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February 29, 2008

AEP:NRC:8535
10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

SUBJECT: Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Amendment Request to Revise Ice Condenser Licensing Basis
(TAC Nos. MD8089 and MD8090)

References:

1. Memorandum from S. C. Black, U. S. Nuclear Regulatory Commission (NRC) Office of Nuclear Reactor Regulation, to J. A. Grobe, NRC Region III, "TIA 2000-08, Seismic Qualification of Ice at the Donald C. Cook Plant," dated December 29, 2000 (ADAMS Accession Number ML010380251).

2. Donald C. Cook Meeting Handout on Ice Condenser Ice Fusion, dated December 12, 2007 (ADAMS Accession Number ML073480087).

3. Memorandum from P. S. Tam, NRC, "Summary of December 12, 2007, "Meeting with I&M on the Issue of Ice Condenser Ice Fusion (TAC No. MD6756)," dated December 20, 2007 (ADAMS Accession Number ML073470330).

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, proposes to amend Facility Operating Licenses DPR-58 and DPR-74. I&M requests review and approval, pursuant to 10 CFR 50.59(c), of a change to the CNP licensing basis as described in the CNP Updated Final Safety Analysis Report (UFSAR). The proposed change implements resolution of the ice condenser ice fusion issue addressed in Task Interface Agreement 2000-08 (Reference 1).

In 2000, U. S. Nuclear Regulatory Commission (NRC) Region III identified a concern associated with seismic qualification of ice in the ice condenser at CNP. In Reference 1, the NRC Office of Nuclear Reactor Regulation (NRR) confirmed that the licensing basis for CNP requires a five-week storage time following ice basket loading to allow adequate fusion of ice particles. This fusion time requirement was derived from the original seismic qualification testing of ice condenser ice baskets

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NRR

conducted in 1974. The fusion time requirement was intended to provide assurance that ice fallout from the baskets during a seismic disturbance, up to and including a design basis earthquake, would not prevent the ice condenser lower inlet doors from opening. This assures compliance with the CNP licensing basis assumption that the ice condenser doors will open in the event such a seismic disturbance occurs coincident with a loss of coolant accident or a main steam line break.

Although the testing performed in support of initial plant licensing and initial ice loading of an entire ice condenser demonstrated that acceptable ice fusion would be achieved by five weeks after ice basket loading, it did not determine a minimum fusion time requirement. Applying this same conservative five-week allowance for ice fusion following normal ice basket maintenance would significantly impact refueling outage schedules. As a result, I&M is proposing to revise the basis for acceptable ice fusion time following normal maintenance of a portion of the ice condenser ice baskets. Specifically, the proposed change, which will be documented in the UFSAR, would allow plant operation during the five-week period following ice basket maintenance based on conservatisms in the original ice basket seismic testing, practical experience with ice fusion gained through decades of ice condenser operation, and design features of the ice condenser. As an additional conservatism, in the event of an operating basis earthquake, or greater seismic disturbance, within five weeks of loading ice baskets, the ice condenser would be inspected within 24 hours, per plant procedures, to ensure that no ice fallout has occurred that could impede proper functioning of the ice condenser lower inlet doors.

The ice fusion issue was discussed in a public meeting at NRC Headquarters on December 12, 2007. The proposed amendment is consistent with that discussion (Reference 2) and with the follow-up actions described in the NRR meeting summary dated December 20, 2007 (Reference 3).

Enclosure 1 provides an affirmation statement pertaining to this letter. Enclosure 2 provides I&M's evaluation of the proposed change. The attachment to this letter provides a mark-up of the affected UFSAR page reflecting the proposed change. There are no new regulatory commitments in this letter.

I&M requests approval of the proposed amendment by April 25, 2008 in order to support start-up of CNP Unit 1 from the Spring 2008 refueling outage. The proposed amendment will be implemented prior to Unit 1 entering Mode 4 at the end of that outage. Copies of this letter and its enclosures and attachment are being transmitted to the Michigan Public Service Commission and Michigan Department of Environmental Quality, in accordance with the requirements of 10 CFR 50.91.

Should you have any questions, please contact Mr. James M. Petro, Jr., Regulatory Affairs Manager, at (269) 466-2491.

