March 26, 2003

Mr. A. Christopher Bakken III, Senior Vice President
and Chief Nuclear Officer
Indiana Michigan Power Company
Nuclear Generation Group
500 Circle Drive
Buchanan, MI 49107

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNIT 2 - ISSUANCE OF AMENDMENT (TAC NO. MB6580)

Dear Mr. Bakken:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 256 to Facility Operating License No. DPR-74 for the Donald C. Cook Nuclear Plant, Unit 2. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated October 16, 2002, as supplemented January 28, 2003.

The amendment would revise the TS values for the 4 kilovolt degraded-voltage and loss-of-voltage relays.

A copy of our related safety evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

John F. Stang, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-316

Enclosures: 1. Amendment No. 256 to DPR-74
2. Safety Evaluation

cc w/encls: See next page

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INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-316

DONALD C. COOK NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 256
License No. DPR-74

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Indiana Michigan Power Company (the licensee) dated October 16, 2002, as supplemented January 28, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-74 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 256, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented prior to startup from Unit 2 refueling outage 14.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

L. Raghavan, Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: March 26, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 256

FACILITY OPERATING LICENSE NO. DPR-74

DOCKET NO. 50-316

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
3/4 3-25a	3/4 3-25a
B 3/4 3-1	B 3/4 3-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 256 TO FACILITY OPERATING LICENSE NO. DPR-74

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-316

1.0 INTRODUCTION

By application dated October 16, 2002 as supplemented January 28, 2003, the Indiana Michigan Power Company (the licensee) requested an amendment to the Technical Specifications (TSs) for the Donald C. Cook (D. C. Cook) Nuclear Plant, Unit 2. The proposed amendment would revise the TS values for the 4 kilovolt (kV) degraded-voltage and loss-of-voltage relays. The proposed changes are part of a planned design change to replace the existing 4kV offsite power transformers, loss of voltage relays, and degraded voltage relays with components of an improved design to increase the reliability of offsite power for safety-related equipment.

The supplemental letter contained clarifying information and did not change the initial no significant hazards consideration determination and did not expand the scope of the original *Federal Register* notice.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 Appendix A, General Design Criteria (GDC) 17 requires that an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. The degraded voltage and loss of voltage relay trip set points and associated time delays assure proper operation of safety-related loads as required by GDC 17 of 10 CFR Part 50, Appendix A.

The licensee initiated the planned design change following the discovery that the terminal voltage at some safety-related electrical equipment may not be adequate during a postulated design-basis accident coincident with a degraded voltage condition. This finding was reported to the Nuclear Regulatory Commission (NRC) in Licensee Event Report 315/1999-022-01 dated March 23, 2000, and actions were taken to assure that safety-related loads would have adequate voltage. Subsequently, on May 4, 2000, the licensee committed to a planned design change to replace the existing 4kV offsite power transformers (reserve auxiliary transformers

[RATs]) and degraded voltage relays with components of an improved design. These changes are needed to increase the reliability of offsite power for safety-related equipment. The licensee's post-restart commitment was to re-evaluate the electrical distribution system's design and licensing basis during the development of the modifications to install the auto-load tap change transformers.

The existing RATs do not have auto load tap changers. The planned design change will replace the existing RATs with load tap changing transformers. When the new RATs are used to provide auxiliary power, they will sense changes in grid voltage and will automatically change taps to maintain the appropriate voltage at the 4kV buses.

The proposed TS revision is needed to allow degraded voltage and loss of voltage relay setpoints to be changed to fully benefit from the improved protection provided by the planned design change. Due to inaccuracies inherent in the existing degraded voltage relays and their associated potential transformer circuits, the relays have wide tolerance. Consequently, spurious trips could occur if the existing relays were set any higher. The design change will replace the degraded voltage relays with relays of an improved design, allowing the degraded voltage trip setting to be increased to maintain voltage above the analytical limit; that is, the value at which all safety-related loads have sufficient voltage to perform their intended safety function.

The design change will also replace the loss of voltage relays with an improved relay design. This allows the loss of voltage relay setpoints to be low enough to prevent spurious tripping, while still maintaining voltage high enough to ensure all safety-related loads have sufficient voltage to perform their intended safety function.

The proposed changes are requested in accordance with Section 50.90 of 10 CFR to assure continued compliance with 10 CFR Part 50, Appendix A, GDC-17, "Electric Power Systems," and GDC-18, "Inspection and Testing of Electric Power Systems."

