

NRR-PMDAPEm Resource

From: Hon, Andrew
Sent: Tuesday, May 23, 2017 12:00 PM
To: Hammargren, Benjamin John; Schrull, Edward Dustin (edschrull@tva.gov)
Cc: Beasley, Benjamin; Saba, Farideh; Schaaf, Robert; Hoffman, Raymond
Subject: REQUEST FOR ADDITIONAL INFORMATION RELATED TO TVA FLEET LAR FOR EAL
Change to Adopt NEI-99-01 Rev.6 (CAC NOS. MF9054 - MF9060)

By letter dated January 4, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML17004A340), Tennessee Valley Authority (TVA) requested approval for an emergency action level (EAL) scheme change for Browns Ferry Nuclear Plant (BFN), Units 1, 2 and 3; Sequoyah Nuclear Plant (SQN), Units 1 and 2; and Watts Bar Nuclear Plant (WBN), Units 1 and 2.

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed below. The proposed questions were discussed by telephone with your staff on May 23, 2017. Your staff confirmed that these questions did not include proprietary or security-related information and agreed to provide a response by July 7, 2017 to this request for additional information (RAI).

The NRC staff considers that timely responses to RAIs help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. Please note that if you do not respond to this request by the agreed-upon date or provide an acceptable alternate date, we may deny your application for amendment under the provisions of Title 10 of the *Code of Federal Regulations*, Section 2.108. If circumstances result in the need to revise the agreed upon response date, please contact me at (301) 415-8480 or via e-mail Andrew.Hon@nrc.gov.

DOCKET Nos. 50-259, 50-260, 50-296, 50-327, 50-328, 50-390, AND 50-391

Andy Hon, PE
Project Manager (TVA Fleet)
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
301-415-8480
OWFN O8H19
Mail Stop O8G-9a
andrew.hon@nrc.gov

RAI-1 BFN, SQN, and WBN

Section 4.3 (Instrumentation Used for EALs) of the endorsed guidance states: "Scheme developers should ensure that specific values used as EAL setpoints are within the calibrated range of the referenced instrumentation." Although BFN, SQN, and WBN use the wording provided in endorsed guidance in their EAL basis documents, no indication is provided that the scheme developers did ensure that specific values used as EAL setpoints were within the calibrated range of the referenced instrumentation. For example, the proposed BFN, SQN, and WBN fission product barriers threshold values that are based on primary containment radiation use values such as: 90091 R/HR for BFN, 72.6 R/HR for SQN, and 265 R/HR for WBN. Additionally, the proposed SQN SU7 (2)(a) threshold value is a containment pressure that is greater than 2.81 PSIG.

Please confirm that all setpoints and indications used in the proposed BFN, SQN, and WBN EAL schemes are within the calibrated range(s) of the stated instrumentation and that the resolution of the instrumentation is appropriate for the setpoint/indication.

RAI-2 BFN, SQN, and WBN

The definitions contained in endorsed guidance for the General Emergency, Site Area Emergency, Alert and Notification of Unusual Event [*Unusual Event*] classification levels begin with "Events are in progress." The BFN, SQN, and WBN definitions in Appendix B for a General Emergency, Site Area Emergency, and Alert begin with "Events are in process." [*Emphasis added.*]

Please revise these definitions to reflect the definitions in the endorsed guidance or provide a justification for the difference.

RAI-3 BFN, SQN, and WBN

The proposed definition for the Owner Controlled Area is, "[t]he site property owned by or otherwise under the control of Site Security." Although Site Security does typically control the area that encompasses a NPP, Site Security does not typically own that property. The definition for the Owner Controlled Area in endorsed guidance states, "The site property owned by, or otherwise under the control of the licensee."

Please revise the definition of Owner Controlled Area to clearly reflect who owns the site property or provide a justification for the difference.

RAI-4 WBN

In section 5.1, "Definitions," there is no proposed definition for Emergency Classification Level for WBN. This definition is included in endorsed guidance and for BFN and SQN.

Please include a definition of Emergency Classification Level for WBN or provide a justification for the difference.

RAI-5 SQN, WBN

The proposed SQN and WBN EAL RG1 (1), RS1 (1) and RA1 (1) threshold values includes steam generator radiation monitor setpoints. To determine a setpoint, the steam generator discharge radiation monitors assume a PORV is full open with a steam generator (SG) pressure of 1078.7 PSIA for SQN and 1199.7 for WBN. Assuming that a PORV was fully opened, SG pressure could lower substantially following an event. Additionally, a PORV may, or may not be, opened following a transient.