Sincerely,

Mark A. Peifer
Site Vice President

PGS/rdw

Enclosures:

1. Affirmation
2. Indiana Michigan Power Company's Evaluation

Attachment:

Donald C. Cook Nuclear Plant Updated Final Safety Analysis Report Marked to Show the Proposed Change

c: J. L. Caldwell, NRC Region III
K. D. Curry, Ft. Wayne AEP, w/o enclosures/attachment
J. T. King, MPSC
MDEQ – WHMD/RPMWS
NRC Resident Inspector
P. S. Tam, NRC Washington, DC

Enclosure 1 to AEP:NRC:8535

AFFIRMATION

I, Mark A. Peifer, being duly sworn, state that I am Site Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

Indiana Michigan Power Company

Mark A. Peifer
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 29th DAY OF February, 2008

Regan D. Wendzel
Notary Public

My Commission Expires REGAN D. WENDZEL
Notary Public, Berrien County, MI
My Commission Expires Jan. 21, 2009

Enclosure 2 to AEP:NRC:8535

INDIANA MICHIGAN POWER COMPANY'S EVALUATION

Subject: License Amendment Request to Revise Required Ice Condenser Ice Fusion Time

1.0 DESCRIPTION

This letter is a request by Indiana Michigan Power Company (I&M) to amend Facility Operating Licenses DPR-58 and DPR-74 for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2. The proposed change modifies the licensing basis as described in the CNP Updated Final Safety Analysis Report (UFSAR) regarding requirements for the ice condenser lower inlet doors.

In May 2000, U. S. Nuclear Regulatory Commission (NRC) Region III identified a concern associated with seismic qualification of ice in the ice condenser ice baskets at CNP, and requested technical assistance from NRC Office of Nuclear Reactor Regulation (NRR) under Task Interface Agreement (TIA) 2000-08. In the TIA response memorandum dated December 29, 2000 (Reference 1), the NRR confirmed that the licensing basis for CNP requires a five-week storage time following ice basket loading to allow adequate fusion of ice particles. This fusion time requirement was derived from the original seismic qualification testing of ice condenser ice baskets conducted in 1974. The fusion time requirement was intended to provide assurance that ice fallout during a seismic disturbance, up to and including a design basis earthquake (DBE), would not prevent the ice condenser lower inlet doors from opening. This provides assurance that the ice condenser doors will open in the event such a seismic disturbance occurs coincident with a loss of coolant accident (LOCA) or a main steam line break (MSLB).

Although the testing performed in support of initial plant licensing and initial ice loading of an entire ice condenser demonstrated that acceptable ice fusion would be achieved by five weeks after ice basket loading, it did not determine a minimum fusion time requirement. Applying this same conservative five-week allowance for ice fusion following normal ice basket maintenance would significantly impact refueling outage schedules. As a result, I&M is proposing to revise the basis for acceptable ice fusion time following normal maintenance of a portion of the ice condenser ice baskets. Specifically, the proposed change, which will be documented in the UFSAR, would allow plant operation during the five-week period following ice basket maintenance based on conservatisms in the original ice basket seismic testing, practical experience with ice fusion gained through decades of ice condenser operation, and design features of the ice condenser. As an additional conservatism, in the event of an operating basis earthquake (OBE), or greater seismic disturbance, within five weeks of loading ice baskets, the ice condenser would be inspected within 24 hours, per plant procedures, to ensure that no ice fallout has occurred that could impede proper functioning of the ice condenser lower inlet doors.

2.0 PROPOSED CHANGE

The proposed activity is a revision to the licensing basis as described in the UFSAR. The existing text of the UFSAR, Revision 21, Section 5.3.5.9.2, "Lower Inlet Doors," "Design Criteria and Codes," "Interface Requirements," Item b) reads:

> Sufficient clearance is required for the doors to open into the ice condenser. Items considered in this interface are floor clearance, lower support structure clearance and floor

drain operation, and sufficient clearance (approximately six inches) to accommodate ice fallout in the event of a seismic disturbance occurring coincident with a LOCA.

