October 6, 1995

Mr. E. E. Fitzpatrick, Vice President
Indiana Michigan Power Company
c/o American Electric Power Service Corporation
1 Riverside Plaza
Columbus, OH 43215

SUBJECT: DONALD C. COOK NUCLEAR PLANT, REQUEST FOR ADDITIONAL INFORMATION CONCERNING PROPOSED EMERGENCY ACTION LEVELS (TAC NO. M89878 AND M89879)

Dear Mr. Fitzpatrick:

We have completed our review of your March 31, 1995, response to our November 22, 1994, request for additional information (RAI). Several issues remain to be resolved before we can complete our review of the D.C. Cook emergency action level methodology. We request that you provide additional information as discussed in the enclosed RAI to support resolution of the remaining issues. To help ensure that you clearly understand the issues raised in the RAI and to support prompt resolution of your request, I have suggested to your staff that we have a conference call to clarify the RAI and subsequently have a meeting to discuss your responses. If you have any questions on this issue, please contact me at (301) 415-3017.

This requirement affects nine or fewer respondents and, therefore, is not subject to the Office of Management and Budget review under P.L. 96-511.

Sincerely,

Original signed by

John B. Hickman, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

cc w/encl: See next page

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SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION REGARDING D.C. COOK 1 & 2 NUCLEAR PLANT EAL REVISIONS TO NUMARC/NESP-007 METHODOLOGY

The NRC completed a review of the additional information transmitted in the March 31, 1995, D.C. Cook Nuclear Plant emergency action level (EAL) submittal. The additional information was requested after the initial NRC review of the D. C. Cook Nuclear Plant June 13, 1994, EAL submittal.

The proposed EALs and additional information submitted were reviewed against the guidance in NUMARC/NESP-007, "Methodology for Development of Emergency Action Levels," Revision 2. NUMARC/NESP-007 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.

The additional information submitted and the procedure/plan review resolved many of the staff's questions. However, several areas of concerns remain with specific EALs which require further information and review. Please provide this additional information as discussed below. The comments are organized with the original NRC comment first, the D. C. Cook response, and then the NRC response.

NRC General Comment:

The D. C. Cook Nuclear Plant EAL scheme deviated from the NESP methodology by not grouping EALs under initiating conditions. The D. C. Cook Nuclear Plant EAL scheme included two separate tables; one table contained all the initiating conditions and a second table contained all the EALs. In most cases the EALs were exact duplicates of the initiating conditions. The separation of EALs from initiating conditions was confusing and would make classification more difficult.

D. C. Cook response:

The initial submittal was not clear concerning the purpose of the Initiating Condition (IC) table. The table was developed to replace the previous information in the Emergency Plan Section 12.3.5, Emergency Classification System. The table would have the appropriate level of detail for off-site agencies. The use of the IC table in the Emergency Plan simplifies the process for revising EALs by not requiring a change to the Emergency Plan for minor changes that do not change the relevant IC. The response also stated that the term IC and EAL are not used in the revised EPIP table. Within the table, each Emergency Condition Category is displayed with its associated Recognition Category on one page to maintain the ability to see the emergency classification escalation pathway.

NRC Evaluation of D.C. Cook Response:

1. The staff accepts D.C. Cook's proposal to include only the ICs in the Emergency Plan and include the detailed EALs in a Emergency Plan Implementing Procedure (EPIP). However, the focus of the NRC comment was not on whether the detailed EALs should be included in the Emergency Plan but rather that the ICs should be included as a part of the EAL scheme in the EPIP. As stated in the NUMARC guidance, an EAL is "a pre-determined, site-specific, observable threshold for a plant Initiating Condition that places the plant in a given emergency class." The NUMARC scheme groups EALs under the IC to which the EALs correspond. This allows the person classifying (and the people being notified of the classification) to understand the plant condition of concern. This logical grouping of EALs under ICs was not included in the D.C. Cook EAL scheme. In addition, the D.C. Cook EAL scheme in some cases included NUMARC ICs as EALs. Also, the revised IC table included in the D.C. Cook Emergency Plan contains some EALs in addition to ICs.

   The D.C. Cook EAL scheme contained in the EPIP should be revised to group EALs under ICs. The EAL scheme must be described in the Emergency Plan but need not be included in the plan. The IC table is acceptable as a description of the EAL scheme but should be revised to be consistent with the ICs contained in the EAL scheme.

   Please provide information regarding actions taken to address these concerns.

2. In addition to the concerns stated above, the staff is concerned that the "and/or" logic specified by NUMARC has not been used. Numerous EALs lack specific "and/or" wording prescribed by NUMARC which would force the declaration for a given EAL condition. Wording used by D. C. Cook includes the phrases "symptoms include" and "such as" which does not clearly indicate classification is required when one or more of the conditions is present. Further, it is not clear whether one of the listed conditions, all of the conditions, or a combination of the conditions is needed for classification. The D. C. Cook Nuclear Plant Deviation Basis Document (DBD) does not contain justification for the deviation.

   Provide further justification for these deviations from the NUMARC/NESP-007 guidance.

NRC Comment 1A: (Corresponding to D. C. Cook EAL R-1 and NUMARC EAL AU1, "Unplanned Release of...Radioactivity")

NRC Comment 1A stated that D.C. Cook did not include the "Note" specified in the NUMARC EAL, i.e., *If the monitor reading(s) is sustained for longer than 60*

minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.

D. C. Cook response:

The annunciator response procedure 12-OHP 4024.139 implements unplanned effluent release detection and analysis procedure 12-PMP 6010.URE.001 and that since existing procedures already direct the initiation of assessment activities, there was no need to incorporate that aspect of the NUMARC note into the classification tables.

NRC Evaluation of D.C. Cook Response:

The purpose of the note is to force an emergency declaration if assessment activities extend beyond 60 minutes (15 minutes for the corresponding Alert, Site Area Emergency and General Emergency EALs). Dose assessment needs to be performed to ensure that the event is properly classified. If the assessment results indicate that the event meets a different classification level (either higher or lower) than is indicated by comparing the actual radiological effluent release to the effluent monitor EAL setpoint, then the event is to be classified using the assessment results as these results are the most accurate indication of the severity of the event. However, a time limit is provided for performing these assessments so that classification will not be delayed. Therefore, the D.C. Cook EAL scheme needs to include a note which guides personnel using the scheme regarding the need for and application of dose assessment results.

In this revision, D. C. Cook has added additional monitors to the EAL without explanation. Lacking an updated DBD for the current submittal, it was not clear why the monitors were added.

Provide additional information for the deviations from NUMARC/NESP-007 guidance.

NRC Comment 1B: (Corresponding to D. C. Cook EAL R-1 and NUMARC EAL AU1, "Unplanned Release of...Radioactivity")

D. C. Cook omitted NUMARC, AU1, EAL #2 which states:

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).