Please explain how the SG discharge radiation monitors can provide an accurate offsite dose indication without accounting for actual steam flow or consider removing the SG discharge radiation monitors from the SQN and WBN proposed EAL schemes.

RAI-6 BFN

The proposed BFN EAL RU1 (2) threshold value states, "0-SI-4.8.B.1.a.1 (Airborne Effluent Release Rate) results greater than Release Rate Fraction of 2.0 for 60 minutes or longer." Although it appears that this value would be 2 times the release limit established by the ODCM, the staff could not determine how the site emergency director could readily identify this condition.

Please explain what conditions will meet this threshold value and provide a justification that decision makers can make a timely and accurate assessment using the existing threshold value wording.

RAI-7 BFN, SQN, and WBN

The proposed BFN and WBN EAL RU2 (1)(a) does not provide a site specific indication that indicates that an unplanned water level drop has occurred or is occurring in the refueling pathway. SQN only provides a spent fuel pit level annunciator. Plants typically have one or more level indications that provide an indication of refueling pathway level. Although personnel observation is one indication that can be used, it should not be the only indication that is available.

Please provide level indications that could be used to indicate a water level drop in the refueling pathway that could be used in conjunction with a rise in radiation levels to support a timely and accurate assessment of RU2.

RAI-8 BFN, SQN, and WBN

The proposed BFN, SQN and WBN EAL CG1, CS1, CA1, and CU1 threshold values appear to limit containment sumps as indications of RCS leakage. With RHR in use, sumps outside the containment may also provide an indication of RCS leakage. Endorsed guidance recommends entering any "site-specific sump and/or tank" levels that could be expected to increase if there were a loss of inventory as threshold values. Note: for CG1 and CS1, the level indications used to determine RCS leakage must also provide information that can be used to quantify RCS leakage as necessary to determine whether or not core uncover has occurred.

Please consider revising the proposed SQN and WBN EAL CG1, CS1, CA1, and CU1 threshold values to provide indications of a loss of RCS inventory via the RHR system or provide justification why these indications would not be appropriate.

RAI-9 BFN

The proposed BFN EAL CG1 (2)(b) and CS1 (3)(b) radiation monitor tables provide for alarms on various radiation monitors. The endorsed guidance for CG1 and CS1 identify “site-specific radiation monitor[s]” and “site-specific value[s]” that are indicative of core uncover. TVA has not provided information that could be used to verify that the high level alarms of the provided radiation monitors are indicative of core uncover.

Please provide justification that supports BFN using the identified radiation monitor high level alarms as indication of core uncover or provide radiation values that would be indicative of core uncover for CG1 and CS1.

RAI-10 SQN and WBN

The proposed SQN and WBN EAL CG1 (1)(a) and CS1 (2)(b) threshold values use a level that corresponds to the less than bottom of the hot leg for thirty minutes vice the endorsed guidance value of “approximately the top of active fuel.” If RVLIS is available, a RVLIS indication that is approximately the top of active fuel should be used. If RVLIS was not available, then RCS level cannot be monitored and this condition should be assessed under EALs CG1 (2) or CS1 (3).

Please clarify the proposed SQN and WBN EAL CG1 (1)(a) and CS1 (2)(b) threshold values to be consistent with endorsed guidance or provide, justification that support this deviation from endorsed guidance.

RAI-11 SQN and WBN

The provided SQN and WBN EAL CG1 (2)(b) and CS1 (3)(b) radiation monitor tables provide for readings of greater than 9500 mR/hr on 1-, 2-RM-90-59 or 60 as threshold values. The endorsed guidance for CG1 and CS1 identify “site-specific radiation monitor[s]” and “site-specific value[s]” that are indicative of core uncover. TVA has not provided information that could be used to verify that the readings on the identified monitors of greater than 9500 mR/hr are indicative of core uncover.

Please provide justification that supports using readings of greater than 9500 mR/hr on 1, 2-RM-90-59 or 60 as an indication of core uncover for CG1 and CS1. The endorsed guidance provides that if the estimated/calculated monitor reading is greater than approximately 110% of the highest accurate monitor reading, then developers may choose not to include the monitor as an indication and identify an alternate EAL threshold.