The proposed revision to this paragraph reads:

> Sufficient clearance is required for the doors to open into the ice condenser. Items considered in this interface are floor clearance, lower support structure clearance and floor drain operation, and sufficient clearance (approximately six inches) to accommodate ice fallout in the event of a seismic disturbance occurring coincident with a LOCA. Original ice basket qualification testing (Reference 6) has shown that freshly loaded ice is considered fused after five weeks following ice loading. During periods of plant operation within five weeks of ice bed maintenance, an alternate method of ice fusion qualification is relied upon (Reference X). Conservatisms in the original qualification testing, qualitative evaluation of operating experience in actual ice condensers, and design features of the ice condenser provide reasonable assurance that the ice condenser lower inlet doors will not be blocked by a seismic disturbance during this limited period. Additionally, in the event of an earthquake (OBE or greater) that occurs within five weeks following ice basket loading, plant procedures require a visual inspection of applicable areas of the ice condenser within 24 hours to ensure that opening of the ice condenser lower inlet doors is not impeded by any ice fallout that resulted from the seismic disturbance.

The "Reference 6" in the proposed wording change refers to the existing CNP UFSAR Section 5.3, Reference 6, which is WCAP-8110, Supplement 9, "Ice Fallout from Seismic Testing of Fused Ice Baskets," dated May 13, 1974. That WCAP is Reference 2 to this enclosure.

The "Reference X" in the proposed wording change refers to the Safety Evaluation Report (SER) to be issued for this license amendment.

3.0 BACKGROUND

The following sections describe pertinent CNP ice condenser design features and maintenance practices, and summarize development and interpretation of the time requirements for ice fusion contained in the licensing basis of CNP.

Ice Condenser Design Features

The ice condenser (Figure 1) is a completely enclosed annular compartment located around approximately 300 degrees of the perimeter of the upper compartment of the containment, but penetrating the operating deck so that a portion extends into the containment lower compartment. The lower portion has a series of hinged doors (lower inlet doors) exposed to the atmosphere of the lower containment compartment and designed to remain closed during normal plant operation. At the top of the ice condenser is another set of doors (top deck doors) that are exposed to the atmosphere of the upper compartment. These doors also remain closed during normal plant operation. Intermediate deck doors are located below the top deck doors. These doors form the floor of a plenum at the upper part of the ice condenser and remain closed during normal plant operation. Within the ice condenser, ice is held in baskets arranged to promote heat transfer to the ice. During normal plant operation the ice condenser performs no function and is not required for safe shutdown of the unit.

In the event of a LOCA or MSLB inside containment, the pressure rises in the lower compartment and the ice condenser lower inlet doors open. This allows air and steam to flow from the lower compartment into the ice condenser. The resulting pressure increase within the ice condenser causes the intermediate deck doors and the top deck doors at the top of the ice condenser to open, allowing air to flow out of the ice condenser into the upper compartment. Steam entering the ice condenser is condensed by the ice, thus, limiting the peak pressure and temperature buildup in containment. Condensation of steam within the ice condenser allows a continual flow of steam from the lower compartment to the condensing surface of the ice, thus, reducing the lower compartment pressure.

Sufficient ice heat transfer surface and flow passages are provided in the ice condenser so that the magnitude of the pressure transient resulting from an accident does not exceed the containment design pressure. The lattice frame and support column assemblies allow passage of steam and air through the space around the ice baskets.

There are floor drains (not shown on Figure 1) located on the wear slab, just outboard of the lower inlet doors. For a small pipe break, the condensed steam and melted ice will collect on the wear slab and flow out the floor drains to the lower containment. For intermediate and large pipe breaks, water will drain through both the lower inlet doors and the floor drains. The lower inlet doors are provided with shock absorber assemblies consisting of collapsible metal segments to dissipate the kinetic energy generated by opening of the doors during a large break LOCA or MSLB.

Ice Bed Maintenance Practices

As a result of sublimation of ice in the ice bed during normal operation, periodic addition of ice mass is necessary to ensure compliance with the Technical Specifications. I&M maintains the required ice mass at CNP by emptying and refilling individual ice baskets during each refueling outage. The population of baskets affected during a given outage is typically 10 to 20 percent of the total.

Ice Fusion

The term "ice fusion" refers to a condition in which an ice basket freshly loaded with flake ice achieves stability at the operating temperature of the ice condenser, i.e., when the ice freezes or otherwise solidifies such that it tends to stay in the ice basket when agitated. The design of the lower inlet doors, as currently described in the UFSAR, includes sufficient clearance to accommodate ice fallout from baskets of fused ice in the event of a seismic disturbance occurring coincident with a LOCA or MSLB.