The D. C. Cook Nuclear Plant DBD indicated the rationale for omitting the EAL #2 was that control room personnel were not required to review those sample results for technical specification compliance so the EAL was not beneficial. The NRC review comment stated that even if effluent technical specifications have been

eliminated at D. C. Cook Nuclear Plant, this does not justify elimination of an EAL equivalent to NUMARC AU1, EAL #2.

D. C. Cook response:

The Cook Nuclear Plant does not sample effluent releases (except as directed by 12-PMP 6010.URE.001, Unplanned Radioactive Effluent Release Detection and Analysis) while they are in progress. Instead, in accordance with plant procedures, the in-path radiation monitors are set up to alarm and terminate the release, if a release-specific set point is exceeded. In the case where the in-path monitors are inoperable and the release must be performed, sampling is independently performed to assure the release does not exceed limiting values. The procedure directs Radiation Protection to perform an assessment of the release and report the actual percentage of technical specification allowance that has occurred.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable without further information or clarification. The staff does not understand why NUMARC, AU1, EAL #2 does not fully apply to D. C. Cook. It appears that if an effluent monitor alarms, annunciator response procedure 12-OHP-4024-139 requires implementing procedure 12-PMP-6010.URE.001 which would direct assessment/sampling activities. If those results indicate that the release exceeded 2x technical specification values for >60 minutes, then classification would be required. Further, if sampling during a planned release, with a monitor inoperable, indicated 2x technical specification values for >60 minutes, classification would be required. This appeared to indicate NUMARC AU1, EAL #2 applies to D. C. Cook.

Provide further justification for these deviations from the NUMARC/NESP-007 guidance.

NRC Comment 2A: (Corresponding to D. C. Cook EAL R-2 and NUMARC EAL AU2, "Unplanned Increase in Plant Radiation..")

The D. C. Cook Nuclear Plant EALs did not provide any site specific indication (e.g., level instrumentation or visual indication of level). The D. C. Cook Nuclear Plant EALs also exclude fuel assemblies in the reactor vessel. The NUMARC basis specifically discussed the purpose and background for these EALs as being related to actual reactor cavity seal failures at PWRs during refueling operations. As written, the D. C. Cook Nuclear Plant EAL would appear to apply only to fuel in the reactor cavity which was suspended on refueling equipment. The DBD did not provide justification for eliminating fuel in the vessel from this EAL.

D. C. Cook response:

The plant design does not have instrumentation for remote monitoring of spent fuel pool or refueling canal level. The words "outside the reactor vessel" have been removed from the classification tables. Radiation monitor R-5 is the installed area radiation monitor in the spent fuel area. ECC R-2 initially included a valid reading of >15 mrem/hr on R-5 as an indicator for an Unusual Event (UE) declaration. This indicator has been moved to ECC R-3 because it is more indicative of loss of water level. Emergency classification escalation will occur via ECC R-3 if one or more irradiated fuel assemblies is uncovered or if R-5 exceeds 1000 mrem/hr.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable without additional information or clarification. The fact that plant design does not provide for remote monitoring of spent fuel pool or refueling canal level is not sufficient justification for eliminating AU2, EAL #2, regarding an uncontrolled water level decrease in the spent fuel pool and fuel transfer canal. Indications such as operator observations of a specific amount of level decrease should be included as an EAL for this IC.

Provide further justification for these deviations from the NUMARC/NESP-007 guidance.

NRC Comment 3A: (Corresponding to D. C. Cook EAL R-1 and NUMARC EAL AA1, "Unplanned Release of...Radioactivity")

D. C. Cook Nuclear Plant EAL did not include the "Note" specified in the NUMARC EAL. The assessment specified in this EAL is to ensure that the release exceeds 200 times the technical specification value based on the actual amount of radioactive effluent being released.

D. C. Cook response:

The D. C. Cook response is the same as the response to NRC Comment 1A above.

NRC Evaluation of D.C. Cook Response:

The response is not acceptable without further information or clarification. As discussed under NRC comment 1A above, the note appears to be applicable to D. C. Cook. In addition, in this revision, D. C. Cook has added an additional EAL for the boundary dose exceeding 10 mrem/hr total effective dose equivalent (TEDE) without explanation. Lacking an updated DBD for the current submittal, it was not clear why this EAL was added and how the TEDE rate is to be calculated.

NRC Comment 3C: (Corresponding to D. C. Cook EAL R-1 and NUMARC EAL AA1, "Unplanned Release of...Radioactivity")

As previously discussed under NUMARC AU1, EALs 1 and 2, D. C. Cook Nuclear Plant eliminated the usage of sample analysis (AA1, EAL #2) as an EAL without proper justification.

D. C. Cook response:

The D. C. Cook response was the same as for NRC Comment 1B above.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable as explained under NRC Comment 1B above.

Please provide further justification or clarification for deviations from NUMARC/NESP-007 guidance.

NRC Comment 4A: (Corresponding to D. C. Cook EAL R-2 and NUMARC EAL AA2, "Major Damage to Irradiated Fuel...")

The D. C. Cook Nuclear Plant DBD stated, "Generic EAL #1 is not used since there are not area monitors in all areas where fuel uncovery can occur." Provide details of the arrangement of area radiation monitors in the vicinity of fuel handling and storage areas and provide additional justification for not using these radiation monitors in an EAL under this IC.

D. C. Cook response:

The details of the radiation monitoring system can be found in the UFSAR, Chapter 11; the D. C. Cook Nuclear Plant does not have a refuel floor area radiation monitor with remote readings. There is an area monitor (R-5) in the Fuel Handling Building and general area monitors in upper and lower containment. However, the key phrase in the generic IC is "loss of water level." If a valid reading for the containment general area radiation monitors were included in the EAL scheme, confirmation of the loss of water level would still need to be specified. Since reactor cavity water level at the Cook Nuclear Plant is checked locally, the statement addressing decreasing water level is the best available classification guide.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable. The lack of remote reading area radiation monitor does not provide justification for eliminating NUMARC AA2, EAL #1. Radiation monitors readings in or near fuel handling areas (with local or remote

readings) should be included as site-specific EALs corresponding to NUMARC example EAL #1. The NUMARC basis states that each site should also define its EALs by the specific area where irradiated fuel is located such as Reactor Cavity, Reactor Vessel, or Spent Fuel Pool. It was not clear how this was done for the D. C. Cook EALs. The redundancy in NUMARC examples EALs may be beneficial in preventing missed classifications. NUMARC AA2 examples are purposely redundant with an assigned "or" logic (1 or 2 or 3 or 4).

Provide additional justification for deviations from NUMARC/NESP-007 guidance.

NRC Comment 4C: (Corresponding to D. C. Cook EAL R-2 and NUMARC EAL AA2, "Major Damage to Irradiated Fuel...")

As in prior D. C. Cook Nuclear Plant EALs associated with reactor cavity and spent fuel pool water level, R-2 deviates from the NUMARC guidance by not including instrumentation or visual level limits. Provide additional justification for this deviation from the NUMARC/NESP-007 guidance.