3.0 TECHNICAL EVALUATION

The proposed TSs changes are as follows:

a. Revise TS Table 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints," to lower the 4kV bus loss of voltage trip setpoint and allowable values for both the motor driven auxiliary feed water pumps and the loss of power functional units. The proposed trip setpoint is 3241 volts with allowable values of greater than or equal to 3195 and less than or equal to 3280 volts.

b. Revise TS Table 3.3-4 to raise the 4kV bus degraded voltage trip setpoint and allowable values, and to decrease the time delay for the loss of power functional units. The proposed trip setpoint is 3959 volts with allowable values of greater than or equal to 3910 volts and less than or equal to 4000 volts. The proposed time delay for the degraded voltage trip is 9 seconds ±0.25 seconds. The proposed time delay will apply only when a steam generator level low-low or a safety injection signal is present.

c. Revise the TSs 3/4.3.1 and 3/4.3.2 bases to explain the applicability of the time delay associated with the 4kV bus degraded voltage trip setpoint.

The licensee stated that the proposed loss of voltage (LOV) relay setpoint and the range of allowable values are based on ensuring the setting is low enough to prevent spurious actuation during a voltage transient caused by motor starting conditions, yet high enough to ensure safety-related equipment will perform as required by the safety analysis. The criteria used to determine the setpoint included:

a. Preventing running Class 1E motors from stalling.

b. Ensuring any load can be started without damaging any loads that are already running.

c. Preventing load shedding due to thermal overloads/relaying.

The proposed setpoint value, 3241 volts, is equal to 78 percent of 4160 volts with an allowable range of 3195 volts to 3280 volts (76.80 to 78.85 percent of 4160 volts). This is based on a plant-specific calculation. On January 28, 2003, the licensee provided details on how the above criteria are met. The licensee stated that the minimum required voltage to prevent Class 1E motor stalling is 76.68 percent of the rated bus voltage. The lowest anticipated transient voltage on the 4.16 kV bus is 79.88 percent of the rated bus voltage and is the result of starting a reactor coolant pump. The proposed setpoint value of 3241 volts with an allowable range of 3195 volts to 3280 volts is sufficient to prevent spurious actuation during transients (i.e., the relay should not actuate during voltage transients experienced during starting of plant motors). The range is sufficient to preclude the stalling, damage, or spurious tripping of Class 1E motors due to low voltage. The voltage analysis demonstrated that (1) the voltage of the Class 1E buses remains above the upper allowable setpoint value of the LOV relay during the start of the largest plant motor; (2) the minimum allowable voltage is sufficient to preclude stalling of Class 1E motors; and (3) the increased current resulting from a voltage just above the lower allowable setpoint value of the LOV relay is within the allowable current versus time range for Class 1E motor overcurrent protection. This ensures that the motor will not be thermally damaged or trip prior to degraded voltage relay actuation.

The time delay for the LOV relay is maintained at 2 seconds with a tolerance of **±** 0.2 seconds. The 2-second time delay was chosen to bypass short duration system voltage drops and to function in sufficient time to allow the protective actions initiated by the loss of voltage to meet the accident analysis equipment start times.

The proposed degraded voltage setpoint is based on a voltage response analysis. It was selected to ensure all safety-related loads have sufficient voltage to perform their intended safety function. The criteria used to determine the setpoint included:

- Providing degraded voltage and time delay setpoints that support the voltage requirements of the Class 1E loads at all onsite system distribution levels (i.e., 4kV, 600 V, and 120/208V).

- Providing minimum continuous running voltage (nominally 90 percent of nameplate) to Class 1E motors on the emergency buses.

The analytical limit, that is, the voltage at which all safety-related loads have sufficient voltage to perform their intended safety function, was determined to be 3902 volts, but a higher value of 3910 volts was used to bound the low end of the allowable value range and to provide margin for future load changes.

The proposed time delay for the degraded voltage relay is based on setting the delay short enough to allow safety-related equipment to operate within the assumptions of the safety analysis, but long enough to avoid spurious operation of the relay. The proposed 9 ± 0.25 second time delay only applies when a safety injection signal or a steam generator low-low level signal is present. This time delay supports the safety analysis assumptions for safety-related equipment operation. The time delay associated with the voltage changes by the new automatic load tap-changing transformer has been considered in the proposed 9 ± 0.25 second time delay determination.

The longer degraded voltage time delay remains the present value of 2 minutes and is applicable during non-accident conditions. It will continue to prevent unnecessary disconnecting of the offsite power source due to short, inconsequential grid disturbances and prevent unnecessary challenges to safety systems of the unit.

