



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

January 2, 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 – FOUNDATION INTERFACES

Reference: Letter from Brian Hughes (NRC) to Andrea L. Sterdis (TVA), Request for
Additional Information Letter No. 136 Related to SRP Section 03.08.05 for the
Bellefonte Units 3 and 4 Combined License Application, dated December 2, 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 the NRC request in the subject letter is addressed in the enclosure which does not
identify any associated changes to 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 2nd day of Jan, 2009.

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

Enclosure
cc: See Page 2

DOB5
NRC

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Enclosure
TVA letter dated January 2, 2009
RAI Response

Response to NRC Request for Additional Information letter No. 136 dated December 2, 2008
(3 pages, including this list)

Subject: Foundation Interface in the Final Safety Analysis Report

<u>RAI Number</u>	<u>Date of TVA Response</u>
03.08.05-01	This letter – see following pages

<u>Associated Additional Attachments / Enclosures</u>	<u>Pages Included</u>
None	

Enclosure
TVA letter dated January 2, 2009
RAI Response

NRC Letter Dated: December 2, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 03.08.05-01

Table 1.8-1 of AP1000 DCD, Rev. 16 requires that plant interface items 3.4 through 3.7 related to building foundations be provided for Section 3.8. COL supplemental information item STD SUP 3.8-1 provided a reference in the FSAR for the depth of embedment of foundations which addresses interface item 3.5. However, information for the other items was not provided. Therefore, the applicant is requested to provide the following information for the other interface items:

- Item 3.4 – depth of overburden (from final plant grade)
- Item 3.6 – specific depth of waterproofing
- Item 3.7 – foundation settlement monitoring

BLN RAI ID: 2567

BLN RESPONSE:

Each of the interface items identified in the RAI is addressed below.

Item 3.4 – depth of overburden (from final plant grade)

FSAR Subsection 3.8.5.1, “Description of the Foundations,” identifies that the depth of overburden and depth of embedment are given in Subsection 2.5.4. FSAR Subsection 2.5.4.1.2 identifies that the “Borehole data show that the bedrock within the power block construction zone is overlain by residual silts and clays, 5 to 40-ft. thick, derived from in-situ weathering of the underlying rock.” Additionally, FSAR Subsection 2.5.4.5.3.1 states “Based on the findings of these borings, the soil overburden depth varies from 5 ft. to 17-ft. below present ground surface for Unit 3 and from 8 ft. to 19 ft. below present ground surface for Unit 4. Weathered rock and rock are present below the soil overburden to the depths explored.” FSAR Subsection 2.5.4.5.3, “Backfill,” states “The current site grades are below the final site grades as shown on Figure 2.5-347. Fill is placed to reach the final site grades. The excavation adjacent to the nuclear island is defined as shown on Figures 2.5-348a and 2.5-348b.” Finally, Table 12.-0-201 and Subsections 2.4.1.1, “Site and Facilities,” and 2.5.4.5.1.1, “Overall Site,” identify the plant grade as 628.6 ft. msl (AP1000 design plant grade of elevation 100).

Thus, the existing current depth of overburden from the minimum excavation bottom (at 588.6 ft. msl as shown on Figure 2.5-348a) to final plant grade (628.6 ft. msl) is approximately 40 ft.

Post-construction this overburden will be replaced with backfill, but the depth from the top of competent rock to final plant grade will be the same.

Item 3.6 – specific depth of waterproofing

DCD Subsections 2.5.4.1, “Excavation,” and 3.4.1.1.1.1, “Waterproofing,” indicate that a waterproof membrane or waterproofing system for the seismic Category I structures will be installed below grade as an architectural aide to limit the infiltration of subsurface water. In addition, DCD Tier 1, Section 3.3, “Buildings,” includes an ITAAC that requires the “Exterior walls and the basemat of the nuclear island have a water barrier up to site grade.” Since the bottom

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of the basemat is approximately 40 ft below the site grade, the specific depth of waterproofing is approximately 40 ft.

Item 3.7 – foundation settlement monitoring

DCD Subsection 2.5.4.3, “Settlement,” describes the settlement requirement for the AP1000 design. This discussion indicates that the “Combined License applicant will address short-term (elastic) and long-term (heave and consolidation) settlement **for soil sites** for the history of loads imposed on the nuclear island foundation and adjacent buildings consistent with the construction sequence. The resulting time-history of settlements includes construction activities such as dewatering, excavation, bearing surface preparation, placement of the basemat, and construction of the superstructure” (emphasis added).

The DCD subsection (as recently modified by WEC response to RAI-TR85-SEB1-36 Rev. 1) continues to identify that “Table 2.5-1 provides guidance to the Combined License applicant on predictions of absolute and differential settlement that are acceptable without further evaluation. The predicted settlements will cover the periods before construction begins through the construction phase, and for the subsequent plant operating period. The predicted settlements will be based on conservative assumptions of soil properties. If the predicted settlements exceed the limits of Table 2.5-1, a detailed evaluation and construction plan will be described by the Combined License applicant. During construction **at a soil site**, settlements would be measured and compared to the predicted settlement values and any exceedances would require additional investigation” (emphasis added).

The COLA FSAR Subsection 2.5.4.10.4.1 provides the predicted settlement and states “The computed settlements from the methods used are less than about 0.20 in. The maximum estimated settlement is 0.18 in. beneath Unit 3 and 0.20 in. beneath Unit 4. The magnitude of these settlement estimates are within the limits allowed by the DCD. This is consistent with expectations for a site utilizing rock to support the Nuclear Islands.”

Further, DCD Subsection 2.5.4.3, “Settlement,” states “The AP1000 does not rely on structures, systems, or components located outside the nuclear island to provide safety-related functions. Differential settlement between the nuclear island foundation and the foundations of adjacent buildings does not have an adverse effect on the safety-related functions of structures, systems, and components.

Thus, no settlement monitoring program is necessary for the Bellefonte nuclear island.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

No COLA revisions have been identified associated with this response.

ASSOCIATED ATTACHMENTS/ENCLOSURES:

None