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

September 4, 2008

10 CFR 52.79

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

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

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION – ASME CODE CLASS 1, 2, AND 3 COMPONENTS

Reference: Letter from Brian Hughes (NRC) to Andrea L. Sterdis (TVA), Request for Additional Information Letter No. 107 Related to SRP Section 03.09.03 for the Bellefonte Units 3 and 4 Combined License Application, dated August 7, 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 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 Tom 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 4th day of Sep, 2008.

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

Enclosure
cc: See Page 2

D085
NRO

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Enclosure
TVA letter dated September 4, 2008
RAI Response

Response to NRC Request for Additional Information letter No. 107 dated August 7, 2008
(9 pages, including this list)

Subject: ASME Code Class 1, 2, and 3 Components in the Final Safety Analysis Report

RAI Number	Date of TVA Response
03.09.03-01	This letter – see following pages

Associated Additional Attachments / Enclosures	Pages Included
None	

Enclosure
TVA letter dated September 4, 2008
RAI Response

NRC Letter Dated: August 7, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 03.09.03-01

AP1000 DCD Tier 2, Section 3.9.8.3, "Snubber Operability Testing," states that Combined License applicants referencing the AP1000 design will develop a program to verify operability of essential snubbers as outlined in DCD Tier 2, Section 3.9.3.4.3, "Snubbers Used as Component and Piping Supports." In its application, Bellefonte stated in FSAR Section 3.9.8.3, "Snubber Operability Testing," that the COL item, STD COL 3.9-3, is addressed in FSAR Section 3.9.3.4.4, "Inspection, Testing, Repair and/or Replacement of Snubbers." As indicated in the FSAR, STD COL 3.9-3 covers a variety of snubber design and surveillance information, including snubber design and testing, snubber installation requirements, as well as snubber preservice and in-service examination and testing. Please address the following: (1) clarify what "snubber operability testing" encompasses for the purposes of STD COL 3.9-3; (2) discuss whether STD COL 3.9-3 represents Bellefonte's complete plant-specific, updated snubber requirements, not already covered in AP1000 DCD Tier 2, Section 3.9.3; (3) clarify whether all or only part of STD COL 3.9-3 is related to snubber operability testing; (4) for any portions of STD COL 3.9-3 which are not related to snubber operability testing, explain why they are included as part of the COL item; (5) discuss all the pertinent codes and standards on which STD COL 3.9-3 is based for purposes of assuring snubber operability; and (6) in light of the above, discuss any need to modify the content of STD COL 3.9-3 or its location within the Bellefonte FSAR.

BLN RAI ID: 1124

BLN RESPONSE:

The subject RAI includes a number of related requests regarding the FSAR information for snubber operability testing included in the COLA FSAR Subsection 3.9.3.4.4 pursuant to DCD COL Item 3.9-3 in DCD Tier 2 Subsection 3.9.8.3. Information presented in Subsection 3.9.3.4.4 regarding snubber testing includes information specific to qualification and installation tests and examinations for snubbers included in the inservice testing program, preservice examination and testing of snubbers, and information related to snubber inservice examination and testing. Therefore, not all information added by STD COL 3.9-3 is related specifically to snubber "operability testing." Each of the numbered parts of the request is addressed below:

(1) For the purposes of STD COL 3.9-3, operability testing encompasses the preservice and inservice examinations and testing required by the ASME OM Code, ISTD, as described in FSAR Subsection 3.9.3.4.4c and Subsection 3.9.3.4.4.d [as revised by TVA's letter to NRC, dated June 12, 2008, in response to NRC RAI No. 03.09.06-03 (BLN-RAI-LTR-007)].

(2) In order to provide a complete description of the snubber operability testing program, that is, the preservice and inservice testing programs for snubbers, additional information was provided in COLA FSAR Subsection 3.9.3.4.4 as indicated in TVA's letter to NRC, dated June 12, 2008, in response to NRC RAI No. 03.09.06-03 (BLN-RAI-LTR-007). Previously in the COLA FSAR, only snubber preservice examination and testing had been described in FSAR Subsection 3.9.3.4.4.c.

(3) As noted above, some of the information provided in the original COLA FSAR Subsection 3.9.3.4.4, relates to snubber qualification testing and examinations and snubber installation verification requirements. These activities are considered precursors to the snubber operability testing that will be conducted in accordance with ASME OM Code, ISTD.

(4) The information not specifically related to COL Item 3.9-3 operability testing, Subsections 3.9.3.4.4.a and 3.9.3.4.4.b, should have been labeled as standard supplemental information, using the left margin annotation STD SUP 3.9-3.

