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

March 4, 2009

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 – EMERGENCY ACTION LEVEL (EAL) SCHEME

Reference: Letter from Brian C. Anderson (NRC) to Andrea L. Sterdis (TVA), Request for Additional Information Letter No. 146 Related to SRP Section 13.3 for the Bellefonte Units 3 and 4 Combined License Application, dated February 2, 2009

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 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 4th day of Mar, 2009.

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

Enclosure
cc: See Page 2

AM45
D085
NRO

cc: (w/Enclosure)
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Enclosure
TVA letter dated March 4, 2009
RAI Response

Response to NRC Request for Additional Information letter No. 146 dated February 2, 2009
(10 pages, including this list)

Subject: Emergency Action Level (EAL) Scheme in the Emergency Plan

RAI Number	Date of TVA Response
13.03-33	This letter – see following pages

Associated Additional Attachments / Enclosures	Pages Included
None	

Enclosure
TVA letter dated March 4, 2009
RAI Response

NRC Letter Dated: February 2, 2009

NRC Review of Emergency Plan

NRC RAI NUMBER: 13.03-33

EALs are discussed in Section D, "Emergency Classification System," of COL application Part 5.

The initial EALs, which are required by 10 CFR 50.47(b)(4) and Section IV.B of Appendix E to 10 CFR Part 50, must be approved by the NRC. The Bellefonte combined license (COL) application does not fully address certain aspects of the required EAL scheme. This is because various equipment set points and other information cannot be determined until the as-built information is available; e.g., head corrections, radiation shine, final technical specifications, and equipment calculations and tolerances. The NRC has been evaluating possible options to ensure applicants address the regulations and provide the following:

Option 1 – Submit an entire EAL scheme, which contains all site-specific information, including set points. Until this information is finalized, EALs would remain an open item.

Option 2 – Submit emergency plan Section D, "Emergency Classification System," which addresses the four critical elements of an EAL scheme (listed below). The NRC will determine the acceptability of the EAL scheme.

- *Critical Element 1* – Applicant proposes an overview of its emergency action level scheme including defining the four emergency classification levels, (i.e., Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency), as stated in NEI 99-01, Revision 5, with a general list of licensee actions at each emergency classification level.
- *Critical Element 2* – Applicant proposes to develop the remainder of its EAL scheme by using a specified NRC endorsed guidance document. In the development of its EALs, the proposed EALs should be developed with few or no deviations or differences, other than those attributable to the specific reactor design. NEI 07-01, if endorsed, will be applicable to the AP1000 and ESBWR (passive) reactor designs, and NEI 99-01 is applicable to all (non-passive) reactor designs. If applicable, EALs related to digital instrumentation and control must be included. The NRC must find in the Safety Evaluation Report that this approach is acceptable for each site.
- *Critical Element 3* – Applicant proposes a License Condition (LC) that the applicant will create a fully developed set of EALs in accordance with the specified guidance document. These fully developed EALs must be submitted to the NRC for confirmation at least 180 days prior to fuel load.
- *Critical Element 4* – The EALs must be kept in a document controlled by 10 CFR 50.54(q), such as the emergency plan; or a lower tier document, such as the Emergency Plan Implementing Procedures.

Please review the two options provided above, identify which option will be chosen, and provide the detailed EAL information in support of the chosen option.

BLN RAI ID: 1783

BLN RESPONSE:

TVA will follow Option 2 for the Bellefonte Nuclear Plant (BLN) Emergency Plan.

Section II.D of the BLN Emergency Plan discusses the EAL scheme based on NUREG-0654 and draft NEI 07-01 guidance. Appendix 1 of the Plan provides detailed initiating conditions (ICs) and EALs

based on the draft NEI 07-01. Section II.D acknowledges the need to revise Appendix 1 when NEI 07-01 is endorsed by the NRC.

The BLN approach to each of the Critical Elements discussed in the NRC's Request for Additional Information is described below:

Critical Element 1 – Emergency Plan Subsection II.D.1, provides an overview defining the four emergency classification levels: Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency as defined in draft NEI 07-01.

In summary, emergency classification level definitions and associated licensee actions at each level are:

Notification of Unusual Event

Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate that a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

TVA actions undertaken at the Notification of Unusual Event include promptly informing State and local authorities of the event, augmenting on-shift resources as needed, assessment and response, and escalation to a more severe class, if appropriate. If the emergency class is not escalated to a more severe class, then State and local authorities will be notified of event termination in accordance with implementing procedures.

Alert

Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the U.S. Environmental Protection Agency (EPA) Protective Action Guidelines (PAG) exposure levels.

