June 10, 1987

Docket Nos. 50-315
and 50-316

Mr. John Dolan, Vice President
Indiana and Michigan Electric Company
c/o American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43216

Dear Mr. Dolan:

The Commission has issued the enclosed Amendment No. 111 to Facility Operating License No. DPR-58 and Amendment No. 94 to Facility Operating License No. DPR-74 for the Donald C. Cook Nuclear Plant, Unit Nos. 1 and 2. The amendments consist of changes to the Technical Specifications in response to your application dated March 26, 1987.

These amendments revise the Technical Specifications on boron concentrations for refueling and in the refueling water storage tank (RWST) and accumulators, increases water volumes in the RWST, increases the RWST temperatures, changes the moderator temperature coefficient to a ramp function rather than a step function, and adds footnotes such that addition of water from the RWST does not constitute a boron dilution. The remainder of items from the March 26, 1987 letter will be the subject of a separate action.

A copy of the Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

/S/

David L. Wigginton, Project Manager
Project Directorate III-3
Division of Reactor Projects

Enclosures:
1. Amendment No. 111 to DPR-58
2. Amendment No. 94 to DPR-74
3. Safety Evaluation

cc w/enclosures:
See next page

Office:	LA/PDIII-3	OGC	PD/PDIII-3
Surname:	PKreutzer	M. Karman	DWigginton
Date:	06/4/87	06/08/87	06/5/87

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Mr. John Dolan
Indiana and Michigan Electric Company

Donald C. Cook Nuclear Plant

cc:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

INDIANA AND MICHIGAN ELECTRIC COMPANY

DOCKET NO. 50-315

DONALD C. COOK NUCLEAR PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 111
License No. DPR-58

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

   A. The application for amendment by Indiana and Michigan Electric Company (the licensee) dated March 26, 1987 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.

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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-58 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 111 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The Technical Specification changes are to be effective before startup following the refueling outage currently scheduled to begin about July 1987.

4. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David L. Wiggington, Acting Project Director
Project Directorate III-3
Division of Reactor Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: June 10, 1987

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

INDIANA AND MICHIGAN ELECTRIC COMPANY

DOCKET NO. 50-316

DONALD C. COOK NUCLEAR PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 94
License No. DPR-74

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

   A. The application for amendment by Indiana and Michigan Electric Company (the licensee) dated March 26, 1987 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. 94 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The Technical Specification changes are to be effective before startup following the refueling outage currently scheduled to begin about January 1988.

4. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David L. Wigginton, Acting Project Director
Project Directorate III-3
Division of Reactor Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: June 10, 1987

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO.111 FACILITY OPERATING LICENSE NO. DPR-58

AMENDMENT NO 94 FACILITY OPERATING LICENSE NO. DPR-74

DOCKET NOS.50-315 AND 50-316

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
Unit 1	
3/4 1-5	3/4 1-5
-	3/4 1-5a
3/4 1-6*	3/4 1-6*
3/4 1-15	3/5 1-15
3/4 1-16	3/4 1-16
3/4 1-17	3/4 1-17
3/4 5-1	3/4 5-1
3/4 5-11	3/4 5-11
Unit 2	
3/4 1-15	3/4 1-15
3/4 1-16	3/4 1-16
3/4 1-17	3/4 1-17
3/4 1-18*	3/4 1-18*
3/4 5-1	3/4 5-1
3/4 5-2*	3/4 5-2*
3/4 5-11	3/4 5-11
3/4 9-1	3/4 9-1

*Included for convenience only.

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.4 The moderator temperature coefficient (MTC) shall be:

a. Within the region of acceptable operation in Figure 3.1-2, and

b. Less negative than -3.5×10^{-4} $\Delta k/k/°F$ at RATED THERMAL POWER.

APPLICABILITY: MODES 1 and 2*#

ACTION:

With the moderator temperature coefficient outside any one of the above limits, be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.1.4.1 The MTC shall be determined to be within its limits by confirmatory measurements. MTC measured values shall be extrapolated and/or compensated to permit direct comparison with the above limits.