RAI-12 BFN

The provided BFN EAL CG1 Table C1, “Containment Challenge” uses an EOI-3 entry on low secondary containment delta pressure (DP) as the equivalent to containment closure not being established. Although a loss of containment closure could result in a low secondary containment DP, factors not directly related to a loss of containment closure could also result in EOI-3 entry conditions. Additionally, as provided, EOI-3 entry appears redundant to an “UNPLANNED rise in containment pressure” in that an unplanned rise in containment pressure would result in a low secondary containment DP.

Please clarify BFN EAL CG1 Table C1 “Containment Challenge” to be consistent with endorsed guidance or provide a more detailed explain as to why containment closure guidance is not applicable to BFN.

RAI-13 SQN and WBN

The proposed SQN and WBN EAL CS1 (1)(b) threshold values are at the centerline of the RCS loops when containment closure is not established which is not consistent with endorsed guidance which provides that if RVLIS is available, a level that is approximately 6 inches below the bottom of the hot leg should be used. If a licensee desires to use diverse level indications, then the lowest readable indication for diverse level indications is approximately the bottom of the hot leg.

Please clarify the proposed SQN and WBN EAL CS1 (1)(b) threshold values to align with endorsed guidance or provide justification for using the lowest readable level that would be based on diverse level indications which would typically be available during all outage conditions.

RAI-14 SQN and WBN

The proposed SQN and WBN EAL CA1 (1) threshold values are at the top of RCS hot leg which is not consistent with endorsed guidance. The endorsed guidance provides a minimum allowable level that supports operation of normally used decay heat removal systems. This level is typically approximately the middle of the hot leg.

Please clarify the proposed SQN and WBN EAL CA1 (1) threshold values to align with endorsed guidance or provide justification for using a level that is well above the level that would be an actual or potential substantial degradation of the level of safety of the plant.

RAI-15 BFN

The provided BFN EAL CA3 (1) threshold value (TV) refers to RCS and the associated Table C2, "Moderator Heat-up Duration Thresholds" uses the term "Moderator" vice "RCS." The basis discussion for CA3 uses RCS and moderator when referring to RCS. Using RCS in the TV and moderator in the associated table identification and mixing both terms in the basis discussion introduces an unnecessary human factor challenge to this EAL.

Please consider consistently using RCS for BFN EAL CA3 (1) to remove the human factor challenge and align with SQN and WBN or explain how using the two identified terms will not potentially result in a human factor challenge.

RAI-16 SQN and WBN

The provided SQN and WBN EAL CA3 (1) threshold value (TV) refers to "RCS **Reheat** Duration Thresholds" vice "RCS **Heat-up** Duration Thresholds" [Emphasis added] in the endorsed guidance. In addition to endorsed guidance, the deviations and differences matrix provided by TVA and the basis discussion for WBN CA3 uses the term Heat-up.

Please consider consistently using Heat-up for the SQN and WBN EAL CA3 (1) Table C-2 titles and associated basis discussions or explain how using the "Reheat" will not potentially present a human factor challenge.

RAI-17 BFN, SQN, and WBN

The ERO basis discussion for proposed BFN, SQN, and WBN EALs CA6 (1) and SA9 (1) states:

No emergency classification is required in response to a FIRE or EXPLOSION resulting from an equipment failure if the only safety system equipment affected by the event is that upon which the failure occurred. An emergency classification is required if a FIRE or EXPLOSION caused by an equipment failure damages other safety system equipment (that is, equipment that was not the source/location of the failure). For example, if a FIRE or EXPLOSION resulting from the failure of a piece of safety system equipment causes damage to the other train of the affected safety system or another safety system, then an emergency declaration is required in accordance with this IC and EAL.

An equipment failure may have a cascading effect leading to a FIRE or EXPLOSION that causes damage to multiple individual components and subcomponents, all associated with one safety system train. For example, consider an electrical breaker failure that leads to a FIRE in both the breaker and an associated pump motor. This failure caused damage to components (that is, the breaker and the pump) as well as subcomponents (for example, the pump motor stator, windings, flywheel, bearings

and electrical connections). The damage to individual components and subcomponents on the affected safety system should therefore be assessed collectively at the system train-level, that is, regardless of their number or location, if all the damaged components are on one safety system train, and no other safety system or system train has been affected, then no emergency declaration is required.