If the ice in the baskets was not sufficiently fused during a DBE, it is possible that an excessive amount of ice would fall from the baskets and impair operability of the ice condenser. Excessive ice fallout could potentially:

- block the lower inlet doors
- block the floor drains
- restrict compression of the shock absorber assemblies
- block flow channels
- decrease the ice mass in the ice baskets

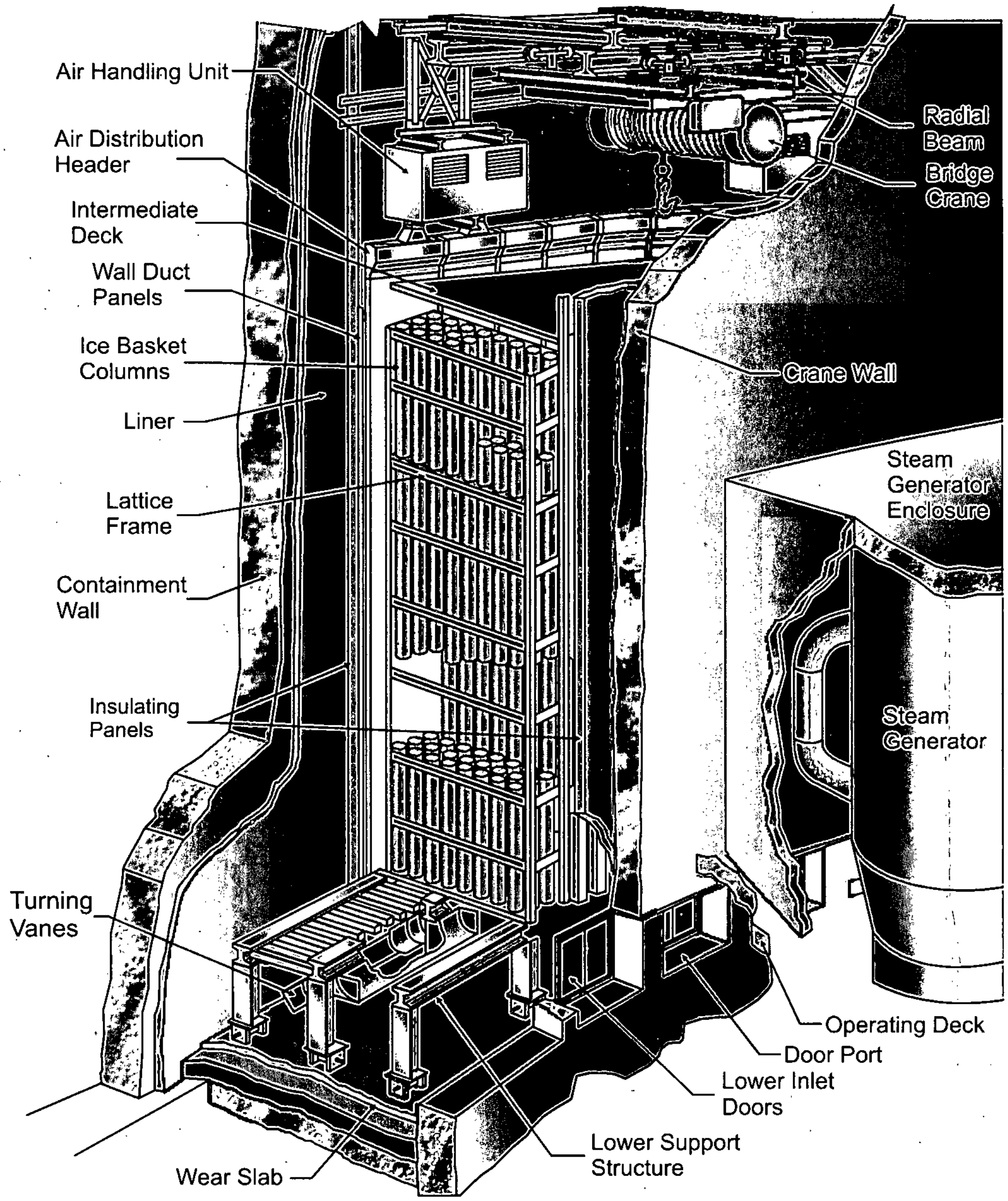

Figure 1
Ice Condenser Sectional View

As part of the original ice condenser qualification program, seismic testing of fused ice baskets was conducted by Westinghouse to determine the amount of ice fallout from ice baskets subjected to simulated plant time-history seismic disturbances. Test results were reported in WCAP-8110, Supplement 9, issued in May 1974 (Reference 2). The test program did not determine a minimum time requirement for ice fusion.