(5) Snubber operability testing is to be conducted during implementation of the preservice and inservice inspection and testing programs in accordance with the requirements of the ASME OM Code, ISTD. As indicated in the first paragraph of COLA FSAR Subsection 3.9.3.4.4, the description of the program provided in the FSAR is based on the 2001 Edition through the 2003 Addenda of the ASME OM Code. However, the initial inservice testing program for snubbers will incorporate the latest edition and addenda of the ASME OM Code approved in 10 CFR 50.55a(f) on the date 12 months before initial fuel load.

(6) The COLA FSAR, Subsection 3.9.3.4.4, will be revised as indicated in the Application Revision section of this response to segregate the snubber operability testing from the remaining portions of the section (i.e., the snubber design and qualification testing, and the snubber installation requirements) and to include the appropriate left margin annotation. In addition, to maintain consistency, to the extent possible, with other industry COL applications, Subsection 3.9.3.4.4.a is revised to clarify and expand on snubber qualification examination and testing. Finally, minor editorial changes are made to the Subsection 3.9.3.4.4.c changes provided in TVA's letter to NRC, dated June 12, 2008, in response to NRC RAI No. 03.09.06-03 (BLN-RAI-LTR-007).

Additionally, changes will be made to the introductory (roadmap) paragraph for FSAR Subsection 3.9.3.4.4 indicating it is a new subsection to follow DCD subsection number 3.9.3.4.3.

This response is expected to be STANDARD for the S-COLAs.

ASSOCIATED BLN COL APPLICATION REVISIONS:

COLA Part 2, FSAR, Chapter 3, Section 3.9.3.4.4 will be revised from:

3.9.3.4.4	Inspection, Testing, Repair and/or Replacement of Snubbers

Add the following text after the last paragraph of DCD Subsection 3.9.3.4.4:

STD COL 3.9-3

The program description of the inservice testing program in this section is based on the ASME OM Code 2001 Edition through 2003 Addenda. The initial inservice testing program incorporates the latest edition and addenda of the ASME OM Code approved in 10 CFR 50.55a(f) on the date 12 months before initial fuel load. Limitations and modifications set forth in 10 CFR 50.55a are incorporated.

a. Snubber Design and Testing

1. A list of snubbers on systems which experience sufficient thermal movement to measure cold to hot position is included as part of the testing program after the piping analysis has been completed.

2. The snubbers are tested to verify they can perform as required during the seismic events, and under anticipated operational transient loads or other mechanical loads associated with the design requirements for the plant. Production and qualification test programs for both hydraulic and mechanical snubbers are carried out by the snubber vendors in

accordance with design specifications. Acceptance criteria for compliance with ASME Section III Subsection NF are cited, and applicable codes and standards are referenced. The following test requirements are included:

- Snubbers are subjected to force or displacement versus time loading at frequencies within the range of significant modes of the piping system.
- Dynamic cyclic load tests are conducted for hydraulic snubbers to determine the operational characteristics of the snubber control valve.
- Displacements are measured to determine the performance characteristics specified.
- Tests are conducted at various temperatures to verify operability over the specified range.
- Peak test loads in both tension and compression are equal to or higher than the rated load requirements.
- The snubbers are tested for various abnormal environmental conditions. Upon completion of the abnormal environmental transient test, the snubber is tested dynamically at a frequency within a specified frequency range. The snubber must operate normally during the dynamic test.

3. Safety-related components which utilize snubbers in their support systems are identified including the following:
   - identification of systems and components
   - number of snubbers utilized in each system and on that component
   - snubber type(s) – (hydraulic or mechanical)
   - constructed to ASME Code Section III, Subsection NF or other
   - snubber use such as shock, vibration, or dual purpose
   - those snubbers identified as dual purpose or vibration arrestor type, indication of fatigue strength evaluation for both snubber and component

b. Snubber Installation Requirements

Installation instructions contain instructions for storage, handling, erection, and adjustments (if necessary) of snubbers. Each snubber has an installation location drawing that contains the installation location of the snubber on the pipe and structure, the hot and cold settings, and additional information needed to install the particular snubber.

c. Snubber Preservice and Inservice Examination and Testing

The pre-service examination plan for applicable snubbers is prepared in accordance with the requirements of the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code), Subsection ISTD, and the additional requirements of this Section. This examination is made after snubber installation but not more than 6 months prior to initial system preoperational testing. The pre-service examination verifies the following:

1. There are no visible signs of damage or impaired operational readiness as a result of storage, handling, or installation.
2. The snubber load rating, location, orientation, position setting, and configuration (attachments, extensions, etc.) are according to design drawings and specifications.
3. Snubbers are not seized, frozen or jammed.
4. Adequate swing clearance is provided to allow snubber movements.
5. If applicable, fluid is to the recommended level and is not to be leaking from the snubber system.
6. Structural connections such as pins, fasteners and other connecting hardware such as lock nuts, tabs, wire, cotter pins are installed correctly.