4.1.1.4.2 The MTC shall be determined at the following frequencies and THERMAL POWER conditions during each fuel cycle:

a. Prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading.

b. At any THERMAL POWER, within 7 EFPD after reaching a RATED THERMAL POWER equilibrium boron concentration of 300 ppm.

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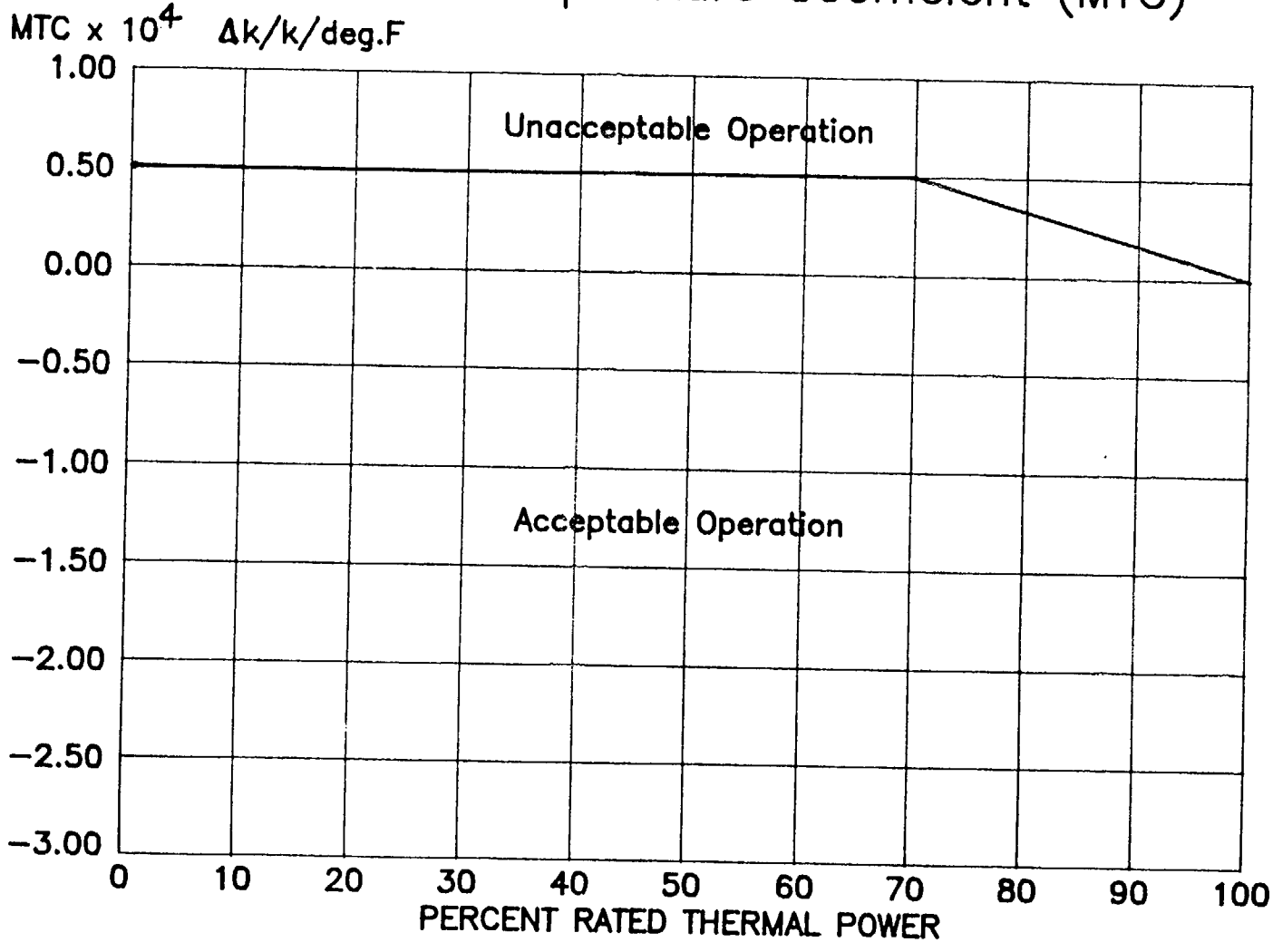
* With K_{eff} greater than or equal to 1.0