U. S. Atomic Energy Commission (AEC) SER, Supplement 2 (Reference 3), which accepted the CNP ice condenser design, was issued by the AEC in October 1974. The SER did not reference WCAP-8110, Supplement 9, and did not specifically address ice storage time to achieve acceptable ice fusion prior to power ascension.

In November 1974, the AEC issued a topical SER (Reference 4) for WCAP-8110, Supplement 9. The topical SER stated that ". . . the data presented in WCAP-8110, Supplement 9 are adequate to conclude that land-based plants using ice condenser type containments should begin their initial ascent to power after a minimum of five weeks following ice loading." Although not included in the original plant-specific licensing of the CNP ice condensers, WCAP-8110, Supplement 9, is referenced in the CNP UFSAR.

In 2007, an NRC Region III Inspector identified a potential concern that typical ice condenser maintenance practices at CNP do not ensure compliance with the licensing basis for ice fusion time requirements in that procedures do not recognize a five-week storage period for freshly loaded ice baskets prior to power ascension (Reference 5). The inspector identified prior instances when CNP units were returned to service within five weeks of loading individual ice baskets. I&M performed evaluations of these instances and concluded that the ice condensers would have performed their function had a DBE occurred during plant operation within five weeks of loading ice.

Additionally, I&M began discussions with the other ice condenser plant licensees (Tennessee Valley Authority and Duke Power Company) and Westinghouse regarding the ice fusion concern. As documented in References 6 and 7, the ice fusion issue was discussed in a public meeting at NRC Headquarters on December 12, 2007. Consistent with those discussions, I&M has elected to change the CNP UFSAR as described in Section 2.0 of this attachment to address the ice fusion concerns

During review of the UFSAR change against the requirements of 10 CFR 50.59, I&M recognized that the interface requirements for the ice condenser lower inlet doors will no longer be met solely by the original qualification testing but will also rely on conservatisms in the original ice basket seismic testing, practical experience with ice fusion gained through decades of ice condenser operation, and design features of the ice condenser. As an additional conservatism, in the event of an operating basis earthquake (OBE) ,or greater seismic disturbance, within five weeks of loading ice baskets, the ice condenser would be inspected within 24 hours, per plant procedures, to ensure that no ice fallout has occurred that could impede proper functioning of the ice condenser lower inlet doors. Since the testing was the method used to validate this aspect of the ice condenser design, I&M determined that the UFSAR change resulted in a departure from a method of evaluation described in the UFSAR used in establishing the design bases or in the safety analyses. Therefore, prior NRC approval is required pursuant to 10 CFR 50.59(c)(2)(viii).

4.0 TECHNICAL ANALYSIS

Under the proposed change to the basis for ice fusion time allowances, for a period of up to five weeks following maintenance of a portion of the ice condenser ice baskets, power ascension and normal plant operation could occur. The alternate means of ice fusion qualification during the five-week period following ice bed maintenance is supported by several defense-in-depth factors.

Conservative Basis for Five-Week Ice Fusion Time

The basis of the five-week ice fusion time requirement was derived from the original seismic qualification of ice condenser ice baskets conducted in 1974. Determination of a minimum ice fusion time was not an objective of the test program. Instead, the results of acceptable ice fallout tests conducted on ice baskets loaded for periods of six to seven and one-half weeks were used by AEC staff to establish a "preoperational limit for minimum storage time" of ice baskets prior to initial power ascension.

As a result of a recent review of the test results documented in WCAP 8110, Supplement 9, I&M and the other ice condenser plant licensees have concluded that the five-week ice fusion time selected as the licensing basis is conservative and that the ice condenser design has substantial margin with respect to ice fallout. Key considerations in reaching this conclusion include:

- The 1974 test program documented in WCAP 8110, Supplement 9, had inherent conservatisms.

  The test baskets floated freely in the lattice frames and were not fixed at one end as would be the case in an actual ice condenser. The floating end would have exacerbated the movement resulting from application of a given seismic excitation, which would have tended to amplify the ice fallout in the test compared to fallout from an actual plant event.

  The test basket was only six feet tall and had an open top, whereas an actual ice condenser basket typically has four vertically stacked 12-foot sections, with only the uppermost section having an open top. The majority of ice fallout during the tests occurred from the open top of the basket. Since proportionally less ice would be expected to fall out of the lower sections of an actual ice condenser basket, the percentage of ice falling out of the test basket section overstates what would likely occur during an actual seismic disturbance.