If the period between the initial pre-service examination and initial system preoperational tests exceeds 6 months, reexamination of Items i, iv, and v is performed. Snubbers, which are installed incorrectly or otherwise fail to meet the above requirements, are repaired or replaced and re-examined in accordance with the above criteria.

The inservice examination and testing plan for applicable snubbers is prepared in accordance with the requirements of the ASME OM Code, Subsection ISTD. Snubber maintenance, repairs, replacements and modifications are performed in accordance with the requirements of the ASME OM Code, Subsection ISTD. Details of the inservice examination and testing program, including test schedules and frequencies, are reported in the inservice inspection and testing plan.

To read:

NOTE: The changes identified below include those provided in response to NRC RAI No. 03.09.06-03 by TVA letter to NRC dated June 12, 2008, Bellefonte Combined License Application - Response to Request for Additional Information - Inservice Testing Provisions, in addition to those provided by this response; changes provided in response to NRC RAI No. 03.09.06-03 are included below for clarity, and to show the extent of snubber operability testing as required for STD COL Item 3.9-3.

Add the following subsection after DCD Subsection 3.9.3.4.3:

3.9.3.4.4 Inspection, Testing, Repair and/or Replacement of Snubbers

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STD SUP 3.9-3

a. Snubber Design and Testing

1. A list of snubbers on systems which experience sufficient thermal movement to measure cold to hot position is included as part of the testing program after the piping analysis has been completed.
2. The snubbers are tested to verify they can perform as required during the seismic events, and under anticipated operational transient loads or other mechanical loads associated with the design requirements for the plant. Production and qualification test programs for both hydraulic and

mechanical snubbers are carried out by the snubber vendors in accordance with the snubber installation instruction manual required to be furnished by the snubber supplier. Acceptance criteria for compliance with ASME Section III Subsection NF, and other applicable codes, standards and requirements are as follows:

- Snubber production and qualification test programs are carried out by strict adherence to the manufacturer's snubber installation and instruction manual. This manual is prepared by the snubber manufacturer and subjected to review for compliance with the applicable provisions of the ASME Pressure Vessel and Piping Code of record. The test program is periodically audited during implementation for compliance.
- Snubbers are inspected and tested for compliance with the design drawings and functional requirements of the procurement specifications.
- Snubbers are inspected and qualification tested. No sampling methods are used in the qualification tests.
- Snubbers are load rated by testing in accordance with the snubber manufacturer's testing program and in compliance with the applicable sections of ASME QME-1-2007, Subsection QDR and the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code), Subsection ISTD.
- Design compliance of the snubbers per ASME Section III Paragraph NF-3128, and Subparagraphs NF-3411.3 and NF-3412.4.
- The snubbers are tested for various abnormal environmental conditions. Upon completion of the abnormal environmental transient test, the snubber is tested dynamically at a frequency within a specified frequency range. The snubber must operate normally during the dynamic test. The functional parameters cited in Subparagraph NF-3412.4 are included in the snubber qualification and testing program. Other parameters in accordance with applicable ASME QME-1-2007 and the ASME OM Code will be incorporated.
- The codes and standards used for snubber qualification and production testing are as follows:
  - ASME B&PV Code Section III (Code of Record date) and Subsection NF.
  - ASME QME-1-2007, Subsection QDR and ASME OM Code, Subsection ISTD.
- Large bore hydraulic snubbers are full Service Level D load tested, including verifying bleed rates, control valve closure within the specified velocity ranges and drag forces/breakaway forces are acceptable in accordance with ASME, QME-1-2007 and ASME OM Codes.

3. Safety-related components which utilize snubbers in their support systems will be identified in a future revision to the FSAR in table format that will include the following:

- identification of systems and components
- number of snubbers utilized in each system and on that component
- snubber type(s) – (hydraulic or mechanical) – and name of supplier
- constructed to ASME Code Section III, Subsection NF or other
- snubber use such as shock, vibration, or dual purpose
- those snubbers identified as dual purpose or vibration arrestor type, will include an indication if both snubber and component were evaluated

b. Snubber Installation Requirements

Installation instructions contain instructions for storage, handling, erection, and adjustments (if necessary) of snubbers. Each snubber has an installation location drawing that contains the installation location of the snubber on the pipe and structure, the hot and cold settings, and additional information needed to install the particular snubber.

STD COL 3.9-3

The description of the snubber preservice and inservice testing programs in this section is based on the ASME OM Code 2001 Edition through 2003 Addenda. The initial inservice testing program incorporates the latest edition and addenda of the ASME OM Code approved in 10 CFR 50.55a(f) on the date 12 months before initial fuel load. Limitations and modifications set forth in 10 CFR 50.55a are incorporated.

