

July 17, 2008

Mr. Ashok S. Bhatnagar, Senior Vice President  
Nuclear Generation Development and Construction  
Tennessee Valley Authority  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

SUBJECT: BELLEFONTE UNITS 3 AND 4 COMBINED LICENSE APPLICATION REVIEW  
SCHEDULE

Dear Mr. Bhatnagar:

This letter informs you that the U. S. Nuclear Regulatory Commission (NRC) staff is taking the following actions regarding the Bellefonte Units 3 and 4 Combined License application (COLA) review schedule:

- extending the seismology schedule by one month
- reevaluating the hydrology schedule in December 2008, with the likely outcome a delay of 8 to 12 months, assuming TVA meets all commitments for the remaining information necessary for our review

The NRC staff previously provided a review schedule to you in a February 15, 2008, letter. Since the issuance of the February 15, 2008, letter, the Tennessee Valley Authority (TVA) has deferred the date when it would provide information necessary for the NRC staff to conduct the seismology and hydrology reviews. Based on TVA's performance, the NRC staff provided you a March 25, 2008, letter that indicated that the staff would reevaluate the Bellefonte COLA review schedule in the July 2008 time frame. This letter represents this reevaluation.

In the February 15, 2008, schedule letter, we stated that our intent is to establish a predictable schedule that identifies and resolves issues early in the review process as This is why early interactions with TVA in Phase 1 of the safety review, regarding seismology and hydrology, were modeled in the Bellefonte COLA schedule. We also identified in the February 15, 2008, letter that the sections of Chapter 2 associated with hydrology and seismology are on the critical path for the review.

The February 15, 2008, schedule letter stated that the staff intended to issue an overarching Request for Additional Information (RAI) that will be based on the seismology issue described in the January 18, 2008, Bellefonte COLA acceptance letter. The staff issued this RAI in a February 15, 2008, letter. The February 15, 2008, RAI letter requested that TVA respond to the RAI by March 20, 2008. TVA has provided three responses to this RAI: a response dated March 19, 2008; a supplemental response dated May 30, 2008, that references a May 14, 2008, NEI letter; and a supplemental response dated June 30, 2008. The staff believes that the critical portion of TVA's response was provided in the May 14, 2008, NEI letter that TVA referenced in its May 30, 2008, supplemental response. The May 14, 2008, response is

approximately two months later than what the staff assumed in developing the February 15, 2008, schedule. The staff is in the process of assessing TVA's submittals and has decided to move the completion for this portion of the Phase 1 review from December 18, 2008, to January 19, 2009, based on TVA's response being two months late than assumed.

Regarding the hydrology review, the staff also identified near term milestones in the February 15, 2008, schedule. These milestones included an inspection of the hydrology code in February 2008; a site visit in April 2008; review of a white paper to be provided by TVA in April 2008; and a model workshop to be provided by TVA in May 2008. The staff performed an inspection the week of February 19 through February 22, 2008. The inspection identified three violations, which are documented in the inspection report dated March 19, 2008. As a result of the inspection, TVA developed a revised plan for the hydrology review. This revised plan was provided to the staff in a March 14, 2008, letter.

The staff is not prepared to provide TVA a schedule for the hydrology review based on the following:

- TVA's failure to meet interim milestones that it had previously established to correct the problem, and
- TVA's discovery of calculation errors during the verification and validation process for the Bellefonte probable maximum flood (PMF) calculation that result in loss of margin between the calculated PMF level and site grade for Bellefonte Units 3 and 4.

These issues are described in further detail below.

#### TVA's Performance in Meeting Hydrology Schedule Milestones

The March 14, 2008, letter, and a subsequent meeting with the staff on April 25, 2008, included proposed milestones, which have not been met by TVA. TVA had previously indicated to the staff that the majority of the verification and validation effort associated with the Bellefonte Units 3 and 4 PMF calculation would be completed by June 23, 2008. In the April 25, 2008, meeting TVA indicated that this milestone would not be met and that it believed the verification and validation process would be completed towards the end of 2008. In TVA's letter dated June 30, 2008, the completion of this verification and validation effort is targeted for April 28, 2009. TVA's June 30, 2008, letter also includes a milestone of December 31, 2008, for establishing a new controlling PMF level and January 5, 2009, for all input data file packages being signed and available for review.

