



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

June 2, 1995

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

Gentlemen:

In the Matter of)	Docket Nos.	50-327
Tennessee Valley Authority)		50-328

SEQUOYAH NUCLEAR PLANT (SQN) - REQUEST FOR ADDITIONAL
INFORMATION (RAI) - EMERGENCY ACTION PLAN CONVERSION TO NUMARC
EMERGENCY ACTION LEVELS (EALs)

By letter dated October 19, 1994, TVA submitted a revision to Appendix B of TVA's Radiological Emergency Plan for SQN Units 1 and 2. The proposed revision, when approved, will replace the current EALs developed from NUREG-0654 guidance with EALs developed from the NUMARC methodology. By letter dated March 15, 1995, the staff requested additional information to support continued review of the SQN EAL conversion. Enclosure 1 to this letter provides TVA's reply to the subject RAI. Any deviations from the NUMARC guidelines are discussed in Enclosure 1. In support of the staff review effort, TVA also submits Enclosures 2 and 3. Enclosure 2 is a revised copy of the subject EALs which occurred as a result of a meeting between NRC and TVA in Rockville, Maryland, on March 22, 1995. A cross-reference between the NUMARC EAL designator and the SQN EAL designator is included in Enclosure 2. Enclosure 3 is a copy of the Emergency Plan Implementing Procedure 1.

The staff also requested that TVA describe the process used to develop the SQN EALs, including a discussion of the internal review by site and corporate representatives. This information is provided as Enclosure 4 to this submittal.

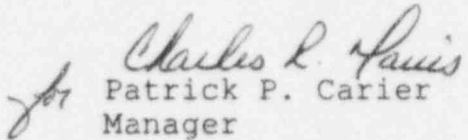
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If you have any questions regarding this reply, please call
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Sincerely,


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Enclosures

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ENCLOSURE 1
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
REPLY TO REQUEST FOR ADDITIONAL INFORMATION
50-327,328

EAL REVISION CONFORMING TO NUMARC/NESP-007 METHODOLOGY

I. GENERAL

NRC Comment I.1

NUMARC/NESP-007 provides the following guidance concerning emergency class downgrading:

A combination approach involving recovery from General Emergencies and some Site Area Emergencies and termination from Unusual Events, Alerts, and certain Site Area Emergencies causing no long-term plant damage appears to be the best choice. Downgrading to lower emergency classes adds notifications but may have merit under certain circumstances.

No downgrading approach was included in the submittal package. Additionally, the SQN submittal did not include a classification implementing procedure nor an emergency plan section that discussed the classification methodology using the NUMARC scheme. The licensee should provide information on how the emergency director would use the NUMARC classification methodology.

TVA Response

TVA's philosophy will be to terminate rather than downgrade due to the potential confusion that this has created for the state and local response agencies. This is implemented in SQN Emergency Plan implementing Procedure (EPIP) 16 and CECC EPIP-13, along with the new EALs.

NRC Comment I.2

In that a "Definitions/Acronyms" section was not included with the EAL tables, the following were noted:

- a. Some words were undefined that were subjective in nature (e.g., "aircraft" - does that include a helicopter, an ultralight, a para-glider?)
- b. Some terms used were undefined. Specifically, "lower toxicity limit" in the Toxic Gas EAL (UE, 4.4).
- c. Some terms were used which have been superseded, e.g., the term "Total Body" was used in the calculations related to radiological effluents. "Total Body" has no meaning according to 10CFR20 and was undefined.
- d. Some definitions were repeated on numerous occasions - each time the same word(s) was used for a different EAL, the definition was repeated (e.g., the definition of VALID).

TVA Response

- a. A definitions page is included in each section of EPIP-1 and has been added to the basis. TVA does not feel that a definition of the generic term is necessary. The operators understand the term includes all heavier than air vehicles.
- b. Lower toxicity limits vary for each gas in question. Material Safety Data Sheets are available in various areas onsite including the Control Room. The SOS is trained to know where the MSDS are and how to get the L.T.L. A reference to the MSDS for lower toxicity limits and lower explosive limits is added to the 4.3 and 4.4 UE and alert.
- c. This term, total body, is in the UE basis and refers to SQN ODCM terms and limits. The ODCM is not converted to the 10CFR20 terminology.
- d. The definition of "valid" is generic to all applications in the procedure. The definition is on each definition page in each section of EPIP-1 and is on the basis definition page. It is repeated in the basis body for reference only. It is repeated only in Appendix B.

NRC Comment I.3

During the review some human factor and grammatical issues were noted. For example:

- a. The "Assessment Method" to be used to evaluate gaseous releases is hidden under Table 7-1. The EAL should focus on performing the assessment in accordance with _____, etc., rather than making the classifier go find it.
- b. There was an inconsistent use of letters and numbers for EAL numbering, an inconsistent use of capitalization for some words in the EALs and small case letters for other words of the EALs that are as important, and an inconsistent use of periods after some sentences and phrases and not after others. (Specifically, Toxic Gas EAL [UE, 4.4])
- c. Several typos were identified (e.g., page B-177, the reference should be NUMARC/NESP-007, AAI [not AA2]).

TVA Response

- a. TVA agrees. An explanation of the assessment method and criteria now proceeds the table and is in a prominent position at the top of the table.
- b. TVA agrees. A full review is complete and any errors are corrected.
- c. TVA agrees. A complete review is finished and any typos detected are corrected.

NRC Comment I.4

During the review it was noted that there were few references to the contemporaneous effects of an event in a unit which would affect the other unit. Further, in a few EALs (e.g., UE 2.1) the words "On either unit ..." were used, but in most EALs it was not clear that the EAL applied to each and both units. No introductory material indicated that all EALs applied to both units.

TVA Response

TVA agrees. A statement has been added to Appendix B and EPIP-1 to clearly indicate that all EALs apply to each and both units and that the classifier must be aware of simultaneous affects on the adjacent unit. The words "On either unit..." are used for unitized equipment (e.g., diesel generators).

NRC Comment I.5

There was confusion due to the mixing of Initiating Conditions (ICs) and EALs and in some cases, not using ICs at all. For example, the fission product barrier EALs list the parameter being evaluated as the IC, and list the EAL(s) as Description. "Reactor Vessel Water Level" is not an IC (e.g., see page B-20). As a matter of fact, the NUMARC guidance does not use an IC (such as "Low Reactor Vessel Water Level") for the fission product barrier matrix - NUMARC proceeds directly to the EAL. Conversely, NUMARC Recognition Categories A, H, and S do use ICs, and then list the threshold values as the EALs. The licensee termed the IC an "Event" (e.g., Loss of AC) and termed the EALs, "Description." Furthermore, many of the "Descriptions" included a detailed IC, and then redundantly listed the supporting EALs with the same threshold criteria that appeared in the "Description" introductory sentence. This redundancy increases the bulk of each IC/EAL set and may impede prompt decision making and classification.

