

September 15, 2004

Mr. Thomas Coutu  
Site Vice President  
Kewaunee Nuclear Power Plant  
Nuclear Management Company, LLC  
N490 Highway 42  
Kewaunee, WI 54216-9511

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT - CHANGES TO THE EMERGENCY  
ACTION LEVELS (TAC NO. MC3611)

Dear Mr. Coutu:

By application dated June 17, 2004, as supplemented September 3, 2004, Nuclear Management Company, LLC, requested a change to the Emergency Action Levels (EALs) for the Kewaunee Nuclear Power Plant. The proposed change would revise the criteria in Chart E, Loss of Power, General Emergency classification to limit applicability to conditions where reactor coolant system temperature is greater than 200°F.

The Nuclear Regulatory Commission (NRC) staff has completed its review of the proposed EAL change and supporting documentation. The NRC staff has concluded that the proposed change meets the standards of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.47(b), and the requirements of Appendix E to 10 CFR Part 50, and, therefore, is considered acceptable. The basis for the NRC staff's conclusions is contained in the enclosed safety evaluation. If you have any questions, please contact me at 301-415-2296.

Sincerely,

**/RA/**

Carl F. Lyon, Project Manager, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosure: Safety Evaluation

cc w/encl: See next page

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DISTRIBUTION:

FLyon EWeiss  
PUBLIC JAnderson, NSIR  
PD III-1 r/f ACRS  
OGC SReynolds, RIII  
THarris LRaghavan

ADAMS ACCESSION NUMBER: ML042570125

\*No significant changes to SE

OFFICE	PM:PDIII-1	LA:PDIII-1	EPD:SC	SC:PDIII-1
NAME	FLyon	THarris	EWeiss*	LRaghavan
DATE	09/14/04	09/14/04	09/08/04	09/15/04

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO PROPOSED EMERGENCY ACTION LEVELS IN

REVISION AK TO EPIP-AD-02, "EMERGENCY CLASS DETERMINATION"

NUCLEAR MANAGEMENT COMPANY, LLC

KEWAUNEE NUCLEAR POWER PLANT

DOCKET NO. 50-305

1.0 INTRODUCTION

By application dated June 17, 2004 (ML041810493), and as supplemented by letter dated September 3, 2004, Nuclear Management Company, LLC (the licensee), requested a change to the Emergency Action Levels (EALs) for the Kewaunee Nuclear Power Plant (KNPP).

The proposed change would revise the criteria in Chart E, Loss of Power, General Emergency classification to limit applicability to conditions where reactor coolant system (RCS) temperature is greater than 200 °F. The existing EALs for KNPP are based on Appendix 1 to NUREG-0654/FEMA-REP-1. The application also included changes to Chart J, Miscellaneous Abnormal Plant Conditions, that the licensee stated did not change the EALs and did not reduce the effectiveness of the Emergency Plan.

2.0 REGULATORY EVALUATION

2.1 Regulations

The regulations governing the development and implementation of EALs for nuclear power licensees are contained in Title 10, Part 50 to the *Code of Federal Regulations* (10 CFR 50):

- Section 50.47(b)(4) states, in part: "A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee..."
- Section IV.B of Appendix E to 10 CFR Part 50 states in part: "These emergency action levels shall be discussed and agreed on by the applicant and State and local governmental authorities and approved by the NRC..."
- Section IV.C, of Appendix E to 10 CFR Part 50 states in part: "Emergency action levels (based not only on onsite and offsite radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency, such as the pressure in containment and the response of the Emergency Core Cooling System) for notification of offsite agencies shall be described...The emergency classes defined shall include:

(1) notification of unusual events, (2) alert, (3) site area emergency, and (4) general emergency...”

## 2.2 Guidance

The guidance documents used to review EAL schemes are identified in Regulatory Guide (RG) 1.101, “Emergency Planning and Preparedness for Nuclear Power Reactors.”

- Revision 2 of RG 1.101 states in part: “The criteria and recommendations contained in Revision 1 of NUREG-0654/FEMA-REP-1 are considered by the NRC staff to be acceptable methods for complying with the standards in 10 CFR 50.47 that must be met in onsite and offsite emergency response plans.” NUREG-0654/FEMA-REP-1, Revision 1, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,” referred to hereon as NUREG-0654, includes the following criteria for EALs:

Section II.D.1: “An emergency classification and emergency action level scheme as set forth in Appendix 1 must be established by the licensee.”

Section II.D.2: “The initiating conditions shall include the example conditions found in Appendix 1 [of NUREG-0654]...”

- NUREG-0818 (Draft), “Emergency Action Levels for Light Water Reactors,” dated October 1981, assesses EALs prepared for a boiling-water reactor and a pressurized-water reactor (PWR) to determine whether they meet the requirements of NUREG-0654, Revision 1.
- Revision 3 of RG 1.101 endorsed NUMARC/NESP-007, “Methodology for Development of Emergency Action Levels,” Revision 2, dated January 1992, as an acceptable alternative to NUREG-0654 for developing EAL schemes. In Section D, “Implementation” the regulatory guide states:

Except in those cases in which an applicant or licensee proposes an acceptable alternative method for complying with specific portions of the Commission’s regulations, the method described in this regulatory guide will be used in the evaluation of emergency plans and preparedness for nuclear power reactors.