\# See Special Test Exception 3.10.4

FIGURE 3.1-2

Moderator Temperature Coefficient (MTC)



MINIMUM TEMPERATURE FOR CRITICALITY

LIMITING CONDITION FOR OPERATION

3.1.1.5 The Reactor Coolant System lowest operating loop temperature (T_{avg}) shall be $\geq$ 541°F when the reactor is critical.

APPLICABILITY: MODES 1 and 2*#.

ACTION:

With a Reactor Coolant System operating loop temperature (T_{avg}) < 541°F, restore (T_{avg}) to within its limit within 15 minutes or be in HOT STANDBY within the next 15 minutes.

SURVEILLANCE REQUIREMENTS

4.1.1.5 The Reactor Coolant System temperature (T_{avg}) shall be determined to be $\geq$ 541°F:

a. Within 15 minutes prior to achieving reactor criticality, and

b. At least once per 30 minutes when the reactor is critical and the Reactor Coolant System T_{avg} is less than 551°F.

*See Special Test Exception 3.10.3

#With $K_{eff} \geq 1.0$.

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 4300 gallons,
2. Between 20,000 and 22,500 ppm of boron, and
3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum usable borated water volume of 90,000 gallons,
2. A minimum boron concentration of 2400 ppm, and
3. A minimum solution temperature of 80°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes* until at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.7 The above required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the boron concentration of the water,
2. Verifying the water level volume of the tank, and
3. Verifying the boric acid storage tank solution temperature when it is the source of borated water.

b. At least once per 24 hours by verifying the RWST temperature when it is the source of borated water.

* For purposes of this specification, addition of water from the RWST does not constitute a positive reactivity addition provided the boron concentration in the RWST is greater than the minimum required by Specification 3.1.2.7.b.2.

BORATED WATER SOURCES - OPERATIONS

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 5650 gallons,
2. Between 20,000 and 22,500 ppm of boron, and
3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum contained volume of 350,000 gallons of water,
2. Between 2400 and 2600 ppm of boron, and
3. A minimum solution temperature of 80°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid storage system inoperable, restore the storage system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the boric acid storage system to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

SURVEILLANCE REQUIREMENTS (Continued)

a. At least once per 7 days by:

   1. Verifying the boron concentration in each water source,

   2. Verifying the water level of each water source, and

   3. Verifying the boric acid storage system solution temperature.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system accumulator shall be OPERABLE with:

a. The isolation valve open,

b. A contained borated water volume of between 929 and 971 cubic feet,

c. A boron concentration of between 2400 ppm and 2600 ppm, and

d. A nitrogen cover-pressure of between 585 and 658 psig.

APPLICABILITY: MODES 1, 2 and 3.*

ACTION:

a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within one hour or be in HOT SHUTDOWN within the next 8 hours.

b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in HOT STANDBY within one hour and be in HOT SHUTDOWN within the next 8 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each accumulator shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying the water level and nitrogen cover-pressure in the tanks, and

2. Verifying that each accumulator isolation valve is open.

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* Pressurizer Pressure above 1000 psig.

REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained volume of 350,000 gallons of borated water.

b. Between 2400 and 2600 ppm of boron, and

c. A minimum water temperature of 80°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature.

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracting with:

1. A minimum usable borated water volume of 4300 gallons,
2. Between 20,000 and 22,500 ppm of boron, and
3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum usable borated water volume of 90,000 gallons,
2. A minimum boron concentration of 2400 ppm, and
3. A minimum solution temperature of 80°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes* until at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.7 The above required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the boron concentration of the water,
2. Verifying the contained borated water volume, and
3. Verifying the boric acid storage tank solution temperature when it is the source of borated water.

b. At least once per 24 hours by verifying the RWST temperature when it is the source of borated water.