D. C. Cook response:

The visual verification of water level is possible through observation of level markings on the side of the spend fuel pool and reactor cavity.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response did not address the original question of why the EALs associated with reactor cavity and spent fuel pool water level deviate from NUMARC guidance by not including instrumentation or visual level limits. The response did not provide justification for the deviation. If visual verification of water level is possible (as stated in the response) and level markings are on the side of the spent fuel pool and reactor cavity (as stated in the response), it appears that NUMARC guidance could easily be implemented.

Provide justification for the deviation from NUMARC/NESP-007 guidance.

NRC Comment 4D: (Corresponding to D. C. Cook EAL R-2 and NUMARC EAL AA2, "Major Damage to Irradiated Fuel...")

D. C. Cook Nuclear Plant EAL R-3 combines a requirement (not suggested in the NUMARC generic EAL) that there be "visual indication of damage to irradiated fuel" combined, using an AND statement, with high alarms on any of several radiation monitors (which were claimed to be lacking as a justification for eliminating NUMARC generic EAL AA2-1). While the "visual indication" aspect of this EAL is satisfactory, and implied in the NUMARC generic IC, if not in the generic EALs, combining the "visual indication" with the alarms is non-conservative. If this EAL

were split into two pieces, it would meet the basic intent of NUMARC generic EALs AA2-1 and AA2-2.

D. C. Cook response:

Indications from area radiation monitor R-5 were moved into this ECC because valid increasing radiation levels on this monitor indicate loss of water covering spent fuel. In addition, suitable indicators under the SAE column for ECC R-3 were added that address indications of loss of water level that can uncover multiple spent fuel assemblies or indication of spent fuel in the spent fuel area losing its water cover based on readings from monitor R-5. This provides a clear escalation path from Unusual Event (uncontrolled loss of water level) to Alert (single spent fuel assembly can become uncovered) to SAE (multiple fuel assemblies can become uncovered). The new ECC is simpler and more in-line with the intent of the NUMARC guidance. ECC R-4 was changed to state in the Alert column:

Any indication of major damage to irradiated fuel such as:
- *Unexpected increase in airborne radioactivity during fuel handling operations.*

NRC Evaluation of D.C. Cook Response:

The D. C. Cook methodology for this EAL is acceptable. However, no information on plant specific monitors, methods, and trigger levels which make this EAL readily observable and measurable were included in this EAL. In addition, justification for the EAL setpoint for the SAE classification for damage to multiple fuel assemblies, i.e. 1000 mrem/hr, was not provided.

Provide additional information for deviations from NUMARC/NESP-007 guidance.

NRC Comment 6A: (Corresponding to D. C. Cook ECC R-1 and NUMARC EAL AS1, "Boundary Dose...exceeds 100 mRem...")

The D.C. Cook EAL scheme did not include an EAL corresponding to EAL AS1-1. The justification given was that dose assessment could not be performed within the first 15 minutes of the release. Licensees are expected to have the capability to quickly perform dose assessments.

D. C. Cook response:

The radiation monitor EAL corresponding the NUMARC EAL AS1-1 was modified to include the following:

For an 8 hour event, a valid reading > 7.5 E-2 uc/cc on VRS-1507/2507 may exceed this threshold.

NRC Evaluation of D.C. Cook Response:

The basis for the use of an 8-hour event (or 8-hour default release duration) is not clear or explained in the D. C. Cook DBD. The NUMARC guidance recommends that 1 hour be assumed when calculating the radiation monitor setpoints. In addition, it is not clear why the radiation monitor EAL setpoint is not a factor of 10 less than the setpoint for the General Emergency EAL. Furthermore, no discussion was included regarding the appropriateness of this setpoint as it relates the setpoint for the Alert radiation monitor EAL.

As discussed under NRC Comment 1A, a note needs to be included in this EAL to ensure that dose assessment results will be used to classify the event if the dose assessment results are available and to ensure that, if assessment activities extend beyond 15 minutes, the event will be classified based upon radiation monitor readings.

Provide the rationale for the use of an 8-hour event duration and justification for values used in the radiation monitor EAL.

NRC Comment 9: (Corresponding to D. C. Cook ECC S-5 and NUMARC EAL SU3, "Loss of Most or All Safety System Annunciators")

The D. C. Cook Nuclear Plant IC Deviation stated, *"Deleted reference to loss of 'most' annunciators and loss of all or most indicators. The loss of 'most' annunciators is not plausible with our design. The only single failure that affects a majority of the annunciators will cause the loss of 'ALL' annunciators. Loss of indications was deleted from this IC because a major loss of indications (CRIDs) will also render the compensatory non-alarming indications inoperable (SPDS, PPC) because loss of the CRIDs will disable input to these systems also."* The D. C. Cook Nuclear Plant DBD did not provide a full discussion of the power supplies and interrelationships of control indicators (CRIDs), SPDS, PPC and annunciators. However, based on the DBD discussion, it would appear that the units could suffer a loss of most or all indication (CRIDs) and therefore SPDS and PPC, without a loss of annunciators. While the NUMARC example EAL starts with a statement on loss of annunciators, the BASIS discussion clearly states that loss of either annunciators or indications are to be considered. A more thorough discussion of the possible causes of loss of various sections of the safety system sections of the annunciator tiles is required in order to evaluate the licensee's claim that a loss of "most" annunciators is not plausible. Provide additional information on annunciator and indicator design, and justification for the apparent deviation from NUMARC/NESP-007 guidance.

D. C. Cook response:

D. C. Cook now uses the NUMARC standard nomenclature of "most." In addition, annunciator panels associated with safety systems are listed in a footnote. With

the exception of the theoretically possible, but practically impossible, discrete failure of each indication downstream of its isolation amplifier (involving dozens of unrelated failures), it is not possible for either Cook Nuclear Plant unit to lose indications without also losing the associated annunciators because of the bistable interface between indication and alarm. The design of the CRID system is described in the UFSAR. However, based on a re-review of the proposed EALs, Cook Nuclear Plant determined that its classification scheme is more complicated than necessary. Accordingly, ECC S-7, Loss of Alarms or Indication, has been revised to state:

Unusual Event

Unplanned loss of most safety system annunciators in a unit for > 15 minutes.
- *Panels 104-114, 119, 120*
- *Panels 204-214, 219, 220*

Alert

Loss of one or more CRIDS resulting in a significant plant transient. -OR-

Unplanned loss of most safety system annunciators in an unit for > 15 minutes with a significant plant transient.

Site Area Emergency

Loss of ALL CRIDs.

NRC Evaluation of D.C. Cook Response:

The staff accepts that it may be difficult to lose indications without losing annunciators if the interface bistable, amplifier, or isolation device taps off downstream, and is located in the same vicinity as the indications. However, the NUMARC basis states that *"it is further recognized that most plant designs provide redundant safety system indication powered from separate uninteruptable power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions."* The intent is to have this EAL recognize the potential (however slight) for a loss of indications.