#### Discovery of Calculation Errors and Loss of Margin

During the June 23 – 26, 2008 workshop, TVA indicated that it had discovered an error in the Bellefonte analysis that resulted in the PMF level for Bellefonte Units 3 and 4 being raised (based on preliminary estimates) by 1.3 feet. In addition, TVA indicated that it had discovered problems with the accuracy of some of the PMF analysis input data, although TVA does not believe these inaccuracies will result in a substantial change to the PMF calculation results. The staff noted during the meeting that the 1.3 foot increase represents a loss of margin between the site elevation and the calculated PMF value. The Bellefonte COLA revision 0 indicates that there is approximately 4.6 feet between the Bellefonte Units 3 and 4 site

elevation and the calculated PMF value. Based on the preliminary results this margin is now 3.3 feet, a reduction of approximately 28%. The staff also notes that if the 1.3 foot error is taken into account, the Bellefonte Units 3 and 4 site would be flooded at the lower bounds of the inspections, tests, analysis and acceptance criteria (ITAAC) value for site elevation of +/- 3.5 feet. The staff does not have confidence that upon completion of the verification and validation effort the Bellefonte Units 3 and 4 site will be dry, given the uncertainty associated with such a complex calculation and the value of the site elevation allowed by the ITAAC. The staff believes that as TVA updates the PMF calculation, it should revisit its options to ensure that either the site remains dry by elevating the site or consider installing flood protection, if the PMF values stay near the values currently calculated.

#### Schedule Ramifications

TVA meets the hydrology interim milestones, the staff estimates the hydrology schedule would be extended by an additional 8 to 12 months. The 8-month extension would be based on the staff's having access to unverified and unvalidated data (and taking the risk that this data does not change) in the January 2009 time frame and then applying a nominal 7-month template for reviewing this information and developing a complete set of RAIs. This schedule would result in a mid August 2009 time frame for completion of Phase 1 for the Bellefonte Units 3 and 4 hydrology review. The 12-month extension would be based on applying the 7-month template to the verified and validated information that would have become available to the staff in early May 2009. This would result in a December 2009 time frame for completion of Phase 1 for the Bellefonte Units 3 and 4 hydrology review.

For reasons stated above the staff is unwilling to commit to either of these two schedules at this time. The staff will reevaluate the Bellefonte Units 3 and 4 hydrology schedule in the December 2008 time frame. In the interim, the staff plans to take steps to extend the seismology schedule by 1 month and to separate the Bellefonte Chapter 2 reference COL review from the subsequent COLs review schedules. Previously the staff had assumed that all safety evaluation report chapters for the reference COL would be completed before they are completed on the subsequent COLs. If this assumption were to continue, the Bellefonte review schedule could delay the reviews for the subsequent COLs. Therefore, the staff intends to develop a separate Phase 4 (SER with no open items) schedule for the Bellefonte reference COL for all chapters except Chapter 2. This will allow the non-Chapter 2 safety evaluation inputs that are common to all the AP1000 COL applications to be developed so that they can be used in the subsequent COL applications. The staff will provide you with the revised Phase 4 schedule once it has been developed. We will continue interacting with TVA staff on this issue in an attempt to minimize the impact on the schedule.

A. Bhatnager

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Should you have any questions regarding the safety review, please contact Joseph Sebrosky, the lead project manager for the safety review for the Bellefonte COL application, at (301) 415-1132 or [jms3@nrc.gov](mailto:jms3@nrc.gov).

Sincerely,

**/RA/**

Thomas A. Bergman, Deputy Director  
for Licensing Operations  
Division of New Reactor Licensing  
Office of New Reactors

Docket Nos.: 52-014, 52-015

cc: See next page

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(Revised 06/03/2008)

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