  The test baskets were each sequentially excited using seismic time histories from four different ice condenser plants, with the cumulative ice loss during the test sequence being used for comparison against the target criterion. This is a conservative approach in that the amount of ice loss after the first excitation cycle for each basket is not representative of a basket receiving its first seismic disturbance. The ability of the ice condenser baskets to meet the fallout criterion for cumulative seismic time histories indicates substantial margin in the design and suggests significant conservatism in the five-week ice fusion time allowance.

- Anecdotal information from decades of ice condenser maintenance suggests freshly loaded ice baskets fuse well before five weeks following loading.

  During ice basket loading, flake ice is pneumatically conveyed from the ice machines and storage bins through up to several hundred feet of four-inch diameter pipe and flexible hose. This process results in the ice particles entering the baskets having surface wetness, indicating that the as-loaded ice temperature is very close to the nominal solution freezing point. By comparison, the ambient temperature in the ice condenser is typically approximately 15 degrees Fahrenheit. Based on practical experience at CNP, freshly blown loose ice falling onto the floor of the ice condenser during ice basket maintenance must be removed within eight to ten hours or else it freezes into a solid mass. It is logical to conclude that refreezing of freshly blown ice occurs within the ice baskets in a similar timeframe.

Reasonable Assurance that Ice Condenser would Function Following Excessive Ice Fallout

Blocking of Lower Inlet Doors

As discussed in UFSAR Section 14.3.4.5.4.1.3, the adequate performance of the ice condenser is further ensured by the lower inlet door design incorporating a low pressure fail open characteristic. Even if it is postulated that the doors were held stationary along the bottom edge by fallen ice, they would structurally fail open at a differential pressure sufficiently low to allow venting from the lower compartment well within the limits of pressure capability of the structures.

The redundancy in flow paths in the ice condenser also provides reasonable assurance that the ice condenser would perform its function even if some lower inlet doors were partially degraded. This inherent redundancy is further enhanced by the nature of typical ice bed maintenance, which affects less than 20 percent of the ice baskets, spread somewhat uniformly throughout the ice condenser, during a given outage. As a result of this practice, only the lower inlet doors located below or in close proximity to replenished ice baskets would be susceptible to excessive ice fallout during a seismic disturbance.

Additionally, a few feet of ice from several ice baskets in the CNP Unit 2 ice condenser were vibrated out using concrete vibrators during a recent outage to simulate the actual fallout pattern on the floor due to a postulated seismic disturbance. By combining the observed fallout patterns of several individual baskets, it was determined that the lower inlet doors would likely stay above the ice fallout throughout their swing path.

Restricting the Compression of Shock Absorber Assemblies

The simulated fallout pattern obtained by vibrating Unit 2 ice baskets as described above was also evaluated for the potential effect on the lower door shock absorber assemblies. It was determined that the ice accumulation was minor and, therefore, would not significantly affect the function of the shock absorbers to dissipate the kinetic energy of the lower inlet door generated during a large break LOCA or MSLB.

Blocking of Floor Drains

As discussed in the UFSAR, the impact of floor drain blockage by excessive ice fallout would be negligible. There are a total of 21 ice condenser floor drains among the 24 ice condenser bays. The ice condenser design is such that for blockage of any floor drain, water would flow to adjacent bays and eventually would spill over the lower inlet door openings if necessary. Additionally, ice on the floor of the ice condenser would be quickly melted by steam entering the ice condenser, which would clear the drain path before a substantial water level developed. In summary, there would be no adverse impact on the ice condenser function for blockage of the floor drains from fallout of ice in the ice baskets.

Blocking of Flow Channels

Any fallout from the ice baskets to the flow channels would be loose ice. This ice would not pose any significant resistance to the flow of air and steam through the ice condenser in that it would be quickly displaced and melted by the high temperature blowdown from a LOCA or MSLB. Therefore, the impact of ice fallout on ice condenser flow channel blockage would be negligible.

Decrease of Ice Mass in the Ice Baskets

Any fallout from the ice baskets would remain within the ice condenser. Although the ice would no longer be in the ice baskets, its mass would remain available to absorb energy from a LOCA or MSLB.

Low Probability of a LOCA or MSLB Occurring Coincident with a Seismic Disturbance

Although this license amendment request is not presented as a risk-informed change under the guidance of Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," consideration of probability provides an insight into the very small potential risk associated with the proposed change.