The revised EAL for the UNUSUAL EVENT did not incorporate any reference to a loss of indications and is therefore slightly more conservative than the NUMARC EAL. The ALERT EAL addresses a loss of one or more CRIDs "resulting in a significant plant transient." NUMARC guidance references a loss "during a plant transient." While it may be likely that the loss could cause a plant transient (and thus an Alert classification would be appropriate), the transient does not need to be caused by that loss for classification as the D. C. Cook EAL states. The D. C.

Cook EAL is more limiting (less conservative) with regard to transients because it does not envelop plant transients that may have been in progress coincident with the loss of CRIDs.

Please provide further information or clarification for deviations from NUMARC/NESP-007 guidance.

NRC Comment 10A: (Corresponding to D. C. Cook ECC S-3 and NUMARC EAL SU7, "Loss of Required DC")

The NUMARC BASIS discussion for "site specific" loss states, "Bus voltage should be based on the minimum bus voltage necessary for operation of safety related equipment. This voltage value should incorporate a margin of at least 15 minutes of operation before the onset of inability to operate those loads." D. C. Cook Nuclear Plant added a 15-minute time requirement to its definition of loss of 250V DC buses. No explanation was provided as to how the 210-volt figure was computed. The intent of the NUMARC EAL is to initiate an emergency declaration at the voltage for which 15 minutes of load capacity remains, not arrive at that voltage and then wait 15 minutes before making a declaration.

D. C. Cook response:

"As documented in a Cook Nuclear Plant system description (SD-DCC-PS104), the 210V DC limit was based on battery service test acceptance criteria. The 15 minute margin was applied in the wrong direction and has been eliminated. Based on interpolation, the voltage at 15 minutes is about 213V DC. However, 213V DC is not readable on installed control room instrumentation due to meter scaling (10V DC divisions on a dial indicator). We have decided to use a value of 215V DC because it is the closest value that can be read on the control board. Use of the 215V DC value is further justified because slowly decreasing battery voltage should only occur during loss of all AC power scenarios, which are separately classified by ECC S-2A and S-2B. Other events of concern for this ECC would involve bus loss (i.e., 0 V DC bus voltage) and are readily discernible against the threshold value of 215V DC."

NRC Evaluation of D.C. Cook Response:

The response for this comment is acceptable except that the D. C. Cook response states that a value of 215V DC will be used because it is the closest value that can be read. However, procedure PMP 2080.EPP.101, Emergency Classification, Revision 1, Attachment A, page 2 of 5, note 2 states "Loss of DC power occurs whenever a DC train's voltage is less than 210V DC." The EAL value (210V DC), according to the D. C. Cook response, is not readable in the control room.

Please provide clarification for the apparent inconsistency on the use of 210V DC footnoted to the EAL matrix.

NRC Comment 10C: (Corresponding to D. C. Cook ECC S-3)

NRC Evaluation of D.C. Cook Response:

The technical information given in the D. C. Cook response for this comment is acceptable; however, it appears that the EAL "Unplanned loss of SFP cooling for greater that 60 minutes in ALL modes" upon which the NRC comment was based has now been removed from the Emergency Plan and PMP 2080.EPP.101, Revision 1 without explanation in the D. C. Cook response.

Provide confirmation on whether or not the EAL will be included in the D. C. Cook EAL scheme.

NRC Comment 11: (Corresponding to D. C. Cook ECC S-5 and NUMARC EAL SA4, "Loss of...Annunciators")

Previously in the D. C. Cook Nuclear Plant DBD (under NUMARC SU3) the licensee claimed that, "Loss of indications was deleted from this IC because a major loss of indication (CRIDS) will also render the compensatory non-alarming indications inoperable (SPDS/PPC) because loss of CRIDs will disable input to these systems also." The NUMARC EAL, stated simply, would be met by one of two basic conditions: (1) Loss of annunciators AND loss of control indications, SPDS, PPC, etc., or (2) Loss of annunciators AND a transient in progress. The D. C. Cook Nuclear Plant EAL would require a loss of annunciators, control room indication, and a transient in progress. This D. C. Cook Nuclear Plant EAL, contrary to licensee statement under NUMARC SU3, seems to imply the SPDS and PPC can continue to operate with a failure of CRIDS. As written, the D. C. Cook Nuclear Plant EAL is either non-conservative (if SPDS and PPC can continue to operate with a loss of CRIDs), or contains a logic error (if SPDS and PPC are rendered inoperable by CRIDs failure). Provide additional information on the relationship of CRIDs, SPDS, and PPC and justification of the apparent deviation from the NUMARC/NESP guidance.

D. C. Cook response:

The D. C. Cook response referenced responses to NRC Comment 9 above and NRC Comment 12 below.

NRC Evaluation of D.C. Cook Response:

The referenced responses did not contain complete explanations which would answer the inconsistencies discussed in NRC comment 11. The effort to understand the licensee response and this EAL (and others) was hampered somewhat by the lack of a revised D. C. Cook Emergency Plan Classification vs

NUMARC/NESP-007 Deviation Basis Document which reflected information on the changes made to the EALs since the original submission.

Provide additional information on all annunciator EALs and justification for any deviations from the NUMARC/NESP guidance. Include information on the power supplies, failure modes for control room indications, annunciators, and compensatory non-alarming indications (SPDS, PPC, etc.).

NRC Comment 12: (Corresponding to D. C. Cook ECC S-3 and NUMARC EAL SS3, "Loss of All Vital DC Power")

D. C. Cook Nuclear Plant has reduced the classification level of this NUMARC example IC/EAL to an Alert. The Alert level EAL, S-3 has been discussed previously, as it relates to operation in Modes 5 and 6, under NUMARC generic EAL SU7. In the D. C. Cook Nuclear Plant IC Deviation statement, the only apparent difference between Cook and other PWRs, might be the fact that D. C. Cook Nuclear Plant has inverters for the normal power supply to control room instrumentation. As in the evaluation of the D. C. Cook Nuclear Plant response to NUMARC SU7, additional information on DC power supplies is required to complete this evaluation. The deviation statement should be written in terms of what sets D. C. Cook Nuclear Plant apart from other Westinghouse PWRs of the same vintage with respect to this NUMARC IC/EAL.

D. C. Cook response:

The D. C. Cook response and DBD indicated that control room indications would not be lost as normal power to instruments is from inverters fed from AC power. Containment cooling, which would isolate on a loss of DC power, could be manually unisolated to restore cooling. The DBD stated that the loss of DC power would also cause a complete failure of automatic actuation for all safeguards equipment and loss of control room annunciators and if in Mode 1, a rapid RCS cooldown due to failure of the automatic turbine trip systems.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response for this comment is not acceptable without further information. The NUMARC basis for this EAL includes both the ability to monitor and control plant safety functions. The loss of DC power at D. C. Cook appears to degrade some aspects of both control and monitoring and manual compensatory actions would be required to regain control.

Provide additional information for deviations from NUMARC/NESP-007 guidance.

