January 2, 1998

Mr. E. E. Fitzpatrick, Vice President
Indiana Michigan Power Company
Nuclear Generation Group
500 Circle Drive
Buchanan, MI 49107

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: ICE WEIGHT AND SURVEILLANCE REQUIREMENT (TAC NOS. M99742 AND M99743)

Dear Mr. Fitzpatrick:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No.220 to Facility Operating License No. DPR-58 and Amendment No.204 to Facility Operating License No. DPR-74 for the Donald C. Cook Nuclear Plant, Units 1 and 2. The amendments consist of changes to the Technical Specifications in response to your application dated October 8, 1997, and supplemented October 21, 1997.

The amendments increase both the minimum required ice mass per ice basket and the total minimum required ice mass, and change the basis for the technical specification. The change to the basis resolves an unreviewed safety question related to taking credit for ice melt contributing to water in the recirculation sump when determining adequate sump inventory.

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

Sincerely,

ORIGINAL SIGNED BY: D. PICKETT FOR:

John B. Hickman, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

Enclosures:
1. Amendment No.220 to DPR-58
2. Amendment No.204 to DPR-74
3. Safety Evaluation

cc w/encls: See next page

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DATE	12/30/97		01/02/97		12/30/97		1/2/98	

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DATED: January 2, 1998

AMENDMENT NO. 220 TO FACILITY OPERATING LICENSE NO. DPR-58, DONALD C. COOK NUCLEAR PLANT, UNIT 1

AMENDMENT NO. 204 TO FACILITY OPERATING LICENSE NO. DPR-74, DONALD C. COOK NUCLEAR PLANT, UNIT 2

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January 2, 1998

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Office of Nuclear Reactor Regulation

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OFFICE	PM:PD33	E	LA:PD33	E	BC:SCSB	E	OGC	
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DATE	12/30/97		01/02/97		12/30/97		1/2/98	

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 2, 1998

Mr. E. E. Fitzpatrick, Vice President
Indiana Michigan Power Company
Nuclear Generation Group
500 Circle Drive
Buchanan, MI 49107

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: ICE WEIGHT AND SURVEILLANCE REQUIREMENT (TAC NOS. M99742 AND M99743)

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Douglas V Pickett for

John B. Hickman, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-315 and 50-316

Enclosures:
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3. Safety Evaluation

cc w/encls: See next page

cc:

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-315

DONALD C. COOK NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 220
License No. DPR-58

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 8, 1997, and supplemented October 21, 1997, 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-58 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 220, 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 the date of issuance, with full implementation within 45 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Douglas V Pickett for

John B. Hickman, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: January 2, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 220

TO FACILITY OPERATING LICENSE NO. DPR-58

DOCKET NO. 50-315

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

REMOVE	INSERT
3/4 6-26	3/4 6-26
3/4 6-27	3/4 6-27
B 3/4 5-3	B 3/4 5-3
B 3/4 6-4	B 3/4 6-4

3/4.6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

3.6.5.1 The ice bed shall be OPERABLE with:

a. The stored ice having boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C,

b. Flow channels through the ice condenser,

c. A maximum ice bed temperature of ≤ 27°F,

d. Each ice basket containing at least 1333 lbs of ice, and

e. 1944 ice baskets.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.1 The ice condenser shall be determined OPERABLE:

a. At least once per 12 hours by using the ice bed temperature monitoring system to verify that the maximum ice bed temperature is ≤ 27°F.

b. At least once per 18 months by:

1. Chemical analyses which verify that at least 9 representative samples of stored ice have a boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C.

2. Weighing a representative sample of at least 144 ice baskets and verifying that each basket contains at least 1333 lbs of ice. The representative sample shall include 6 baskets from each of the 24 ice condenser bays and

Surveillance Requirements (Continued)

shall be constituted of one basket each from Radial Rows 1, 2, 4, 6, 8 and 9 (or from the same row of an adjacent bay if a basket from a designated row cannot be obtained for weighing) within each bay. If any basket is found to contain less than 1333 pounds of ice, a representative sample of 20 additional baskets from the same bay shall be weighed. The minimum average weight of ice from the 20 additional baskets and the discrepant basket shall not be less than 1333 pounds/basket at a 95% level of confidence.