One of the following four scenarios would result during the five-week period following ice basket maintenance:

1. No seismic disturbance or LOCA or MSLB occurs.
2. A seismic disturbance occurs without a coincident LOCA or MSLB occurring.
3. A LOCA or MSLB occurs without a seismic disturbance occurring.
4. A seismic disturbance occurs coincident (or nearly coincident) with a LOCA or MSLB.

In the first three scenarios, there would be no impact as a result of the proposed change. In the first two scenarios, the ice condenser would not be called upon to perform an accident mitigation function. In the third scenario, although the ice condenser would be called upon to mitigate an accident, absent a seismic disturbance, there would be no motive force to dislodge less-than-fully-fused ice and the ice condenser would function as designed.

The new alternate basis for ice fusion qualification would only be called into play in the unlikely event that the fourth scenario occurred. Using plant-specific inputs for relevant initiating event frequency and seismic hazard data, I&M conservatively calculated the conditional probability of a LOCA or MSLB occurring within a 24-hour period following an OBE, or greater seismic disturbance, during a five-week period following ice bed maintenance to be less than 2E-08. This extremely low probability of occurrence is below the threshold where events are typically considered significant.

Summary

The original ice condenser basket seismic qualification led to a five-week storage time requirement for freshly loaded ice baskets prior to power ascension. However, conservatisms in the original testing and anecdotal evidence from ice condenser experience suggest that freshly loaded, wet flake ice adequately solidifies in the ice baskets much sooner than five weeks. In addition, design features of the ice condenser are such that the lower inlet doors will not be blocked by ice fallout from a seismic event.

The proposed change would permit ascent to power operation within the five-week period following ice basket loading. A very small risk would be accepted that the ice condenser may experience greater ice fallout from freshly loaded ice baskets than predicted by the original ice condenser qualification testing as a result of a seismic disturbance occurring during this time period. This risk is mitigated by design features of the ice condenser, which are such that the ice condenser would perform its intended function following ice fallout from a seismic event. The risk would be further limited by plant procedures that require prompt inspection of applicable portions of the ice condenser following an OBE or greater seismic disturbance.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

Indiana Michigan Power Company (I&M) has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated?

   Response: No

   The previously evaluated accidents of concern regarding the proposed change to licensing basis requirements for the ice condenser are a loss of coolant accident (LOCA) and a main steam line break (MSLB) in containment. The ice condenser will not initiate a previously evaluated accident and provides no function until mitigation of a LOCA or MSLB in containment is required. Therefore, a change to the ice condenser design or licensing basis does not significantly impact the probability of occurrence of an accident previously evaluated.

   Following the proposed amendment, the licensing basis would allow plant operation to continue during the five weeks following ice loading with procedural requirements to inspect the ice condenser within 24 hours following an OBE or greater seismic disturbance. With these changes, the ice condenser is still expected to perform its mitigation function under all circumstances following a LOCA or MSLB. Therefore, the proposed amendment does not involve a significant increase in the consequences of an accident previously evaluated.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed amendment does not change the design function or operation of any system, structure, or component (SSC). The proposed amendment does not affect the capability of the ice condenser or other SSCs to perform their function. As a result, no new failure mechanisms, malfunctions, or accident initiators are created. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No

   The proposed amendment involves no change in the capability of an SSC. Under the proposed amendment, the ice condenser would remain fully capable of performing its design function under credible circumstances. Therefore, there is no significant reduction in a margin of safety as a result of the proposed amendment.

Based on the above, I&M concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

The proposed amendment requires the inspection of each ice condenser within 24 hours of experiencing a seismic disturbance greater than or equal to an OBE within the five-week period following ice basket loading to ensure continued ice condenser operability. As such, exceptions to the requirements of 10 CFR 100, or to Donald C. Cook Nuclear Plant (CNP) Plant Specific Design Criteria (PSDC) are not required. This license amendment request does not alter or revise the current bounding safety analyses of record in any way. Consequently, CNP will remain in compliance with the applicable regulations and requirements, including:

- PSDC 2, "Performance Standards," which requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes.
- PSDC 10, "Reactor Containment," which requires that the reactor containment and associated systems withstand the effects of gross equipment failures, such as large pipe breaks, without loss of required integrity.
- PSDC 37, "Engineered Safety Features Basis for Design," which requires that these systems function to back up the safety provided by the core design, the reactor coolant pressure boundary, and their protection systems.
- PSDC 49, "Reactor Containment Design Basis," which requires that the reactor containment structure and any necessary heat removal systems including the ice bed maintain the leakage of radioactive materials below the limits of 10 CFR 100.