NRC Comment 14: (Corresponding to D. C. Cook ECC R-1 and NUMARC EAL SS6, "Loss of...Annunciators")

For the reasons previously discussed for the Unusual Event and Alert EALs for loss of annunciators, this EAL does not appear to be appropriate criteria for indication of the inability to monitor a significant transient.

D. C. Cook response:

The D. C. Cook response references the response to NRC Comment 9 above.

NRC Evaluation of D.C. Cook Response:

The response will require additional information as indicated in NRC Comments 9 and 11 above.

NRC Comment 19: (Corresponding to D. C. Cook ECC R-1 and NUMARC EAL HA1, "Turbine Failure...")

The D. C. Cook Nuclear Plant EAL deviates from the NUMARC guidance by not specifying turbine missiles and by not including the condition of missile penetration. Provide justification for this deviation.

D. C. Cook response:

The conditions in the Alert column for ECC N-7, Equipment or Structural Failure, have been revised to state:

- *Turbine-failure missile affects the operability of other systems required for the current operating mode or for safe shutdown.*
- *Significant visible damage to plant structures due to any cause.*

The new wording is consistent with the Alert level indicators proposed for ECCs N-1 through N-6 in the response to NRC Comment 18 above. To clarify the escalation from the Unusual Event threshold (penetration of the affected turbine casing), the indicator states either some other system must be affected or that significant structural damage outside the affected component must occur. For more information concerning required equipment, please refer to the response to NRC Comment 20 below.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable. NUMARC guidance for Alert, HA1, example EAL #6 states:

Turbine failure generated missiles result in any visible structural damage to or penetration of any of the following plant areas: (site-specific) list.

and the NUMARC basis states in part:

"if missiles have damaged or penetrated areas containing safety-related equipment the potential exists for substantial degradation of the level of safety of the plant."

D. C. Cook's EAL is less conservative and deviates from NUMARC guidance. The NUMARC intent is to declare the Alert if there is penetration into a vital area of the plant, not withstanding damage to systems/components within the area. The D. C. Cook EAL would require turbine missiles to affect system operability or cause significant visible damage to the specified areas before an Alert would be declared.

Provide additional information for deviations from NUMARC/NESP-007 guidance.

NRC Comment 23: (Corresponding to D. C. Cook ECC H-4 and NUMARC EAL HS2, "Control Room Evaluation")

The NUMARC BASIS for this EAL states, *"In cold shutdown and refueling modes, operator concern is directed toward maintaining core cooling such as is discussed in Generic Letter 88-17, "Loss of Decay Heat Removal."* In power operation, hot standby, and hot shutdown modes, operator concern is primarily directed toward maintaining critical safety functions and thereby assuring fission product barrier integrity." The D. C. Cook Nuclear Plant EAL limits control outside the control room to "RCS inventory Control," thus ignoring the other critical safety functions. Provide justification for this deviation from the NUMARC/NESP-007 guidance.

D. C. Cook response:

The EAL has been revised to state:

Control Room evacuation has occurred AND control of the following processes is not established within 30 minutes:
- *Reactivity*
- *RCS inventory*
- *RCS temperature*
- *SG heat sink*

and a footnote was added to explain the meaning of the term "control."

NRC Evaluation of D.C. Cook Response:

The D. C. Cook revised EAL and response for this comment are not acceptable. The time period for establishing control was lengthened from 15 minutes to 30

minutes in the revised EAL without justification or an explanation of the technical basis. The NUMARC basis clearly states this time should not exceed 15 minutes. This EAL would be acceptable if the time to establish control was changed back to the original 15 minutes.

Revise the EAL to meet NUMARC guidance or provide additional detailed justification for the deviations from NUMARC/NESP-007 guidance.

NRC Comment 26: (Corresponding to the Potential Loss of Fuel Clad EAL)

The NUMARC criterion for Fuel Clad Barrier Example EAL # 1 states:

POTENTIAL: Core Cooling - ORANGE
OR
Heat Sink - RED

The D.C. Cook equivalent EAL stated:

POTENTIAL: Core Cooling - ORANGE
Heat Sink - RED - AND - Wide range level in at least 3 SGs is <29%
(43% for adverse containment)

The D.C. Cook DBD provided discussion on how the SGs will continue to act as a heat sink until wide range level is lost. Although absent from the DBD, the D.C. Cook FPB matrix does contain an OR statement for the two CSFs. The generic Westinghouse EPGs for the HEAT SINK CSF require no SGs in the narrow range, and feedwater flow less than the safeguards AFW flow requirement for heat removal to equate to a RED path. The D.C. Cook DBD did not make a statement as to whether it had deviated from the Westinghouse EPGs in formulating its plant-specific EOPs (i.e., do the EOPs contain this same caveat on SG wide-range level in order to achieve a RED path on the HEAT SINK CSF?). Provide justification for this deviation from the NUMARC/NESP-007 guidance in the form of discussion on criteria for the plant-specific HEAT SINK RED path on the CSF Status Trees (CSFSTs), and by providing details on the relationship of wide to narrow range SG level instrumentation.

D. C. Cook response:

Cook Nuclear Plant does not deviate from Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERGs) for the heat sink critical safety function status tree (CSFST). Narrow range SG level covers 144 inches down from the same upper tap as the wide range SG level. Wide range SG level C\covers about 25 feet from SG tube sheet to the bottom of the dryer assembly in the top of the SG. Both ranges of SG level are environmental qualified for a post-LOCA containment. The SG narrow range level is calibrated for normal operating

pressure and temperature conditions. The SG wide range level is calibrated for cold shutdown conditions.

The Cook Nuclear Plant specific symptoms are written in such a way that they are not misinterpreted or misapplied to result in declaration of a site area emergency (due to potential loss of both fuel clad and RCS barriers) following a normal reactor trip. The WOG ERGs for the Heat Sink CSF require no SG level in the narrow range and feedwater flow less than the safeguards auxiliary feedwater (AFW) flow requirement for heat removal to equate to a RED path. Following a reactor trip from full power, the normal transient response for Cook Nuclear Plant is for SG level to drop below the bottom of the narrow range. In addition, main feedwater is automatically shut off and the AFW pumps will start on a low level signal. Thus, due to automatic response to a normal reactor trip, a transitory set of conditions which mimic the Heat Sink CSF - RED condition in the period prior to startup of the AFW pumps can exist.

According to the 'Background for WOG ERG F-0,' page 4, the Heat Sink CSF protects both the Fuel Clad barrier and the RCS barrier. However, Review of WOG ERG Background for FR-H.1, Section 2, shows that Heat Sink CSF - RED does not immediately represent a severe challenge to these two, as shown in the description of the loss of feedwater accident with no operator action. Review of Figure 1 and the description of Period 3 of this event makes it clear that RCS heat-up to pressurizer (PZR) PORV operation does not occur for between 25 to 50 minutes following the loss of feedwater event. Core uncovery therefore cannot result solely due to loss of secondary heat sink until the PZR PORV has dumped a large quantity of reactor coolant without adequate RCS makeup.