The ice condenser shall also be subdivided into 3 groups of baskets, as follows: Group 1 - bays 1 through 8, Group 2 - bays 9 through 16, and Group 3 - bays 17 through 24. The minimum average ice weight of the sample baskets from Radial Rows 1, 2, 4, 6, 8 and 9 in each group shall not be less than 1333 pounds/basket at a 95% level of confidence.

The minimum total ice condenser ice weight at a 95% level of confidence shall be calculated using all ice basket weights determined during this weighing program and shall not be less than 2,590,000 pounds.

3. Verifying, by a visual inspection of at least two flow passages per ice condenser bay, that the accumulation of frost or ice on the top deck floor grating, on the intermediate deck and on flow passages between ice baskets and past lattice frames is restricted to a nominal thickness of 3/8 inches. If one flow passage per bay is found to have an accumulation of frost or ice greater than this thickness, a representative sample of 20 additional flow passages from the same bay shall be visually inspected. If these additional flow passages are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

c. At least once per 18 months by verifying, by a visual inspection, each ice condenser bay, that the accumulation of frost or ice on the lower inlet plenum support structures and turning vanes is restricted to a nominal thickness of 3/8 inches. An accumulation of frost and ice greater than this thickness is evidence of abnormal degradation of the ice condenser.

d. At least once per 40 months by lifting and visually inspecting the accessible portions of at least two ice baskets from each 1/3 of the ice condenser and verifying that the ice baskets are free of detrimental structural wear, cracks, corrosion or other damage. The ice baskets shall be raised at least 12 feet for this inspection.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown, and ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. Reactor coolant system cooldown can be caused by inadvertent depressurization, a loss of coolant accident or a steam line rupture. Consistent with the applicable LOCA analyses, the limits on RWST minimum volume and boron concentration ensure that 1) when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following a LOCA assuming mixing of the RWST, RCS, ECCS water, and other sources of water that may eventually reside in the sump, with all control rods assumed to be out.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 7.6 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The ECCS analyses to determine F_Q limits in Specifications 3.2.2 and 3.2.6 assumed a RWST water temperature of 70°F. This temperature value of the RWST water determines that of the spray water initially delivered to the containment following LOCA. It is one of the factors which determines the containment back-pressure in the ECCS analyses, performed in accordance with the provisions of 10 CFR 50.46 and Appendix K to 10 CFR 50.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA and 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA. These conditions are consistent with the assumptions used in the accident analyses.

The minimum weight figure of 1333 pounds of ice per basket contains a 5% conservative allowance for ice loss through sublimation. In the event that observed sublimation rates are equal to or lower than design predictions after three years of operation, the minimum ice baskets weight may be adjusted downward. In addition, the number of ice baskets required to be weighed each 18 months may be reduced after 3 years of operation if such a reduction is supported by observed sublimation data.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

The OPERABILITY of the ice bed temperature monitoring system ensures that the capability is available for monitoring the ice temperature. In the event the monitoring system is inoperable, the ACTION requirements provide assurance that the ice bed heat removal capacity will be retained within the specified time limits.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-316

DONALD C. COOK NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 204
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 8, 1997, and supplemented October 21, 1997, 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:

   Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 204, 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 the date of issuance, with full implementation within 45 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Douglas V Pickett for

John B. Hickman, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: January 2, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 204

FACILITY OPERATING LICENSE NO. DPR-74

DOCKET NO. 50-316

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

REMOVE	INSERT
3/4 6-35	3/4 6-35
3/4 6-36	3/4 6-36
B 3/4 5-3	B 3/4 5-3
B 3/4 6-4	B 3/4 6-4

3/4.6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

3.6.5.1 The ice bed shall be OPERABLE with:

a. The stored ice having boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C,

b. Flow channels through the ice condenser,

c. A maximum ice bed temperature of ≤ 27°F,

d. Each ice basket containing at least 1333 lbs of ice, and

e. 1944 ice baskets.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.1 The ice condenser shall be determined OPERABLE:

a. At least once per 12 hours by using the ice bed temperature monitoring system to verify that the maximum ice bed temperature is ≤ 27°F.

b. At least once per 18 months by:

1. Chemical analyses which verify that at least 9 representative samples of stored ice have a boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C.

