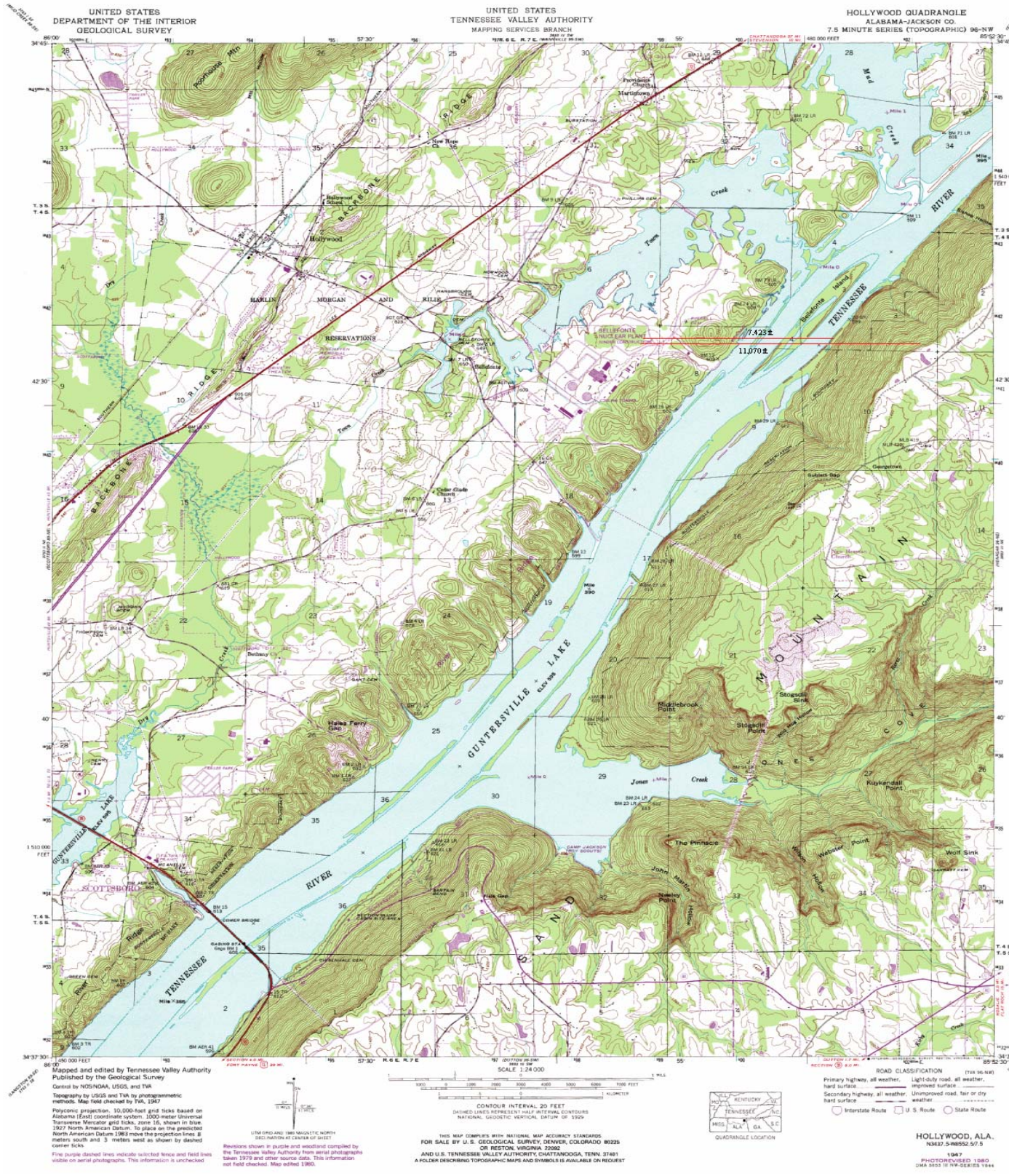
Example for Calculating Distances

**Example for Calculating Distances**

The following figure provides an example for determining the approximate distances and heights of significant elevation changes near the Bellefonte site.

The example shows the “distance to the beginning of the incline” of 7,423 ft and the “distance to peak” of 11,070 ft for the East direction from the Bellefonte site. These distances were previously provided in response to NRC RAI 02.03.05-03 (BLR-RAI-LTR-095).

Attachment 02.03.05-007A  
 TVA letter dated January 12, 2008  
 RAI Responses



Attachment 02.03.05-007A  
TVA letter dated January 12, 2009  
RAI Responses