TVA actions undertaken at the Alert emergency class include those described for the Notification of Unusual Event and activation of the Technical Support Center and Operational Support Center. In addition, Central Emergency Control Center and other key emergency response personnel are alerted, on-site monitoring teams are dispatched, periodic plant status updates and meteorological assessments are provided to offsite authorities, as are dose estimates, if any event-related releases are occurring.

Site Area Emergency

Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that result in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.

TVA actions undertaken at the Site Area Emergency class include those described for the Alert emergency class and activation of the Central Emergency Control Center. In addition, an individual is dedicated to provide plant status updates to offsite authorities and periodic media briefings (jointly with offsite authorities when practicable), senior technical and management staff are made available for consultation with NRC and the State on a periodic basis, and release and dose projections based on available plant condition information and foreseeable contingencies are provided.

General Emergency

> Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels off-site for more than the immediate site area.
>
> TVA actions undertaken at the General Emergency class are identical to those described for the Site Area Emergency class except there is no more severe emergency class.

Section II.D of the BLN Emergency Plan will be revised to reflect minor changes to the classification level definitions and to add the licensee actions in a future revision of the BLN COLA, as described in the Application Revisions section. In addition, a minor change to the definition of "hostile action" and the addition of the defined term "imminent" are made for consistency with the above definitions and licensee actions.

Critical Element 2 – The remainder of the site-specific EAL scheme will be developed using the NRC-endorsed version of NEI 07-01, Rev. 0. The fully developed site-specific EAL scheme will be included in the Emergency Plan, with no deviations. Accordingly, the current EAL scheme will be removed from Appendix 1 in a future revision of the Emergency Plan. In addition, several other changes will be made throughout the Emergency Plan to refer to the NRC-endorsed version of NEI 07-01, Rev. 0, as the basis for EAL scheme and methodology used in the BLN Emergency Plan. References to the NRC-endorsed version of NEI 07-01, Rev. 0, will be provided in Emergency Plan Subsections II.D.2 and III.A, following endorsement by the NRC.

Critical Element 3 – The following License Condition related to the creation of a fully developed set of site-specific EALs is proposed in accordance with the guidance document discussed above:

PROPOSED LICENSE CONDITION:

The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Rev. 0, with no deviations. These fully developed EALs shall be submitted to the NRC for confirmation at least 180 days prior to initial fuel load.

This License Condition will be added to Part 10 of the COL Application as described in the Application Revisions section.

Critical Element 4 – As discussed in Critical Element 2, the fully developed site-specific EAL scheme will be incorporated into a future revision to the Emergency Plan. Accordingly, future changes to the EAL scheme will require an evaluation under 10 CFR 50.54(q) to determine if the change will reduce the effectiveness of the Emergency Plan.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. COLA Part 5, Emergency Plan, Definitions, will be revised by changing the last sentence of the definition for Hostile Action, from:

   Non-terrorism based EALs should be used to address such activities (e.g., violent acts between individuals in the owner controlled area).

   To read:

   Non-terrorism based EALs are used to address such activities (e.g., violent acts between individuals in the owner controlled area).

2. COLA Part 5, Emergency Plan, Definitions, will be revised by adding a new defined term, Imminent, as follows:

   Imminent – Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur.

3. COLA Part 5, Emergency Plan, Subsection II.D, first paragraph will be revised from:

   TVA has developed and implemented a standard emergency classification scheme, based on system and effluent parameters, on which affected State and local response organizations may rely for determining initial off-site response measures. For BLN, the initiating conditions include the conditions provided in NEI 07-01, Rev. 0, "Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors" (Reference 6) as it applies to AP1000 facilities and postulated accidents identified in the FSAR.

   To read:

   TVA uses a standard emergency classification scheme based on system and effluent parameters, which allows affected State and local response organizations to determine initial off-site response measures. For BLN, the initiating conditions are those provided in NEI 07-01, "Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors" (Reference 6) as it applies to AP1000 facilities and postulated accidents identified in the FSAR.

4. COLA Part 5, Emergency Plan, Subsection II.D.1, will be revised from:

   Appendix E of 10 CFR Part 50 identifies four distinct classes of emergencies. The definitions of these emergency classes are more fully discussed in NEI 07-01, as follows:

   - Notification of Unusual Event (NOUE) - Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.
   - Alert – Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline (PAG) exposure levels.
   - Site Area Emergency - Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile actions that result in intentional damage or malicious act: 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the

public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.

- General Emergency – Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Appendix 1 of this plan provides recognition categories, the associated initiating condition matrices, and the emergency action levels.