2. Weighing a representative sample of at least 144 ice baskets and verifying that each basket contains at least 1333 lbs of ice. The representative sample shall include 6 baskets from each of the 24 ice condenser bays and

SURVEILLANCE REQUIREMENTS (Continued)

shall be constituted of one basket each from Radial Rows 1, 2, 4, 6, 8 and 9 (or from the same row of an adjacent bay if a basket from a designated row cannot be obtained for weighing) within each bay. If any basket is found to contain less than 1333 pounds of ice, a representative sample of 20 additional baskets from the same bay shall be weighed. The minimum average weight of ice from the 20 additional baskets and the discrepant basket shall not be less than 1333 pounds/basket at a 95% level of confidence.

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c. At least once per 18 months by verifying, by a visual inspection, of each ice condenser bay, that the accumulation of frost or ice on the lower plenum support structures and turning vanes is restricted to a nominal thickness of 3/8 inches. An accumulation of frost or ice greater than this thickness is evidence of abnormal degradation of the ice condenser.

d. At least once per 40 months by lifting and visually inspecting the accessible portions of at least two ice baskets from each 1/3 of the ice condenser and verifying that the ice baskets are free of detrimental structural wear, cracks, corrosion or other damage. The ice baskets shall be raised at least 12 feet for this inspection.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown, and ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. Reactor coolant system cooldown can be caused by inadvertent depressurization, a LOCA or steam line rupture. Consistent with the applicable LOCA analyses, the limits on RWST minimum volume and boron concentration ensure that 1) when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following a LOCA assuming mixing of the RWST, RCS, ECCS water, and other sources of water that may eventually reside in the sump, with all control rods assumed to be out.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 7.6 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The ECCS analyses to determine F_Q limits in Specifications 3.2.2 and 3.2.6 assumed a RWST water temperature of 70°F. This temperature value of the RWST water determines that of the spray water initially delivered to the containment following LOCA. It is one of the factors which determines the containment back-pressure in the ECCS analyses, performed in accordance with the provisions of 10 CFR 50.46 and Appendix K to 10 CFR 50.

3/4.6.4 COMBUSTIBLE GAS CONTROL

The OPERABILITY of the equipment and systems required for the detection and control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit is capable of controlling the expected hydrogen generation associated with 1) zirconium-water reactions, 2) radiolytic decomposition of water and 3) corrosion of metals within containment. These hydrogen control systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA," March 1971.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA and 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA. These conditions are consistent with the assumptions used in the accident analyses.

The minimum weight figure of 1333 pounds of ice per basket contains a 5% conservative allowance for ice loss through sublimation. In the event that observed sublimation rates are equal to or lower than design predictions after three years of operation, the minimum ice baskets weight may be adjusted downward. In addition, the number of ice baskets required to be weighed each 18 months may be reduced after 3 years of operation if such a reduction is supported by observed sublimation data.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

The OPERABILITY of the ice bed temperature monitoring system ensures that the capability is available for monitoring the ice temperature. In the event the monitoring system is inoperable, the ACTION requirements provide assurance that the ice bed heat removal capacity will be retained within the specified time limits.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 220 TO FACILITY OPERATING LICENSE NO. DPR-58

AND AMENDMENT NO. 204 TO FACILITY OPERATING LICENSE NO. DPR-74

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-315 AND 50-316

1.0 INTRODUCTION

By letter dated October 8, 1997, and supplemented October 21, 1997, the Indiana Michigan Power Company (the licensee) requested amendments to the Technical Specifications appended to Facility Operating License Nos. DPR-58 and DPR-74 for the Donald C. Cook Nuclear Plant, Units 1 and 2. The proposed amendments would increase both the minimum required ice mass per ice basket and the total minimum required ice mass, and change the basis for the technical specification.

