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## CALVERT CLIFFS NUCLEAR POWER PLANT

September 15, 2011

U. S. Nuclear Regulatory Commission  
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** Calvert Cliffs Nuclear Power Plant; Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318  
Independent Spent Fuel Storage Installation; Docket No. 72-8  
Response to Request for Additional Information Re: Request to Adopt Revised  
Emergency Action Levels

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**REFERENCES:**

- (a) Letter from Mr. M. J. Fick (CCNPP) to Document Control Desk (NRC), dated February 1, 2011, Emergency Action Level Changes
- (b) Letter from Mr. D. V. Pickett (NRC) to Mr. G. H. Gellrich (CCNPP), dated July 14, 2011, Request for Additional Information Re: Request to Adopt Revised Emergency Action Levels - Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 – (TAC Nos. ME5424 and ME5425)

In reference (a), Calvert Cliffs Nuclear Power Plant requested Nuclear Regulatory Commission (NRC) approval for the adoption of revised Emergency Action Levels (EALs) for use at Calvert Cliffs Nuclear Power Plant in accordance with 10 CFR Part 50, Appendix E. The revised EALs are based on Nuclear Energy Institute (NEI) 99-01, Revision 5. In Reference (b), the NRC requested additional information concerning the information submitted in Reference (a). Attachment (1) contains the requested additional information.

In addition to the changes described in Attachment (1), another change to the EAL scheme has been identified. For EALs HU1.1 and HA1.1 the plant-specific bases has been revised to correct the described seismic instrument actuation setpoint from 0.01g to 0.02g and note that data evaluation is required.

In Reference (a), approval of the EAL scheme change was requested by February 1, 2012 with implementation within 180 days. We wish to revise the implementation timeframe. Due to scheduled operator training, we would like to implement the revised EALs no sooner than August 30, 2012.

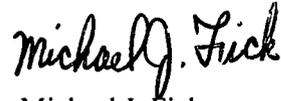
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Therefore, we request an implementation timeframe consistent with implementation after August 30, 2012.

Should you have questions regarding this matter, please contact me at (410) 495-5216 or Mr. Douglas E. Lauver at (410) 495-5219.

Very truly yours,



Michael J. Fick  
Director-Emergency Preparedness

MJF/PSF/bjd

Attachment: (1) Response to Request for Additional Information Re: Request to Adopt Revised  
Emergency Action Levels

cc: D. V. Pickett, NRC  
W. M. Dean, NRC

Resident Inspector, NRC  
S. Gray, DNR

**ATTACHMENT (1)**

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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RE:  
REQUEST TO ADOPT REVISED EMERGENCY ACTION LEVELS**

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## ATTACHMENT (1)

### RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RE: REQUEST TO ADOPT REVISED EMERGENCY ACTION LEVELS

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*By letter dated February 1, 2011, Constellation Energy Nuclear Group, LLC, (CENG), requested prior approval of a revised emergency action level (EAL) scheme for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (CCNPP).*

*CENG's letter stated that the current CCNPP EAL scheme is based on generic development guidance from NEI 99-01, "Methodology for Development of Emergency Action Levels," Revision 4, dated January 2003 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML041470143). Since 1992, numerous enhancements and clarification efforts have been made to the generic EAL development guidance resulting in the most latest document, Nuclear Energy Institute (NEI) 99-01, Revision 5, "Methodology for Development of Emergency Action Levels," (ADAMS Accession No. ML080450149), which was found to be acceptable for use as generic EAL development guidance by the Nuclear Regulatory Commission (NRC) staff by letter dated February 22, 200B (ADAMS Accession No. MLOB0430535).*

*The proposed EAL schemes were developed using the generic development guidance from NEI 99-01, Revision 5 with numerous differences and deviations based upon design criteria applicable to the site as well as licensee preferences for terminology, format, and other licensee desired modifications to the generic EAL scheme provided in NEI 99-01 Revision 5.*

*The NRC staff has determined that the following request for additional information (RAI) is necessary to facilitate the staff review.*

