

November 4, 2004

Mr. Mano K. Nazar  
American Electric Power  
Senior Vice President and Chief Nuclear Officer  
Indiana Michigan Power Company  
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SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 - OPPORTUNITY TO PROVIDE INFORMATION REGARDING REQUEST FOR TECHNICAL ASSISTANCE (TIA) 2004-02, "DEGRADED VOLTAGE PROTECTION AT D. C. COOK" (TAC NOS. MC3428 AND MC3429)

Dear Mr. Nazar:

By memorandum from C. Pederson (Region III) to E. Leeds (Office of Nuclear Reactor Regulation, NRR), Request for Technical Assistance (TIA) 2004-02, "Degraded Voltage Protection at D. C. Cook," dated June 7, 2004 (ML041590273), Region III requested technical assistance to resolve an issue associated with the degraded voltage protection at Donald C. Cook Nuclear Plant, Units 1 and 2 (CNP). Specifically, Region III requested that NRR evaluate the lack of automatic degraded voltage protection (1) during normal operation (when power is supplied through the unit auxiliary transformers) and (2) during the first 30 seconds of a design-basis event when the degraded voltage protection scheme is bypassed and engineered safeguards feature loads are being sequenced onto the safety buses, and determine if the degraded voltage protection design is adequate and meets the current licensing basis. The issue was characterized as an unresolved item (50-315, 316/2003007-02) in Nuclear Regulatory Commission (NRC) Inspection Report 50-315 and 50-316/03-07, dated August 12, 2003 (ML032260201).

The NRC has preliminarily concluded that the degraded voltage protection design at CNP is not in accordance with previously established NRC acceptance criteria and should be modified to include degraded voltage protection during normal operation and during the first 30 seconds of design-basis events. Specifically, the NRC staff concluded that the degraded voltage protection design at CNP does not conform to (1) General Design Criteria 17 of Appendix A to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, or (2) NRC staff position MPA B-23, which were used by the NRC staff to approve the electrical distribution system design at CNP, or to (3) CNP Technical Specification 3.3.2.1. The staff's concerns are related to (1) adequacy of undervoltage protection for the loads supplied from the redundant safety buses and (2) the fact that if degraded voltage protection is bypassed for the first 30 seconds of an accident, the permanently connected Class 1E loads (e.g., motor-operated valve magnetic contactors) may be damaged and prevent the associated motors from performing their safety functions. No documentation was found that the NRC staff approved the existing degraded voltage protection design at CNP with respect to bypassing the degraded voltage protection function.

The preliminary NRC staff conclusions regarding the existing design are that CNP is not in conformance with the current licensing basis, specifically:

1. The automatic degraded voltage protection should not be bypassed during normal operation regardless of the power source to the safety buses.
2. The automatic degraded voltage protection should not be bypassed for the first 30 seconds of a design-basis event while the safety buses are transferred from the unit auxiliary transformers (UATs) to the reserve auxiliary transformers (RATs).

The NRC staff believes that during normal operation during Modes 1, 2, 3 and 4, when the safety buses are supplied from the UAT, there may be a lack of adequate protection of the loads supplied from the redundant safety divisions. You have indicated that during normal operation the automatic degraded voltage protection is bypassed. Therefore, during normal operation potential degraded voltage conditions existing on redundant safety buses will not be automatically detected. Degraded voltage conditions could result from deficiencies in the equipment between the main generator and the safety buses, from starting transients experienced during normal operating events not originally considered in the sizing of these circuits, or from problems with the main generator and its excitation system. With the degraded voltage protection bypassed, the potential exists for disabling redundant equipment important to safety if degraded voltage conditions exist. Under these conditions, the existing design may also result in rendering both offsite and onsite power sources unuseable. Also, if degraded voltage protection is bypassed for the first 30 seconds of an accident and a sustained degraded grid condition exists, the permanently connected Class 1E loads (e.g., magnetic contactors for the motor operated valves) may be damaged and may prevent the associated motors from performing their safety functions. The lack of degraded voltage protection when safety equipment is being loaded onto the safety buses following a reactor trip or safety injection signal may be a vulnerability with common mode failure potential for multiple safety systems.

In addition, NRC staff position MPA B-23 requires that, "the voltage monitors shall automatically initiate the disconnection of offsite power sources whenever the voltage setpoint and time delay limits have been exceeded." This NRC staff position was provided in a letter to you dated June 3, 1977, and reiterated in a letter dated August 16, 1979. NRC staff position MPA B-23 was subsequently included in branch technical position PSB-1 in Appendix 8-A of Chapter 8 of NUREG-0800, the Standard Review Plan. This NRC staff position has not changed since it was promulgated in 1977. The degraded voltage relays should remain active regardless of the power sources connected to the safety buses, (i.e., whether powered by the UAT or the RAT).

Finally, CNP Technical Specification (TS) 3/4.3.2 Limiting Condition for Operation (LCO) 3.3.2.1 requires that, "the Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4." Table 3.3-3, Functional Unit No. 8, "Loss of Power," includes (a), "4kV bus loss of voltage," and (b), "4kV bus degraded voltage." The LCO is applicable in Modes 1, 2, 3, and 4. The NRC staff needs more information to determine how TS 3.3.2.1 would be satisfied with the degraded voltage relays bypassed during normal operations (i.e., Mode 1).

M. Nazar

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In accordance with NRR Office Instruction LIC-106, "Control of Task Interface Agreements," you may provide any relevant information to the NRC staff that you believe should be considered before NRC issues its TIA response. Specifically, please address (1) how CNP is in compliance with TS 3.3.2.1, (2) how CNP meets NRC staff position MPA B-23, and (3) how the existing degraded voltage protection at CNP adequately assures plant safety. Please contact me at (301) 415-2296 at the earliest opportunity to discuss your response.

Sincerely,

*/RA/*

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

Docket Nos. 50-315 and 50-316

cc: See next page

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\*\*previously concurred  
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