The licensee's letter of October 8, 1997, contained a proprietary submittal from a licensee contractor. The licensee's letter of October 21, 1997, contained the identical technical specification proposal and a non-proprietary version of the contractor's information. Therefore, the letter of October 21, 1997, did not change the staff's no significant hazards considerations determination as set forth in the *Federal Register* notice dated October 22, 1997 (62 FR 54863).

2.0 BACKGROUND

During a loss-of-coolant accident (LOCA), water from several sources (e.g., refueling water storage tank (RWST), reactor coolant system (RCS), accumulators, and melted ice) collects in the lower regions of the containment, part of which acts as a sump (i.e., recirculation sump) for the recirculation of water through the safety injection and containment spray systems. As the accident progresses, the RWST, the initial source of water for the emergency core cooling (ECCS) and containment spray systems, empties and the water that has accumulated in the lower regions of the containment is used as the source of water for the recirculation phase of safety injection and containment spray. The water inventory in the recirculation sump must be sufficient to provide adequate net positive suction head to the pumps, and to prevent vortexing in the recirculation sump. As described in the Bases section 3/4.5.5, "Refueling Water Storage Tank," of the Cook Technical Specifications, the water volume of the RWST is sufficient to support post-accident recirculation flow in containment. Thus, with regard to water inventory in

the recirculation sump, the accident analysis considers water only from the RWST and does not take credit for the other water sources described above.

As part of an NRC Architect Engineer design inspection conducted at the D.C. Cook facility during the period from August 4 through September 12, 1997, a plant-specific issue was raised (designated as URI 50-315,316/97-201-06) indicating that under certain loss-of-coolant accident (LOCA) scenarios, the volume of water in the ECCS sump may not be sufficient to support operation of the ECCS and containment spray pumps in the recirculation phase of a LOCA. The inspection report stated that this was because the licensee could not confirm adequate communication between the active and inactive sumps within the containment and that water was being removed over time from the active sump to the inactive sump by the containment spray system. The inactive sump is an annular space under the ice condenser bays extending 300 degrees around the containment and bounded by the crane wall and the containment wall.

In order to correct this situation, the licensee proposed to take credit for the additional water sources resulting from ice melt, leakage from the RCS, and accumulator inventory. In order to gain sufficient margin, the licensee determined that the amount of ice specified in the technical specifications must be increased. The licensee performed an analysis pursuant to 10 CFR 50.59 to determine if the proposed changes to the facility as described in its Updated Safety Analysis Report would involve a change to a technical specification or result in an unreviewed safety question. The licensee determined that taking credit for these additional water sources was a reduction in the margin of safety as defined in the bases of a technical specification and, therefore, resulted in an unreviewed safety question.

By letter dated October 8, 1997, and supplemented on October 21, 1997, the licensee proposed to amend the technical specifications for D.C. Cook, Units 1 and 2, to increase the minimum required mass of ice per ice basket and the total minimum required ice mass in the ice condenser. In addition, the licensee proposed a change to Bases section 3/4.5.5 of the technical specifications to reflect the fact that the water from the melted ice, the RCS, and the accumulators would be used in the calculation of the water level in the containment during the recirculation phase of a LOCA. As described above, staff approval of this section of the technical specifications Bases would resolve the unreviewed safety question.

Specifically, the licensee proposed to revise the technical specifications for both units as follows:

3/4.6.5 Each ice basket must have at least 1333 pounds of ice.

The current required minimum amount of ice is 1220 pounds.

3/4.6.5 The minimum total ice condenser ice weight at a 95% level of confidence shall not be less than 2,590,000 pounds.

The current required minimum ice weight is 2,371,450 pounds.

Bases 3/4.6.5 The minimum weight per basket contains a 5% allowance for ice loss through sublimation.

The current allowance is 10%.

Bases 3/4.5.5 This basis was revised to state that: when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within the containment to permit recirculation cooling flow to the core.

The current basis discusses only the water inventory of the refueling water storage tank. As stated above, the licensee considers this change to be an unreviewed safety question.

The staff met twice with the licensee at public meetings on September 23, 1997, and October 9, 1997 to discuss the licensee's proposal and the supporting analyses.