6.0 ENVIRONMENTAL CONSIDERATIONS

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(b); no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. Memorandum from S. C. Black, NRC Office of Nuclear Reactor Regulation, to J. A. Grobe, NRC Region III, "TIA 2000-08, Seismic Qualification of Ice at the Donald C. Cook Plant," dated December 29, 2000 (ADAMS Accession Number ML010380251).
2. WCAP-8110, Supplement 9, "Ice Fallout from Seismic Testing of Fused Ice Baskets," dated May 13, 1974.
3. Letter from K. Kniel, AEC, to J. Tillinghast, American Electric Power, "Supplement 2 to Safety Evaluation Report," dated October 25, 1974.
4. Letter from D. R. Vassallo, AEC, to R. Salvatori, Westinghouse Electric Corporation, acceptance of topical report WCAP-8110, Supplement 9, "Ice Fallout from Seismic Testing of Fused Ice Baskets," dated November 21, 1974.
5. Letter from C. A. Lipa, NRC, to M. W. Rencheck, I&M, "D. C. Cook Nuclear Power Plant, Units 1 and 2 NRC Integrated Inspection Report 05000315/2007006; 05000316/2007006," dated January 24, 2008 (ADAMS Accession Number ML080250115).
6. CNP Meeting Handout on Ice Condenser Ice Fusion, dated December 12, 2007 (ADAMS Accession Number ML073480087).
7. Memorandum from P. S. Tam, NRC, "Summary of December 12, 2007, Meeting with I&M on the Issue of Ice Condenser Ice Fusion (TAC No. MD6756)," dated December 20, 2007 (ADAMS Accession Number ML073470330).

Attachment to AEP:NRC:8535

DONALD C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT (UFSAR) MARKED TO SHOW CHANGES

UFSAR Chapter 5, Page 123 of 169

Interface Requirements

a) The door frames are attached to the crane wall via studs and anchor bolts with a compressible seal. Attachment to the crane wall is critical for the safety function of the doors.

b) Sufficient clearance is required for the doors to open into the ice condenser. Items considered in this interface are floor clearance, lower support structure clearance and floor drain operation, and sufficient clearance (approximately six inches) to accommodate ice fallout in the event of a seismic disturbance occurring coincident with a LOCA. **[INSERT]**

c) Steam line and feedwater lines are provided with jet shields where necessary, to prevent direct impingement on the lower inlet doors.

d) The forces from opening or stopping the doors are transmitted to the crane wall and lower support structure, respectively.

5.3.5.9.3 Loading Conditions

The loading conditions for the lower inlet doors are specified in section 5.3.4.2.

Design Temperatures

Minimum inside temperature during normal operation is 10°F. The maximum outside temperature during normal operation is 120°F. The maximum design accident temperature for the lower inlet doors is 250°F.

Design Pressures

The maximum closing differential pressure during normal operating is 1 psf.

Maximum opening differential pressure during DBA is 16.3 psi, which includes a 20% margin.

5.3.5.9.4 Design Description

Twenty-four pairs of insulated inlet doors are located on the ice condenser side of ports in the crane wall at an elevation immediately above the ice condenser floor. Each pair is hinged vertically on a common frame.

In order to dissipate the large kinetic energies resulting from pressures acting on the doors during a LOCA, each door is provided with a shock absorber assembly.

INSERT:

Original ice basket qualification testing (Reference 6) has shown that freshly loaded ice is considered fused after five weeks following ice loading. During periods of plant operation within five weeks of ice bed maintenance, an alternate method of ice fusion qualification is relied upon (Reference X). Conservatisms in the original qualification testing, qualitative evaluation of operating experience in actual ice condensers, and design features of the ice condenser provide reasonable assurance that the ice condenser lower inlet doors will not be blocked by a seismic disturbance during this limited period. Additionally, in the event of an earthquake (OBE or greater) that occurs within five weeks following ice basket loading, plant procedures require a visual inspection of applicable areas of the ice condenser within 24 hours to ensure that opening of the ice condenser lower inlet doors is not impeded by any ice fallout that resulted from the seismic disturbance.