#### **NRC RAI 1:**

*Section 1.0, "Purpose," needs to clearly state that the EAL Technical Bases Document is intended to provide clarification and understanding of how the EALs were developed for CCNPP as well as the intent of each EAL. While the EAL Technical Bases Document supports the technical review of the CCNPP EAL scheme, the document is actually intended to ensure consistent understanding of the EAL scheme for EAL decision makers at CCNPP. The document states that it "may" be useful in training; however, this document "shall" be used for training purposes. Please ensure this section accurately captures this point.*

#### **CCNPP Response RAI 1:**

Section 1.0 of the EAL Technical Bases document has been revised to read:

"This document provides an explanation and rationale for each Emergency Action Level (EAL) included in the EAL Upgrade Project for Calvert Cliffs Nuclear Power Plant (CCNPP). The EAL Technical Bases Document is intended to provide clarification and understanding of how the EALs were developed for CCNPP as well as the intent of each EAL. This document ensures consistent understanding of the EAL scheme for decision makers. It should be used to facilitate review of the CCNPP EALs and provide historical documentation for future reference. Decision-makers responsible for implementation of ERPIP-3.0 "Immediate Actions Attachment 1, Emergency Action Levels" and the Emergency Action Level Matrix, may use this document as a technical reference in support of EAL interpretation. This information may assist the Emergency Director in making classifications, particularly those involving judgment or multiple events. The basis information shall also be used in training, for explaining event classifications to off-site officials, and facilitates regulatory review and approval of the classification scheme."

#### **NRC RAI 2:**

*Section 4.0, "Definitions," has the words "... from the Control Room panels" added to the definition for "unisolable" without any justification as to why. Please explain why this was added to the definition or*

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*return the definition to the accepted industry standard verbiage as reflected in the latest NRC approved EAL scheme development guidance.*

**CCNPP Response RAI 2:**

The definition of "Unisolable" has been revised to be consistent with the generic guidance:

"A breach or leak that cannot be promptly isolated."

**NRC RAI 3:**

*EAL RU1.1 and RU1.2: For the site specific EAL development method chosen by CCNPP, please consider combining these EALs to aid in reducing reader burden and possibly improve the timeliness of the declaration. Each EAL refers to the exact same table, for the exact same time duration, and with the same Note being applicable. The only difference would be the incorporation of the basis information for each EAL.*

**CCNPP Response RAI 3:**

Emergency Action Levels RU1.1 and RU1.2 have been combined into a single EAL (RU1.1) that addresses both gaseous and liquid releases.

**NRC RAI 4:**

*EAL RA1.1 and RA1.2: For the site specific EAL development method chosen by CCNPP, please consider combining these EALs to aid in reducing reader burden and possibly improve the timeliness of the declaration. Each EAL refers to the exact same table, for the exact same time duration, and with the same Note being applicable. The only difference would be the incorporation of the basis information for each EAL.*

**CCNPP Response RAI 4:**

Emergency Action Level RA1.2, addressing liquid effluent monitor indications, has been deleted. The upper range of the Liquid Discharge Radiation Monitor (RE-2201) is 1.0E+06 cpm. The effluent reading corresponding to 200 times the Offsite Dose Calculation Manual limit is 8.42E+07 cpm. Therefore, the Liquid Discharge Radiation Monitor is not capable of reading the intended Alert threshold for liquid effluents. Therefore, Emergency Action Level RA1.2 has been deleted and "N/A" has been placed in the Alert column for RE-2201.

**NRC RAI 5:**

*EAL RA 1.2: Please explain how "off-scale hi" will be differentiated from instrument error and how timely this determination would be.*

**CCNPP Response RAI 5:**

The upper range of the Liquid Discharge Radiation Monitor (RE-2201) is 1.0E+06 cpm. The effluent reading corresponding to 200 times the Offsite Dose Calculation Manual limit is 8.42E+07 cpm. Therefore, the Liquid Discharge Radiation Monitor is not capable of reading the intended Alert threshold for liquid effluents. Therefore, Emergency Action Level RA1.2 has been deleted and "N/A" has been placed in the Alert column for RE-2201.

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**NRC RAI 6:**

*EAL RA3.1:*

- a. *Please explain why CAS and SAS both need to be on this list. If the site can function adequately with only CAS (which is the typical industry response) then only CAS needs to be reflected in this EAL. Please explain why both facilities are needed, or revise to reflect CAS or SAS, not both.*
- b. *Please explain why you stated "There is no radiation monitoring system at CCNPP for the Control Room .... " A review of the Updated Final Safety Analysis Report and previous versions of the CCNPP EAL scheme (ADAMS Accession No. ML021350540) show that instrument O-RI-5350(67), "Control Room Vent," is available for the CCNPP Control Room. Please explain why the Control Room does not have radiation monitoring, or correct this EAL. In addition, please explain how CCNPP satisfies General Design Criteria 19, Control Room, from Appendix A of 10 CFR Part 50. If this error is due to an oversight, assuming there is an error, please document in your response to this RAI that you reviewed and confirmed that no similar oversights exist in this submittal.*

**CCNPP Response RAI 6:**

- a. The SAS was deleted from Emergency Action Level RA3.1.
- b. Calvert Cliffs does not have installed area radiation monitoring for the Control Room. The referenced radiation monitor [0-RI-5350(67)] is the Control Room Ventilation Supply Monitor and detects particulate and gaseous activity in the Control Room ventilation supply. As described in the Calvert Cliffs UFSAR, this monitor provides a signal to isolate the Control Room ventilation and initiate the filtration system. This ventilation system response has been evaluated and ensures that General Design Criteria 19 is satisfied. The referenced radiation monitor does not detect area radiation levels as specified in the Emergency Action Level threshold. Emergency Action Level RA3.1 plant-specific bases have been revised to clarify this configuration.

**NRC RAI 7:**

*EAL CU1.1: Please explain why you added "Defueled" as an Operating Mode for this EAL or correct the discrepancy. You stated that this was an omission from the generic EAL scheme development guidance but provided no justification as to why you believe that to be correct.*

**CCNPP Response RAI 7:**

Emergency Action Level CU1.1 is anticipatory to a complete loss of vital AC power (CA1.1). The Defueled mode is already included in Emergency Action Level CA1.1 to address loss of Spent Fuel Pool Cooling upon a complete loss of vital AC power. In the Defueled mode (which is a complete core off-load during refueling), the decay heat load in the Spent Fuel Pool is at its highest level. We have therefore included the Defueled mode as an applicable mode for Emergency Action Level CU1.1.

**NRC RAI 8:**

*EAL CA 1.1: Please explain why you stated all the exclusion criteria for declaration of this EAL. These statements are not supported in the justification section(s) of this submittal, and as a result, the staff has no basis for effectively evaluating the acceptability of these claims.*

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#### **CCNPP Response RAI 8:**

The five bulleted exclusionary criteria were deleted from the site-specific bases for Emergency Action Level CA1.1.

#### **NRC RAI 9:**

*EALs CU5.1 and SU6.1: Please explain how the "Dedicated offsite agency telephone system" and the "CCNPP Radio System" are acceptable for contacting the NRC in the required timeframe or correct the table.*

#### **CCNPP Response RAI 9:**

The dedicated offsite agency telephone system was deleted from Tables C-5 and S-3. The applicability of the CCNPP Radio System as an offsite (external) communications system was also deleted from Tables C-5 and S-3.

#### **NRC RAI 10:**

*EALs HU1.2 and HA 1.2: Please explain if 100 mph is within the calibrated range of the instrumentation available in the Control Room.*

#### **CCNPP Response RAI 10:**

Calvert Cliffs uses a Met One Instruments wind speed transmitter (Model 1564D) with an anemometer cup assembly (Model 170-41). They are a matched pair and come from Met One Instruments with a certificate of calibration. Calvert Cliffs also uses a Model 21.11 wind speed processor to process the input from the transmitter.

The wind speed assembly and processor are capable of detecting up to 50 m/s (111.8 mph) wind speed and providing the data to the MIDAS computer. This data is displayed on the Control Room MIDAS computer terminal as a 15 minute average.

The meteorological tower where the wind speed instrumentation is installed is designed to withstand a 110 mph wind gust.

#### **NRC RAI 11:**

*EAL HU2.1: The proposed revision to the start time of this EAL determination is unacceptable and not supported by the justification provided. The start time for this EAL begins when the alarm/annunciator is received, or when the report of a fire is received, whichever is earlier.*

#### **CCNPP Response RAI 11:**

The following Emergency Action Level HU2.1 bases statement has been deleted:

"If the alarm cannot be verified by redundant Control Room or nearby Fire Panel indications, notification from the field that a fire exists would be required to start the 15-minute classification and fire extinguishment clocks."

#### **NRC RAI 12:**

*EAL HA3.1: Please confirm that the areas listed in Table H-1 are the areas CCNPP will use for this particular EAL. The intent of this EAL is to declare an Alert when access to an area is impeded due to a*

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*gaseous event. The areas of concern are limited to those that must be entered for safe operation or safe shutdown/cooldown. If access to the area is unnecessary to operate said equipment, then the table does not need the area listed.*

#### **CCNPP Response RAI 12:**

Table H-1 lists structures and areas containing safe shutdown structures and equipment. Emergency Action Level HA3.1 is worded to require classification when access to one or more Table H-1 areas is prohibited. If the area is not required to be accessed for safe operation or shutdown/cooldown under plant conditions existing at the time, then emergency action level classification would not be required.

#### **NRC RAI 13:**

*EAL HA4.1: Please reflect applicability of this EAL for security events at your independent spent fuel storage installation.*

#### **CCNPP Response RAI 13:**

The site-specific basis for this Emergency Action Level has been revised to read:

"Note that this condition is applicable for any hostile action occurring, or that has occurred, in the Owner Controlled Area including the Independent Spent Fuel Storage Installation (ISFSI)."

#### **NRC RAI 14:**

*EAL SA3.1: The final sentence from your plant-specific bases section does not document that escalation to the site area emergency EAL SS3.1, which can also be due to actions away from the control room panels, are successful in shutting down the reactor. Please explain why, or correct the discrepancy.*

#### **CCNPP Response RAI 14:**

The last sentence of the plant-specific bases for Emergency Action Level SA3.1 states:

"If manual reactor trip actions at the Control Room panels (following an unsuccessful automatic reactor trip) fail to reduce reactor power to or below 5%, the event escalates to the Site Area Emergency under EAL SS3.1."

No credit is taken for manual trip actions away from the Control Room panels in Emergency Action Level SS3.1. If an automatic trip fails, manual trip actions taken from the Control Room panels will be initiated prior to taking remote manual trip actions. Remote manual trip actions are credited, however, in Emergency Action Level SG3.1.

#### **NRC RAI 15:**

*EALs SU5.1, SA5.1, and SS5.1: These EALs require more detail on which annunciators and indicators are applicable. The generic EAL scheme development requires more guidance for these EALs. Leaving this open for subjective judgment determination by a Control Room Shift Manager is unacceptable and contrary to consistent EAL decision-making within the time considerations required by regulation. Please provide more detail as to what annunciators and indicators are applicable (for example, panel numbers, specific instruments, etc.).*

#### **CCNPP Response RAI 15:**

As stated in the generic bases for SU5.1, SA5.1 and SS5.1:

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Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.).

The quantification of safety system indications and annunciation cannot be specified by specific panels, annunciators, or indicators because the Emergency Action Level must address significant losses in the aggregate and also for specific control parameters. Specifying specific control room panels or specific control room indicators would unduly limit the possible combinations and magnitude of indication/annunciation losses.

#### **NRC RAI 16:**

*Fission Barrier Matrix:*

- a. *Please explain why CCNPP did not carryover the critical safety function status tree equivalents developed by the Combustion Engineering Owners Group (CEOG) and as reflected in revision 10 of the CCNPP EAL Technical Basis Document, i.e., Safety Function Status Checks. Develop the equivalent thresholds using CEOG guidance and the existing CCNPP EALs.*
- b. *Document and justify why all the other fission barrier thresholds from the existing CCNPP fission barrier matrix are not addressed in this submittal and why the NRC should consider them to no longer be applicable, or revise accordingly.*

#### **CCNPP Response RAI 16:**

- a. The Combustion Engineering Owners Group did not generically develop critical safety function status tree equivalents for use with Combustion Engineering designed plants. However, the site-specific equivalents developed and reflected in the current revision of the Calvert Cliffs NEI 99-01 Rev. 4-based Emergency Action Level Fission Product Barrier Matrix and associated Technical Bases Document were incorporated into the proposed Calvert Cliffs NEI 99-01 Rev. 5-based Emergency Action Level scheme (see Table A below).
- b. All existing fission product barrier thresholds are addressed in the proposed NEI 99-01 Rev. 5-based Fission Product Barrier matrix (Reference 1, Attachment 2, Table F-1). The existing CNMT Loss #5 and #6 thresholds are subsumed into the new CNMT Loss #5.

The process used to generate the fission product barrier thresholds included collection of site specific input data with consideration for other potential fission product barrier indicators not specifically identified within the generic NEI 99-01 Revision 5 guidance. Multiple drafts and site technical inter-disciplinary reviews were conducted. A formal verification and validation was performed using actual operating crews and a formal review by the Plant Operation Review Committee was completed. These activities identified one additional plant design specific applicable barrier potential loss threshold (RCS Potential Loss #1: OTCC flow established) that was included in Table F-1.

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<b>Table A - Fission Product Barrier Critical Safety Function Threshold Equivalent Comparison</b>			
<b>Current Calvert Cliffs Thresholds (NEI 99-01 Rev. 4)</b>		<b>Proposed Calvert Cliffs Thresholds (NEI 99-01 Rev. 5)</b>	
Fuel Clad Loss 1	CET readings > 1,200°F	Fuel Clad Loss 1	CET readings > 1,200°F
Fuel Clad Pot. Loss 1	CET readings indicate superheat	Fuel Clad Pot. Loss 1	CET readings > 700°F
Fuel Clad Pot. Loss 2	RVLMS level ≤ 10 in. (last light)	Fuel Clad Pot. Loss 3	RVLMS level ≤ 10 in. alarm
Fuel Clad Pot. Loss 3	RCS heat removal cannot be established AND EITHER: RCS pressure > PORV setpoint OR RCS subcooling < 25°F	Fuel Clad Pot. Loss 2	RCS heat removal cannot be established AND EITHER: RCS pressure > PORV setpoint OR RCS subcooling < 25°F
N/A	N/A	RCS Pot Loss 1	OTCC flow established
RCS Pot Loss 1	Uncontrolled RCS cooldown and to left of Max Operating Pressure Curve (EOP Attachment 1, RCS Pressure Temperature Limits)	RCS Pot Loss 2	Uncontrolled RCS cooldown and to left of Max Operating Pressure Curve (EOP Attachment 1, RCS Pressure Temperature Limits)
RCS Pot Loss 2	RCS heat removal cannot be established AND EITHER: RCS pressure > PORV setpoint OR RCS subcooling < 25°F	RCS Pot Loss 3	RCS heat removal cannot be established AND EITHER: RCS pressure > PORV setpoint OR RCS subcooling < 25°F
CNMT Pot Loss 1	Containment pressure ≥ 50 psig and increasing	CNMT Pot Loss 3	Containment pressure ≥ 50 psig and rising
CNMT Pot Loss 2	Containment hydrogen concentration ≥ 4%	CNMT Pot Loss 4	Containment hydrogen concentration ≥ 4%
CNMT Pot Loss 4	CET readings cannot be restored < 1,200°F within 15 min.	CNMT Pot Loss 1	CET readings cannot be restored < 1,200°F within 15 min.

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<b>Table A - Fission Product Barrier Critical Safety Function Threshold Equivalent Comparison</b>			
<b>Current Calvert Cliffs Thresholds (NEI 99-01 Rev. 4)</b>		<b>Proposed Calvert Cliffs Thresholds (NEI 99-01 Rev. 5)</b>	
CNMT Pot Loss 5	CET readings > 700°F AND Reactor vessel water level cannot be restored > top of core within 15 min.	CNMT Pot Loss 2	CET readings > 700°F AND Reactor vessel water level cannot be restored > RVLMS 10 in. alarm within 15 min.