*For purposes of this specification, addition of water from the RWST does not constitute a dilution activity provided the boron concentration in the RWST is greater than or equal to the minimum required by Specification 3.1.2.7.b.2.

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 5650 gallons,
2. Between 20,000 and 22,500 ppm of boron, and
3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum contained volume of 350,000 gallons of water,
2. Between 2400 and 2600 ppm of boron, and
3. A minimum solution temperature of 80°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid storage system inoperable, restore the storage system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the boric acid storage system to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

SURVEILLANCE REQUIREMENTS (Continued)

a. At least once per 7 days by:

1. Verifying the boron concentration in each water source,

2. Verifying the contained borated water volume of each water source, and

3. Verifying the boric acid storage system solution temperature.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All full length (shutdown and control) rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more full length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

b. With more than one full length rod inoperable or misaligned from the group step counter demand position by more than ± 12 steps (indicated position), be in HOT STANDBY within 6 hours.

c. With one full length rod inoperable due to causes other than addressed by ACTION a, above, or misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within one hour either:

   1. The rod is restored to OPERABLE status within the above alignment requirements, or

   2. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

      a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions.

*See Special Test Exceptions 3.10.2 and 3.10.3

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system accumulator shall be OPERABLE with:

a. The isolation valve open,

b. A contained borated water volume of between 929 and 971 cubic feet,

c. A boron concentration between 2400 ppm and 2600 ppm, and

d. A nitrogen cover-pressure of between 599 and 644 psig.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within one hour or be in HOT SHUTDOWN within the next 12 hours.

b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in HOT STANDBY within one hour and be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each accumulator shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and

2. Verifying that each accumulator isolation valve is open.

*Pressurizer Pressure above 1000 psig.

SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 31 days and within 6 hours after each solution volume increase of $\geq$ 1% of tank volume by verifying the boron concentration of the accumulator solution.

c. At least once per 31 days when the RCS pressure is above 2000 psig by verifying that power to the isolation valve operator is disconnected by removal of the breaker from the circuit.

d. At least once per 18 months by verifying that each accumulator isolation valve opens automatically upon receipt of a safety injection test signal.

REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained volume of 350,000 gallons of borated water,

b. Between 2400 and 2600 ppm of boron, and

c. A minimum water temperature of 80°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.9 REFUELING OPERATIONS

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 With the reactor vessel head unbolted or removed, the boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained uniform and sufficient to ensure that the more restrictive of the following reactivity conditions is met:

a. Either a K_{eff} of 0.95 or less, which includes a 1% $\Delta k/k$ conservative allowance for uncertainties, or

b. A boron concentration of greater than or equal to 2400 ppm, which includes a 50 ppm conservative allowance for uncertainties.

APPLICABILITY: MODE 6*.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes** and initiate and continue boration at greater than or equal to 10 gpm of 20,000 ppm boric acid solution or its equivalent until K_{eff} is reduced to less than or equal to 0.95 or the boron concentration is restored to greater than or equal to 2400 ppm, whichever is the more restrictive. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the above two reactivity conditions shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any full length control rod in excess of 3 feet from its fully inserted position within the reactor pressure vessel.

4.9.1.2 The boron concentration of the reactor coolant system and the refueling canal shall be determined by chemical analysis at least once per 72 hours.

*The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed.

**For purposes of this specification, addition of water from the RWST does not constitute a positive reactivity addition provided the boron concentration in the RWST is greater than the minimum required by Specification 3.1.2.7.b.2.

INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

APPLICABILITY: MODE 6.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes.* The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.2 Each source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

a. A CHANNEL FUNCTIONAL TEST at least once per 7 days, and

b. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of CORE ALTERATIONS, and

c. A CHANNEL CHECK at least once per 12 hours during CORE ALTERATIONS.