Revisions per response to NRC RAI No. 03.09.06-03

c. Snubber Preservice Examination and Testing

The preservice examination plan for applicable snubbers is prepared in accordance with the requirements of the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code), Subsection ISTD, and the additional requirements of this Section. This examination is made after snubber installation but not more than 6 months prior to initial system preoperational testing. The preservice examination verifies the following:

1. There are no visible signs of damage or impaired operational readiness as a result of storage, handling, or installation.
2. The snubber load rating, location, orientation, position setting, and configuration (attachments, extensions, etc.) are according to design drawings and specifications.
3. Snubbers are not seized, frozen or jammed.
4. Adequate swing clearance is provided to allow snubber movements.
5. If applicable, fluid is to the recommended level and is not to be leaking from the snubber system.
6. Structural connections such as pins, fasteners and other connecting hardware such as lock nuts, tabs, wire, cotter pins are installed correctly.

If the period between the initial preservice examination and initial system preoperational tests exceeds 6 months, reexamination of Items 1, 4, and 5 is

performed. Snubbers, which are installed incorrectly or otherwise fail to meet the above requirements, are repaired or replaced and re-examined in accordance with the above criteria.

A preservice thermal movement examination is also performed, during initial system heatup and cooldown. For systems whose design operating temperature exceeds 250°F (121°C), snubber thermal movement is verified.

Additionally, preservice operational readiness testing is performed on snubbers. The operational readiness test is performed to verify the parameters of ISTD-5120. Snubbers that fail the preservice operational readiness test are evaluated to determine the cause of failure, and are retested following completion of corrective action(s).

Snubbers that are installed incorrectly or otherwise fail preservice testing requirements are re-installed correctly, adjusted, modified, repaired or replaced, as required. Preservice examination and testing is re-performed on installation-corrected, adjusted, modified, repaired or replaced snubbers as required.

d. Snubber Inservice Examination and Testing

Inservice examination and testing of safety-related snubbers is conducted in accordance with the requirements of the ASME OM Code, Subsection ISTD. Inservice examination is initially performed not less than two months after attaining 5% reactor power operation and is completed within 12 calendar months after attaining 5% reactor power. Subsequent examinations are performed at intervals defined by ISTD-4252 and Table ISTD-4252-1. Examination intervals, subsequent to the third interval, are adjusted based on the number of unacceptable snubbers identified in the current interval.

An inservice visual examination is performed on the snubbers to identify physical damage, leakage, corrosion, degradation, indication of binding, misalignment or deformation and potential defects generic to a particular design. Snubbers that do not meet visual examination requirements are evaluated to determine the root cause of the unacceptability, and appropriate corrective actions (e.g., snubber is adjusted, repaired, modified, or replaced) are taken. Snubbers evaluated as unacceptable during visual examination may be accepted for continued service by successful completion of an operational readiness test.

Snubbers are tested inservice to determine operational readiness during each fuel cycle, beginning no sooner than 60 days before the start of the refueling outage. Snubber operational readiness tests are conducted with the snubber in the as-found condition, to the extent practical, either in place or on a test bench, to verify the test parameters of ISTD-5210. When an in-place test or bench test cannot be performed, snubber subcomponents that control the parameters to be verified are examined and tested. Preservice examinations are performed on snubbers after reinstallation when bench testing is used (ISTD-5224), or on snubbers where individual subcomponents are reinstalled after examination (ISTD-5225).

Defined test plan groups (DTPG) are established and the snubbers of each DTPG are tested according to an established sampling plan each fuel cycle. Sample plan size and composition is determined as required for the selected sample plan, with additional sampling as may be required for that sample plan based on test failures and failure modes identified. Snubbers that do not meet test requirements are evaluated to determine root cause of the failure, and are assigned to failure mode groups (FMG) based on the evaluation, unless the failure is considered unexplained or isolated. The number of unexplained

snubber failures, not assigned to a FMG, determines the additional testing sample. Isolated failures do not require additional testing. For unacceptable snubbers, additional testing is conducted for the DTPG or FMG until the appropriate sample plan completion criteria are satisfied.

Unacceptable snubbers are adjusted, repaired, modified, or replaced. Replacement snubbers meet the requirements of ISTD-1600. Post-maintenance examination and testing, and examination and testing of repaired snubbers, is done to verify as acceptable the test parameters that may have been affected by the repair or maintenance activity.

Service life for snubbers is established, monitored and adjusted as required by ISTD-6000 and the guidance of ASME OM Code Nonmandatory Appendix F.

ASSOCIATED ATTACHMENTS/ENCLOSURES:

None