The proposed setpoint and time delay values were determined by a plant-specific calculation using the methodology provided in Institute of Electrical and Electronics Engineers Standard 741-1997, “Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations.” The calculation considers the errors associated with the circuit that monitors the voltage at the 4kV safety-related switchgear. It also reflects factors associated with the design change, which includes replacing the existing voltage relays with new relays furnished with internal harmonic filters. The accuracy of the relays and associated components, as well as the tolerances associated with setting the relays, have been considered.

In addition to the protection provided by the LOV relays and the degraded voltage relays, the licensee has established provisions to monitor and maintain adequate switchyard voltages and to respond in the event that the switchyard voltages drop below the minimum acceptable levels. For added assurance that all essential loads can adequately perform their design functions, an interface agreement between the American Electric Power (AEP) Energy Delivery and Customer Relations Group and the AEP Nuclear Generating Group has been developed, a real-time switchyard voltage monitoring computer program has been developed, and response procedures have been developed.

The interface agreement provides guidance to ensure that the organizations responsible for operation, maintenance, and engineering consider the impact of their activities on facilities located at D. C. Cook and on the AEP transmission system. Specifically, the interface agreement contains a provision that system control center personnel monitor system conditions to ensure that adequate voltage levels to support the D. C. Cook facility in the event of an accident are maintained.

Switchyard voltages are monitored on the D. C. Cook Online Load Flow (CKOLF) computer program, which is a real-time state-estimator/load-flow computer program. CKOLF determines the expected voltage levels at the switchyard assuming a D. C. Cook Unit 1 trip (if only one unit is operating) or both Units 1 and 2 trip (if both units are operating). The program provides an alarm to the AEP Transmission Coordinator (AEPTC) if the expected switchyard voltage is not within the acceptable limits. A special operating procedure, "Cook Nuclear Plant Transmission/Auxiliary Voltage Operating Guide," is followed by the AEPTC. This procedure provides directions for the AEPTC to respond to switchyard voltage conditions outside of the limits acceptable to D. C. Cook as indicated by an alarm. The AEPTC's required actions include notifying D. C. Cook Unit Supervisors of the switchyard voltage conditions and also taking immediate compensatory actions to restore voltage levels to within acceptable limits. Additionally, D. C. Cook has an operating procedure "Degraded Offsite AC Voltage Response," that provides directions for responding to degraded switchyard voltage conditions.

The proposed bases change explains that the proposed time delay for the 4kV bus degraded voltage setpoint presented in the TS is to protect the plant during situations addressed in the safety analysis in Chapter 14 of the Updated Final Safety Analysis Report. A longer time delay that is not included in the TS will apply when neither a steam generator low-low level nor a safety injection signal is present. The longer time delay will be included in an owner-controlled document instead of the TS. This is consistent with NUREG-1431, Revision 2, and its bases.

The proposed changes allow the LOV relays and degraded voltage relays to act in concert to assure that electrical equipment powered by the 4 kV bus will perform its safety function if a loss of offsite power or a degraded voltage condition were to occur. The changes to the setpoints and time delays together with the interface agreement assure the electrical equipment is capable of performing its function to meet the requirements of the accident analyses.

The proposed format changes are for improved readability, consistency with NUREG-1431, Revision 2, and improved appearance. The format changes are not intended to introduce other changes.

In response to the NRC staff's request for additional information (RAI) regarding auxiliary bus voltage analysis, the licensee stated that Electrical Transient Analyzer Program (ETAP) was used to perform the power system analysis and the system model is developed from approved design drawings and procedures. The system model reflects the configuration of D. C. Cook and the expected configurations under design-basis accident conditions. Connected loads and their operating conditions used in the model (i.e., percent loading, duration, etc.) are based on available design information for meeting their most demanding design requirements. The results of the analysis confirm that all essential loads in the system will have adequate voltage to perform their design function as long as the voltages remain at or above the analytical limit of 3902 volts or 93.8 percent of 4160 volts at the 4kV safety-related buses.

The NRC staff evaluated the assumptions, loading and summary of results provided by the licensee on January 28, 2003 and finds them acceptable. The licensee stated that ETAP is widely accepted and used in the industry as the power system analysis tool. This program meets 10 CFR Part 50, Appendix B requirements and has been verified and validated. The system modeled in ETAP was developed in accordance with approved design drawings and procedures.

4.0 SUMMARY

The NRC staff has reviewed the information in the license amendment request and the response to the NRC staff RAI and for the reasons set forth above concluded that the requirements of GDC 17 will be fulfilled via implementation of this amendment, which is therefore acceptable. The proposed amendment continues to assure compliance with DGC 18.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Michigan State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes the requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or change the surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (67 FR 68739). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The NRC staff has concluded, 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 issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Amar Pal

Date: March 26, 2003