The above basis discussion is not reflected in either the provided BFN, SQN, or WBN EALs CA6 (1) and SA9 (1) TVs or notes associated with BFN, SQN, and WBN EALs CA6 (1) and SA9 (1). Additionally, the basis discussion for the statement quoted above provides information that appears to only modify assessments based on a FIRE or EXPLOSION.

Please add a note to the threshold values for EALs CA6.1 and SA9.1 that clearly indicates that an emergency classification is required if a hazardous event, including a FIRE or EXPLOSION, caused by an equipment failure damages safety system equipment that was otherwise functional or operable, or explain how decision makers will be able to perform timely and accurate assessments of EALs CA6.1 or SA9.1. Note: EPFAQ 2016-002, "Clarification of Equipment Damage" can be referred to if desired.

Please modify the threshold value as needed to be consistent with the proposed basis document regarding when an Alert declaration should be made based on equipment damage as a result of a hazardous event. Note: EPFAQ 2016-002, "Clarification of Equipment Damage" can be referred to if desired.

Please revise the basis discussion as needed to address all hazardous events for BFN, SQN, and WBN EALs CA6 (1) and SA9 (1).

RAI-18 BFN, SQN, and WBN

The ERO basis discussion for proposed BFN, SQN, and WBN EALs CA6 (1) and SA9 (1) states:

The emergency classification guidance provided above may also be used to assess damage caused by electrical arcing if no FIRE or EXPLOSION event is apparent.

The above basis discussion is not reflected in either the provided BFN, SQN, or WBN EALs CA6 (1) and SA9 (1) TVs or notes associated with BFN, SQN, and WBN EALs CA6 (1) and SA9 (1). Additionally, the basis discussion for the statement quoted above provides information that appears to only modify declarations based on a FIRE or EXPLOSION. It appears the proposed BFN, SQN, and WBN EALs CA6 (1) and SA9 (1) are trying to address electrical arcing as a condition that is separate from a fire. Since the proposed definition of a fire, which is consistent with endorsed guidance, states, "Combustion characterized by heat and light," electrical fires are already included in BFN, SQN, and WBN EALs CA6 (1) and SA9 (1) threshold values. The addition of the above electrical arcing discussion could introduce a human factors challenge and result in inaccurate assessments.

Please clarify the discussion relating to electrical arcing from BFN, SQN, and WBN EALs CA6 (1) and SA9 (1) or revise the discussion as necessary to clarify that an electrical fire, which could be characterized by heat and light due to electrical arcing, should be assessed as a fire as defined in the provided EAL definition of a fire.

RAI-19 BFN

The proposed BFN containment fission product barrier loss threshold 1A, for primary containment conditions threshold value states, "Drywell pressure greater than the PCPL curve." The PCPL curve appears to be a part of the BFN SAMG strategy and not part of the EOLs typically used by the on-shift operators. SAMGs are not typically implemented until the technical support center (TSC) is staffed. Additionally, it appears that a pressure limit of 55 PSIG would apply until the containment was substantially flooded. Flooding the containment per SAMGs would represent a containment barrier potential loss condition. The BFN EOLs appear to vent the primary containment when primary containment pressure reaches 55 PSIG. Additionally, the current BFN EAL use 55 PSIG as a primary containment threshold value.

Please clarify the proposed BFN Containment fission product barrier loss threshold 1 A, for primary containment conditions threshold value to use 55 PSIG vice the PCPL curve or provide a discussion that explains how the containment barrier would not be potentially lost when the primary containment was being intentionally vented due to a primary containment pressure at or above the BFN design containment pressure of 55 PSIG. Additionally, ensure the containment barrier threshold discussion is changed as required.

RAI-20 SQN and WBN

For the proposed SQN and WBN fuel clad and RCS fission product barriers, RED entry conditions for the heat sink CSFST are used as a threshold for a potential loss of these barriers. However, the endorsed guidance states:

In accordance with EOPs, there may be unusual accident conditions during which operators intentionally reduce the heat removal capability of the steam generators; during these conditions, classification using threshold is not warranted.

This guidance is included in the barrier threshold basis discussions; however, it is not included in the relevant barrier thresholds.

Please explain why the endorsed guidance concerning making classifications for heat sink conditions when operators intentionally reduce heat removal capability, in accordance with EOPs, is not included in the fission product barrier thresholds as this could result in an inaccurate EAL declaration, or revise accordingly.