The WOG ERG Background for FR-H.1 further states on page 11 that '(a)ll cases show that core uncovery is minimized and long term core cooling is sustained through RCS bleed and feed heat removal.' On page 41, it further states that 'symptoms of SG dryout provide adequate indication to successfully initiate feed and bleed.' Therefore, symptoms that require initiation of feed and bleed cooling constitute a 'potential loss' challenge to core cooling and thus the Fuel Clad barrier. Cook Nuclear Plant EOP FR-H.1 uses 3 out of 4 SG WR levels less than 29% (43% for adverse containment conditions) as the bleed and feed initiation criterion. Inclusion of this requirement in addition to a Heat Sink CSFST - RED condition therefore: (1) appropriately focuses the concern on the ability to maintain longer term core cooling, and (2) assures that the Heat Sink CSFST - RED will not be misapplied and result in unnecessary declaration of a site area emergency.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable. The staff understands the technical discussion and justification, but does not consider the nonconservative deviation from NUMARC guidance necessary. With minor wording changes, which do not deviate from the intent of NUMARC, the EALs can be tailored for a specific plant

response. To suggest that a licensed shift supervisor might declare a CSFST - RED, then an SAE during a reactor trip with normal plant response due to the wording of this EAL is not reasonable. The momentary loss of SG levels (below narrow-range indication) and loss of feed (before AFW pumps start) is a very short transient condition. If D. C. Cook believes that there is a clear chance for misinterpretation and declaration of an SAE for a reactor trip with normal plant response, then words that exclude the momentary transient could be added without resorting to the less conservative "AND" condition (3 out of 4 wide range steam generator level, etc.).

Provide additional justification for deviation from NUMARC/NESP-007 guidance.

NRC Comment 28A: (Corresponding to Fuel Clad Loss EAL)

The D.C. Cook DBD provided the following EAL Deviation statement: *We have applied a time limit on the use of containment radiation monitors because the radiation levels for a given amount of fuel damage will be constantly decreasing with time. In order to prevent the SS/SEC from having to refer to a time-plot of radiation vs fuel damage, we have limited the viability of this symptom and used the lowest radiation reading within that time frame associated with the level of core damage assumed in the generic guidance. Therefore this symptom is not used on the Fission Product Barrier table associated with ICs.*

D. C. Cook response:

The context of the basis statement in question is that a constant amount of core damage will result in a continuously decreasing containment radiation monitor reading due to radioactive decay. The original statement can be misinterpreted, and did account for increasing core damage. The basis statement was revised to state: 'A containment radiation monitor value corresponding to a noble gas release to containment from 5% clad damage decayed for 90 minutes was selected for this indicator of fuel clad loss. This radiation monitor reading corresponds to an undecayed noble gas release due to about 2% to 3% clad damage. Thus, the containment monitor value corresponds to the 2% to 5% clad damage range described by the generic guidance.'

From an organizational standpoint, immediate core damage is the worst case condition because assessment personnel are not going to be available for up to 60 minutes. Ninety minutes was selected because it allows adequate time for the Technical Support Center to be staffed and core damage assessment to begin. While the 200 R/hr is a valid assessment of immediately occurring core damage in the range of 2% - 5%, the 90 minute threshold does not need to be included. Therefore, the indicator was revised to state:

CNTMT area radiation >200 R/hr prior to the TSC beginning core damage assessment.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response for this is acceptable if the EAL "TSC assessment of core damage >5% clad failure" is modified to "assessment of core damage >5% clad failure" and note 2 at the bottom of the EAL table "prior to the TSC beginning core damage assessment" is deleted. The control room shift technical advisor may perform a core damage assessment prior to the TSC being activated so it is not appropriate to limit the EAL for dose assessment to those performed by the TSC only. Furthermore, the EAL "CNTMT area radiation >200 R/hr" should apply at all times because when the containment radiation levels are above this value core damage is indicated.

Provide additional justification for the deviations from the NUMARC/NESP-007 guidance.

NRC Comment 32A: (Corresponding to RCS Barrier Loss EAL)

On the loss EAL, we added the caveat that subcooling cannot be restored. This allows some leeway in those circumstances where the EOPs direct minimizing subcooling for some mitigating action. The licensee did not provide an example of where the EOPs purposefully have the operators reduce subcooling to <30 degrees F (it is presumed that this includes instrument error). The licensee placed no time constraint on the phrase "can NOT be restored."

D. C. Cook response:

The D. C. Cook response stated: *The Cook Nuclear Plant EOPs, which are based on the WOG ERGs, have SI re-initiation criteria based on loss of subcooling. At that point, operator action would be taken to restore subcooling. There are instances in which the EOPs instruct the operators to purposefully lower RCS pressure to reduce subcooling to less than minimum required. For example, ECA-3., directs the operators to purposefully reduce RCS pressure to saturated conditions. Since subcooling loss is due to operator action, then the generic EAL indicator of loss of subcooling due to RCS leak rate exceeding available RCS makeup would not apply for this case. Including a time limit could imply that action should be undertaken to restore subcooling, which is not appropriate when EOP ECA-3.2 is in effect.*

It is noted that our previous submittal made use of the requirement that RCS subcooling remain <30 degrees fahrenheit. That number referred to the sum of pressure and temperature measurement system errors, including allowances for normal channel accuracies, translated into temperature using saturation tables.

Upon close examination, we do not believe this single number to be reflective of our current procedures which specify different values depending on the system conditions and the severity of the environment in the containment. Since several

different numbers are involved, and in fact can change as we change plant instruments, we do not believe it to be appropriate to include a dynamic tabulation of such values as part of the emergency planning documentation.

We have, therefore, elected to change the subcooling criteria for the RCS barrier to be 'less than the minimum required.' This minimum required is intended to refer to the value currently specific by the Cook Nuclear Plant emergency operating procedure which is applicable at the time. It is also noted that this change in wording will maintain emergency planning documentation on this issue consistent with the recommendations of the WOG ERGs which recommend that the minimum subcooling be set equal to instrument inaccuracy.

We also believe that is important to retain the phraseology 'and cannot be restored' since its removal could result in unnecessary agitation of operations under emergency conditions. In addition to the example cited above where current procedures may require the plant to deliberately be taken out of a required subcooling condition, it is also possible to envision conditions where subcooling may be inadvertently lost, but can be restored at will since the RCS barrier remains intact. It is not prudent to unnecessarily perturb emergency response operations under either of these conditions.