The staff has reviewed the licensee's proposal. Our evaluation is provided below.

3.0 EVALUATION

The licensee used the MAAP4 computer code to demonstrate that sufficient water inventory would be available in the active containment sump in order to support continued recirculation pump flow for both the ECCS and containment spray pumps. However, MAAP4 has not been reviewed and approved by the NRC for licensing calculations. In order to verify that there is adequate assurance that the water level in the containment sump will be sufficient to satisfy the vortexing limit, the staff requested Science Engineering Associates, Inc. (SEA), to perform confirmatory calculations of the ice melt rate and the sump water level in the D.C. Cook plant.

SEA performed its calculations using the MELCOR/CONTAIN computer code. MELCOR/CONTAIN was developed by the NRC, in part, to provide a means of independently verifying design-basis containment calculations performed by licensees. MELCOR/CONTAIN is a versatile code that is actively used and maintained by the NRC and has been successfully validated against numerous experiments. Because this code was specifically developed for independent verification, the staff considers it an appropriate verification tool for this application.

The staff depended on data provided by the licensee for several important portions of the calculation. For example, the geometry of the containment (distances, areas, and volumes) were taken from the licensee's data. Break flow mass and energy calculations were the results of NOTRUMP (a Westinghouse proprietary computer code) calculations and MAAP4 calculations provided by the licensee. Although using the licensee's data for these important parameters decreased the extent to which the calculations were independently verified, the staff was nevertheless able to examine the validity of the licensee's calculations in considerable detail.

The licensee's analysis considered both large- and small-break LOCAs. The critical factor is to maintain the sump recirculation water level above elevation 602 feet 10 inches. According to the licensee, tests performed in 1977 demonstrated that a minimum level of 602 feet 10 inches

prevents pump vortexing at maximum safeguards flow. The limiting case was the 2-inch double-ended guillotine break of the RCS in the inactive sump. This small break minimized RCS flow to the sump and, at the same time, maintained RCS pressure sufficiently high to prevent accumulator flow into the RCS. Finally, flow out of the sump was maximized by assuming both trains of containment spray were operating. Using these conservative assumptions, SEA's calculations demonstrated that the sump level during recirculation flow would be maintained above the minimum level of 602 feet 10 inches.

The staff also examined the licensee's revised allowance for sublimation of ice. The licensee's October 8, 1997, submittal provided data on ice bed sublimation rates for Unit 1 and Unit 2 for a period of 13 years. The licensee stated that the average measured change in ice mass over an 18-month period was 2.31% for Unit 1 and 2.68% for Unit 2. Although there is considerable variability in the data provided by the licensee for both units, the staff considers the conservatism in the ice weight (a 95% confidence level is required by the technical specifications on measurements of the ice weight) to be sufficient. Since the data for approximately 12 years on each unit demonstrates a mean of less than 5%, the staff finds the licensee's proposal to reduce the sublimation factor to 5% to be acceptable.

4.0 SUMMARY

Based on staff calculations using the MELCOR/CONTAIN computer code, using some data provided by the licensee but using independent models for some key assumptions, the staff finds that the licensee's proposal to credit ice melting in determining the water inventory available to the ECCS and containment spray pumps is acceptable. In particular, the licensee's proposed change to the technical specifications to increase the minimum required total ice weight to 2,590,000 pounds and the minimum required weight of ice per basket to 1333 pounds, with a sublimation uncertainty of 5%, is acceptable.

On Bases page 3/4 5-3 for Unit 2, the wording "the limits of RWST...." has been corrected to read "the limits on RWST...." The staff has also corrected a typographical error in the Unit 2 Bases section 3/4.5.5 (page B 3/4 5-3) introduced in Amendment No. 199. The licensee's May 26, 1995, application requested an RWST water temperature of 70 °F for both units; however, when Unit 2 page B 34/ 5-3 was issued on March 13, 1997, the value was inadvertently left as 80 °F. The value has been corrected to read 70 °F.

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

These amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding (62 FR 54863). Accordingly, the 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 the amendments.

7.0 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) 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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Date: January 2, 1998