TVA Response

TVA does not feel that this is an impediment or confusing to Operations. Classification exercises with operators do not identify this as a problem.

NRC Comment I.6

Consideration should be given to separating the Basis document from the NP-REP. The basis document should be a controlled, daily, working document, readily available and changed as errors are detected through the plant change review process.

TVA Response

The Radiological Emergency Plan is a licensing document. Appendix B, the basis document, is a major element of the plan. SQN EPIP-1 implements the plan with Appendix B being used in parallel for additional information and the EAL basis. As errors are identified in either document they are corrected and revised simultaneously.

II. SPECIFIC

NUMARC Recognition Category A - Abnormal Rad Levels/Radiological Effluent

NRC Comment II.1

The NUMARC example EAL AUI-1 states:

A valid reading on one or more of the following monitors that exceeds the "value shown" (site-specific monitors) indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site-specific procedure):

(site-specific list)

Note: If the monitor reading(s) is sustained for longer than 60 minutes and the required assessment cannot be completed within this period, then the declaration must be made based on the valid reading.

The licensee equivalent EAL for gaseous effluent monitors, Unusual Event, 7.1 stated:

1. A VALID rad monitor reading exceeds the values under Unusual Event in Table 7-1 (Page 182) for > 60 minutes unless assessment within this time period confirms that the criterion is Not exceeded.

The licensee equivalent EAL for liquid effluent monitors, Unusual Event, 7.2 stated:

1. A VALID rad monitor reading exceeds the values under UE in Table 7-1 (Page 182) for > 60 minutes, unless assessment within this time period confirms that the Criterion is Not exceeded.
 - a. NUMARC specifies that a declaration shall be made if a monitor reading exceeds a threshold value for > 60 minutes and the required assessment cannot be completed in the same timeframe. The indirect licensee EAL statement does not fulfill the intent of the NUMARC EAL with respect to mandatory assessment accompanying the high monitor reading.

- b. NUMARC specifies a site-specific list of monitors that may result in a classification if an assessment is not completed in a timely manner. The licensee implemented the gaseous effluent EAL with different monitors in different locations for the four classifications:

- 1-, 2-RM-90-400, Shield Building
- 0-RM-90-101B, Auxiliary Building
- 0-RM-90-132B, Service Building
- 1-, 2-RM-90-119, Condenser Vacuum Exhaust

Other monitors such as main steam safeties or steam dump monitors were not mentioned in the basis document, nor their absence explained.

- c. Several of the calculated threshold values listed in Table 7-1 for emergency declaration exceed the instrument range; e.g., the Service Building instrument range (0-RM-90-132B) is $1.0E + 07$ cpm, but the Alert threshold is $3.0E + 07$ cpm. A table footnote instructs the classifier, "If the monitor is offscale then use the ASSESSMENT METHOD to determine the release rate." Instructions for the following situations were not addressed:

- (1) When the monitor is offscale; and
- (2) The time to complete the assessment has expired.

- d. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. A note is included in EPIP-1, Table 7-1, to indicate required actions. That statement was added to Table 7-1 on page 159 of Appendix B. (See comment I.3.a)

In the basis for each classification, a discussion was added to explain that assessment is required, the assessment method, and the requirement for classification.

- b. SQN does not have installed main steam safety or steam dump radiation monitors.
- c. TVA believes that this comment and II.1.a are the same, and the above response applies to this statement also.

NRC Comment II.2

The NUMARC example EALs AUL-3 and -4 state:

3. Valid reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background for 60 minutes (for sites having telemetered perimeter monitors).

4. Valid indication on automatic real-time dose assessment capability greater than (site-specific value) for 60 minutes or longer. (for sites having such capability)
- a. There were no equivalent licensee EALs, and no explanation for their omission was included in the basis document.
- b. Provide additional information that explains the omission of these EALs.

TVA Response

- a. SQN does not have telemetered perimeter monitors or automatic real-time dose assessment capability.

NRC Comment II.3

The NUMARC criteria for initiating condition (IC) AU2 state:

AU2 Unexpected Increase in Plant Radiation or Airborne Concentration.

EXAMPLE EMERGENCY ACTION LEVELS: (1 or 2 or 3 or 4)

1. (Site-specific) indication of uncontrolled water level decrease in the reactor refueling cavity with all irradiated fuel assemblies remaining covered by water.
2. Uncontrolled water level decrease in the spent fuel pool and fuel transfer canal with all irradiated fuel assemblies remaining covered by water.
3. (Site-specific) radiation reading for irradiated spent fuel in dry storage.
4. Valid direct area radiation monitor readings increase by a factor of 1000 over normal* levels.

* Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

The equivalent licensee IC and EALs (UE, 7.4) for the NUMARC IC and EALs AU2-1 and AU2-2 stated:

UNPLANNED loss of water level in Spent Fuel Pool or Reactor cavity or Transfer Canal with fuel remaining covered (1 and 2 and 3)

1. Plant personnel report water level drop in spent fuel pool or reactor cavity or transfer canal.

2. VALID alarm on RM-90-101 or RM-90-102 or RM-90-103.
3. Fuel remains covered with water
- a. Contrary to the logic of the NUMARC guidance, the licensee used an and logic for water level decrease accompanied by increases in refueling floor (?) radiation monitor readings. As stated in the NUMARC basis information, the (loss of water level) as a precursor to a more serious event warrants an Unusual Event declaration without other supporting conditions.
- b. There was no equivalent licensee EAL for NUMARC EAL AU2-3, and its omission was not explained in the basis document.
- c. The licensee equivalent IC and EAL (UE, 7.3) for NUMARC EAL AU2-4 stated:

UNPLANNED increases in Radiation levels within the facility

1. VALID area Radiation Monitor readings increase by a factor of 1000 mrem/hr over normal levels
- d. No information was provided in the basis document (or the EAL) as to how the emergency classifier would comply with the NUMARC guidance concerning establishing what normal levels had been during the past 24 hours.
- e. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. SQN does not have installed means for monitoring level, other than a \pm 3-inch level change alarm, in the identified areas. An additional aid is indication of increasing rad levels. Classification would not be based on the alarm alone.
- b. SQN does not maintain dry storage.
- c. This is a NRC comment (restatement of the EAL).
- d. TVA agrees. EAL 7.3 UE is revised to include "...over the highest reading in the past 24 hours excluding the current peak value."

NRC Comment II.4

The NUMARC criteria for IC AA2 state:

Major Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

EXAMPLE EMERGENCY ACTION LEVELS: (1 or 2 or 3 or 4)

1. A (site-specific set point) alarm on one or more of the following radiation monitors: (site-specific monitors)

Refuel Floor Area Radiation Monitor
Fuel Handling Building Ventilation Monitor
Fuel Bridge Area Radiation Monitor
2. Report of visual observation of irradiated fuel uncovered.
3. Water level less than (site-specific) feet for the Reactor Refueling Cavity that will result in irradiated fuel uncovering.
4. Water level less than (site-specific) feet for the Spent Fuel Pool and Fuel Transfer Canal that will result in irradiated fuel uncovering.

The licensee equivalent IC and EALs (Alert, 7.4) stated:

Major damage to irradiated fuel or loss of Water Level that has or will uncover irradiated fuel outside the Reactor Vessel (1 and 2).

1. VALID alarm on RM-90-101 or RM-90-102 or RM-90-103 or RM-90-130/131 or RM-90-112

2. (a or b)

- a. Plant personnel report damage of irradiated fuel sufficient to rupture fuel rods

OR

- b. Plant personnel report water level drop has or will exceed makeup capacity such that irradiated fuel will be uncovered in the spent fuel pool or fuel transfer canal

- a. Contrary to the logic of the NUMARC guidance, the licensee used an "and" logic for water level decrease accompanied by increases in refueling floor and containment particulate, iodine, and gas monitors and area monitor readings. An explanation for the logic change was not provided in the basis document.
- b. The NUMARC guidance required site-specific water levels below which a classification was to be made. The site-specific values were not provided in the licensee EALs nor was their absence explained in the basis document.
- c. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA believes that this comment and II.3.a are the same and the above response applies to this statement also.
- b. SQN does not have installed means for monitoring level, other than a \pm 3-inch level change alarm, in the fuel pool or transfer canal. Validation of the alarms by visual observation of water level decrease is an additional aid in determining actual conditions.

NRC Comment II.5

The NUMARC criteria for IC AA3 and EAL AA3-2 state:

AA3 Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown.

2. Valid (site-specific) radiation monitor readings GREATER THAN <site-specific> values in areas requiring infrequent access to maintain plant safety functions:

- (Site-specific) list

The licensee equivalent EAL for Area Radiation Levels, Alert, 7.3 stated:

2. (a and b)
 - a. VALID area radiation monitor readings exceed values listed in Table 7-2 (Page 190)
 - b. Access restrictions impede operation of systems necessary for Safe Operation or the ability to establish Cold Shutdown
- a. The licensee's EAL included the conditional criteria that access was required to a particular area at the time of declaration, whereas, the NUMARC criteria required an Alert declaration if radiation monitor readings in one or more areas increased above the site-specific value. The conditional "and" criteria of the EAL was inconsistent with the NUMARC guidance, and was not explained in the basis document.
- b. All of the threshold values listed in Table 7-2 for emergency declaration exceeded the instrument range; e.g., the aux feed pumps instrument range (1-RE-90-8) is 0.2 to 1E + 03 mrem/hr, but the Alert threshold is 1.5E + 03 mrem/hr. Thus values have been listed in the table that are unable to be read on the monitor. No instructions were provided to the classifier for the situation.

- c. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA disagrees. If access is not required and operation of systems to establish or maintain cold shutdown is not required or jeopardized then this should not be classified. An equivalent classification would most likely be due to other causes. If access is not required this event may not be classified.
- b. TVA agrees. This is a typo that is corrected. All instrument ranges are 0.2 to 1E+4 mrem/hr., except 1,2-RE-90-2 range is .1 to 1E+4 rem/hr. EPIP-1 is correct.

NRC Comment II.6

The NUMARC criteria for IC ASI and EAL ASI-1 state:

ASI Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR Whole Body or 500 mR Child Thyroid for the Actual or Projected Duration of the Release.

1. A valid reading on one or more of the following monitors that exceeds or is expected to exceed the value shown indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site-specific procedure):

(site-specific list)

Note: If the monitor reading(s) is sustained for longer than 15 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.

The equivalent licensee IC and EAL (Site Area Emergency, 7.1) stated:

Exclusion Area Boundary (Beta-Gamma) Dose resulting from an actual or imminent release of Gaseous Radioactivity that exceeds 100 mrem (TEDE or 500 mrem Thyroid CDE for the actual or projected duration of the release.

1. A VALID rad monitor reading exceeds values under Site Area (Emergency) in Table 7-1 (Page 182) for > 15 minutes, unless assessment within this time period confirms that the Criterion is Not exceeded.

- a. The basis document included the calculational details for the monitor readings of Table 7-1. Each of the Type 1 and II releases used a value of 0.25 for the length of the release, hr. This inconsistency with the NUMARC guidance of 1 hour was not explained.
- b. The calculation indicated that SQN cannot read iodine release rates directly with any installed monitors, thus a second calculation was performed to determine a noble gas release rate that corresponds to the associated iodine release rate. The calculation used a standard ratio of iodine to noble gas release rate (0.001) which is used in CECC procedures for dose assessment. No further explanation for this value was provided; furthermore, the value is inconsistent with industry literature on the subject.
- c. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. The recalculations are complete and are based on setting the threshold value for a 1-hour release with the requirement to complete assessment within 15 minutes, (60 minutes for UE).
- b. 0.001 is a default value based on containment filter efficiencies for Iodine and agreed upon by TVA and the state of Tennessee. This value has been used for several years. The value is the standard ratio of iodine to noble gas release rate and is very conservative with respect to the SQN FSAR nuclide distribution.

NRC Comment II.7

The NUMARC criteria for initiating Condition AG1 state:

Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity that Exceeds 1000 mR Whole Body or 5000 mR Child Thyroid for the Actual or Projected Duration of the Release Using Actual Meteorology.

The licensee equivalent IC for effluent monitors, General Emergency, 7.1 stated:

Exclusion Area Boundary Dose resulting from an actual or imminent release of Gaseous Radioactivity that Exceeds 1000 mrem TEDE or 5000 mrem Thyroid CDE for the actual or projected duration of the release.

- a. NUMARC specifies the use of actual meteorology for the dose projections. The licensee EAL did not reflect the use of actual meteorology for dose projections, nor was the requirement for the use of actual meteorology stated in the basis document.

- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

IVA Response

- a. TVA dose assessment programs use actual meteorological data. The real time data is automatically entered into a computer based assessment program.

Recognition Category F - Fission Product Barrier Degradation

NRC Comment II.8

The NUMARC criteria for Recognition Category F, Fission Product Barrier Reference Table 4, provide guidance on the concept of "IMMINENT." The criteria states,

"... an event (or multiple events) could occur which result in the conclusion that exceeding the Loss or Potential Loss thresholds is IMMINENT (i.e., within 1 to 2 hours). In this IMMINENT LOSS situation use judgment and classify as if the thresholds are exceeded."

- a. This concept was not included in the "Fission Product Barrier Utilization in Emergency Event Classification" (Page B-31 through B-39) section of Appendix B of the REP nor discussed in the basis document.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-07 guidance.

TVA Response

- a. Imminent is addressed in the definitions pages in EPIP-1 and page 7 instructions for using Section 1 of EPIP-1. A table of contents and definitions page is now included in the basis document.

NRC Comment II.9

The NUMARC criteria for Fuel Clad Barrier Example EALs (Table 4, Fission Product Barrier Reference Table), #6, state:

6. Other (Site-Specific) Indications

(Site-Specific) as
applicable

(Site-Specific) as
applicable

- a. There was no equivalent licensee EAL for the NUMARC example EAL nor was the omission explained in the basis document. In each of the sections of NUMARC guidance for the barriers, examples of "other" EALs to be considered were provided. No rationale was provided why the suggested examples were not applicable to SQN.

- b. Provide additional information that explains the omission of this EAL.

TVA Response

- a. TVA does not feel there are additional indications needed. Based on the barrier criteria and the logic used for classification, additional indications were not required.

NRC Comment II.10

The NUMARC criteria for RCS Barrier Example EALs (Table 4), #4, state:

4. Containment Radiation Monitoring

LOSS

Containment rad monitor reading
GREATER THAN (site-specific) R/hr

POTENTIAL LOSS

Not applicable

- a. The licensee provided no equivalent EAL to the NUMARC example EAL, and provided no explanation for its absence in the basis document.
- b. Provide additional information that explains the omission of this EAL.

TVA Response

- a. SQN does not have containment rad monitors to directly measure RCS leakage without fuel damage. Other site specific indications are provided for RCS leakage. These are addressed in Section 2.0 and Section 7.0.

NRC Comment II.11

The NUMARC criteria for RCS Barrier Example EALs (Table 4), #5, state:

4. Other (Site-Specific) Indications

LOSS

(Site-Specific) as
applicable

POTENTIAL LOSS

(Site-Specific) as
applicable

The licensee implemented an "other" EAL (1.2.4) based upon reactor vessel water level as follows:

LOSS

VALID RVLIS level < 40% on
LI-68-368 or 371 with No RCP
Running (FR-C.2)

POTENTIAL LOSS

Not Applicable

- a. The parenthetical expression (FR-C.2) was inconsistent with the EAL statement. The EAL utilizes criteria of low reactor vessel water level and no reactor coolant pumps running. Entry conditions for FR-C.2 include RVLIS Full Range water level and no RCPs running, and core exit thermocouple (TC) temperatures, and RCS subcooling based upon TCs. The inconsistency of two criteria in the body of the EAL, and the four criteria of FR-C.2 entry conditions was not explained in the basis document. Confusion to a classifier may result from the inconsistency - "Is classification based upon the two criteria of the EAL or the four entry conditions of FR-C.1?" EALs are to be clear and unambiguous.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. The intent is to use the two criteria of the EAL. The reference to FR-C.2 has been removed. Reference to FR-C.2 is also removed from EAL 1.1.4. Additionally, in the basis, 40 percent RVLIS level has been noted as 3.5 feet above core bottom or 8.5 feet exposed fuel, for information to the operators.

NRC Comment II.12

The NUMARC criteria for Containment Barrier Example EALs utilizing Core Exit Thermocouple Readings as the EAL thresholds state:

CONTAINMENT BARRIER EXAMPLE EALs

6. Core Exit Thermocouple Readings

LOSS

Not applicable

POTENTIAL LOSS

Core exit thermocouples in excess of 1200°F and restoration procedures not effective within 15 minutes; or core exit thermocouples in excess of 700°F with reactor vessel level below top of active fuel and restoration procedures not effective within 15 minutes.

The licensee's equivalent EAL was found in IC 1.3.1, Critical Safety Function Status, as:

LOSS: Not applicable

POTENTIAL LOSS

Containment Red (FR-Z.1)

(corresponds to NUMARC #1, CSFS)

OR

Actions of FR-C.1 (Red Path) are INEFFECTIVE (i.e., core TCs trending up)

The licensee's basis document stated:

In this IC, the functional restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered ineffective if the temperature is not decreasing or if the vessel water level is not increasing.

- a. Although the criteria of vessel water level and core exit thermocouple temperature were included in the licensee EAL, the NUMARC criteria for time to permit activities of FR-C.1 to take effect have not been addressed. The NUMARC guidance in the basis information is clear; whether or not the procedures will be effective should be apparent within 15 minutes. The absence of the time element from the licensee EAL was not explained in the licensee's basis document.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. Fifteen (15) minute criteria to determine effectiveness of FR-C.1 is now in the basis in the definition of INEFFECTIVE. The definition is already part of EPIP-1 and in the basis statement of IC 1.3.1 Potential Loss.

NRC Comment II.13

The NUMARC criteria for Containment Barrier Example EALs (Table 4, Fission Product Barrier Reference Table), #7, state:

7. Other (Site-Specific) Indications

(Site-Specific) as applicable

The licensee implemented this example EAL with:

1.3.4 Containment Bypass

POTENTIAL LOSS

Unexplained VALID increase in area or Ventilation RAD monitors adjacent to containment (with LOCA in progress)

- a. NUMARC guidance for model EALS requires that the EALS be objective and unambiguous. The phrase Unexplained VALID increase did not appear to be objective and unambiguous. For example, how much increase constitutes the basis for a declaration, and how does the value differ from the Alert EAL 7.3, TABLE 7-2 for unplanned increases in radiation levels?
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA disagrees. To set a single threshold value for EAL 1.3.4, potential loss is not possible. Dose rates through the Rx. shield building from activity released into containment were calculated. The source terms used are R.G. 1.4 sources diluted by the full volume of injection water available, plus melted ice from containment. The study assumed the design LOCA.

The areas around containment are separated into zones on the different elevations. The zones are established on the basis of the highest dose rate in the area, resulting from all the contained sources within or abutting the zone, one-half hour after the accident. The SQN FSAR shows the relative dose rate in the zones as a function of time after the accident normalized to the dose rate at 0.5 hour. The results indicate that the zone whose dose rate is due only to shine from containment varies from 7.7×10^3 mrem/hr at 0.5 hour to 7.7 mrem/hour at 24 hours following the accident. Other zones, although not as dramatic, exhibit the same characteristic over a longer period of time. With a continually changing dose rate, coupled with an unknown initial source term, establishing a threshold value for classification is not a valid approach. An expanded basis to indicate the intent of "unexplained" has been added to the EAL.

Recognition Category H - Hazards and Other Conditions

NRC Comment II.14

The NUMARC example EAL HU1-4 states:

4. Vehicle crash into plant structures or systems within protected area boundary.

The equivalent licensee EALs (5.3 Aircraft/Projectile and 5.6 Watercraft Crash) stated:

- 5.3 Aircraft crash or PROJECTILE impacts (Strikes) within the EXCLUSION AREA BOUNDARY
- 5.4 Watercraft Strikes the ERCW Pumping Stations resulting in a reduction of Essential Raw Cooling Water (ERCW)

The NUMARC basis information states, EAL 4 is intended to address such items as plane or helicopter crash, or on some sites, train crash, or barge crash that may potentially damage plant structures containing functions and systems required for safe shutdown of the plant.

- a. Although the specific vehicles mentioned in the basis information were addressed by the licensee EALs, the licensee's basis document did not confirm that other vehicles, such as trucks, operating within the Protected Area (Figure 4-A), could not possibly potentially damage plant structures ... required for safe shutdown of the plant, such as the diesel generator building. This same comment applies to NUMARC example EAL HAI-5.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. The definition of projectile, in EPIP-1, is an object ejected, thrown, or launched.... This is understood to include land type vehicles.

NRC Comment II.15

The NUMARC example EAL HUI-5 states:

5. Report by plant personnel of an unanticipated explosion within protected area boundary resulting in visible damage to permanent structure or equipment.

The equivalent licensee EAL (4.2 Explosions) stated:

EXPLOSION Within the PROTECTED AREA (Figure 4-A) Resulting in VISIBLE DAMAGE to Any Permanent Structure or Equipment.

- a. Although the NUMARC example EAL includes the modifier unanticipated, the licensee EAL does not include "unanticipated." However, the licensee's basis document indicated the criteria should have been included: Unplanned is included in the IC to preclude the declaration of an emergency as a result of a planned maintenance action. The omission of the criteria "unanticipated" in the EAL was not explained in the basis document.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. The EAL is revised with "unplanned" added to address the unanticipated aspect. Unplanned is defined in EPIP-1 and Appendix B.

NRC Response II.16

The NUMARC example EAL HU2-1 states:

Fire in buildings or areas contiguous to any of the following (site-specific) areas not extinguished within 15 minutes of control room notification or verification of a control room alarm:

(Site-specific) list

The licensee equivalent EAL for Fire, Unusual Event, 4.1 stated:

FIRE within the PROTECTED AREA (Figure 4-A) Threatening any of the Areas Listed in Table 4-1 that is Not Extinguished within 15 Minutes From the Time of Control Room notification or Verification of Control Room Alarm.

- a. NUMARC provides for emergency declaration for fires in or contiguous to defined areas immediately adjacent to plant vital areas. The licensee EAL omitted this concept, and used the term Threatening the listed areas. The term threatening was not defined nor discussed in the basis document and no explanation was provided for using the term Threatening instead of in ... or contiguous to.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. The intent is to allow a graduated response from threatening to affecting. It is felt that a fire threatening the listed areas is contiguous to those areas. Threatening is now defined in 4.1 UE basis as: The listed structures are considered to be threatened if a fire is in an area adjacent to or is in actual contact with the listed structure.

NRC Comment II.17

The NUMARC IC and example EAL HU3-1 state:

HU3 Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant

1. Report or detection of toxic or flammable gases that could enter within the site boundary in amounts that can affect normal operation of the plant.

The licensee implemented the above example EAL with two separate EALs, one for toxic gas, the other for flammable gas. The flammable gas EAL was acceptable. The toxic gas EAL (UE, 4.4) was implemented with the following:

- A. Safe Operations impeded due to access restrictions caused by TOXIC GAS or SMOKE concentrations within a Facility Structure Listed in Table 4-2.

The NUMARC basis information states, This IC is based on releases in concentrations ... that will affect the health of plant personnel...

- a. The licensee EAL provided no reference criteria for concentrations of toxic gas above which the health of personnel would be affected. Without quantitative criteria, an objective emergency declaration cannot be made. It was noted that the licensee EAL for flammable gas emergencies did include criteria for concentrations.
- b. Provide additional information that explains the omission of reference criteria for concentrations of toxic gas.

TVA Response

- a. This is left to the professional judgment of the Site Emergency Director to determine if safe operations is impeded. This is appropriate for a U.E. If when sampled the gas is >LTL then an Alert is appropriate.

NRC Comment II.18

The NUMARC example IC HA1 and EAL HA1-2 state:

HA1 Natural and Destructive Phenomena Affecting the Plant Vital Area.

EXAMPLE EMERGENCY ACTION LEVELS: (1 or 2 or 3 or 4 or 5 or 6 or 7)

1. (Site-specific) method indicates Seismic Event greater than Operating basis Earthquake(OBE).
2. Tornado or high winds striking plant vital areas: Tornado or high winds greater than (site-specific) mph strike within protected area boundary.
3. Report of any visible structural damage on any of the following plant structures:
 - Reactor Building
 - Intake Building, etc.
4. (Site-Specific) indications in the control room.

The licensee implemented EALs HA1-2, -3, and -4 with 5.2 "Tornado" that stated:

Tornado or High Winds strikes any structure listed in Table 5-1 and results in VISIBLE DAMAGE (1 and 2)

1. Tornado or High Winds (Sustained >80 mph >one minute on O-XR-90-181) strikes any structure listed in Table 5-1.
2. (a or b)
 - a. Confirmed report of VISIBLE DAMAGE

OR

- b. Control Room indications of degraded Safety System or component response due to the event.

The NUMARC logic for the example EALs was any one of the listed EALs should cause a declaration (or logic). The NUMARC basis information stated:

Each of these EALs is intended to address events that may have resulted in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

- a. The licensee's EAL structure required that a tornado or high wind condition be observed and a confirmed report or indications of system degradation. This logic appears to be inconsistent with the anticipatory philosophy of the NUMARC guidance, and was not explained in the basis document.

- b. The licensee implemented EAL HA1-1 with 5.1 Earthquake as follows:

Earthquake detected by site seismic instrumentation (1 and 2)

1. Panel XA-55-15B Alarm Window 30 (E-2) Plus Either Window 22 (D-1) or 29 (E-1) Activate
2. (a or b)
 - a. Ground motion sensed by Plant personnel

OR

- b. National Earthquake Information Center at (303) 273-8500 can confirm the event.

- c. The NUMARC logic requires an Alert declaration based upon a site specific method detecting an earthquake greater than OBE. The licensee's EAL requires detection by instrumentation and confirmation by observation. Again, this logic appears to be inconsistent with the anticipatory philosophy of the NUMARC guidance, and was not explained in the basis document.
- d. Additionally and unlike Item 18. A., above, concerning tornadoes and high winds, the licensee EAL set did not include an EAL of Report of any visible structural damage...related to potential earthquake damage. Since there is no generic EAL equivalent to NUMARC EAL HA1-3, the equivalent EAL should be included with any natural or destructive phenomena EALs listed by the licensee.
- e. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. The intent of specifying damage or degradation validates a tornado strike and provides discrimination for events of little or no consequence. Consequential damage (i.e., loss of AC power, loss of functions, etc.) is assessed on the basis of other EALs.
- b. NRC comment.

- c. Confirmation by observation (i.e., ground motion sensed or National Earthquake Information Center confirmation) prevents unnecessary classifications due to inadvertent activation of the alarms by bumping or kicking. The alarms are set at the OBE level. The alarm is validated through observation.
- d. Earthquake does not require visible damage because damage may not be apparent (i.e., structural damage). This is clearly anticipatory to declare rather than wait for confirmation of damage.

NRC Comment II.19

The NUMARC example EAL HA3-1 states:

- 1. Report or detection of toxic gases within a Facility Structure in concentrations that will be life threatening to plant personnel.

The licensee equivalent EAL for Hazards, Alert, 8.3.4 stated:

Release of TOXIC GAS or SMOKE within a facility structure which Prohibits Safe Operation of systems required to establish OR maintain cold S/D (1 and 2 and 3)

- 1. Plant personnel report TOXIC GAS or SMOKE within any building listed in Table 4-2
- 2. (a or b)
 - a. Plant personnel report Severe Adverse Health Reactions due to TOXIC GAS or SMOKE (i.e., burning eyes, nose, throat, dizziness)
 - b. Sampling indicates > Lower Toxicity Limit
- 3. Plant personnel unable to perform actions necessary to establish and maintain Cold Shutdown while utilizing appropriate personnel protection equipment.
 - a. The licensee term in EAL 2.b., Lower Toxicity Limit, was undefined in the basis document. Some toxic gases in use at power plants may have multiple "toxicity limits" that may be construed as a lower toxicity limit.
 - b. Provide additional information that explains the use of "Lower Toxicity Limit" in this EAL.

TVA Response

- a. NRC observation.
- b. The lower toxicity limit for gasses is listed on the Material Safety Data Sheets. These are available in several areas onsite including the control room. A reference to the MSDS is included in the EAL. See response to NRC comment I.2.b.

NRC Comment II.20

The NUMARC example IC and EAL HA5-1 state:

HA5 Control Room Evacuation Has Been Initiated

- 1. Entry into (site-specific) procedure for control room evacuation.

The licensee equivalent EAL, Alert, 4.5 stated:

4.5 Control Room evacuation

Evacuation of the Control Room is Required (1 and 2)

- 1. AOI-27 "Main Control Room Inaccessibility" Has Been Entered
- 2. SOS/SED Orders Control Room Evacuation
- a. The NUMARC criteria specifically initiates the declaration at the time of entry into the control room evacuation procedure. The licensee's EAL was specific about the time of declaration being the procedure entry and when the emergency director orders the evacuation, presumably some time after procedure entry when all preparatory steps have been completed and the Site Emergency Director feels all conditions are in readiness for the actual evacuation. The apparent time difference between the NUMARC guidance and the licensee EALs was not explained in the basis document.
- b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. The requirement to require physical evacuation is deleted from 4.5 Alert.

NRC Comment II.21

The NUMARC example IC HA6 states:

Other Conditions Existing Which in the Judgment of the
Emergency Director Warrant Declaration of an Alert.

The licensee implemented this IC with EAL 4.7, Emergency Director
Judgment, which stated:

Events are in process or have occurred which involve an Actual
or Potential Substantial Degradation of the level of safety of
the plant. Any releases are not expected to be limited to
small fractions of the EPA

- a. The licensee mis-stated the definition of an Alert emergency
with, ...not expected to be limited to small fractions. For an
Alert, any releases are expected to be but small fractions of
EPA guidelines.
- b. Provide additional information that explains this deviation
from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. The definition is corrected by removing the word
not. EPIP-1 is correct.

NRC Comment II.22

The NUMARC example IC and EALs HS1-1 and -2 state:

HS1 Security Event in a Plant Vital Area.

1. Intrusion into plant vital area by a hostile force.
2. Other security events as determined from (site-specific)
Safeguards Contingency Plan.

The licensee equivalent IC and EAL, 4.6, "Security," stated:

Security Event has or is occurring which results in Actual or
Likely Failures of Plant Functions needed to Protect the Public

VITAL AREA, Other Than the Control Room, Has Been Penetrated by
a Hostile Armed Force

- a. The licensee implemented NUMARC example EAL HS1-1, but omitted an EAL equivalent to HS1-2. The omission was not explained in the basis document.
- b. Provide additional information that explains the omission of this EAL.

TVA Response

- a. There are no other security events defined in the Safeguards Contingency Plan.

NRC Comment II.23

The NUMARC example EAL HS2-1 states:

1. The following conditions exist:
 - a. Control room evacuation has been initiated.
- AND
- b. Control of the plant cannot be established per (site-specific) procedure within (site-specific) minutes.

The equivalent licensee EAL, 4.5, SAE stated:

Evacuation of the Control Room has been initiated and Control of all necessary equipment Has Not been established within 15 minutes of staffing the Auxiliary Control Room (1 and 2 and 3)

1. AOI-27 "Main Control Room Inaccessibility" entered
2. SOS/SED orders Control Room evacuation
3. Control has not been established at the Remote Shutdown Panel within 15 minutes of staffing the Auxiliary Control Room and transferring of switches, listed on Checklist AOI-27-1, on Panels L11A and L11B to the Aux position.

The NUMARC basis information states that:

(Site-specific) time for transfer based on analysis or assessments as to how quickly control must be reestablished without core uncovering and/or core damage. This time should not exceed 15 minutes.

- a. The licensee started the 15 minute clock after staffing the Auxiliary Control Room and after completing switch transfer. This is inconsistent with the NUMARC guidance that starts the clock when control is no longer exercised from the main control room. The licensee stated in the basis document that the 15 minute time limit ... is based on a reasonable time period for personnel to leave the control room, arrive at the Auxiliary Control Room area, and re-establish plant control to preclude core uncover and/or core damage.... The basis document did not cite any assessment or analysis that concluded core damage would not occur for the extended time period of the licensee's EALs.
- b. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA disagrees. Evacuation of the main control room and transfer of switches on the backup control room panels is done in a short period of time (2-3 minutes). Switching on other panels in remote locations takes longer to accomplish. The Site Emergency Director can make a reasonable and informed judgment on reestablishment of plant control by monitoring the remote shutdown panel. Condition #2, SOS/SED orders control room evacuation has been deleted.

Recognition Category S - System Malfunctions

NRC Comment II.24

The NUMARC IC and EAL criteria for SU3 state:

SU3 Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes

1. The following conditions exits:
 - a. Loss of most or all (site-specific) annunciators associated with safety systems for greater than 15 minutes.

AND

- b. Compensatory non-alarming indications are available.

AND

- c. In the opinion of the Shift Supervisor, the loss of the annunciators or indicators requires increased surveillance to safely operate the unit(s).

AND

- d. Annunciator or Indicator loss does not result from planned action.

The equivalent licensee Event and EALs (2.1, Loss of Instrumentation) stated:

On Either Unit UNPLANNED loss of >75% of MCR annunciators and Annunciator Printer or Safety System indications for >15 minutes and P-250 computer or SPDS Unavailable (1 and 2 and 3)

- 1. UNPLANNED loss of >75% of MCR annunciators and Annunciator Printer or Safety System indications for >15 minutes.
 - 2. SOS/SED Judgment that increased surveillance is required (beyond Shift complement) to Safely operate the unit.
 - 3. Neither the P-250 Computer or nor the SPDS is capable of displaying data requested.
- a. The NUMARC IC and example EALs postulate the loss of control room, safety system annunciation or indications, but clearly state that compensatory non-alarming indications are available. The licensee IC and EALs postulate the loss of annunciation or indication, and neither the P-250 computer or the SPDS is operative. Thus the condition appears to be the same as the Alert condition where compensatory indication is not available.
 - b. Provide additional information that explains this deviation from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. Neither...nor is changed to read Either...or. The L requirements are clearer by addition of indication that the loss for >15 minutes also applies to annunciators and annunciator printer, and >75 percent also applies to the safety system indications.

NRC Comment II.25

The NUMARC example EAL SU4-1 states:

1. (Site-Specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.
- a. The licensee provided no equivalent EAL (e.g., failed fuel monitor, containment monitor reading) and provided no explanation for the omission in the basis document.
- b. Provide additional information that explains the omissions of this EAL.

TVA Response

- a. SQN does not have a failed fuel monitor. Containment radiation monitors have been discussed previously in response II.10.a. Fuel clad degradation is monitored through an established chemistry sampling program.

NRC Comment II.26

The NUMARC example EAL SA2-1 states:

(Site-specific) indication(s) exist that indicate that reactor protection system setpoint was exceeded and automatic scram did not occur, and a successful manual scram occurred.

The licensee equivalent IC and EAL 2.3 Failure of Reactor Protection, Alert stated:

RX power >5% and not decreasing after VALID Auto Trip signal failure but Manual Trip is Successful (1 and 2 and 3)

1. VALID Auto Trip failed to trip the Reactor.
2. RX power >5% and not decreasing following Auto Trip Failure.
3. (a or b)
 - a. Manual Trip from the MCR was successful

OR

- b. FR-S.1 entered and immediate operator actions are successful in decreasing RX power to >5%.

- a. The licensee IC is improperly stated. The exception condition is that reactor power is not decreasing after a valid auto trip signal. The word failure should be deleted from the IC.
- b. The licensee added an additional condition (3.b) regarding a success path achieved with implementation of FR-S.1 (rather than just a successful manual scram from the MCR). The added criteria was justified in the basis documentation with,

This IC requires that the actions of FR-S.1 were successful in decreasing the reactor power to less than 5%. Based upon the Westinghouse Owners Group background document analysis, there will be no core damage or impairment of RCS integrity if the success path of FR-S.1 is accomplished. The actions of FR-S.1 must be considered unsuccessful if reactor power is not decreasing when control rods are being inserted or when emergency boration, from the MCR, of the reactor coolant system is taking place.

The time criteria of added EAL 3.b., immediate, was not quantified in the basis document.

- c. The NUMARC basis information states that:

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes the control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., reactor trip button). Failure of manual scram would escalate the event to a Site Area Emergency.

The licensee added criteria which addressed implementing another procedure (FR-S.1) before declaring a SAE. This appears to be inconsistent with the anticipatory philosophy of the NUMARC guidance. More importantly, the failure of the Auto Trip Signal, coupled with presumably, the failure of the manual scram function to perform, represents actual (redundant) failures of plant functions required for protection of the public, the definition of a SAE. This comment also applies to the licensee's EAL concerning NUMARC IC SS2.

- d. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. The word failure is deleted.
- b. TVA agrees. Reference to FR-S.1 is deleted.
- c. TVA agrees. Reference to FR-S.1 is deleted.

NRC Comment II.27

The NUMARC example SA3-1 states:

1. The following conditions exist:
 - a. Loss of (site-specific) Technical Specification required functions to maintain cold shutdown
- AND
- b. Temperature increase that either:
 - Exceeds Technical Specification cold shutdown temperature limit
- OR
- Results in uncontrolled temperature rise approaching cold shutdown Technical Specification limit.