* During the 1984 refueling outage only, removal of the last 30 assemblies is allowed with only one source range neutron flux monitor operating.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.111 TO FACILITY OPERATING LICENSE NO. DPR-58

AND AMENDMENT NO. 94 TO FACILITY OPERATING LICENSE NO. DPR-74

INDIANA AND MICHIGAN ELECTRIC COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT NOS.1 AND 2

DOCKET NOS. 50-315 AND 50-316

1.0 INTRODUCTION

By letter dated March 26, 1987, the Indiana and Michigan Electric Company (IMEC, the licensee) submitted proposed changes to the Technical Specifications for the Donald C. Cook Nuclear Plant to permit Unit 1 reload and operation for Cycle 10 and Unit 2 similar or related changes. The changes include increasing the required boric acid in the Emergency Core Cooling System (ECCS) accumulators and the refueling water storage tank (RWST), increasing the temperature for systems with increased boron concentrations, and for Unit 1, a change to the moderator temperature coefficient from a step function of power to a ramp function of power. The staff has reviewed the relevant portions of the submittal and has prepared the evaluation which follows. The licensee's submittal included other proposed changes which will be the subject of a separate action.

2.0 EVALUATION

2.1 Increase in Allowable Value of Boron Concentration in Borated Water Sources

The proposed amendment would increase the RWST and ECCS Accumulator boron concentration from a minimum of 1950 ppm into the range of 2600 ppm. The changes are necessary to assure that the reactor will remain sub-critical in cold shutdown following a LOCA when higher enrichment fuel is used for anticipated extended fuel cycles. This increase also has implications for the analysis of several non-LOCA events and for the system chemistry through the mechanism of pH change in the post accident containment sump liquid inventory.

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2.1.1 Non-LOCA Safety Analyses

The only non-LOCA events which are affected by the increased boron concentration are those for which the ECCS is actuated. Each of these events has been examined to determine the effect of increased boron concentration. The results show that the increased boron has a generally helpful effect on the individual event and in no case does it have a harmful effect.

2.1.2 LOCA Analysis

The small break LOCA analysis makes no assumption about the boron concentration in the ECCS water (shutdown is achieved and maintained by control rods). Thus the increased boron concentration has no effect on the small break LOCA analysis.

During the initial portion of the large break LOCA analysis, subcriticality is maintained by voids in the core and the increased boron concentration has no effect on this portion of this event. Since the peak clad temperature occurs during this portion of the event, there is no effect on the results of the LOCA analysis.

For post LOCA shutdown, no credit is taken for control rods in the D. C. Cook analysis. Thus, the boron in the ECCS water is relied upon to maintain shutdown. The ECCS water, when mixed with other sources (reactor coolant water, etc.), must produce a boron concentration sufficient to maintain the reactor in a shutdown state. The adequacy of the increased concentration to achieve this goal is to be addressed for each reload.

A potential problem of boron precipitation due to concentration of boron in the liquid occurs as a result of steaming produced by decay heat in the core. Conservative analysis of this effect by the licensee produced the conclusion that the initial switch to hot leg injection should occur at 12 hours (instead of the present 24 hours). The emergency procedures for the D. C. Cook Nuclear Plant should be updated to reflect the new time.

Boron precipitation is also a function of the temperature of the liquid. The licensee has appropriately increased the acceptable level of temperature to account for the increased boron concentration. Since the new minimum temperatures of the RWST liquid for both units is now 80°F and these tanks are located outdoors, the licensee proposes to perform the temperature surveillance test every 24 hours without the previous exception which allowed no testing if the outdoor temperature exceeded the minimum liquid temperature requirement. The staff finds this acceptable.

2.1.3 Other Considerations

Increasing the ECCS boron concentration reduces the pH of the containment spray and recirculating core coolant solutions. The reduction in pH can lead to reduction of the iodine spray removal coefficient and decontamination factor (DF), increase in the rate of hydrogen production due to zinc corrosion and increase in the potential for chloride induced stress corrosion cracking of stainless steel. These effects have been examined by the licensee with the following results.

The minimum calculated pH resulting from the increased boron concentration does not reduce the iodine spray removal coefficient or DF below that assumed in the FSAR. This is acceptable.