To read:

Appendix E of 10 CFR Part 50 identifies four distinct classes of emergencies. The definitions of these emergency classes are more fully discussed in NEI 07-01, as follows:

- Notification of Unusual Event - Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate that a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

  TVA actions undertaken at the Notification of Unusual Event include promptly informing State and local authorities of the event, augmenting on-shift resources as needed, assessment and response, and escalation to a more severe class, if appropriate. If the emergency class is not escalated to a more severe class, then State and local authorities will be notified of event termination in accordance with implementing procedures.

- Alert - Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA PAG exposure levels.

  TVA actions undertaken at the Alert emergency class include those described for the Notification of Unusual Event and activation of the TSC and OSC. In addition, CECC and other key emergency response personnel are alerted, on-site monitoring teams are dispatched, periodic plant status updates and meteorological assessments are provided to offsite authorities, as are dose estimates, if any event-related releases are occurring.

- Site Area Emergency - Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.

  TVA actions undertaken at the Site Area Emergency class include those described for the Alert emergency class and activation of the CECC. In addition, an individual is dedicated to provide plant status updates to offsite authorities and periodic media briefings (jointly with offsite authorities when practicable), senior technical and management staff are made available for consultation with NRC and the State on a periodic basis, and release and dose projections based on available plant condition information and foreseeable contingencies are provided.

- General Emergency - Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels off-site for more than the immediate site area.

  TVA actions undertaken at the General Emergency class are identical to those described for the Site Area Emergency class except there is no more severe emergency class.

Appendix 1 of this plan provides recognition categories, the associated initiating condition matrices, and the emergency action levels based on the NEI 07-01 [Appendix 1 is "reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available].

5. COLA Part 5, Emergency Plan, Subsection II.D.2, will be revised from:

   This section incorporates by reference NEI 07-01, "Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors", Rev.0, dated [to be provided following NRC endorsement], ADAMS No. [to be provided following NRC endorsement]. Appendix 1 provides the parameter values and equipment status that are indicative of each emergency class.

   To read:

   TVA adopts the methodology provided in NEI 07-01. Appendix 1 provides the parameter values and equipment status that are indicative of each emergency class. [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available.]

6. COLA Part 5, Emergency Plan, Subsection II.H.5 will be revised from:

   The bases for the Emergency Action Levels, as discussed in NEI 07-01, describe the bases for the selection of the designated instruments as indicators of emergency conditions.

   To read:

   The bases for the Emergency Action Levels, as discussed in Appendix 1, describe the bases for the selection of the designated instruments as indicators of emergency conditions. [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available.]

7. COLA Part 5, Emergency Plan, Subsection II.I.1, second sentence will be revised from:

   Appendix 1 of this plan includes the various indications that correspond to the emergency initiating conditions based on the methodology provided in NEI 07-01, Rev. 0.

   To read:

   Appendix 1 of this plan includes the various indications that correspond to the emergency initiating conditions based on the methodology provided in NEI 07-01. [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available.]

8. COLA Part 5, Emergency Plan, Subsection III.A, Reference 6 will be revised from:

   Nuclear Energy Institute, "Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors," NEI 07-01, Rev. 0, September 2007.

   To read:

   [Reserved]

9. COLA Part 5, Emergency Plan, Appendix 1 – Emergency Action Levels will be revised by changing the cover page from:

   Appendix 1 – Emergency Action Levels

   To read:

   Appendix 1 – Emergency Action Levels

   [Reserved]

10. COLA Part 5, Emergency Plan, Appendix 1 – Emergency Action Levels will be revised by deleting Pages A1-2 through A1-97.

11. COLA Part 10, Proposed License Conditions (Including ITAAC), Proposed License Condition 4, will be revised from:

    4. Not used

    To read:

    4. EMERGENCY PLANNING ACTIONS:

    Because various equipment set points and other information cannot be determined until the as-built information is available, the COL Application does not fully address certain aspects of the EAL scheme. Thus, COL applicants using EAL schemes in accordance with NEI 07-01 are proposing the following license condition, or similar.

    PROPOSED LICENSE CONDITION:

    The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Revision 0, with no deviations. These fully developed EALs shall be submitted to the NRC for confirmation at least 180 days prior to initial fuel load.