RAI-21 BFN

The proposed BFN EAL HU2 (1) includes the following threshold value:

Assessment by Unit 1 and Unit 2 Control Room personnel that an earthquake has occurred.

This threshold value could implies that BOTH the unit 1 and unit 2 control room personnel must perform an assessment to determine that an earthquake has occurred. This threshold value is not consistent with endorsed guidance. The proposed BFN EAL Program manual includes the following General Consideration relative to Valid Indications:

All emergency classification assessments shall be based upon valid indications, reports or conditions. A valid indication, report, or condition, is one that has been verified through appropriate means such that there is no doubt regarding the indicator's operability, the condition's existence, or the report's accuracy. For example, verification could be accomplished through an instrument channel check, response on related or redundant indicators, or direct observation by plant personnel.

Please explain why the above threshold value from the BFN EAL HU2 (1) is required and how it will be accurately and consistently performed in a timely manner.

RAI-22 SQN

The proposed SQN EAL HU2 (1) includes the following threshold value:

Seismic event greater than Operating Basis Earthquake (OBE) as indicated by Panel XA-55-15B alarm windows E-2 and D-1 activated

Please explain how the activation of Panel XA-55-15B alarm windows E-2 and D-1 can be used to discriminate a seismic event that is greater than an OBE and a seismic event that is less than an OBE.

If the activation of Panel XA-55-15B alarm windows E-2 and D-1 cannot be used to accurately assess an OBE condition, then please explain how the seismic instrumentation at SQN can be used to perform a timely and

accurate assessment of a seismic event or provide an alternate EAL threshold that is consistent with the developer notes provided in endorsed guidance.

RAI-23 SQN and WBN

The proposed SQN and WBN EAL HU2 basis discussions include the following example:

Earthquakes of this magnitude should be readily felt by on-site personnel and recognized as a seismic event (for example, typical lateral accelerations are in excess of 0.08g).

Although this example is consistent with endorsed guidance, the guidance is intended to be an example that is replaced by site-specific values.

Please clarify the SQN and WBN HU2 basis discussions to reflect SQN and WBN values respectively.

RAI-24 BFN, SQN, and WBN

The areas listed in Table H-2, "Fire Areas," in the proposed BFN, SQN, and WBN EAL HU4 seem to be vague or too all-encompassing. The endorsed guidance states: "the "site-specific" list of plant room should specify these rooms or areas that contain SAFETY SYSTEM equipment."

Please explain if the listed areas are restricted to only the areas that contain equipment needed for safe operation, safe shutdown and safe cool-down, or revise accordingly consistent with endorsed guidance.

RAI-25 BFN

For SU4 (3), the proposed threshold value is 25 gpm. This is not consistent with SU4 (2) and is less than the BFN technical specification value.

Please clarify the proposed SU4 (2) threshold value of 30 gpm RCS leakage as a threshold value for SU4 (3) to eliminate a potential human factor challenge to timely and accurate assessment of SU4.

Hearing Identifier: NRR_PMDA
Email Number: 3539

Mail Envelope Properties (Andrew.Hon@nrc.gov20170523120000)

Subject: REQUEST FOR ADDITIONAL INFORMATION RELATED TO TVA FLEET LAR FOR EAL Change to Adopt NEI-99-01 Rev.6 (CAC NOS. MF9054 - MF9060)
Sent Date: 5/23/2017 12:00:14 PM
Received Date: 5/23/2017 12:00:00 PM
From: Hon, Andrew

Created By: Andrew.Hon@nrc.gov

Recipients:

"Beasley, Benjamin" <Benjamin.Beasley@nrc.gov>
Tracking Status: None
"Saba, Farideh" <Farideh.Saba@nrc.gov>
Tracking Status: None
"Schaaf, Robert" <Robert.Schaaf@nrc.gov>
Tracking Status: None
"Hoffman, Raymond" <Raymond.Hoffman@nrc.gov>
Tracking Status: None
"Hammargren, Benjamin John" <bjhammargren@tva.gov>
Tracking Status: None
"Schrull, Edward Dustin (edschrull@tva.gov)" <edschrull@tva.gov>
Tracking Status: None

Post Office:

Files	Size	Date & Time
MESSAGE	23808	5/23/2017 12:00:00 PM

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received: