December 6, 1995

Mr. Lee Liu
Chairman of the Board and
Chief Executive Officer
IES Utilities Inc.
Post Office Box 351
Cedar Rapids, IA 52406

SUBJECT: DUANE ARNOLD ENERGY CENTER - REQUEST FOR ADDITIONAL INFORMATION ON EAL REVISION TO NUMARC/NESP-007 METHODOLOGY (M93692)

Dear Mr. Liu:

On September 15, 1995, you submitted a proposed revision to the Duane Arnold Energy Center (DAEC) Emergency Action Levels and requested NRC review and approval of the submitted revisions. The request was made pursuant to 10 CFR 50.54(q) and 10 CFR 50.4. The enclosed RAI provides guidance on the information the staff needs to make an assessment of the appropriateness of your request.

This request for information affects fewer than 10 respondents; therefore, OMB clearance is not required under Pub. L. 96-511.

Sincerely,

ORIGINAL SIGNED BY:

Glenn B. Kelly, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure: Request for Additional Information

cc w/encl: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING DUANE ARNOLD ENERGY CENTER

EAL REVISION TO NUMARC/NESP-007 METHODOLOGY

The NRC has completed its initial review of the proposed emergency action levels (EALs) contained in the September 15, 1995, Duane Arnold Energy Center submittal. The submittal consisted of the proposed EAL procedure, the Duane Arnold EAL Technical Basis Document, letters of agreement from State and local authorities, and copies of applicable Emergency Operating and Abnormal Operating procedures. The EAL procedure contained the EAL statements, the corresponding emergency classifications, a unique designator number for each EAL, the plant Operating Condition Applicability, and any tables or other data necessary for interpretation of the EAL. The Technical Basis Document gave further details on the EAL, provided justification for any deviations from the NUMARC example EALs and cited specific Duane Arnold procedure numbers and other related references.

The proposed EALs were reviewed against the guidance in NUMARC/NESP-007, "Methodology for Development of Emergency Action Levels," Revision 2. This document has been endorsed by the NRC in Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors," Revision 3, as an alternative means by which licensees can meet the requirements in 10 CFR 50.47 (b) (4) and Appendix E to 10 CFR Part 50. Since the staff has previously endorsed the guidance in NUMARC/NESP-007, the review focused on those EALs that deviated from the guidance and those EALs that required the development of site-specific thresholds. As a result of the initial review, a number of EALs were identified which required additional information in order to determine whether the EALs conform to NUMARC/NESP-007. Please provide this additional information as discussed below.

GENERAL

Issue No. 1

The Duane Arnold EAL scheme deviated from the NUMARC methodology by not grouping EALs under initiating conditions (ICs). The Duane Arnold EAL basis document did group the EALs under ICs; however, this arrangement was not maintained in the emergency implementing procedure used for classifying the emergency. The grouping of EALs under the ICs to which the EALs correspond allows the person classifying (and the people being notified of the classification) to more clearly understand the plant condition of concern.

Please provide justification for this deviation from the NUMARC guidance.

NUMARC Recognition Category A
Abnormal Rad Levels/Radiological Effluent

Issue No. 2

NUMARC Initiating Condition (IC) AU1 states:

> *AU1* *Any unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Technical Specifications for 60 Minutes or Longer.*

NUMARC EALs associated with this IC include:

> 1. *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)*
>
> 2. *Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates with a release duration of 60 minutes or longer in excess of two times (site-specific technical specifications).*

A. An EAL corresponding the NUMARC Example EAL 2 was not provided. No justification for this deviation was provided. (This comment also applies to the corresponding Duane Arnold Alert level EAL AA1.)

B. In the Duane Arnold basis document for this EAL it is stated that:

> *The Low Level Radwaste Processing and Storage Facility (LLRPSF) is not considered as an accident release point since the radiation monitor automatically trips the building exhaust at the Technical Specification instantaneous release limit thus terminating the release.....*

The NUMARC basis states that this IC "represents an uncontrolled situation and hence, a potential degradation in the level of safety." In formulating the EALs for this IC, it should not presumed that safety systems will operate as designed. In fact it is the misoperation of this equipment which will cause the IC to be met. Therefore, the Duane Arnold EAL scheme should include EALs for the monitored release paths. (This comment also applies to the corresponding Duane Arnold Alert level EAL AA1.)

Please provide justification for these deviations from the NUMARC guidance.

Issue No. 3

NUMARC Initiating Condition (IC) AA1 states:

> *AA1 Any unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Technical Specifications for 15 Minutes or Longer.*

A NUMARC EAL associated with this IC is:

> *3. A valid reading on perimeter radiation monitoring system greater than 10.0 mR/hr sustained for 15 minutes or longer.*

The equivalent Duane Arnold EAL is:

> *Valid field survey reading outside the site boundary above 10 mR/hr. (Dose assessment is NOT available)*

A. The addition of the condition "dose assessment NOT available" is not appropriate because exceeding the survey result, in and of itself, is indicative of a loss of control of radioactive material which meets the IC. (This comment also applies to Duane Arnold EALs AS1 and AG1.)

B. The Duane Arnold EAL did not include the condition "sustained for 15 minutes or longer." No justification was provided for this deviation. (This same comment also applies to Duane Arnold EALs AS1 and AG1.)

Please provide justification for these deviations from the NUMARC guidance.

Issue No. 4

NUMARC IC AA2 states:

> *AA2 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.*

NUMARC EALs associated with this IC include:

> *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.*

The Duane Arnold EAL scheme includes the following EALs:

1. *Uncontrolled loss of reactor cavity or fuel pool water level results in a spent fuel assembly that is NOT fully covered by water.*

OR

2. *Valid Fuel Pool water level indication (LI-3414) below 13 feet 9 inches*

A. The Duane Arnold EAL #1 does not provide for the method of detection of the plant condition as is provided for in NUMARC EAL #2, i.e. "Report of visual observation of irradiated fuel uncovered." This concern may be the result of the Duane Arnold EAL scheme not including EALs under ICs.

B. The Duane Arnold EAL scheme does not include an EAL corresponding the NUMARC EAL #3. No justification was provided for this deviation.

Please provide justification for these deviations from the NUMARC guidance.

Issue No. 5.

NUMARC IC AA3 states:

Release of Radioactive Material or Increases in Radiation Levels Within the Facility that Impedes Operation of Systems Required to Maintain Safe Operation or to Establish or Maintain Cold Shutdown

NUMARC EALs associated with this IC include:

1. *Valid (site-specific) radiation monitor readings GREATER THAN 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions*

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 corresponding Duane Arnold EAL is:

Dose rates prevent occupancy or access to areas required to achieve or maintain safe shutdown

A. The Duane Arnold EAL scheme did not include EALs corresponding to these NUMARC EALs for this IC. The condition provided in the Duane Arnold scheme is closely related to the NUMARC IC but does not contain site-specific thresholds for classifying the event.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 6

NUMARC IC AS1 states:

> *AS1 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.*

NUMARC Example EALs associated with this IC include:

> *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):*
>
> *4. Field survey results indicate site boundary dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate child thyroid dose commitment of 500 mR for one hour of inhalation.*

The Duane Arnold EAL corresponding to NUMARC EAL #4 is:

> *4. Valid field survey reading outside the site boundary above 100 mR/hr.*

A. The Duane Arnold EAL scheme did not include the NUMARC condition for the child thyroid dose commitment.

B. The Duane Arnold EAL scheme includes EALs corresponding to NUMARC EAL #1. The Duane Arnold EAL basis document states that; "In order to calculate suitable radiation monitor values as described in the generic methodology, use of an assumed source term mixture, use of annual average meteorology, and rounding off is required." Insufficient detail was provided to determine whether the "assumed source term" met the guidance for the source term in the NUMARC basis for this EAL.

Please provide justification for this deviation from the NUMARC guidance and additional information on the "assumed source term mixture" used to derive the setpoints for the radiological effluent radiation monitors. (This same request applies to Duane Arnold EAL AG1.)

NUMARC Recognition Category F
Fission Product Barrier Degradation

Issue No. 7

The NUMARC EAL methodology includes a fission product barrier matrix for determining whether or not a barrier (fuel clad, reactor coolant system, or containment) is lost or potentially lost and for classifying events based on the combination of lost or potentially lost barriers. The fission product barrier matrix provides multiple indications to operators to assess the status of each of the barriers.

Classification of an event is made by determining the combination of barriers which have either been lost or potentially lost. The NUMARC guidance specifies that the following combination of barriers is indicative of a Site Area Emergency.

Loss of BOTH Fuel Clad and RCS
OR
Potential Loss of BOTH Fuel Clad and RCS
OR
Potential Loss of EITHER Fuel Clad OR RCS, and Loss of ANY Additional Barrier

A. The Duane Arnold EAL scheme also contains a fission product barrier matrix. However, the Duane Arnold EAL scheme defines the combination of barriers which is indicative of a Site Area Emergency differently than the NUMARC guidance. The combination of barriers specified in the Duane Arnold EAL scheme for the Site Area Emergency is:

Loss or Potential Loss of Any Two Barriers

The Duane Arnold EAL basis document explains that using this combination of barriers makes the classification easier to understand and that no sequences are significantly affected by the simplified logic. Insufficient detail was provided in the Duane Arnold EAL basis document to verify that the Duane Arnold EAL scheme meets the intent of the NUMARC guidance. The comparison table provided did not identify which EALs were being compared and did not justify the adequacy of those combinations which would result in a Site Area Emergency classification in the Duane Arnold EAL which would not have resulted in a Site Area Emergency classification in the NUMARC guidance.

Please provide additional justification for this deviation from the NUMARC guidance.

Issue No. 8

The NUMARC EAL for the loss and potential loss of the fuel clad barrier based on reactor vessel water level indications are:

Loss:

Level LESS THAN (site-specific) value

Potential Loss:

Level LESS THAN (site-specific) value

The corresponding Duane Arnold EALs are:

Loss:

RPV Level below -30 inches and cannot be restored

Potential Loss:

RPV Level below -15 inches and cannot be restored

A. The Duane Arnold EAL basis document did not justify the addition of "cannot be restored" to these EALs. It is not clear why the loss or potential loss cannot be based on the level alone. The addition of the condition "cannot be restored" may cause confusion and/or delay classification. (this same comment also applies to the Loss of Reactor Coolant System Barrier EAL based upon reactor vessel level.)

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 9

The Duane Arnold EAL scheme includes the following EAL:

Core damage assessment determines at least 5% fuel clad damage

The Duane Arnold EAL basis document states:

It is intended that determination of barrier loss be made whenever the indicator threshold (for the containment monitor) *is reached until such time that core damage assessment is performed, at which time direct use of containment rad monitor readings is no longer required.*

A. The Duane Arnold EAL scheme did not include a statement corresponding to the statement in the Duane Arnold basis document regarding the use of the containment rad monitor EAL. This may cause confusion when classifying an event.

Provide additional information that justifies the adequacy of this EAL.

Issue No. 10

The NUMARC EAL for the potential loss of the reactor coolant system barrier based on RCS leak rate indications includes the following conditions:

unisolable primary system leakage outside drywell as indicated by area temp or area rad alarm

The corresponding Duane Arnold EAL is:

Unisolable primary system leakage outside the drywell as indicated by ARMs or in-plant radiological surveys

A. The Duane Arnold EAL basis document did not justify not including the condition "as indicted by area temp" in the Duane Arnold EAL. (This comment also applies to the same Duane Arnold EAL listed under the Loss of Containment Barrier column of the fission product barrier table.)

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 11

The NUMARC EAL for the potential loss of the RCS barrier based on drywell pressure indications is:

Pressure Greater than (site-specific) psig

The NUMARC basis for this EAL states:

The (site-specific) drywell pressure is based on the drywell high pressure alarm setpoint and indicates a LOCA. A higher value may be used if supporting documentation is provided which indicates the chosen value is less than the pressure which would be reached for a 50 gpm Reactor Coolant System leak.

The corresponding Duane Arnold EAL is:

Drywell cooling operating AND drywell pressure above 2 psig

The Duane Arnold EAL basis document states:

There is no significant deviation from the generic indicator. The (site-specific) value for this loss indicator corresponds to the drywell high pressure ECCS initiation signal setpoint of 2.0 psig.

A. The Duane Arnold EAL basis does not address why the Duane Arnold EAL uses the ECCS initiation drywell pressure setpoint instead of the alarm setpoint as specified in the NUMARC guidance.

B. It is not clear whether drywell cooling operation may be automatically

isolated when drywell pressure exceeds 2 psig and whether this may cause confusion when classifying the event.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 12

The NUMARC EALs for the loss of the Containment barrier based on drywell pressure indications are:

Rapid unexplained decrease following initial increase or

Drywell pressure response not consistent with LOCA conditions

A. The Duane Arnold EAL scheme did not include these EALs and the Duane Arnold EAL basis document did not justify this deviation.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 13

The NUMARC EAL for the potential loss of the containment barrier based on reactor pressure vessel water level is:

Reactor vessel water level LESS THAN (site-specific) value and the maximum core uncovery time limit is in the UNSAFE region

The corresponding Duane Arnold EAL is:

RPV Level below -40 inches AND no injections source available

A. The Duane Arnold EAL does not appears to meet the intent of the NUMARC EAL. Two concerns have been identified with the Duane Arnold EAL. One is that the term "not available" has not been defined and may cause confusion when classifying the event. The second concern is that even if the injection source is available, if the water level was to remain below 40 inches for a given amount of time, the barrier should be considered potentially lost. As stated in the NUMARC EAL basis: "if emergency operating procedures have been ineffective in restoring reactor vessel level within the maximum core uncovery time limit, there is not a success path... Whether or not the procedures will be effective should be apparent within the time provided. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be, ineffective."

Please provide justification for this deviation from the NUMARC guidance.

NUMARC Recognition Category H
Hazards and Other Conditions Affecting Plant Safety

Issue No. 14

NUMARC IC HU1 includes the following EAL:

3. *Assessment by the control room that an event has occurred.*

A. The Duane Arnold EAL scheme did not include an EAL corresponding to this EAL and no justification was provided for this deviation.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 15

NUMARC IC HU1 includes the following EAL:

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

The NUMARC Basis for this EAL explains that:

Automobiles, trucks, and forklifts are also vehicles within the context of this EAL. The key is whether or not the vehicle can potentially cause significant damage to plant structures.

The corresponding Duane Arnold EAL is:

7. *Vessel or vehicle collision with structures or equipment required for safe shutdown*

The Duane Arnold basis document states that:

DAEC EAL 7 addresses vessel (aircraft) or vehicle (truck or train) crashes with structures or equipment required for safe shutdown.

A. The Duane Arnold EAL did not define the term "structures or equipment required for safe shutdown." It is not clear that users of the EAL procedure will be able to ascertain what are the structures or equipment required for safe shutdown. (This comment applies to the other EALs under IC HU1.)

B. The Duane Arnold basis document deviates from the NUMARC guidance by specifically not including automobiles and forklifts as vehicles for this EAL.

Please provide justification for these deviations from the NUMARC guidance.

Issue No. 16

NUMARC IC HU1 includes the following EAL:

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

The corresponding Duane Arnold EAL is:

3. *Visible damage of structures or equipment required for safe shutdown*

5. *Explosion within plant protected area*

A. Duane Arnold EAL #3 is not specific as to the cause of the damage which would result in the Unusual Event classification. It is not clear whether "damage" to equipment from maintenance errors or operational errors would be classified under this EAL.

B. Duane Arnold EAL #5 does not include the NUMARC condition of "resulting in visible damage...." No justification was provided for this deviation.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 17

NUMARC IC HU1 includes the following EAL:

6. *Report of turbine failure resulting in casing penetration or damage to turbine or generator seals*

The corresponding Duane Arnold EAL is:

6. *Turbine failure causing observable casing damage*

A. Contrary to the NUMARC EAL, the Duane Arnold EAL did not include the condition "damage to turbine or generator seals."

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 18

NUMARC IC HU2 includes the following EAL:

1. *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 corresponding Duane Arnold EAL is:

1. Fire within safe shutdown area NOT extinguished within 15 minutes of control room notification or verification of control room alarm.

A. The NUMARC EAL specifies "buildings or areas continuous to .... " The corresponding Duane Arnold limits the areas considered to only "safe shutdown area(s)." This same list of areas is included in the related Alert level EAL. The areas applicable under the Unusual Event EAL is broader than the areas applicable under the Alert level EAL.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 19

NUMARC IC HU3 includes the following EAL:

2. Report by local, county or State official for potential evacuation of site personnel based on offsite event

The corresponding Duane Arnold EAL is:

2. Notification of near site release that may require evacuation.

A. The term "near site" is not defined in the Duane Arnold EAL. In addition, it is not clear that including this term is necessary for the Duane Arnold EAL to met the intent of this NUMARC EAL.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 20

NUMARC IC HU4 includes the following EAL:

2. Other security events as determined from (site-specific) Safeguards Contingency Plan.

The corresponding Duane Arnold EAL is:

2. Suspected sabotage device discovered in plant switchyard.

The Duane Arnold EAL basis document states:

Other (site-specific) security events of concern at DAEC include discovery of a suspected sabotage device in the plant switchyard, which is located outside the protected area.

A. It is not clear for the information provided whether Duane Arnold EAL #2 includes all the applicable security events in the Duane Arnold

Safeguards Contingency Plan.

Please provide additional information to justify that the Duane Arnold EAL includes all applicable security events in the Duane Arnold Safeguards Contingency Plan.

Issue No. 21

NUMARC IC HA1 includes the following EAL:

3. *Report of any visible structural damage on any of the following plant structures:*

- *Reactor Building*
- *Intake Building*
- *Ultimate Heat Sink*
- *Refueling Water Storage Tank*
- *Diesel Generator Building*
- *Turbine Building*
- *Condensate Storage Tank*
- *Control Rooms*
- *Other (Site-Specific) Structures*

A. The Duane Arnold EAL scheme did not include an EAL corresponding to this EAL and did not justify this deviation.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 22

NUMARC IC HA1 includes the following EAL:

3. *Vehicle crash affecting plant vital areas*

The corresponding Duane Arnold EAL is:

6. *Vessel or vehicle collision affecting ability to achieve or maintain safe shutdown*

A. The Duane Arnold EAL deviates from the NUMARC EAL by including the condition that the collision affects the ability to achieve or maintain safe shutdown. No justification was provided for this deviation. It may be difficult to make a definitive determination whether the vehicle collision did affect the ability to achieve or maintain safe shutdown. It is not appropriate to delay classification in order to make this determination. (This comment also applies to Duane Arnold EAL HA1, #5)

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 23

NUMARC IC HA4 includes the following EAL:

> 2. *Other security events as determined from (site-specific) Safeguards Contingency Plan.*

A. The Duane Arnold EAL scheme did not include an EAL corresponding to this EAL. The Duane Arnold EAL basis document states that: "Based on information provided by DAEC Security, generic EAL 2 is unnecessary at DAEC." It is not clear what, if any, security events were considered in making this determination. This comment also applies to the corresponding Site Area Emergency IC HS1. For HS1 it appears that a sabotage device discovered in the plant vital area should be included as an EAL.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 24

NUMARC IC HA5 includes the following EAL:

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

The corresponding Duane Arnold EAL is:

> *Control Room evacuation procedures have been initiated*

A. Contrary to the NUMARC guidance, the specific Duane Arnold procedure for control room evacuation is not identified in the EAL.

Please provide additional information that justifies the departure from the NUMARC guidance.

Issue No. 25

NUMARC IC HS2 includes the following EAL:

> 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 corresponding Duane Arnold EAL is:

Control room has been evacuated AND control of plant from Remote

Shutdown Panel 1C388 NOT established within 20 minutes.

The basis for the NUMARC EAL states:

(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. (emphasis added)

The Duane Arnold basis document states:

operator control within 20 minutes would not impact the integrity of the fuel clad, the reactor pressure vessel, and the primary containment.

A. The Duane Arnold EAL basis did not justify why the time limit to classify this event should exceed 15 minutes. For instance, the Duane Arnold basis did not describe why more than 15 minutes is needed for determining whether control is established at the remote shutdown panel

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 26

NUMARC IC HG1 contains the following EALs;

1. *Loss of physical control of the control room due to security event.*

OR

2. *Loss of physical control of the remote shutdown capability due to security event.*

The corresponding Duane Arnold EALs are:

1. *Loss of physical control of the control room*

OR

2. *Loss of physical control of remote shutdown capability*

A. Contrary to the NUMARC guidance, the Duane Arnold EALs do not include the condition "due to security event." Therefore an event where the control room must be evacuated for reasons other than due to a security event may erroneously be classified under this EAL.

Please provide justification for this deviation from the NUMARC guidance.

NUMARC Recognition Category S
System Malfunction

Issue No. 27

NUMARC IC EAL SU1 contains the following EALs:

1. The following conditions exist:

a. Loss of power to (site-specific) transformers for greater than 15 minutes

AND

b. At least (site-specific) emergency generators are supplying power to emergency busses.

The corresponding Duane Arnold EAL is:

Loss of Offsite Power Lasting More Than 15 Minutes

A. Contrary to the NUMARC guidance, the Duane Arnold EAL does not identify site-specific transformers, loss of power to which constitutes "loss of all offsite power."

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 28

NUMARC IC SU3 includes the following EAL:

1. The following conditions exist:

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 corresponding Duane Arnold EAL is:

Unplanned loss of annunciators on panels 1C03, 1C04, and 1C05 lasting more than 15 minutes AND compensatory non-alarming indications are available.

A. The Duane Arnold EAL is inconsistent with the NUMARC guidance in that it

specifies loss of all annunciators. The Duane Arnold EAL basis document states that the annunciators share a common power supply and therefore it is not necessary to include the condition of "most annunciators." It is not clear that there is no event which could result loss of most annunciators and no reason was given for why a loss of most annunciators would not meet the intent of the NUMARC guidance.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 29

NUMARC IC SU4 includes the following EALs:

1. *(Site-specific) radiation monitor readings indicating fuel clad degradation greater than technical specification limits.*

2. *(Site-specific) coolant sample activity value indicating fuel clad degradation greater than technical specification limits.*

The corresponding Duane Arnold EALs are:

1. *Valid Pretreat RM-4104 rad monitor reading above 4E+3 mR/hr*

2. *Coolant activity above 12 µCi/ml DOSE EQUIVALENT I-131*

A. The Duane Arnold basis document describes the technical specification basis used for developing these EALs. It is not clear why technical specification 3.6.b.2 was used for the basis for Duane Arnold EAL #1 whereas technical specification 3.6.b.1 was used for the basis for Duane Arnold EAL #2.

Please provide additional information which justifies the basis used to develop these EALs.

Issue No. 30

NUMARC IC SU5 contains the following EAL:

1. *The following conditions exist:*

   a. *Unidentified or pressure boundary leakage greater than 10 gpm*

   OR

   b. *Identified leakage greater than 25 gpm*

The corresponding Duane Arnold EAL is:

Unidentified leakage above 10 GPM
OR
Total RCS leakage above 35 GPM
OR
Main steam line break as determined from annunciators or plant personnel report

A. The Duane Arnold EAL is not consistent with the NUMARC guidance in that it does not specify a value for pressure boundary leakage. No justification was provided for this deviation.

B. The Duane Arnold EAL is not consistent with the NUMARC guidance in that it specifies 35 gpm for the total RCS leakage instead of 25 gpm as is specified in the NUMARC guidance. The NUMARC guidance states that this IC is included as an Unusual Event because it may be a precursor of more serious conditions. The Duane Arnold basis document does not address why a 25 gpm total RCS is not indicative of a potential degradation of the level of safety at Duane Arnold and therefore is not an Unusual Event.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 31

NUMARC IC SU6 contains the following EALs:

1. *Loss of all (site-specific list) onsite communication capability affecting the ability to perform routine operations.*

2. *Loss of all (site-specific list) offsite communications capability*

The corresponding Duane Arnold EALs are:

1. *Loss of ALL onsite electronic communication methods*

2. *Loss of ALL electronic communication methods with government agencies*

A. Contrary to the NUMARC guidance, a site-specific list of communication capabilities was not included in these EALs. The concern with this deviation is that the user of the classification procedure may not be readily able to ascertain whether the EALs are met or not because of the lack of site-specific information.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 32

NUMARC IC SU7 contains the following EAL:

1. Either of the following conditions exist:

a. Unplanned Loss of Vital DC power to required DC busses based on (site-specific) bus voltage indications.

AND

b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

The corresponding Duane Arnold EAL is:

Complete Loss of 125 VDC lasting more than 15 minutes

A. Contrary to the NUMARC guidance, the Duane Arnold EAL did not specify the applicable vital buses in this EAL and did not specify what voltage level constitutes a loss of DC. The concern with this deviation is that classification may be delayed or an event improperly classified due to the lack of specific information. (This comment also applies to IC SS3)

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 33

NUMARC IC SA3 contains the following EAL:

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 corresponding Duane Arnold EAL is:

RCS temperature rise that is not allowed by procedures or Tech Specs that will result in RCS temperature above 212 F.

A. The Duane Arnold EAL deviates from the NUMARC EAL by including the condition that the temperature rise is "not allowed by procedures or Tech Specs" rather than "the loss of tech spec functions." The concern is that the conditions specified in the Duane Arnold EAL will make classifying events more difficult and that some events classified under the NUMARC EAL scheme may not be classified under the Duane Arnold EAL scheme.

B. The Duane Arnold EAL deviates from the NUMARC guidance by not including the condition of "uncontrolled temperature rise approaching cold shutdown technical specification limit." This may result in delaying classifications. This deviation was not justified in the Duane Arnold EAL basis document.

Please provide justification for these deviations from the NUMARC guidance.

Issue No. 34

NUMARC IC SS2 includes the following EAL:

(Site-specific) indications exist that automatic and manual scram were not successful.

The corresponding Duane Arnold EAL is:

All control rods NOT inserted to at least position 02 AND Boron injection with SBLC is required.

A. The Duane Arnold EAL deviates by including the condition that "boron injection with SBLC is required." This condition may result in delaying classification. If the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed then conditions exist that lead to imminent loss or potential loss of both fuel clad and the RCS and therefore a Site Area Emergency classification is warranted. It is not appropriate to wait until boron injection is procedurally mandated to classify the event.

Please provide justification for this deviation from the NUMARC guidance.

Issue No. 35

NUMARC IC SS4 states:

Complete loss of Function Needed to Achieve or Maintain Hot Shutdown

NUMARC EALs associated with this IC include:

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

The corresponding Duane Arnold EAL is:

Adequate core cooling conditions CANNOT be achieved or maintained
OR
Reactor CANNOT be brought subcritical

A. The Duane Arnold EAL does not include plant specific indication for determining whether adequate core cooling conditions exist. This could make this EAL difficult to use.

Provide additional information that justifies the adequacy of this EAL.

Issue No. 36

NUMARC IC SG1 contains the following EAL:

1. Prolonged loss of all offsite and onsite AC power as indicated by:

a. Loss of power to (site-specific) transformers.

AND

b. Failure of (site-specific) emergency diesel generators to supply power to emergency busses.

AND

c. At least one of the following conditions exists:

- *Restoration of at least one emergency bus within (site-specific) hours is NOT likely*

OR

- *(Site-specific) indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.*

The corresponding Duane Arnold EAL is:

Loss of Voltage on Buses 1A3 and 1A4 and ANY of the following
- *Restoration of power to either Bus 1A3 or 1A4 is NOT likely within 4 hours*
- *RPV level remains indeterminate*
- *RPV level remains below -30 inches*

A. The terms "remains indeterminate" and "remains below -30 inches" are not defined in the Duane Arnold EAL. Using undefined terms such as these may result in confusion when classifying an event. In addition, if a

station blackout condition occurred and water level reached the top of active fuel, plant conditions warrant classifying the event as a General Emergency without waiting to determine if the level is going the "remain" less than top of active fuel.

Provide additional information that justifies the adequacy of this EAL.

Issue No. 37

NUMARC IC SG2 contains the following EALs;

1. *(Site-specific) indications exist that automatic and manual scram were not successful*

AND

2. *Either of the following:*

   a. *(Site-specific) indications exist that the core cooling is extremely challenged*

   OR

   b. *(site-specific) indications exist that heat removal is extremely challenged.*

The corresponding Duane Arnold EAL is:

Entry into ATWS EOP-RPV Control is required and BOTH for the following:

- *Reactor power is expected to remain above 5% or CANNOT be determined AND*
- *Main condenser is NOT available*

A. It is not clear that the condition of the main condenser not being available is a sufficient indication of an extreme challenge to heat removal. The NUMARC EAL guidance state that "For BWRs (site-specific) considerations include inability to remove heat via the main condenser, or via the suppression pool or torus (e.g. due to high pool water temperature". The Duane Arnold EAL did not include indications regarding heat removal via the suppression pool.

B. No condition equivalent to the NUMARC condition "(Site-specific) indications exist that the core cooling is extremely challenged" was provided in the Duane Arnold EAL. The NUMARC guidance states, "For BWRs, the extreme challenge of the ability of cool the core is intended to mean that the reactor vessel water level is below 2/3 coverage of active fuel." The Duane Arnold EAL did not include a comparable EAL for this condition.

C. Contrary to the NUMARC guidance the Duane Arnold EAL includes the condition "Reactor power is expected to remain above 5% or CANNOT be determined." Further justification is needed to determine whether the addition of this condition meets the intent of the NUMARC EAL. In addition, the term "is expected to remain above 5%" is not defined in the Duane Arnold EAL.

Please provide justification for these deviations from the NUMARC guidance.