NRC Evaluation of D.C. Cook Response:

The D. C Cook EAL and response are not acceptable without additional information. Although the D. C. Cook logic is understandable, the deviation from NUMARC guidance is not necessary or appropriate. It is recognized that during accident mitigation the plant must be operated in accordance with approved EOPs. NUMARC recognized this when formulating initiating conditions and example EALs. The NUMARC example IC/EAL states "RCB Leak Rate GREATER THAN available makeup capacity as indicated by a loss of RCB subcooling. D. C. Cook did not include "RCB Leak Rate GREATER THAN makeup capacity" in its EAL. In the D. C. Cook EAL, the loss of subcooling statement stands alone without being connected to the RCS leak rate. For the NUMARC EAL, if the loss of subcooling is deliberate, in accordance with procedures, and there is no RCB leak rate greater than makeup capacity, classification would not be required (based on subcooling alone). At that point in the EOPs (intentional reduction of subcooling), the SEC/SS should be aware of RCB conditions. Therefore, the "RCB Leak Rate GREATER THAN makeup capacity" (which D. C. Cook omitted from the EAL) would not be present and no classification should be required. If the NUMARC EAL was implemented without omitting part of the NUMARC wording, it would appear the NUMARC EAL would be appropriate for D. C. Cook as written.

Provide additional information for the deviation from NUMARC/NESP-007 guidance.

NRC Comment 32B: (Corresponding to RCS Barrier Potential Loss EAL)

The setpoint for the potential loss of RCS specified in the D. C. Cook Nuclear Plant scheme is higher that the setpoint specified in the NUMARC scheme, i.e., "Unisolable leak exceeding the capacity of one charging pump in the normal charging mode." The D. C. Cook Nuclear Plant DBD did not provide adequate justification for this deviation. Provide justification for this deviation from the NUMARC/NESP-007 guidance.

D. C. Cook response:

The generic basis for this indicator states that 'this (indicator) assures that any event that results in significant RCS inventory shrinkage or loss (e.g. events leading to reactor scram and ECCS actuation) will result in no lower than an 'Alert' emergency classification.' The Cook Nuclear Plant indicator is taken directly from procedural guidance (OHP 4022.002.002) for the manual initiation of safety injection. The Cook EAL therefore reflects plant-specific indication of an unisolable leak exceeding the capacity of one charging pump in the normal charging mode. For more information on the interrelationship of RCS leakage indicators, please refer to the response to NRC Comment 33 below.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook EAL and response for this comment are not acceptable. The D. C. Cook EALs for RCS barrier potential loss and RCS barrier loss are *"ECCS operating in SI mode AND SI actuation is not diagnosed as 'inadvertent' "* and *"ECCS operating in any SI RECIRCULATION MODE"* respectively. The D. C. Cook justification did not provide adequate justification for why the D. C. Cook threshold (in terms of leak rate) for the potential loss EAL was much higher than NUMARC guidance. In addition both loss and potential loss EALs are predicated upon the timely, correct operation of the ECCS, specifically safety injection. The NUMARC EAL would require classification based on leakage rate (e.g., greater than the capacity of one charging pump or greater than available makeup capacity) whether or not safety injection operates correctly, or operates at all. Because of that, the D. C. Cook EALs are nonconservative. Additionally, the D. C. Cook "potential loss" EAL requires an additional caveat that "SI actuation is not diagnosed as inadvertent." The caveat would not be necessary if the NUMARC guidance were followed.

Provide justifications for deviations from NUMARC/NESP-007 guidance.

NRC Comment 33: (Corresponding to RCS Barrier Loss EAL)

The D. C. Cook Nuclear Plant EAL appears to deviate from the NUMARC guidance by using the term FAULTED instead of the NUMARC conditions of: *"a non-isolable secondary line break or a prolonged release of contaminated secondary coolant is*

occurring from the affected SG to the environment." In addition, no site-specific indication of a ruptured SG was provided. Contrary to the assertion made in the D. C. Cook Nuclear Plant DBD, including SG tube rupture under the event based EAL is not equivalent to including SG tube rupture under the fission product barrier EALs. Provide discussion of the EOP definitions for RUPTURED and FAULTED, and provide justification for the deviations from NUMARC/NESP-007 guidance taken in both this EAL and in RCS EAL #2 for the definition of POTENTIAL LOSS.

D. C. Cook response:

The generic guidance clearly indicates that the fission barrier table is to be consist with, and be based on, EOP symptoms and assessment of barrier conditions rather than be based on a separate, redundant scheme. In the EOPs, RUPTURED indicates a steam generator that is diagnosed as having a tube rupture (primary to secondary leakage path). FAULTED indicates a steam generator that is diagnosed as having a breach in the secondary pressure boundary up to and including the outermost isolation valves. The Cook Nuclear Plant fission barrier table uses these terms in the same manner that they are used in the EOPs.

The generic guidance states that the RCS Barrier SG tube rupture EALs are intended to address the full spectrum of SG tube rupture events in conjunction with the Containment Barrier SG Secondary side release with primary-to-secondary leakage EAL, and using the Fuel Clad Barrier EALs. The Cook Nuclear Plant specific EALs were developed to assure that there is smooth escalation of SG tube rupture sequences and are consistent with the generic guidance.

Cook Nuclear Plant ECC S-8, Excessive RCS Leakage, addresses smaller sized SG tube leakage that exceeds Tech Spec allowable but fall well within normal makeup capacity, i.e., SG tube leaks greater than 10 gpm. Leaks of this magnitude will result in declaration of an Unusual Event. This condition addresses SG leakage exceeding tech spec limits shown in the generic fission barrier table. Additionally, ECC S-8 addresses tube breaks with leak rates that are somewhat larger than normal makeup capacity, and require manual initiation of safety injection, i.e., PZR level can not be maintained greater the 4% with one charging pump. This is an alternate indication to the Fission Barrier Table RCS Barrier "potential loss" symptom of the ECCS operating in the SI mode and SI actuation is not diagnosed as inadvertent. SG tube ruptures of this magnitude are readily controlled in accordance with the EOPs and will result in declaration of an Alert either using ECC S-8 or using the Fission Barrier Table and determining RCS Barrier 'potential loss' via condition B-2 on Table 1; Fission Product Barrier Classification Matrix.

Larger spectrum tube rupture events that can lead to SG overfill and prolonged releases off-site are addressed by the RCS Barrier Table. If the break were large enough, RCS Barrier "loss" would be determined based on the existence of a steam generator that is both ruptured and faulted. A faulted SG could have a breach in its secondary pressure boundary either inside or outside containment.

For the case of concern, containment barrier "loss" would be determined based on a ruptured steam generator that has unisolable steam flow out of the containment. Under these conditions, a Site Area Emergency would be declared based on conditions B-21 or B-24 on Table 1: Fission Product Barrier Classification Matrix. Please refer to the response to NRC Comment 38 below for more information on this containment barrier "loss" indicator.

Escalation to General Emergency would be based on further degradation and the subsequent potential loss of the Fuel Clad barrier. Under these conditions, a General Emergency would be declared based on conditions B-4, B-7, or B-13 on Table 1: Fission Product Barrier Classification Matrix.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response is not acceptable; it did not provide justification for omitting site-specific indications specified in the NUMARC guidance for ruptured steam generator loss and potential loss as requested by the RAI. The response also indicated that ECC, S-8 provides an alternate indication for the Fission Barrier Table RCS Barrier "potential loss" symptom of ECCS operating in the SI mode. The alternate symptom is not acceptable as a substitute for a NUMARC-specified EAL in the Fission Product Barrier Matrix because it is not clearly identified as a "potential loss" indicator for that matrix. It is also not positively linked to the Fission Product Barrier Classification Matrix like the Fission Product Barrier Matrix is. Therefore, having condition ECC, S-8 with the loss of other barriers may not result in an appropriate classification.