Licensees may use either NUREG-0654 or NUMARC/NESP-007 in the developing their EAL scheme, but may not use portions of both methodologies.

- Emergency Preparedness Position Paper (EPPOS) No. 1, “Acceptable Deviations From Appendix 1 to NUREG-0654 Based Upon the Staff’s Regulatory Analysis of NUMARC/NESP-007,” dated June 1995, provides guidance to Nuclear Regulatory Commission (NRC) staff on the acceptability of proposed EAL revisions when those depart from the guidance in Appendix 1 to NUREG-0654. In the Introduction, the EPPOS states:

Although Regulatory Guide 1.101 admonishes the mixing of the emergency classification guidance in NUMARC/NESP-007 with that in

Appendix 1 to NUREG-0654, it is recognized that licensees who continue to utilize the example initiating conditions in Appendix 1 to NUREG-0654 as the basis for their classification scheme could benefit from the guidance in NUMARC/NESP-007. To that end, licensees could utilize the technical bases under the example emergency action levels (EALs) in NUMARC/NESP-007 to enhance and clarify their site-specific EALs developed from NUREG-0654. The chosen classification scheme, whether based on Appendix 1 to NUREG-0654 or NUMARC/NESP-007, must remain internally consistent.

- Nuclear Energy Institute (NEI) 99-01 (Revision 4), "Methodology for Development of Emergency Action Levels," was endorsed by the NRC as an acceptable alternative to NUREG-0654 and NUMARC/NESP-007 in Revision 4 to RG 1.101.

### 3.0 TECHNICAL EVALUATION

The technical evaluation was performed using the guidance provided in NEI 99-01 (Revision 4) for Initiating Condition SG1. The staff also used the guidance provided in EPPOS No. 1 to evaluate changes to a NUREG-0654 scheme that utilized the technical bases under the EALs in NUMARC/NESP-007.

The licensee is proposing the following change to the criteria for a General Emergency classification under Chart E, Loss of Power, to procedure EPIP-AD-2:

<u>Existing Revision AJ</u>		<u>Proposed Revision AK</u>	
(1)	Buses 1 through 6 are de-energized including the D/G supplies to buses 5 and 6, <u>AND</u>	(1)	RCS is > 200 °F, <u>AND</u>
(2)	Loss of the turbine driven AFW pump, <u>AND</u>	(2)	Buses 1 through 6 are de-energized including the D/G supplies to buses 5 and 6, <u>AND</u>
(3)	Conditions exist for greater than 2 hours.	(3)	Loss of the turbine driven AFW pump, <u>AND</u>
		(4)	Conditions exist for greater than 2 hours.

The current KNPP EAL scheme is based on NUREG-0654, Appendix 1 - Example Initiating Condition: General Emergency, #5.d, which states:

(Example PWR Sequence) Failure of offsite and onsite power along with total loss of emergency feedwater makeup capability for several hours. Would lead to eventual core melt and likely failure of containment.

The existing General Emergency classification for a loss of power (Revision AJ) has been compared to and is consistent with the guidance provided in draft NUREG-0818 (PWR Initiating Condition No. 5d for a General Emergency, pgs. 79 and 80). However, Appendix 1 to NUREG-0654 provides no guidance on mode applicability. The licensee's intent under Revision AK is to limit the applicability for a General Emergency classification under Chart E, Loss of Power, to conditions where RCS temperature is greater than 200 °F, utilizing the EAL technical

bases in NUMARC/NESP-007 as provided for in EPPOS No. 1.

Revision 4 to NEI 99-01, IC SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power," addresses corresponding NUREG-0654, Appendix 1 criteria for General Emergency Initiating Condition #5.d. NEI 99-01 SG1 limits applicability to Power Operations, Hot Standby and Hot Shutdown Modes for a PWR. Per the associated NRC regulatory analysis for NEI 99-01 (Revision 4), a General Emergency classification based on a prolonged loss of all AC power is not considered in Cold Shutdown, Refueling, or Defueled Modes because of the significantly reduced decay heat, lower temperature and pressure, and increased time to restore one of the emergency (essential) busses. Section 3.17.3 (PWR Operating Modes) to NEI 99-01 defines "Hot Shutdown Mode" as " $200\text{ }^{\circ}\text{F} < \text{RCS temperature} < 350\text{ }^{\circ}\text{F}$ ." Section 1.0 of the KNPP Technical Specifications defines Hot Shutdown Mode as " $\text{RCS temperature} \geq 540\text{ }^{\circ}\text{F}$ ," and Interim Shutdown Mode as " $\text{RCS temperature} > 200\text{ }^{\circ}\text{F}$  but  $< 540\text{ }^{\circ}\text{F}$ ." Under Revision AK to EPIP-AD-2, the licensee proposes to establish an applicability threshold of  $> 200\text{ }^{\circ}\text{F}$ , which is consistent with the KNPP Interim Shutdown Mode. In Enclosure 1 to the application letter, the licensee states the following as the basis for change to Chart E, Loss of Power, General Emergency:

With a loss of power to the Engineered Safety Features busses, all modes of injection to the core are lost with the exception of accumulators. Both electric auxiliary feedwater (AFW) pumps are also lost. This EAL looks at the availability of the turbine-driven AFW pump as a source of cooling by adding water to the steam generators (heat sink) and establishing natural circulation of the RCS. The Kewaunee Updated Safety Analysis Report describes the AFW system as designed to remove residual heat from the RCS until the temperature drops below  $300\text{-}350\text{ }^{\circ}\text{F}$  and the residual heat removal (RHR) system is capable of providing the necessary heat sink. Thus, technical specifications place requirements on the AFW system if RCS temperature is above  $350\text{ }^{\circ}\text{F}$ . This means that all AFW pumps could be out of service and still be within the limits of technical specifications. Below  $250\text{ }^{\circ}\text{F}$ , the turbine-driven AFW pump is no longer effective in pumping water to the steam generators because there is not enough steam pressure to drive the pump.

In Enclosure 1 to the September 3, 2004, supplemental letter, the licensee modified its request to be consistent with the guidance found in NEI 99-01 (Revision 4) by limiting the applicability to those plant conditions where the RCS temperature is  $> 200\text{ }^{\circ}\text{F}$ .

The NRC staff finds that the EAL technical bases contained in NEI 99-01 (Revision 4), supporting the proposed change, were correctly utilized and that the proposed change does not adversely impact the internal consistency of the existing NUREG-0654 scheme. Therefore, the NRC staff considers this change acceptable per the guidance provided to licensees in EPPOS No. 1.

#### 4.0 STATE CONSULTATION

With the application letter, dated June 17, 2004, and the supplemental letter dated September 3, 2004, the licensee provided letters from the following offsite agencies, documenting that the specific changes in Revision AK to EPIP-AD-2 have been discussed and agreed upon:

- Kewaunee Emergency Management,
- Manitowoc Emergency Management,
- State of Wisconsin, Radiation Protection Section
- State of Wisconsin, Emergency Management

This documentation is considered acceptable in meeting the requirements of Section IV.B to Appendix E of 10 CFR Part 50.

## 5.0 CONCLUSION

The licensee submitted the proposed change to the criteria in Chart E, Loss of Power, General Emergency classification (EPIP-AD-2, Revision AK) for consideration as an alternative method to the guidance in Appendix 1 to NUREG-0654/FEMA-REP-1. Therefore, NRC approval is required prior to implementation.

The NRC staff has determined that the licensee's proposed change to the criteria in Chart E, Loss of Power, General Emergency classification, in its application letter dated June 17, 2004, and supplemental letter dated September 3, 2004, is acceptable. The NRC staff also finds that the licensee's proposed change meets the standards of 10 CFR 50.47(b) and the requirements of Appendix E of 10 CFR Part 50. Therefore, the NRC staff concludes, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the approval of the proposed emergency plan changes will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Anderson

Dated:

Kewaunee Nuclear Power Plant

cc:

John Paul Cowan  
Executive Vice President &  
Chief Nuclear Officer  
Nuclear Management Company, LLC  
700 First Street  
Hudson, MI 54016

Plant Manager  
Kewaunee Nuclear Power Plant  
N490 Highway 42  
Kewaunee, WI 54216-9511

Manager, Regulatory Affairs  
Kewaunee Nuclear Power Plant  
N490 Highway 42  
Kewaunee, WI 54216-9511

David Molzahn  
Nuclear Asset Manager  
Wisconsin Public Service Corporation  
600 N. Adams Street  
Green Bay, WI 54307-9002

Resident Inspectors Office  
U. S. Nuclear Regulatory Commission  
N490 Hwy 42  
Kewaunee, WI 54216-9511

Regional Administrator, Region III  
U. S. Nuclear Regulatory Commission  
2443 Warrenville Road, Suite 210  
Lisle, IL 60532-4352

Jonathan Rogoff  
Vice President, Counsel & Secretary  
Nuclear Management Company, LLC  
700 First Street  
Hudson, WI 54016

Larry L. Weyers  
Chairman, President and CEO  
Wisconsin Public Service Corporation  
600 North Adams Street  
Green Bay, WI 54307-9002

David Zellner  
Chairman - Town of Carlton  
N2164 County B  
Kewaunee, WI 54216

Mr. Jeffery Kitsembel  
Electric Division  
Public Service Commission of Wisconsin  
PO Box 7854  
Madison, WI 53707-7854