Examination of zinc corrosion rate data shows that the corrosion rate for the minimum pH resulting from the increased boron concentration (7.6) is less than that assumed in the FSAR. This is acceptable. Corrosion of other materials (e. g., aluminum) decreases monotonically with decreasing pH.

The pH value of 7.6 is greater than the minimum values recommended by the vendor in order to minimize chloride stress corrosion cracking of stainless steel and is acceptable. Other equipment has been qualified at high pH values to maximize effects. The reduced pH will have a positive effect for other equipment qualification.

The licensee has also added footnotes to appropriate technical specifications to indicate that additions to the reactor coolant system from the RWST do not constitute a boron dilution event. The RWST boron concentration is set to provide adequate shutdown margin, therefore, these footnotes for clarification are acceptable.

2.2 Moderator Temperature Coefficient

The licensee proposes to amend Specification 3/4.1.1.4 for Unit 1 to replace the fixed value of the most positive Moderator Temperature Coefficient (MTC) with a curve of permitted value as a function of core power. The curve would show a constant value of + 5 pcm/deg F for core power from zero to 70 % of full power. Above 70 percent the allowed value would decrease linearly to zero pcm/deg F at full power.

The current Specification has two values of permitted MTC. Up to 70 percent of full power + 5 pcm/deg F is permitted, and above that power the MTC must be zero or negative. However, the safety analyses on which the present Specification is based were performed with positive moderator coefficients at full power. Thus, the proposed linear reduction is bounded by previously approved safety analyses and is therefore acceptable. This change had previously been approved for Unit 2.

2.3 Technical Specification Changes

The Limiting Conditions for Operation and Bases TS changes resulting from the accepted proposal are as follow:

TS Page	TS LCO or BASES	Title
For Unit 1:		
3/4 1-5 & 1-5a	3.1.1.4	Moderator Temperature Coefficient
3/4 1-15	3.1.2.7	Borated Water Sources - Shutdown
3/4 1-16	3.1.2.8	Borated Water Sources - Operating
3/4 1-17	4.1.2.8.6	RWST Temperature Surveillance
3/4 5-1	3.5.1	Accumulators
3/4 5-11	3.5.5	Refueling Water Storage Tank
3/4 9-1	3.9.1	Boron Concentration
B 3/4 1-2 and 1-3	3/4.1.2	Boration Systems
B 3/4 5-3	3/4.5.5	Refueling Water Storage Tank
B 3/4 9-1	3/4.9.1	Boron Concentration
For Unit 2:		
3/4 1-15	3.1.2.7	Borated Water Sources - Shutdown
3/4 1-16	3.1.2.8	Borated Water Sources - Operating
3/4 1-17	4.1.2.8b	RWST Temperature Surveillance
3/4 5-1	3.5.1	Accumulators
3/4 5-11	3.5.5	Refueling Water Storage Tank
3/4 9-1	3.9.1	Boron Concentration

The above replacement TS pages identified in the licensee's request are acceptable as proposed. The staff identified pages 3/4 1-17 for Unit 1 and Unit 2 as inadvertent omissions in the licensee's request for changes related to boron concentrations. This change for both units clarifies the intest to verify RWST temperature every 24 hours regardless of outdoor temperature. Addition of these changes at this time was discussed with the licensee and they agreed.

3.0 EVALUATION RESULTS

Based on the review described above, the staff concludes that the proposed Technical Specification changes, which implement an increase in the boron concentration of the ECCS water, are acceptable. It is noted that the review was based on a vendor-specific analysis (Westinghouse Electric Corporation) for

D. C. Cook Unit 1. A similar analysis for Unit 2 was performed by Allied Nuclear Fuels (formerly ENC) and by American Electric Power Service Corporation. However, in accordance with the licensee's projected reload schedules, implementation of the specific changes is not required before the next Unit 2 refueling outage. The effective date of the Technical Specifications for each unit will be addressed in the license amendments.

In addition, the staff concludes that the proposed Technical Specification change related to the Moderator Temperature Coefficient is acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change in surveillance requirements. The staff has determined that the amendments involve 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 published a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet 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 these amendments.

5.0 CONCLUSION

The 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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