The licensee equivalent EAL for Loss of Shutdown Systems, Alert, 6.1 stated:

Inability to maintain unit in Cold Shutdown when required with containment closure established (1 and 2 and 3)

1. Cold Shutdown required by Technical Specifications.
 2. Incore TCs (if available) indicate Core Exit temperature has increased $>10^{\circ}\text{F}$ and RCS temperature is $>200^{\circ}\text{F}$
 3. CNTNT closure is established.
- a. The licensee EAL did not include the required technical specification functions to maintain cold shutdown. The omission of this criteria was not explained in the basis document. Without the anticipatory declaration that would occur with the loss of shutdown functions, the EAL would appear to be inadequate. The NUMARC criteria seeks to make an early declaration for loss of function, and not wait until the loss of function manifests itself as a significant condition.
 - b. The licensee added the and criteria that CNTNT closure is established. As explained in the basis document:

This Threshold is intentionally anticipatory in that offsite doses are not expected to be affected by reaching 200°F or at the point of boiling provided the containment barrier is in place.

It was unclear what the declaration would be if the containment barrier were not in place. The NUMARC guidance indicates that the declaration is to be made without regard to containment integrity. The basis document did not clarify the reason for the less conservative criteria. This comment also applies to the licensee's EAL concerning NUMARC IC SS5.

- c. The NUMARC declaration logic is based on exceeding the cold shutdown temperature limit or an uncontrolled temperature rise. As explained in the basis document:

The specification of a 10°F temperature increase precludes an Alert declaration for a momentary controllable loss that occurs at a temperature near 200°F. The 10°F value also ensures the declaration is made prior to onset of boiling (212°F) where temperature may temporarily stabilize.

The 10°F for uncontrolled temperature rise is an acceptable value; however, the explanation for the logic of uncontrolled temperature rise and greater than Technical Specification limits is inadequate. A 10°F temperature rise is not considered to be a momentary controllable loss given the size of the heat sink and the amount of temperature change. No analysis was provided in the basis document to show that a "momentary" loss could cause a step change of 10°F. In fact, if such is the case, the EAL should be based upon NUMARC example EAL SA3-1.a. only.

- d. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA disagrees. There are no required functions to maintain cold shutdown in the Technical Specifications.
- b. TVA disagrees. EPIP-1 and the basis both contain a note, as part of the EAL, that refers the Site Emergency Director to Section 7.1, Gaseous Effluents.
- c. TVA agrees. The 10°F value is no longer a criteria required to be met before classification.

NRC Comment II.28

The NUMARC example EAL SS4-1 states:

- 1. Complete loss of any (site-specific) function required for hot shutdown.

The licensee equivalent IC and EAL, 6.2 Loss of Shutdown Capability, SAE stated:

Complete loss of function needed to achieve or maintain Hot Shutdown (1 and 2 or 3)

1. Hot Shutdown required
2. CSF status tree indicates Core Cooling Rod (FR-C.1)

OR

3. CSF status tree indicates Heat Sink Red (FR-H.1) (RHR shutdown cooling not in service)
- a. The licensee has added the criteria (beyond NUMARC guidance) that Hot Shutdown is required. This approach appears to be non-conservative in that Hot Shutdown may be required during the next 5 minutes of operation at power, but since it is not required now, a declaration would not be made. This approach appears to be inconsistent with the anticipatory philosophy of the NUMARC guidance, and was not explained in the basis document.
 - b. The NUMARC criteria specify emergency declaration for complete loss of functions required for hot shutdown, including the ultimate heat sink and reactivity control. The licensee EAL did not address the loss of functions required for hot shutdown. Entry into the CSFST red paths did not provide the anticipatory declaration that loss of functions would. The licensee did not explain the deviation in the basis document. Notwithstanding that ultimately a loss of hot shutdown function may manifest itself as a red path on the CSFSTs, the licensee EAL does not appear to be anticipatory.
 - c. As written, the Initiating Condition appears to be inconsistent with the implementing EALs. Thus the EALs do not appear to be consistent, objective, and unambiguously clear.
 - d. The licensee stated in the basis document, If RHR cooling is in service then the CSF status tree for Heat Sink Red is not applicable. Therefore this comment has been added to the IC. Presumably, the comment referred to relates to EAL 6.2, IC#3. The parenthetical expression following EAL 6.2, IC #3 introduced confusion; if RHR is in service, it is not immediately obvious by reference to only the EAL how to make the emergency declaration.
 - e. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA disagrees. If the condition is within allowable Technical Specification operating conditions, an emergency condition does not exist, and a classification is not warranted. If an ATWAS was to occur, a SAE would be declared as indicated by the note to refer Rx Protection System Failure.
- b. TVA disagrees. There are no Technical Specifications required functions for hot shutdown. Loss of a function results in a CSFST red path.
- c. This is a continuation of comment II.28.b.
- d. TVA disagrees. EAL 6.2, IC #3, is the second part of an "or" logic. Additionally, a note references failure of the Reactor Protection System (Section 2.3).

NRC Comment II.29

The NUMARC example EAL SS5-1 states:

1. Loss of Reactor Vessel Water Level as indicated by:
 - a. Loss of all decay heat removal cooling as determined by (site-specific) procedure.
- AND
- b. (site-specific) indicators that the core is or will be uncovered.

The licensee equivalent IC and EAL, 6.1 Loss of Shutdown Systems, SAE stated:

Loss of water level in the Rx vessel that has or will uncover active fuel in the Rx vessel with CNTNT closure established.
(1 and 2 and 3)

1. Rx vessel water level <el. 695' on LR-68-402
 2. Incore TCs (if available) indicate RCS Temp. >200°F
 3. CNTNT closure is established
- a. The NUMARC criteria specify evaluation of decay heat removal for this event as well as vessel level. The licensee did not include the decay heat system criteria in the EAL and did not justify the omission in the basis document.

- b. The licensee included RCS temperature criteria in EAL #2; however, the parenthetical phrase (if available) is confusing. To declare the SAE based upon this IC, all three conditions must be present. If the core thermocouples are not available, the declaration cannot be made even though the conditions of loss of decay heat removal and low vessel level are present. This is clearly not the intent of the NUMARC guidance, thus the added criteria of core temperature should be re-evaluated. This deviation was not explained in the basis document.
- c. Provide additional information that explains these deviations from the NUMARC/NESP-007 guidance.

TVA Response

- a. TVA agrees. Loss of RHR capability is added as a criteria to EAL 6.1 SAE.
- b. TVA disagrees. Unavailable does not preclude classification. If the TCs are not available the condition is assumed to be met.

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