12. COLA Part 10, Proposed License Conditions (Including ITAAC), Appendix B, Table 3.8-1, Inspections, Tests, Analyses (1.1) and Acceptance Criteria (1.1.1 and 1.1.2) will be revised from:

1.1 An inspection of the control room, technical support center (TSC), and Central Emergency Control Center (CECC) will be performed to verify that they have displays for retrieving facility system and effluent parameters in specific Emergency Action Levels (EALs) identified in the following list of EALs in Appendix 1, Section 5, of the Emergency Plan: **EALs in Emergency Plan Appendix 1, Section 5** Abnormal Rad Levels/Radiological Effluents: AU1 (EALs 1, 2), AU2, AA1 (EALs 1, 2), AA2, AA3, AS1 (EAL 1), AG1 (EAL 1) Cold Shutdown/Refueling System Malfunction: CU2, CU3, CU4, CU7, CU8, CA1, CA4, CS1, CG2 Fission Product Barrier Thresholds: Fuel Clad Barrier Thresholds Values: 2. Primary Coolant Activity Level 3. Core Exit Thermocouple Readings 4. Reactor Vessel Water Level 6. Containment Radiation Monitoring RCS Barrier Threshold Values: 2. RCS Leak Rate 4. SG Tube Rupture 6. Containment Radiation Monitoring	1.1.1 The specific parameters identified in the EALs in Emergency Plan Appendix 1, Section 5 have been retrieved and displayed in the control room, TSC, and CECC. 1.1.2 The ranges available in the control room, TSC, and CECC encompassed the values for the specific parameters identified in the EALs in Emergency Plan Appendix 1, Section 5.

Containment Barrier Threshold Values: 2. Containment Pressure 3. Core Exit Thermocouple Reading 4. SG Secondary Side Release with P-to-S Leakage 5. CNMT Isolation Failure or Bypass 6. Significant Radioactive Inventory in Containment Hazards or Other Conditions Affecting Plant Safety: HU1 (EAL 2), HA1 (EALs 1, 2) System Malfunction: SU1, SU4 (EAL 1), SU8, SA1, SA2, SA4, SS1, SS2, SS3, SS6, SG1, SG2	

To read:

1.1 An inspection of the control room, technical support center (TSC), and Central Emergency Control Center (CECC) will be performed to verify that they have displays for retrieving facility system and effluent parameters that constitute the bases for the classification scheme in Appendix 1, Section 5, of the Emergency Plan. [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available.]	1.1.1 The specific parameters identified in the EALs in Emergency Plan Appendix 1, Section 5 have been retrieved and displayed in the control room, TSC, and CECC. [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available.] 1.1.2 The ranges available in the control room, TSC, and CECC encompassed the values for the specific parameters identified in the EALs in Emergency Plan Appendix 1, Section 5. [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available.]

13. COLA Part 10, Proposed License Conditions (Including ITAAC), Appendix B, Table 3.8-1, Inspections, Tests, Analyses (6.1) and Acceptance Criteria (6.1) will be revised from:

6.1 A test of the emergency plan will be conducted by performing an exercise or drill to verify the capability to perform accident assessment.	6.1 A report exists that confirms an exercise or drill has been accomplished including use of selected monitoring parameters identified in the EALs in Emergency Plan Appendix 1, Section 5, to assess simulated degraded plant and initiate protective actions in accordance with the following criteria: A. Accident Assessment and Classification 1. Initiating conditions identified, EALs parameters determined, and the emergency correctly classified throughout the drill. B. Radiological Assessment and Control 1. Onsite radiological surveys performed and samples collected. 2. Radiation exposure to emergency workers monitored and controlled. 3. Field monitoring teams assembled and deployed. 4. Field team data collected and disseminated. 5. Dose projections developed. 6. The decision whether to issue radioprotective drugs to TVA emergency workers made. 7. Protective action recommendations developed and communicated to appropriate authorities.

To read:

6.1 A test of the emergency plan will be conducted by performing an exercise or drill to verify the capability to perform accident assessment.	6.1 A report exists that confirms an exercise or drill has been accomplished including use of selected monitoring parameters identified in the EALs in Emergency Plan Appendix 1, Section 5 to assess simulated degraded plant and initiate protective actions in accordance with the following criteria , [Appendix 1 is "Reserved" until after the NRC-endorsed version of NEI 07-01, Rev. 0 is available]: A. Accident Assessment and Classification 1. Initiating conditions identified. 2. EALs parameters determined. 3. Emergency correctly classified throughout the drill. B. Radiological Assessment and Control 1. Onsite radiological surveys performed and samples collected. 2. Radiation exposure to emergency workers monitored and controlled. 3. Field monitoring teams assembled and deployed. 4. Field team data collected and disseminated. 5. Dose projections developed. 6. Decision whether to issue radioprotective drugs to TVA emergency workers made. 7. Protective action recommendations developed and communicated to appropriate authorities.

ASSOCIATED ATTACHMENTS/ENCLOSURES:

None