Provide additional information on deviations from NUMARC/NESP-007 guidance.

NRC Comment 36C: (Corresponding to Containment Barrier Potential Loss EAL)

D. C. Cook Nuclear plant completely eliminated an EAL equivalent to the third NUMARC EAL under POTENTIAL LOSS (Containment pressure greater than containment depressurization setpoint and less than one full train of depressurization equipment operating). The DBD provided no explanation for this deviation. Provide justification for this deviation from the NUMARC/NESP-007 guidance.

D. C. Cook response:

The Cook Nuclear Plant uses the passive ice condenser to suppress containment pressure during a LOCA. The containment depressurization setpoint is 2.9 psig for automatic initiation of containment spray. As long as ice is available, there is no immediate challenge to the containment when the containment spray pumps are not operating. Thus, considering this indicator as a 'potential loss' of the Cook Nuclear Plant ice condenser containment is not appropriate. The more appropriate

criteria would be the containment CSFST - RED path of 8 psig which is already included in EAL #1.

It should be noted that significant margin to containment failure exists at these setpoint levels. The best estimate of containment failure pressure, which is used in the individual plant examination, is at least 36 psig for the high confidence of low probability of failure (Reference NRC Safety Evaluation Report, letter from S. A. Varga to J. Dolan, February 21, 1985).

NRC Evaluation of D.C. Cook Response:

The condition where safety-related equipment designed to protect the containment does not operate as designed when the setpoint for initiation of the equipment is exceeded is considered as an early indication of a potential loss of containment. The D. C. Cook response did not adequately justify removal of this EAL.

Provide additional justification for this deviation from the NUMARC/NESP-007 guidance.

NRC Comment 38: (Corresponding to Containment Barrier Loss EAL)

There are several problems with this D.C. Cook EAL, as follows: D.C. Cook uses the term "RUPTURED," which in previous EALs was implied to refer to a tube rupture. The NUMARC EAL refers to primary to secondary leakage, not a SG tube rupture. D.C. Cook uses the words, "ruptured SG has known steam flow outside the containment for greater than 30 minutes." D.C. Cook has previously implied that the word "FAULTED" refers to a SG discharging steam to atmosphere. The NUMARC example EAL contained no time criteria for the discharge of steam to atmosphere; whereas D.C. Cook has added a very nonconservative 30 minutes before meeting this EAL. Provide justification for these significant deviations from the NUMARC/NESP-007 guidance.

D. C. Cook response:

Please refer to the response to NRC Comment 33 above for explanation of the use of the terms 'faulted' and 'ruptured' in the Cook Nuclear Plant EOPs and emergency plan. Based on simulator exercises and previous operating experience at other PWRs, lifting of the atmospheric relief valves associated with the ruptured SG can be expected to occur prior to completing the RCS depressurization phase required by the steam generator rupture EOP E-3. The operation of these relief valves is expected to occur during the first 15 to 20 minutes of the accident response. The original wording for the containment loss indicator, 'A SG is ruptured and the ruptured SG has known steam flow outside the containment for >30 minutes,' was based on the assumption that the steam flow was coming from a relief valve. However, it is clear that this intent could have been

misinterpreted using the original wording for this indicator. Therefore, Containment Loss indicator was revised to state:

Any RUPTURED SG has unisolable steam flow out of the containment.

By using the term 'unisolable,' the revised EAL would result in an immediate determination of containment barrier 'loss' for breaks outside containment and stuck open atmospheric relief valves that cannot be isolated, rather than waiting for 30 minutes, as would be possible using the original wording. Further, the SG PORVs are 'isolable.' Thus, this wording excludes normal and expected response of the ruptured SG PORV during the initial RCS depressurization phase of EOP E-3, which was the original intent using the 30 minute threshold, and the intent of the generic guidance.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response and revised EAL are unacceptable. The criterion for the NUMARC EAL is primary-to-secondary leakage greater than technical specification allowable. D.C. Cook did not provide justification that a leakage rate of greater than technical specification corresponds to a ruptured steam generator tube as defined the EOPs. Furthermore, the D. C. Cook EAL specifies that the release to the environment is "unisolable," whereas the NUMARC EAL specifies simply that there is a release. The D. C. Cook response did not adequately justify this deviation.

Provide justification for this deviation from the NUMARC/NESP-007 guidance.

NRC Comment 39: (Corresponding to Containment Barrier Potential Loss EAL)

The D. C. Cook Nuclear Plant DBD did not adequately justify the equivalence of the D. C. Cook Nuclear Plant EAL and the NUMARC EAL. In particular, no information was given regarding the relationship between the NUMARC criteria of "core exit thermocouples in excess of 700 degrees F and reactor vessel level below top of active fuel" and the D. C. Cook Nuclear Plant EAL, "Core Cooling CSFST - RED."

D. C. Cook response:

The Cook Nuclear Plant Core Cooling CSFST (based on the WOG ERG CSFST for plants with RVLIS) includes two separate paths that result in Core Cooling - RED. The first is core exit temperature greater than 1200 degrees F. This is used by all Westinghouse plants, whether or not they have a RVLIS design like that at the Cook Nuclear Plant. The second RED path for plants with a RVLIS design such as that at the Cook Nuclear Plant is core exit temperature greater than 700 degrees F and RVLIS Level less than 3.5 ft from the bottom of the active fuel. These are the two conditions referred to in the generic methodology.

However, either core cooling RED path will result in entry into EOP FR-C.1, Response to Inadequate Core Cooling, which is the applicable functional restoration procedure referred to in the generic methodology. Thus, use of Core Cooling CSFST - RED is directly equivalent to the indicators used in the generic methodology.

NRC Evaluation of D.C. Cook Response:

The D. C. Cook response for the original comment is acceptable. However, the D. C. Cook EAL contains a wording deviation which is more conservative than NUMARC. The NUMARC EAL, Containment Barrier, Core Exit Thermocouple Readings, under potential loss states in part:

"restoration procedures not effective within 15 minutes."

The D. C Cook equivalent EAL states in part:

"core temperature does not drop within 15 minutes."

The NUMARC basis (pg. 5-33) states the functional restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. It further states the procedure is considered effective if the temperature is decreasing (as the D. C. Cook EAL states) or if the vessel water level is increasing. Although the D. C. Cook EAL is more specific in stating what the NUMARC restoration procedure being "effective" means, the NUMARC basis information regarding a vessel level increase was not included. Therefore NUMARC's "effective" means temperature decrease or level increase and D. C. Cook's "effective" means only a temperature decrease.

Provide additional information as to whether the omission of the "vessel level increase" for this EAL was intentional and if so, the technical basis for the omission.